

The Influence of Perceived Stress, Socio-Demographic Characteristics and Family Level of Education on Strength of Motivation among Medical Students

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Abstract: The study identifies the level of motivation, the rate of perceived stress and the relationship with socio-demographic characteristics among medical students. The research questioned 601 students enrolled in a medical university. The level of motivation was evaluated using *Strength of Motivation for Medical Students – revised* and the perceived stress, by the *Perceived Stress Scale – 10*. Medical students have a high level of motivation. Women are more motivated but there are no differences when it comes to the level of perceived stress. The least motivated students are those from the 5th and the lowest score for perceived stress was obtained by 3rd-year students. Persistence correlates negatively with perceived stress. The results proved that the less educated their parents are, the more motivated students are. Results are important for students to find strategies to decrease their level of stress and to increase their level of motivation, and for university policy makers to find methods of helping students achieve their goals.

Keywords: medical students, motivation, perceived stress, academic performance

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INTRODUCTION

The admission systems in Romanian medical universities are based on selection only: students have to pass a written admission exam. Final marks from high school are also taken into consideration. Being competitive is a cause and a consequence of the medical academic system in Romania, because high marks ensure admission to the medical university, but earning a high number of credits during academic years and passing exams with high marks are requirements when someone intends to become a resident in the specialty of choice.

Medical studies last longer and are more demanding compared to other kinds of specialties (they include clinical stages, working with patients, passing written and practical exams etc.). Students are more stressed compared to the general population or to peers who work. The rate of retention is decreasing at all medical universities around the world and special policies are targeting this problem.

Studies have proved that students' motivation to continue their medical education depends on a lot of factors (Wouters et al. 2017; Gavrilesco et al. 2017; Iorga et al. 2018), such as socio-demographic characteristics (educational background, family factors, environment etc.), personality factors (personality traits, locus of control, motivation etc.), university-related factors (extracurricular activities, mediating conflicts, providing educational and social support, living on the university campus etc.).

While the literature concerning retention, burnout and motivation is well documented, these have not been intensely targeting Eastern European medical students (Zugun-Eloae et al. 2016). Successful students have higher professional expectations, and disappointments related to the medical profession are the main cause for the brain drain phenomenon among health care professionals in Eastern Europe, including Romania (Séchet & Vasilcu 2015, Iorga et al. 2017).

The aim of the present study is to identify the level of strength of motivation and the rate of perceived stress and to find the relationship with socio-demographic characteristics, comparing medical students from all academic years. This paper is the first cross-sectional study focusing on medical students registered in all years of study. Previous articles developed comparative analysis considering students from a limited number of years of study.

MATERIAL AND METHODS

Study design and recruitment of participants

The present research was conducted in accordance with the Declaration of Helsinki. Ethical approval was granted by the Research Ethics Committee of the “Grigore T. Popa” University of Medicine and Pharmacy in Iași, Romania. Informed consent was obtained from the participants prior to the beginning of the study. In the meantime, students were informed about the goal of the study and that psychological support would be provided at the university by two psychologists working with the Center for Career Counseling. Students included in the research were informed about the confidentiality of data and the use of results. A number of 650 students responded to the questionnaires between July 2016 and February 2017. All participants are enrolled at the “Grigore T. Popa” University of Medicine and Pharmacy in Iași, Romania, and come from all 6 years of study. The data included in the research refers to 601 students, those who filled in the questionnaires fully (a 92.46% response rate).

Questionnaires

Two tools were used for the research. In order to identify the level of strength of motivation we used the *Strength of Motivation for Medical Students – revised – SMMS-R* (Nieuwhof et al. 2004). The instrument has 3 dimensions: *willingness to sacrifice* has 5 items and we obtained Cronbach’s alpha = 0.708; *readiness to start* with 5 items with Cronbach’s alpha – 0.657. The third dimension is *persistence* with 5 items and Cronbach’s alpha – 0.599. Other authors using this scale obtained the following Cronbach’s alpha scores: 0.70, 0.67 and 0.55, respectively (Kusurkar et al. 2011). Because the scores are lower on the persistence scale, the authors recommended prudence in interpreting the results for this subscale, but it is acceptable for comparing groups of students. For this instrument we obtained a total Cronbach’s alpha score for this instrument = 0.797 (comparable with the total score of the mentioned research).

For the measurement of medical students’ perceived stress we used the *Perceived Stress Scale - 10* (PSS – 10) developed by Cohen & Williamson (1988). Cronbach’s alpha score is 0.850. This instrument measures the perceived stress on a scale from 0 (never) to 4 (very often). This is not a diagnostic test, but high scores represent a high risk of developing a stress-related disease.

Additional data were developed by questions targeting medical students from all six years of study, in order to evaluate the rate of self-declared symptoms during stressful academic periods, such as: socio-demographic characteristics, perceived physical and psychological effects experienced as distress signs, academic results and thoughts related to one’s career, like dropping out.

Statistical Analysis

Statistical analysis was performed using SPSS Statistics v23.0.0 for MAC.OSX. To compare the results between male/female, academic years, urban/rural background and parents’ educational level, we applied the t-test for independent samples and one-way ANOVA. The statistical difference was defined as $p < 0.05$. For the correlation study we used Pearson and Spearman correlations, in order to identify the relationship between the variables considered.

RESULTS

Socio-demographic characteristics

A total of 601 questionnaires fully filled in were included in the study. Most of the medical students have an urban background, 466 (77.54%), meaning that more than $\frac{3}{4}$ of students received their education at colleges in large cities and less than $\frac{1}{4}$ had the chance to pass the admission exams successfully. This result is important for policy makers in the field of education, considering the fact that in our country almost half of the population lives in the countryside, meaning that children raised in rural areas have less access to higher education.

The socio-demographic variables considered for the study, such as gender, age, year of study, parents’ educational level, are presented in *Table 1*.

Variables		N (%) or Mean (SD)	
sex	male	163 (27.12)	
	female	438 (72.88)	
credits obtained in previous year (from 600)	513.80 ± 56.29 (with a minimum of 60 and a maximum of 600)		
year of study	1 st	male	17 (2.83)
		female	89 (14.81)
	2 nd	male	30 (4.99)
		female	66 (10.98)
	3 rd	male	31 (5.16)
		female	81 (13.48)

	4 th	male	26 (4.33)
	110 (18.30)	female	84 (13.98)
	5 th	male	31 (5.16)
	75 (12.48)	female	44 (7.32)
	6 th	male	28 (4.66)
	102 (16.97)	female	74 (12.31)
living environment	urban	466 (77.54)	
	rural	134 (22.30)	
mother's level of education	General school	1 (0.17)	
	College or high schools	253 (42.17)	
	University	331 (55.17)	
father's level of education	General school	23 (3.83)	
	College or high schools	253 (42.10)	
	University	325 (54.08)	

Table 1. Socio-demographic characteristics

A number of 15 students declared the highest number of credits possible, meaning that they obtained the maximum level for all academic assessments during the previous year of study (2.7%). A number of 403 (67.05%) questioned students obtained over 500 credits of a maximum of 600.

The data gathered from the subjects revealed that, considering the educational level of both parents, more than half of the students declared that their parents had university degrees.

Psychological data

Regarding the perceived stress level, our subjects obtained an $M = 17.31 \pm 6.79$, meaning that medical students were found to have an average score of perceived stress.

Strength of motivation comprises three subscales. *Willingness to sacrifice* measures the availability of a person to make sacrifices for their medical career. *Readiness to start* represents the lack of patience when entering medical studies. The third subscale evaluates the student's persistence in the academic medical field despite unfriendly circumstances (during or after the study). Considering the subscales for strength of motivation, we obtained a high level of motivation, $M = 55.02 \pm 9.19$ (the maximum score being 75) and high levels for all three dimensions were obtained (the maximum score being 25 for all subscales). The higher the score, the greater the strength of motivation is.

The results for both instruments used in the research are presented in *Table 2*.

Instruments		Results
SMMS-R	<i>Willingness to sacrifice</i>	18.21 ± 3.89
	<i>Readiness to start</i>	18.99 ± 4.04
	<i>Persistence</i>	17.81 ± 3.76
	Total score	55.02 ± 9.19
PSS -10	Total score	17.31 ± 6.79

Table 2. The results for SMMS-R and PSS-10

Comparative analysis

In order to compare the students’ level of perceived stress and strength of motivation considering the socio-demographic variables, we used the *Independent Samples T-test* and *ANOVA Univariate*. For the two-level variables (sex, living environment) we used the *Independent T-test* and for variables with more than two levels (parents’ level of education and year of study) we used the ANOVA analysis.

Three variables were found to produce significant differences: sex, year of study and parents’ level of education.

Sex

There are significant differences between males (M = 17.31 ± 3.53) and females (M = 18.54 ± 3.97), with a t (599) = - 3.45, p = 0.001 for the first subscale of SMMS-R, meaning that women are more willing to make sacrifices for their medical studies. Considering the second subscale, we found that men are less ready to start studying in the medical field compared to women (M = 17.82 ± 4.10 vs M = 19.43 ± 3.94, t (599) = - 4.411, p = 0.000). The results obtained on the third subscale proved that women are more persistent than men in their desire to follow medical studies (M = 17.01 ± 3.63 vs M = 18.11 ± 3.77, t (599) = - 3.218, p = 0.001). Significant differences were also obtained for the total score for SMMS-R (M = 52.15 ± 8.36 vs M = 56.09 ± 9.26, t (599) = - 4.759, p = 0.000), meaning that female students are more motivated to study in the medical field compared to male students.

Regarding the perceived stress, evaluated with PSS-10, we found that sex produces no differences between men and women.

Year of study

For the first two subscales of SMMR-R we obtained no significant differences considering the year of study. In the case of the third subscale (persistence) we found that there are significant differences (F

(5,595) = 6.115, $p = 0.000$) between 5th-year students and the rest of the academic years – they obtained significant lower results compared to other students ($M = 15.68 \pm 3.25$ compared to $M = 18.25 \pm 3.52$ for 1st-year, $M = 18.08 \pm 3.85$ for 2nd-year, $M = 18.04 \pm 3.45$ for 3rd-year, $M = 18.42 \pm 3.82$ for 4th-year and $M = 17.77 \pm 4.09$ for 6th-year students). For the total score of *SMMR - R* we had significant results ($F(5,595) = 3.329$, $p = 0.006$) only between students from the 5th year of study ($M = 51.30 \pm 7.06$) and those from the 1st year ($M = 56.20 \pm 8.02$), 2nd year ($M = 55.50 \pm 10.24$) and 4th year of study ($M = 56.26 \pm 9.94$), meaning that 5th-year students have lower scores on the strength of motivation scale.

For the perceived stress level, we found that there are significant differences ($F(5,595) = 6.170$, $p = 0.000$) between subjects from the 3rd year of study and those from the 1st, 4th and 6th year, 3rd-year students having lower slower scores. The means for all 6 years are presented in *Table 3*.

Year of study	M ± St dev
1	18.00 ± 7.23
2	17.11 ± 7.45
3	15.00 ± 6.62
4	18.22 ± 6.13
5	15.82 ± 6.29
6	19.43 ± 5.97

Table 3. Results for *PSS-10*, considering the year of study

Our results showed that students enrolled in the 3rd year of study have significantly lower scores than students from the 1st, 4th and 6th year of study, and 5th-year students have significantly lower scores compared to 6th-year students.

The parents' level of education

We also wanted to identify the rate of level of education among parents and the differences determined by this variable. As presented in *Table 4*, from the total of students whose parents have bachelor's degrees, 84.9% of mothers and 86.5% of fathers live in urban areas, compared to 15.1% and 13.5%, respectively, who live in rural areas. This difference is also valid if we compare the level of education considering the other categories: high school/colleges or secondary school.

environ- ment	mother				father			
	second- ary school	high school/ college	univer- sity	total	second- ary school	high school/ college	univer- sity	total
rural	7	77	50	134	13	77	44	134
urban	9	176	282	467	10	176	281	467
total	16	253	332	601	23	253	325	601

Table 4. The parents' level of education considering the variable "environment"

For the fathers' level of education we obtained a *Chi Square* (2) = 39.611, $p < 0.000$, determining a modest effect on the relationship between these two variables (*Cramer's V* coefficient being 0.257). For mothers, we obtained a *Chi Square* (2) = 23.957, $p < 0.000$ with a *Cramer's V* = 0.200, which also determines a modest effect.

The students whose mothers have high school/college degrees have obtained significantly higher scores on two of the subscales of SMMS-R: *willingness to sacrifice* (M = 18.77, F (2,598) = 4.818, $p = 0.008$) and *readiness to start* (M = 19.53, F (2,598) = 4.297, $p = 0.014$) and also for the *total score* (M = 56.22, F (2,598) = 4.285, $p = 0.014$), compared to those with mothers having university degrees (17.77, 18.64, respectively 54.27). Students whose mothers have college/high school degrees are more willing to sacrifice themselves and more ready to start medical studies.

This tendency is also available considering fathers' level of education for the first dimension - *willingness to sacrifice* (M = 18.88) for high school degrees and M = 17.76 for university degrees (F (2,598) = 4.818, $p = 0.008$) and the total score of SMMS-R (M = 56.33 respectively M = 54.20) with (F (2,598) = 5.079, $p = 0.006$). The parents' level of education does not produce significant differences in our subjects' perceived level of stress.

No significant differences were identified between urban/rural areas for the following variables: the number of credits, SMMS-R dimensions and total score and PSS-10.

Correlation analysis

In order to perform the correlation analysis, we first tested the normality of our data distribution by using the Kolmogorov-Smirnov test. The results have shown that none of the variables we considered for the correlation analysis have a normal distribution, which is why we used Spearman correlations. The results are presented in Table 5.

Variables	Willingness to sacrifice	Readiness to start	Persistence	Total score SMMS
Total score PSS	R = - 0.009 p = 0.819	R = 0.004 p = 0.928	R = - 0.099* p = 0.015	R = - 0.038 p = 0.352
Age	R = - 0.046 p = 0.260	R = - 0.011 p = 0.796	R = - 0.108** p = 0.008	R = - 0.076 p = 0.064
Number of children	R = - 0.005 p = 0.903	R = 0.019 p = 0.639	R = - 0.010 p = 0.802	R = - 0.004 p = 0.917
Number of points	R = - 0.010 p = 0.821	R = - 0.001 p = 0.990	R = - 0.057 p = 0.181	R = - 0.024 p = 0.576

Table 5. The results for the correlation analysis between variables and SMSS dimensions

The results we obtained show that there are no significant correlations between the number of children in the family of origin and the dimensions or total score on the strength of motivation questionnaire, nor between the numbers of points a student obtained in the previous school year and the dimensions or total score of SMSS.

The only significant correlations we obtained when we analyzed age and the total score of perceived stress with the factors and the total score of SMSS are between the dimension persistence and the first two variables. Our results show that persistence correlates negatively with the amount of perceived stress (R = - 0.099*, p = 0.015); this meaning that the more stressed out a person feels, the less persistent they will be in following their objectives. Persistence also correlates negatively with age (R = - 0.108**, p = 0.008), so the older a subject is, the less persistent they are in achieving their goals.

Regression analysis

For the regression analysis we used linear regression, since we identified a negative correlation between the level of perceived stress and the persistence dimension of SMMS-R. The results are presented in Table 6.

Steps	Model		Willingness to sacrifice	Readiness to start	Persistence	Total score SMMS-R
Step 1	PSS-10	R ² adjusted	-0.002	-0.002	0.010	0.001
		ΔR ²	0.000	0.000	0.012	0.003
		F	0.049	0.045	6.983**	1.606

Table 6. Regression analysis

For the model where we used PSS-10 as a predictor, none of the results were statistically significant. The prediction model where the PSS-10 total score was the predictor was significant ($p = 0.008$) only for the persistence dimension. This predictor has a negative effect ($b = -0.060$; $\beta = -.107$), indicating that the more present it is, the less stressed the student is and the more persistent he/she will be in achieving goals. This model explains 1.2% of the variance of the dependent variable of the persistence dimension.

DISCUSSIONS

The present study findings have important academic implications. Our research proved that women are more motivated to obtain their academic degree than men. Our result confirms a few researches in the field, identifying that female medical students are more motivated and more determined to continue their postgraduate education (D' Lima et al. 2014). Some studies pointed out that female students are more prone to having extrinsic motivation (*being responsible*) than intrinsic motivation (*feeling responsible*) as Bacon developed in his theory in 1991 about responsibility.

Students' motivation is very important for the academic route, for involvement in continuing education and the practice of medicine. Women seem to be more determined to accomplish their tasks in the medical field also later, in their profession, some studies proving that they have high rates of burnout and low rates of professional satisfaction (Iorga et al. 2016).

Regarding the year of study, we found that 3rd-year students are less stressed than students from other years and 5th-year students are the least motivated. Our result is firstly due to the university curricula: the first two academic years are dedicated to the fundamental knowledge in medicine and a deep theoretical study is needed to obtain a high number of credits. Secondly, the result is explained by personal factors: students are able to adjust to academic needs better, they enter clinical stages and the interactions with health professionals and doctors make them feel more "used in practice" and "practically useful", not only evaluated for their theoretical knowledge. They learn over the academic years how to adjust themselves to the educational demands and find strategies to cope with stress. This proves another finding of this study: that there are no differences between sexes when it comes to the level of perceived stress among medical students.

Our study also suggests that socio-demographic characteristics are related to all dimensions of motivation. Students with less educated parents (college/high school graduates) are more willing to sacrifice themselves and more ready to start medical studies, compared to those whose parents have higher education (university degrees). We can generally say that the less educated their parents are, the more motivated students are. This result is one of the most important for our research, since some studies have pointed out that intrinsic motivation is related to family background (parents' level of education, learning facilities at home or parents' occupation) and a positive relationship was found with academic achievement among pupils (Muola 2010). Our study targeted students from a medical university, where the admission process is severe and high standards are needed. The medical profession ensures a good social status and a high economic level. The willingness to sacrifice of students whose parents have a lower educational level proves the need to overcome their socio-economic level and that they value the academic achievement process highly, which may lead them to success.

Considering that an important rate of students come from rural areas with fewer chances to have access to educational options and that fewer parents from rural areas have a high level of education, this finding is important for teachers to encourage and mentor students to achieve their academic goals, despite family resources. Moreover, parents of students living in urban areas tend to have higher levels of education, compared to those living in rural areas.

We also found a negative correlation between perceived stress and motivation. The more distressed a student is, the less persistent the subject will be in following goals, being less able to mobilize his/her resources.

Strengths and limitations of the study

The study included a large number of students registered in all six years of study, ensuring a significant statistical analysis and comparative analysis between variables and important outcomes for medical students in Romania. Despite the available data, we may consider that the results could be generalized only for students enrolled in medical studies (general medicine) and not applied for students enrolled in the other specialties in the medical university (nursing, kinetotherapy, and nutrition). Another limitation of the study is that students included in the research are native Romanians; results cannot

be generalized for international students studying at “Gr. T. Popa” University of Medicine and Pharmacy in Iași, Romania, or at other medical universities in the country.

CONCLUSION

Our results are important for both students and university teachers to find methods of decreasing the level of stress and increasing the level of motivation. Considering the fact that socio-demographic variables (sex, age and parents’ level of education) seem to influence only motivational dimensions, while these variables were not found to influence the perceived level of stress, we tend to consider that stress is more related to personality factors than to socio-demographic variables.

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