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Self-Efficacy as a Predictor of Stress in Medical Students of King Khalid University, Saudi Arabia

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Abstract

Background: Self-efficacy and stress are closely related concepts. These concepts have been endorsed as the primary causes influencing the adaptation of students to the college environment. The objectives of this study were to: 1) Measure self-efficacy among medical students, 2) Study association of self-efficacy with basic characteristics of the students, 3) Determine the role of self-efficacy as a predictor of stress. **Methods:** Self efficacy and stress were measured using the Kessler-10 instrument and the General Self Efficacy scale, for 267 medical students, including both sexes. Statistical analysis included descriptive statistics for the basic characteristics and self-efficacy, independent samples t-test and ANOVA to find the association between self-efficacy and various socio-demographic factors and correlation and regression analysis to determine the role of self-efficacy as a predictor of stress. **Results:** Students aged more than 22 years had significantly higher self-efficacy scores as compared to younger students ($t=2.32$; $p < 0.05$). The linear relationship between stress and self-efficacy was demonstrated using Pearson's correlation. A significant negative correlation was revealed ($r = -0.136$, $R^2 = 0.018$); $p < 0.05$. Self efficacy was identified as a predictor of stress. Predicted stress score = $27.91 + (-.165 * X)$. **Conclusions:** Self efficacy has a significant negative correlation with stress in medical students and is a predictor of stress.

Keywords: medical students, Saudi Arabia, self-efficacy, stress

Introduction

The concept of self-efficacy was evolved by Albert Bandura, founder of the social cognitive theory in the late 1970's.¹ He defined perceived self-efficacy as "the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". Hans Selye in his article on stress coined the terms eustress and distress. Eustress was described as stress that is able to exert a healthy effect on people and gives one a feeling of fulfillment or contentment and also makes one excited about life. Eustress is often called the therapeutic stress because it gives a person the ability to produce their best performance. Unfortunately, eustress occurs as a short phase before it turns into distress.² Distress which is often used synonymously with stress is a modern day sickness.³ It is defined as "a physical or psychological stimulus that can produce mental or physiological reactions that may lead to illness". It can be considered as a psychological hazard that may result in various health issues including weak immune system, mental fatigue, anxiety and depression as evidenced by several research findings that point to the fact of a positive association between perceived stress, anxiety and depression.³⁻⁵ University students worldwide are observed to be a high risk group with a prevalence of

higher stress level than the general population.⁶ Among this group too, medical students have been reported to have higher levels of stress than other groups and demand special concern.⁷ With international studies revealing high levels of mental health issues like anxiety and depression in student populations, stress and its ill effects are turning into a global health issue.^{8,9} The two entities described above, i.e. self-efficacy and stress are closely related concepts. Self-efficacy and perceived stress have been endorsed as the primary causes influencing the adaptation of fresh students to the college environment through scientific research.^{7,9} In Lazarus' cognitive model of stress,¹⁰ personal beliefs such as self-efficacy are critical in appraising the external demands from the environment as either a "threat" or a "challenge".

Persons with high self-efficacy beliefs are more likely to evaluate the demands as a challenge rather than a threat, and respond positively.¹⁰⁻¹¹ Self-efficacy has also been described as a function of one's cognitive capacity in action.¹² A person with higher self-efficacy is expected to have better coping skill, since it is a technique which is based on cognitive capability.¹³ Studies have shown a positive correlation between self-efficacy and college adaptation.¹⁴⁻¹⁵ Greater self-efficacy breeds more confidence in overcoming challenges that are usually

faced in college life.¹⁴ Persons with high self-efficacy exhibit confidence in their skills and abilities to do well and have been shown to partake more in learning activities. Students with higher self-efficacy endeavor, adapt better and persist to achieve better academic performance than students with low self-efficacy.¹³ As reported by Lazarus, "when coping is ineffective, the level of stress is high; however, when coping is effective, the level of stress is apt to be low", thus concluding that people with higher self-efficacy are likely to experience lower level of stress.¹⁶ Low self-efficacy on the other hand has shown to be related to the use of inadequate strategies, which in turn are associated with poor adjustment with teachers and peers, reflecting not only in their college adjustment, but also in their overall problem behavior.¹³ In a previous paper, we have reported on the perceived stress among the medical students of King Khalid University.¹⁷ The present paper focuses on further understanding of stress among this group as a function of self-efficacy. We have therefore attempted to establish a potential link between self-efficacy and perception of stress. We started with the study hypothesis that self-efficacy is inversely correlated to stress, or in other words, higher self-efficacy scores can predict lower levels of stress among medical college students. This study is the first of its kind in the region and attempts to answer some important questions on role of self-efficacy in predicting stress.

Methods

The study is set in King Khalid University, which is one of the largest Saudi Government Universities. A total of 267 medical students from pre-clinical and clinical years comprised the sample for this cross sectional study, which were selected by convenient sampling procedure. The medical program at KKU is spread over six-years duration, starting with an orientation (1st) year together with students of other health specialties (such as pharmacy and nursing). This is followed by two years of preclinical (2nd and 3rd) studies and exams in courses like anatomy, physiology, biochemistry, pathology etc. The last three years include clinical/hospital/bedside teaching and assessment in subjects like medicine, surgery, pediatrics, Obstetrics and Gynecology etc.

The study used a self-administered questionnaire in English language that consisted of three parts. Part one extracted general information of students including respondent's age, gender, academic level, father's education level and occupation, mother's education level and occupation and family monthly income. For the purpose of analysis, the age was regrouped as younger (≤ 22 years) and older (> 22 years), based on the calculated mean age of the study group. Part two consisted of the Kessler10 Psychological Distress instrument (K10) developed by Kessler and colleagues.¹⁸ This instrument has been used widely in population-based epidemiological

studies to measure current (1-month) distress and has an observed Cronbach's alpha of 0.89, 95% CI = 0.88-0.90.

The Kessler scale and stress characteristics of study sample have been described by the author in a separate work.¹⁷ In this paper, the emphasis is on self-efficacy, which formed the third part of the study instrument. For measuring self-efficacy, the General Self-efficacy scale (GSES) was used. The GSES was created by Schwarzer to predict coping with daily hassles as well as adaptation after experiencing various kinds of stressful life events.¹⁹ The scale includes 10 items measuring global feelings of self-efficacy. Typical items are "Thanks to my resourcefulness, I know how to handle unforeseen situations," and "When I am confronted with a problem, I can usually find several solutions." Responses are given on a 4-point scale (0 – not at all true; 1- barely true, 2- moderately true, 3 – completely true). Responses to all 10 items are summed up to yield the final composite score, ranging between 10-40. General self-efficacy is reported to be a universal construct that yields meaningful relations with other psychological constructs with Cronbach's alphas ranging from 0.76 to 0.90.²⁰

The respondents were briefed about the purely scientific purpose of the study. Those students who met the inclusion criteria and agreed to participate were included and assured about anonymity and confidentiality of their responses. Completely filled questionnaires were collected on the same day and included in the final analysis.

Inclusion criteria. Medical students in pre-clinical and clinical levels, without any known medical or psychiatric illness.

Data analysis. SPSS 17.0 was used for data entry and analysis. Descriptive results were presented as frequencies and percentages, while self-efficacy score was described as mean and standard deviation. Independent samples t-test and one-way ANOVA were used to study the relationship of self-efficacy with various social and demographic factors. Pearson's correlation coefficient was computed to establish relationship between stress and self-efficacy, and predictive ability of self-efficacy for stress was studied using regression. Data are presented as tables and scatter chart. All results were considered significant at ($p < 0.05$).

Ethical consideration. The institutional ethical committee of KKU provided the ethical approval (REC#2016-05-18) for the study.

Results

Our study included both male and female students. The mean age of study group was 22.9 (± 1.41) years. Table 1 describes the baseline characteristics of the participants.

The baseline characters were analyzed for their association with self-efficacy. Results for the t-test/ANOVA are projected in Table 1. Only age showed a significant relationship with self-efficacy, students of age more than 22 years had higher self-efficacy scores as compared to younger students ($t=2.32; p < 0.05$). The other variables like sex, parental variables and family income did not show any association with self-efficacy.

The descriptive statistics of self-efficacy and stress in students is depicted in Table 2. Normality of distribution

of stress and self-efficacy scores was confirmed from the skewness and kurtosis. Stress mean score was found to be 23.46 ± 7.77 , with skewness of -0.43 and kurtosis of 0.25. Self efficacy mean score was 26.98 ± 6.41 , with skewness of 0.78 and kurtosis of 0.97.

Correlation and regression statistics were applied to study the relationship of stress with self-efficacy and the results are presented in Tables 3 and Table 4. An analysis of residuals confirmed the assumptions of linearity. Durbin Watson statistic of 1.89 confirmed the absence

Table 1. Distribution of Respondent by Their Baseline Characteristics and its Relationship with their Self-efficacy Scores

Variable	n (267)	(%) (100)	Mean Difference/ partial η^2	95% CI of the difference.	df	t value/ F value	P
Age							
≤22 years	94	35.2	2.11	0.32,3.91	265	2.32	0.02
>22 years	173	64.8					
Gender							
Male	182	68.2	-1.60	-3.45,-0.24	265	-1.7	0.08
Female	85	31.8					
Level							
Preclinical	30	11.2	-0.06	-2.80,-2.67	265	0.002	0.96
Clinical	237	88.8					
Father's education							
Primary school	44	16.5					
High School	84	31.5	0.01	---	(4.262)	0.74	0.56
Bachelor/Diploma	70	26.2					
Postgraduate	52	19.5					
Illiterate	17	6.4					
Mother's education							
Primary school	89	33.3					
High School	53	19.9	0.02	---	(4.262)	1.63	0.16
Bachelor/Diploma	47	17.6					
Postgraduate	26	9.7					
Illiterate	52	19.5					
Father's occupation							
Teacher	46	17.2					
Professional	23	8.6	0.005	---	(4.262)	0.32	0.86
Businessman	28	10.5					
Retired	96	36.0					
Military/Police	74	27.7					
Mother's occupation							
Housewife	177	66.3	0.97	0.86,2.81	264	1.04	0.29
Working	89	33.7					
Family Income							
≤ SR10,000	84	31.5	-0.47	-2.33,1.39	265	-0.49	0.61
>SR10,000	183	68.5					

SR = Saudi Riyals

Table 2. Description of Self efficacy and stress scores (N=267)

Variables	Range	Min.	Max.	Mean	S D	Skewness		Kurtosis		Percentiles		
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	SE	Statistic	SE	25	50	75
Self-efficacy	30.00	10.00	40.00	26.9850	6.41132	- 437	149	251	297	18	23	28
Stress	40.00	10.00	50.00	23.4682	7.77176	781	149	972	297	23	28	31

Statistical method: Normality test

of any auto correlation. Four outliers were identified and included in the analysis. The linear relationship between stress and self-efficacy was demonstrated using Pearson’s correlation. A negative correlation was revealed ($R = -0.136$, $R^2 = 0.018$) which was significant at $p < 0.05$. Regression analysis was performed with stress score as

the dependent and self-efficacy score as the independent variable. The regression equation was generated as ($Y = a + bx$); Predicted stress score = $27.91 + (-.165 * X)$.

Figure 1 shows the linear relationship between stress and self-efficacy.

Table 3. Model Summary Statistics-Regression Analysis of Self-efficacy and Stress

Model	R	R ²	Std. Error of the Estimate	Change Statistics				Durbin-Watson
				F Change	df1	df2	Sig. F Change	
1	.136	.018	7.71426	4.980	1	265	.026	1.892

Predictors: (Constant), Self-efficacy
 Dependent Variable: Stress

Table 4. Regression Analysis of General Self-efficacy Predicting Stress (Coefficients)

Model		Unstandardized Coeff.		Standardized Coeff.	t	Sig.	95% CI for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	27.911	2.046		13.642	.000	23.882	31.939
	Self-efficacy	-.165	.074	-.136	-2.232	.026	-.310	-.019

Dependent Variable: Stress

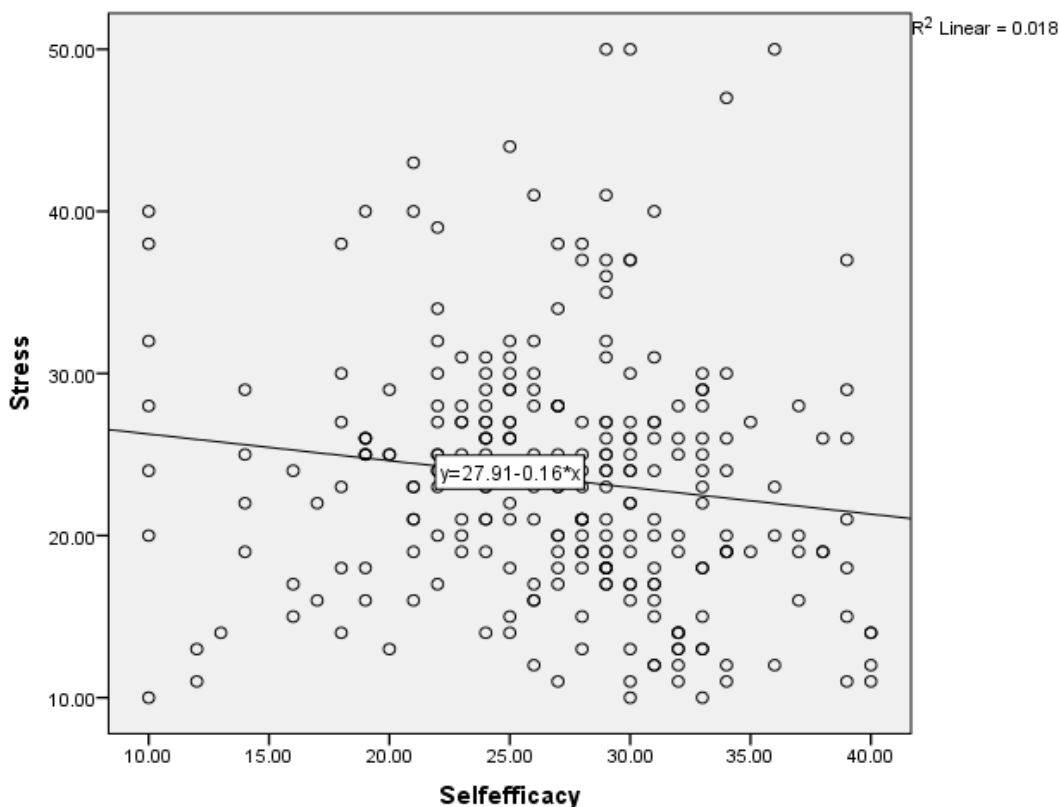


Figure 1. Scatter Plot with Regression Line

Discussion

This research study primarily aimed at broadening the area of stress research on medical students towards another important and influencing variable, namely self-efficacy. Extensive internet search revealed a total lack of information on this aspect of psychological health of the medical students in Saudi Arabia; contrary to the vast amount of work that has been done to elucidate the prevalence of stress and burnout among this group. Understanding the importance of self-efficacy as the most important pillar in successful coping, we tried to establish the predictive ability of self-efficacy on stress in this group through regression model.

In this study we measured stress and self-efficacy among a group of medical students. Most of the students were in their clinical years of learning and were aged more than 22 years. In an earlier paper, we reported the characteristics of stress perceived by the students and its relation with the socio-demographic factors. Mean stress score was found to be 23.46 ± 7.77 (on a scale of 0-50), and it was normally distributed.¹⁷ The mean stress score is lower than generally reported. The lower stress scores in this study can be explained by the cultural influence of Islam in this population. Several studies have reported that Muslims tend to use high levels of positive religious coping strategies. In a New Zealand study on Muslim medical students, positive religious coping was found to have a small to moderate negative correlation with perceived stress for Arab/Middle-Eastern students. Past research with Muslim participants also suggests that religious coping is also positively correlated with a variety of indices of mental health and psychological well-being, having beneficial psychological outcomes and tends to reduce distress among Muslims.²¹⁻²²

In the current work we moved one step further to investigate if self-efficacy in medical students could be used to predict stress. Mean self-efficacy score was 26.98 ± 6.41 (on a scale of 10-40) and it is similar to other studies.²³ Regarding the relationship of self-efficacy with basic characteristics of the respondents, it was found that age showed a significant relationship with self-efficacy. The students aged more than 22 years had higher self efficacy scores as compared to younger students. This finding is consistent with findings from other studies in different regions.^{24,25} The theoretical basis for this finding is rooted in Bandura's theory which introduces self-efficacy. He purported that individual experiences (that obviously increase with age) help people to perform their tasks with higher confidence in their abilities.¹ Thus, it is expected that older people may have higher sense of self-efficacy. The other variables like sex, parental variables and family income did not show any association with self-efficacy. A similar result was reported on a study among nurses which found no statistically significant differences

in reported self-efficacy between male and female study participants. However, that study also did not find any significant differences observed in rated self-efficacy related to the age of participants.²⁶

Regarding the relation between stress and self-efficacy, a linear relationship between stress and self-efficacy was demonstrated in this study and a significant negative correlation was revealed. Lower stress scores were correlated with increasing self-efficacy score. Regression analysis confirmed that self-efficacy can be used to predict stress. These findings are very important and are complemented by the findings reported in some previous studies in other countries. Increased self-efficacy eventually results in decreased levels of perceived stress. This inverse relation between self-efficacy and stress is particularly important in college students as it can have an effect on the academic performance too. The outcomes of a number of studies highlight the important protective role of self-efficacy against stress, as well as its role regarding a close connection to the quality of life, effective coping with stress, and other desirable variables.²⁷ There are other studies that have focused on the importance of self-efficacy and psychological issues like depression and social avoidance and positive relation with QOL.^{28,29} A study on medical students in Malaysia found support for the mediating effects of self-efficacy on quality of life. It concluded that the negative effects of depression on quality of life are significantly reduced due to the effects of self-efficacy.²⁸ These studies also reported that self-efficacy significantly predicts quality of life and a negative relationship between self-efficacy and depression and a positive relationship between self-efficacy and quality of life.^{27,28}

Self-efficacy also shows its importance in stress-coping training. In a Czech study, it was found that significant correlations between self-efficacy and stress coping strategies among university students existed.²³ Though in this study we started with a one-tailed hypothesis, studies in past have suggested a two way relation between stress and self-efficacy. Self-efficacy fuels stress, and contrarily, stress fuels a person's self-efficacy. The findings of the current study can be considered as the first step and set a direction for future course of research in stress, self-efficacy, and general wellbeing and academic success of students in the region. Studies from other parts of the world have concluded that self-efficacy can have an impact not only on the health but also on academic performance and quality of life of students. In a Japanese study on medical students, the researcher concluded that further efforts to develop educational training programmes that reduce stress and help guide individuals to develop efficient stress coping styles would contribute to favourable academic outcomes among medical students.³⁰ Increased self-efficacy can lead to greater motivation and success, resulting in positive health outcomes such as better quality of life and both mental and physical

wellbeing.³¹ This eventually results in decreased levels of perceived stress. This inverse relation between self-efficacy and stress is particularly important in college students as it can enhance academic performance too. Studies have reported that academic self-efficacy promotes confidence in reading textbooks, asking questions in class, and studying for exams.³¹ A strong positive correlation between self-efficacy and college adaptation has been reported in studies.¹⁵ High self-efficacy has shown to generate more confidence in overcoming challenges that are usually faced in college life.¹⁴ Kausar noted that findings about relationship between academic workload, perceived stress and coping have important implications for students in higher education.³¹ Self-efficacy provides better adaptation to college life and finally results in higher academic achievements.

This study was limited by a small sample size and use of self-reported measures, which creates a potential recall and social desirability bias. However, it still remains a seminal addition to the growing body of evidence suggesting that the stress and resulting burnout in the medical field can be influenced by enhancing self-efficacy. This study gets strength from the fact that is the first of its kind study in Saudi Arabia. It is hoped that the study will have influence on the well-being and life satisfaction of medical students in the region and benefit its educationists and counselors. Future studies addressing these limitations are highly recommended.

Conclusions

In this study self-efficacy was found to be inversely correlated to stress. Self-efficacy emerges as a constructive idea, a significant concept that merits inclusion in education and counseling related to coping with stress among medical students. It is imperative to consider the issues of vulnerability to stress, stress perception, coping, and self-efficacy in the academic environment of a medical student. It should be the mission for educators to develop positive ways of dealing with stress among students. The overall well-being, satisfaction, and academic achievement of the students is connected to their stress-coping strategies and eventually their self-efficacy. In this regard, educational intervention such as stress management training may be introduced into their curriculum. Such educational interventions may promote positive attitude towards personal health care, including mental and psychological health. There is a need for close attention to intervention strategies that emphasize on self-efficacy among the students.

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Conflict of Interest Statement

None declared.

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