

A comparative study of stress and mental health among Argentinean and Swedish medical students

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Abstract

Background: Studies on medical students' mental health rarely consider whether generalisability between nationalities is feasible, due to lack of comparative studies between different nationalities. This study aims to shed light on the question by comparing stress and mental health among medical students from Sweden and Argentina. **Methods:** This is a cross-sectional study. Argentinean (N=397) and Swedish medical students (N=342) received questionnaires on demographic data, alcohol, tobacco and drug use, study stress and depressive symptoms. Parts of the Swedish data were included in a previous study. Measures used were AUDIT-C, HESI (Higher Education Stress Inventory), MDI (Major Depression Inventory) and Meehan's suicidal history items. Linear regressions were performed to assess associations between Depression scores and individual lifestyle, demographic and study stress variables, controlling for nationality in a second step. **Results:** Response rates were 77.1% (n=306) among Argentinean students and 90.4% (n=309) among Swedish students. The two populations differed with regard to demographical and lifestyle variables. Argentinean students had higher depression scores, rated peer support as lower and were more worried about the future than Swedish medical students. Associations between depression and study stress differed between the two nationalities. **Conclusions:** Generalisations from findings in different medical student populations should be made with caution. Studies from a broader selection of nationalities and large-scale comparative studies are called for to identify commonalities and differences within an international population of medical students and professionals

INTRODUCTION

Many papers on medical students' distress have been published during the last couple of decades. North American and European studies dominate the field [1-3], although the number of papers from other parts of the world is growing [4-8]. Most studies are conducted at single medical schools. Some exceptions are the Norwegian studies of a nationally representative sample [9-10] and a US multicenter study, the latter addressing the effect of ethnicity on burnout in a medical student population [11]. The results of such studies may be generalised with stronger confidence, but we still do not know if they should be considered representative of a presumed international body of medical students. Although it is plausible to view medical students as a fairly homogenous population (with regard to socioeconomic status, healthy behaviours, etc) at least within certain cultural areas, this assumption is seldom questioned or explicitly articulated.

In a global perspective, it is possible that effects of different political systems, national economic standards or different health care systems have an impact on medical students'

wellbeing, equally or even more relevant than variables such as academic stress, personality, economy or gender, which are often studied. A Nigerian study showed that among the most important stressors for the medical students were frequent strikes among teachers, and a study of Nepalese medical students reported, among other psychosocial stressors, "quality of food in mess" as a common and severe stressor [12-13]. Further, the above-mentioned factors that are commonly studied as influential on distress may have divergent effects within different settings and cultures.

The use of many different definitions of distress in studies of the mental health of medical students makes reliable comparisons difficult. The outcomes may be depression, stress, anxiety and burnout reactions [11, 14-15]. Some studies show gender differences [16-18], while others do not [9, 14]. Reported figures of prevalence of depressive symptoms vary, and attempts to explain them by various correlates are equally sensitive to the problem of replicability of findings, since different measures and sets of variables are employed in different studies. International comparative studies are called for, to shed light on the

question of generalisation.

This study presents a unique set of data, where identical instruments have been used to study distress in medical students of two different countries and cultures, Sweden and Argentina. The two studied universities have a student-exchange collaboration, which enabled the study. Some data from the Swedish medical students in this study were included in a previous study [18]. Our aim was to shed some light on the question of international generalisability of findings on medical student distress. For this purpose we investigated demographic data, levels of depressive symptoms, lifestyle factors and study stress among medical students from Argentina and Sweden. Secondly, we examined whether patterns of relationships between depression and a set of possible determinants differed between the two countries.

METHODS

GENERAL SETTING

Both universities are public and offer a traditional flexnerian curriculum, where basic science is studied prior to clinical training.

Universidad de Cuyo is the only state-owned medical school in Mendoza, Argentina. Compared to the two privately owned medical universities in Mendoza, it is the oldest and the hardest one to enter. For admittance to its medical school, applicants have to take entrance examinations in chemistry, biology and physics. Approximately 1,500 students take the tests every year, and the 120 who score the best results are admitted in February each year. Students receive graded marks during the entire course of study.

All six Swedish medical schools are public. Karolinska Institutet is situated in the capital, Stockholm. About 130 students enter their medical training at Karolinska Institutet each semester, yielding 260 students per year. Students are admitted to medical school at Karolinska Institutet through one of three ways. Two of these are in national competition, by secondary school grades or results on a generic test for university education application (SweSat), and one by a local selection through tests and interviews (constituting around 60% of admittances). Study allowances are available to all Swedish university students as governmental loans to be paid back when studies are completed or disrupted. Swedish medical student do not receive graded marks, but may only pass or fail courses.

SUBJECTS

The data collection methods differed (see below), but at both locations, all registered medical students at the selected stages were approached, and responders received a complimentary cinema voucher. The study population covered initial, mid- and late stages of medical school.

KAROLINSKA INSTITUTET

Three subgroups of medical students at Karolinska Institutet, were approached; 127 first year students 2001, 98 third year and 117 sixth year students 2002 (N=342). Questionnaires were sent to students' homes, and reminders were given. The procedure has been described in detail elsewhere [5, 6]. The gender distribution was similar in all three subgroups; 60% were female.

UNIVERSIDAD DE CUYO

At Universidad de Cuyo, Mendoza, Argentina, 419 students were listed at 1st 4th and 6th curricular years. Of these, 22 were not active students and thus excluded. The remaining 397 constituted the sample. Fifty-nine percent were female, although the gender distribution varied in the three subgroups between 57.2% in 1st year, 68.8% in 4th year and 51.6% in 6th year ($p=0.049$, Monte Carlo, two-sided test). The Argentinean students were informed about the study on the University web page before data collection was initiated in April and May 2005. Students in all three subgroups received questionnaires in person from the investigator (AMU) and were asked to complete and hand them back during the same day. Collection methods in the three subgroups varied slightly, due to the different settings at the three stages. First year students received questionnaires during a full class lecture. Fourth year students attended hospital rotations, circulating each, every second, third or fourth week between different wards and clinics, and were approached individually at these venues. Sixth year students were approached at different evening class electives.

Ethical approval was obtained from the Comité de Ética, Facultad de Ciencias Médicas de la Universidad Nacional de Cuyo and the Ethics committee at Karolinska Institutet, Stockholm.

MEASURES

TRANSLATION OF THE QUESTIONNAIRE

The Swedish questionnaire was translated by one of the authors (AMU) into Spanish. Back translation was performed by a professional Spanish-Swedish translator and the resulting similarity with the original was considered

satisfactory. In addition, a reference group at Universidad de Cuyo, representing teachers, students and researchers checked the questionnaire for contextual relevance.

LIFESTYLE

The questionnaire comprised questions on gender, age, daily smoking, drug use, religious beliefs, financing of studies, whether either parent was a physician, or whether either of the parents had immigrated, all coded 0/1. Swedish students were also asked about daily use of tobacco in the form of orally applied moist snuff. The AUDIT-C, comprising the initial three items of the AUDIT, was applied to monitor alcohol use [19-20].

STUDY STRESS

We measured study stress using the Higher Education Stress Inventory (HESI), a comprehensive instrument, developed by our group, consisting of 33 items positively and negatively worded with regard to stressors [18, 21]. Each item is rated on a four-point Likert scale, 1-4, (totally disagree, somewhat disagree, somewhat agree, totally agree). Positively worded items have reversed scoring (indicated by “rev” below), so high scores always denote high stress. A factor analysis (Principal Axis factoring, Varimax rotation, Eigenvalues >1), yielded 9 factors, explaining 39.6% of total variance. Four of these were used for comparative purposes: Lack of peer support (Cronbach’s α 0.73), four items e.g. “The studies have created anonymity and isolation among students”, or “My fellow students support me” (rev); Worries about future coping and economy (Cronbach’s α 0.72), four items e.g. “I worry about long working hours and responsibilities in my future career”, or “I am worried about my future economy and my ability to repay student loans”; Low commitment (Cronbach’s α 0.70), two items, e.g. “I am satisfied with my choice of career” (rev); Lack of teacher support (Cronbach’s α 0.63), four items, e.g. “The teachers give encouragement and personal attention (rev)”, and “I feel that the training is preparing me well for my future profession (rev)”. These four explained 23.5% of the total variance. Five factors were excluded due to low Cronbach’s alphas. For each factor the mean item ratings were drawn, factor scores thus taking on values between 1 and 4, where 4 denotes high stress.

DEPRESSION AND SUICIDAL IDEATION

Self-rated depression was assessed by a slightly modified version of the Major Depression Inventory, with four response alternatives (0-3) instead of the original six [18, 22]. This modification had been chosen for the original

Swedish study, to enable comparisons with a Swedish population study [23]. The items are scored with respect to symptoms during the preceding two weeks. We applied a sum score of the MDI, “Depressive symptom load” (Cronbach’s α 0.85), adding scores for all ten items, with a minimum score of 0 (no symptoms) and a maximum of 30 [21]. The sum score for the original version of the MDI with six response alternatives ranges between 0 and 50 [24].

Suicidal intention was assessed by an inventory by Meehan [25], containing questions on having considered taking one’s life during lifetime and during the last 12 months, as well as having committed a suicide attempt in any of these time-spans. Response alternatives were “yes” or “no”.

STATISTICS

Analyses were made using the Statistical Package for the Social sciences (SPSS), version 15.0. We used two-sided Chi²-tests to compare proportions and independent samples t-tests for means. Bonferroni correction was applied. Bivariate linear regressions (method enter) were used to examine relationships between depressive symptoms and individual demographic, lifestyle and study stress variables, and in a second step each independent variable was controlled for nationality.

RESULTS

In Argentina the total response rate was 77.1% (n=306/397). The subgroup response rates were 92.9% at 1st year, 73.3% at 4th year and 66.4% among 6th year students. The response rate in Sweden was 309/342, 90.4% (subgroups; 89.0, 96.9 and 86.3%, respectively). There was a similar gender distribution in the two populations; 60.2% (n=186) females at KI and 59.2% (n=181) females at Mendoza among responders. Since response rates and gender distributions differed between stages of medical school in Argentina, comparisons were performed on the entire samples from each university, without stratifying for stage of medical school.

DEMOGRAPHICS AND LIFESTYLE

In Table 1 demographic details are given. Swedish students were older, more likely to have a parent who had immigrated and less likely to have a religious conviction. A majority of Argentinean students were to a greater extent financially supported by their families, and female students at Cuyo did more often receive study allowances than their male peers. Almost every second student in Sweden had a paid employment during semesters, while significantly fewer, one

out of five, Argentinean students had.

Daily smoking was significantly more common among Argentinean students, 16.1%, compared to 1.9% of the Swedish students. However, when including the common Swedish use of oral tobacco, i.e. moist snuff, there was no significant difference in daily tobacco use: 16.1% (49) in Cuyo, and 13.3% (41) at KI. Among Swedish students, daily tobacco use was higher in males (26.8%, n=33 vs. 4.3%, n=8 of females, $p<0.0001$). Lifetime prevalence of narcotic drug use was twice as common in the Swedish population as among Argentinean students. In the Swedish sample, there was a gender difference, with almost half of the males and a fifth of the females confirming lifetime use. As expected, male students had higher AUDIT-C levels than females at both sites and, Swedish students had significantly higher scores for both genders. About 80% of the Argentinean students report they never engaged in binge-drinking “six or more drinks on one occasion” compared to around 25% of the Swedish

Figure 1
Study stress

	Universidad de Cuyo, Argentina						Karolinska Institutet, Sweden					
	Women		Men		Total n=306		Women		Men		Total n=309	
	n	%	n	%	n	%	n	%	n	%	n	%
Responders' gender distribution	181	59.2%	125	40.8%			186	60.2%	123	39.8%		
Age	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
	22.2	3.0	22.3	4.0	22.2	3.4	26.3	4.7	26.0	4.7	26.1 [§]	4.7
Religious belief [†]	82	72.6%	51	68.9%	133 [§]	71.1%	25	21.7%	11	14.1%	36	18.7%
Parent/s immigrated	15	8.3%	9	7.2%	24	7.8%	31	16.7%	30	24.4%	61 [§]	19.7%
Parent physician	18	9.9%	16	12.8%	34	11.1%	35	18.8%	25	20.3%	60	19.4%
Paid employment during semesters	36	19.9%	34	27.2%	70	22.9%	81	43.5%	62	50.4%	143 [§]	46.3%
Study allowances	22*	12.2%	5	4.0%	27	8.9%	160	86.0%	103	83.7%	263 [§]	85.1%
Regular financial support from parents	153	84.5%	100	80.6%	253 [§]	83.0%	40	21.5%	24	19.5%	64	20.7%
Daily smoking	30	16.7%	19	15.2%	49 [§]	16.1%	2	1.1%	4	3.3%	6	1.9%
Ever used drugs (incl marijuana)	22	12.2%	25	20.2%	47	15.5%	34	18.3%	57 [§]	46.3%	91 [§]	29.5%
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
AUDIT-C	1.5	1.5	2.4 [§]	1.9	1.9	1.7	3.4	1.7	4.9 [§]	1.9	4.0 [§]	1.9
Low peer support	2.09	.76	2.25	.68	2.15 [§]	.73	1.61	.53	1.51	.50	1.57	.52
Worries about future coping and economy	3.02	.59	2.89	.64	2.97 [§]	.61	2.55 [§]	.68	2.20	.66	2.41	.69
Low commitment	1.33	.55	1.36	.51	1.34	.53	1.31	.44	1.27	.44	1.29	.44
Low teacher support	2.11	.61	2.14	.56	2.12	.59	2.26	.47	2.19	.43	2.23	.45
Depressive symptoms	10.8 [§]	4.9	8.1	4.7	9.7 [§]	5.0	8.0*	5.0	6.0	4.6	7.2	4.9
	n	%	n	%	n	%	n	%	n	%	n	%
Suicidal ideation ever	34	18.8%	18	14.4%	52	17.0%	61	32.8%	28	22.8%	89*	28.8%

SD= standard deviation

Indications of statistic significance refer to differences between nationality (total columns), and between genders within each nationality. Indication placed at highest value. * $p<0.05$, $^{\dagger}p<0.01$, $^{\ddagger}p<0.001$; Pearson's χ^2 for proportions and Independent samples t-tests for means. Bonferroni corr.

*first year students not included, since question not asked 1st year students at Karolinska Institutet. (n_{Cuyo}=187, n_{KI} = 193)

Argentinean students reported higher workload and more worries about the future. Among the Swedish students, females rated higher than males on worries about the future, but no gender difference was seen in Argentina.

DEPRESSIVENESS AND SUICIDAL IDEATION

Female students of both nationalities had more depressive symptoms than males and Argentinean students scored higher than Swedish students. Lifetime suicidal ideation was more common in the Swedish student population, but there were no differences between the two samples regarding suicidal ideation during the past year or of lifetime suicide attempts (not shown in Table 2). No students reported a suicide attempt during the past year.

DO DETERMINANTS OF DISTRESS DIFFER BY NATIONALITY?

We wanted to examine whether lifestyle and study factors related differently to distress, measured as depressive symptoms, in the two populations. Bivariate associations between depressive symptoms and selected demographic and lifestyle variables as well as study stress and lifetime suicidal ideation were analysed with linear regression analyses. Each independent variable was in the following step controlled for nationality, see Table 2.

Figure 2

	Unadjusted		Controlled for nationality*			
	Beta	p	Beta	p	Beta _{ref}	p
Gender (ref.category= man)	.222	.000	.399	.000	-.244	.000
Age(mean/sd) [†]	-.164	.000	-.071	.105	-.216	.000
Religious belief, n=380	.168	.000	.025	.629	-.268	.000
Parent/s immigrated	-.031	.441	.011	.791	-.245	.000
Parent physician	-.064	.107	-.037	.352	-.239	.000
Paid employment during semesters	-.141	.000	-.087	.033	-.222	.000
Daily smoking (n=)	.137	.001	.081	.048	-.223	.000
Ever used drugs (incl marijuana)	.029	.471	-.013	.752	-.247	.000
AUDIT-C (mean/sd)	-.146	.000	-.023	.628	-.237	.000
Low peer support	.301	.000	.241	.000	-.146	.001
Worries about future coping and economy	.409	.000	.370	.000	-.099	.014
Low commitment	.226	.000	.216	.000	-.233	.000
Low teacher support	.155	.000	.185	.000	-.264	.000
Suicidal ideation ever (0/1)	-.233	.000	-.273	.000	-.281	.000

Linear regressions for each explanatory variable, bivariate and controlling for nationality. Standardised coefficients shown.

*Ref. cat. Argentina. Unadjusted Beta_{ref} -0.243, p= 0.000.

All variables except drug use and parents' occupational or migrant status were significantly associated with depressive symptoms in the bivariate analyses. When controlling for nationality, female gender was significantly associated with an increased risk of being more depressed, in both populations. Age, religious belief and alcohol use had no effects in themselves in the adjusted analyses, but were confounders of nationality. Daily smoking was still significantly associated with depressive symptoms after control, but the size of the coefficient decreased, indicating a presumably universal, but weak association. Study stress variables had statistically significant and relatively strong

associations with depressive symptoms also after control for nationality, although factors Low peer support and Worries about future coping had a decreasing effect on the Nationality.

DISCUSSION

This study presents unique comparative data from two samples of medical students from two nations, two continents and two cultures. The results should be interpreted with caution, for reasons discussed below, but suggest that “nationality” may have an impact on how several determinants effect distress in medical students. Accordingly, generalisability between different medical students populations should not be taken for granted.

The two student samples differed in their expressions of demography, lifestyles and perceived study stress. Argentinean students presented a more “traditional” profile [26], with a high endorsement of religion, a closer financial bond with parents and less alcohol and drug use. Smoking was much more common among the Argentinean students, but the prevalence was lower in both samples than in the general population of the same age, about 36% in Argentina and around 15-25 % in Sweden [27-28].

Regarding study stress, the Higher Education Stress Inventory performed differently in the two samples. A factor analysis of the HESI in a previous paper on the Swedish sample yielded 10 factors that explained 58.4% of the variance, whereas the analysis performed on the compound sample in this study explained 39.6% [18]. Further, the four factors with acceptable internal consistency explained only slightly more than 20% of the variance. Thus the HESI does not seem to perform as well among the Argentinean students. The inventory was developed in a Swedish educational setting, and its accuracy in another culture may be limited [29]. This finding may thus indicate a difference between medical student populations, although methodological reasons may also contribute, see Limitations below.

The lack of gender pattern for Worries about future coping and economy among the Argentinean students was somewhat unexpected, as a factor construct of some of the same items had a known gender difference in the Swedish sample [18, 21]. A Canadian study of undergraduate university students, showed that the propensity to worry, especially over issues of confidence in oneself, was more common among female [30]. A Norwegian study showed that the identification with the role of doctor was lower

among female students, and was associated with confidence in own knowledge for female [31]. The gender neutral pattern of scores at a higher level among Argentinean students, as compared to Swedish, may reflect the different professional prospects in the two countries, which may overrule any effect of gender. Medical students in Argentina have a more insecure position after graduation, where residency positions are gained in competition, and students may take unpaid auscultation positions at hospitals or wards to gain credits. In addition, there is a situation of unemployment among physicians in Argentina.

In Sweden, by contrast, there is a shortage of physicians; all medical students can feel confident that they will be employed and the postgraduate education is well regulated, as are salaries. An interpretation of the different patterns of worrying might be that among Argentinean students it is triggered mainly by external realities, and that the worries of Swedish female students might be apprehended as expressions of a gender specific proneness. The recent recession in Argentina, which affected most parts of society, may also have contributed to concerns about economy.

Depression scores were also higher among Argentinean students, thus a significant negative effect of the nationality variable was expected. The nationality variable is of course complex and may include aspects such as “culture”, gender roles, urbanity, economy and language. Of the recorded demographic and lifestyle variables, only gender had a significant independent effect. In addition, the negative association of paid employment during semesters and the positive relationship of daily smoking with symptoms of depression remained statistically significant, when controlling for nationality. They may thus be considered having similar and independent associations with depression in both populations. However, the coefficients were low and their relevance probably of minor significance. For the employment variable, though, it may be reasonable to expect that those who have the energy to take on extra work are also those with better mental health.

Study stress factors Low peer support and Worries about the future changed the effect of nationality, indicating an interactive effect with a stronger association with depressive symptoms among Argentinean students. Swedish students rated Low peer support lower (thus perceiving peer support as better), and it is possible that the lack of graded marks in Swedish medical schools reduces competition among students. The interactions may also reflect variants of response modes, which may in turn be expressions of more

evasive concepts such as “culture”, or other external factors not studied here. The overall negative association between reporting any lifetime suicidal ideation and depression scores seems counterintuitive, but may be due to the different time-spans targeted in the dependent and independent variables, or an effect of recall bias.

LIMITATIONS

There are several limitations to this study. The different conditions for data collection in the two samples may have influenced response modes. Questionnaires were mailed in Sweden and distributed on site in Argentina. As a result, Swedish students most probably completed their forms during leisure time at home, while the Argentineans students completed theirs at school. Further, the response rates differed, and the Argentinean students, especially in the later years, were represented to a lesser extent. Possible effects of this are not known, but as age had no significant effect of on depression when stratification for nationality was performed, we may assume that they are restricted. Most importantly; the questionnaire appeared in different languages in the two samples. Although the translation was tested and the face validity of the questionnaire was approved of by Argentinean students, teachers and administrators before the study, the different parts of the questionnaire had not been validated for the two populations. Finally, we relied solely on self-reports, and had no “objective” data of, for example, study conditions. This is, however, often the case in studies in this field.

CONCLUSIONS

Our findings suggest that different medical student populations may well differ in demographic and lifestyle aspects, although for mental distress outcome, these had no major significance. Further, the monitoring of study conditions was context-dependent, and the inventory used did not perform equally well in the studied settings. Differences in study conditions and the perceptions of these may, however, affect or be affected by depressive symptomatology. Gender effects also differed between the two settings, reflecting the divergent results on gender issues among medical students from the literature. The results indicate that findings from different medical student samples should not automatically be treated as universally applicable to other populations of medical students. The movement towards a broader international representation of studies in the field is thus encouraging and instead of the North American predominance a more diversified picture may emerge. Large-scale international studies are called for to

clarify commonalities and differences between medical students and medical professionals of different cultures.

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