Research Article

Factors of Academic Success Among Undergraduate Medical Students in Taif University, Saudi Arabia: A Cross-Sectional Study

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ABSTRACT

This cross-sectional research was carried out in the College of Medicine at the University of Taif, Kingdom of Saudi Arabia. It included a random sample of medical students in 4th, 5th and 6th years (males and females). Data were collected using a semi-structured, self-administered questionnaire, including comprehensive, anonymous demographic and socioeconomic data, lifestyle factors, health related quality of life, social support, student's academic motivation, the past year grade point average (GPA). The study included 261 students. The age ranged between 21 and 27 years (22.8±1.1 years). Males represented 55.9% of the participants. Moreover, non-smokers, membership in charity association, having higher score of psychological domain of quality of life, and higher learning strategies score were significantly associated with grade point average (GPA) score and they are responsible for 21.5% variability of the score. From the results it could be concluded that Academic performance of senior medical students in Taif University, manifested by GPA score is influenced by many factors (multi-factorial) that are responsible for only 21.5% of variability in grade point average (GPA).

Key words: *Cross-Sectional, Undergraduate, Medical Students, Socio-Economic, Chronic Health, Acute Diseases*

INTRODUCTION

Higher education and training are positioned among the top priorities of the Saudi government. Over twenty years ago, official royal declaration claimed that developing highly qualified human resources was the key step to achieve advancement, and more than half of the national budget is spent for that purpose [1]. Consequently, number of government and private training institutions and colleges has increased, which resulted in increasing number of students in all university branches.

All over the world, medical studies are characterized by great competitiveness, and both entry to and graduation from medical colleges may be highly selective [2]. In Saudi Arabia, admission to medical college is subject to cognitive tests followed by a structured interview, which ensures intellectual aptitude of admitted students to pursue the challenging medical studies [3]. However, students' performance may drop or fluctuate over the study years, due to multiple factors.

In Saudi Arabia, Abdulghani et al. (2014) [4] carried out a qualitative study to examine the impact of learning strategies, resource management, motivation and dealing with non-academic issues including sleep quality, language (English) barrier, stress and homesickness for undergraduate medical students. Besides the significant effect of learning strategies, results suggested that low level of preparedness to examinations and low proficiency in English language are also significant factors of poor academic achievement. Authors concluded that factors affecting academic achievement are those correlated with deep learning strategy.

The assessment of cognitive skills and motivational will of students has long been the subject of interest for psychologists and educators. Several models have been used to assess cognitive, meta-cognitive and motivational factors as predictors for students' academic achievement. Consequently, several tools were developed to assess student's cognitive characteristics, especially motivation and learning strategies. Motivation is represented as a complex parameter, which is composed of several dimensions including self-efficacy, intrinsic motivation, achievement goals and attributions [5]. Metacognition is defined as the awareness about one's own learning abilities. Metacognitive factors were demonstrated to be conditioning learning and impacting on academic achievement. These are classified into several categories including attention control, motivation regulation, affect regulation, behavioral regulation, and self-instruction statements [6].

Kivinen (2003) [6] assessed the students' motivation in 3 international schools using the Motivated Strategies for Learning Questionnaire (MSLQ), which is a multidimensional tool developed to assess student motivational beliefs and cognitive strategy use in learning. This questionnaire was developed by Pintrich et al. (1993) [7] based on socio-dynamic model of motivation, and explores intrinsic and extrinsic cognitive resources of the student in relation with learning, such as goal orientation, expectancy of success, self-efficacy, and affect control. The questionnaire showed robust psychometric properties and significant correlation with academic achievement [8].

The aim of this study was to identify and quantify various factors associated with academic success as measured by past year grade point average among senior medical students.

MATERIALS AND METHODS

Study design
A cross-sectional study was conducted in the College of Medicine at the University of Taif, Kingdom of Saudi Arabia.

Study population and selection criteria
The study included a representative sample of medical students in 4th, 5th and 6th years, which were registered in the College of Medicine at the University of Taif, for the academic year 2017-2018. Number of 4th, 5th and 6th year students (males + females) for the current academic year (2016-2017) is estimated at 209, 197, and 176, respectively. The samples were taken randomly; 96 of medical students from 4th year, 90 medical students from 5th year and in 6th years were taken 75 medical students.

Data collection tool
Data were collected using a semi-structured, self-administered questionnaire, including the following parts:

1. Comprehensive, anonymous demographic and socioeconomic data, such as age, gender, marital status, etc.
2. Lifestyle factors such as sleeping pattern, exercise, smoking, eating habits, spiritual and religious habits, etc, according to Trockel et al., (2000) [9-11].
3. Health related quality of life using the WHOQOL-BREF questionnaire, which is a 26-item (see Appendix 1) reliable and validated tool assessing quality of life (QoL) in the domains of physical health, psychological health, social relationships and environment [12, 13]. This tool has been tested across cultures including in general Arabic population and showed very good psychometric properties, such as construct validity and internal consistency with Cronbach's alpha superior to other QoL assessment tools [14, 15]. For categorization of the quality of life, the following values of the WHOQOL-BREF score were extracted from the reviewed studies and were applied in the current study: score ≤ 45, poor HRQOL; score 46–65, moderate HRQOL; and score > 65, relatively high HRQOL [16].
4. Other health-related data including chronic diseases, motor or sensorial handicaps, and significant acute medical or surgical condition during the college years.
5. Social support, as assessed using the Multidimensional scale of perceived social support (MSPSS), which is a 12-item 3-subscale valid questionnaire assessing subjective perception of support received from family, friends and other significant persons, [17, 18] (See Appendix 2). This questionnaire was tested in different populations, such as in Arab American Adolescents, Arab immigrant women, Turkish university students and Palestinians living in occupied territories, and showed good to high psychometric properties [19, 20]. Social support was assessed separately from QOL using this specific

tool (besides few similar items already assessed by the WHOQOL-BREF questionnaire), as the researcher hypothesized that social support could be a crucial factor for academic success in the Saudi society.

6. Student's academic motivation, using self-efficacy (7 items) and active learning strategies (8 items) scales from MSPSS questionnaire (Appendix 3 & 4). These two scales showed excellent reliability testing including Cronbach's alpha = 0.91 and 0.82, respectively, as well as significant correlations with student's academic achievement in past academic year [21].

7. Past year GPA, that was analyzed as the variable for academic achievement.

8. Pilot Study

A pilot study was carried out on a random sample of 20 students to examine item clarity and estimate the actual amount of time needed to complete the questionnaire. An extra open question was added to the pilot questionnaire to collect three other factors perceived by the students as significant determinants of academic performance. The 3 most frequently reported factors were included in the final questionnaire. Furthermore, results of the pilot study were used to test reliability of relevant questionnaire parts including health-related QoL (WHOQOL-BREF), social support (MSPSS), self-efficacy and active learning strategies (SMTSL) in the study population.

RESULTS AND DISCUSSION

Demographic and socio-economic characteristics

The study included 261 students. Their age ranged between 21 and 27 years. The mean age was 22.8 and the standard deviation (SD) was 1.1 years. Other demographic and socio-economic characteristics of the students are presented in table 1. Males represented 55.9% of the participants. Majority of the students were Saudis (98.9%). More than one-third of the participants were recruited from the fourth (36.8%) or fifth (34.5%) academic levels. Majority of them (95.8%) were singles. Among married students (n=11), 45.5% had children. Majority of the students (96.6%) live in urban placed and originally from Taif (92%). Also, the majority of them (89.9%) live with their parents. Family size of more than half of the students (53.2%) ranged between 6 and 9 persons whereas it exceeded 9 persons in 7.3% of students. Number of siblings ranged between 4 and 6 in 48.6% of the students whereas it exceeded 6 in 29.5% of them. Among 46.8% of the students, the number of university graduate siblings ranged between one and three. Family income exceeded 20000 SR/month among 39.1% of the participants. University fathers` and mothers` educational level was reported among 61.3% and 49.4% of the students, respectively. Only one student had a part-time job (0.4%). Parents were the source of financial support for the majority of students (87.8%). Private and family cars were the means of transportation for 59% and 34.9% of the students, respectively. The time between home and university ranged between 15 and 30 minutes among 54% of the students.

In accordance with what has been reported by Al Shawwa et al. (2015) [22], financial factors did not have a significant impact on academic performance in the present study. This may be explained by the fact that in our culture, all students remain under the care of their families until graduation.

In the present study, the studied family-related factors such as marital status of the students, pattern of residence, paternal and maternal educational levels did not show any significance with academic performance, which reflects that those factors might not directly impact efficiency of the students' learning process. The same has been observed by others Al Shawwa et al. (2015) [22].

Academic performance

Their GPA ranged between 1.30 and 3.90 out of 4 with a mean of 3.04 and SD of 0.52. It was abnormally distributed as evidenced by significant Shapiro-Wilk test, $p < 0.001$.

Bahammam, et al. (2012) [23] indicated in their study that academic performance is adversely impacted by the short duration of night sleep, late bedtimes, and increased somnolence during daytime. However, in the current study and in accordance with [24], sleep pattern was not associated with academic performance of medical students.

Health-related factors

Chronic health problems

Figure 2 shows that the commonest reported health-related problem among senior medical students was visual impairment (42.5%), followed by allergy (21.8%), bronchial asthma (6.5%) and hearing impairment (3.4%).

Acute diseases

Only 15 students (5.7) reported a history of a significant acute disease during college years as shown in figure 3

Surgery

Twenty two students (8.4%) underwent a significant surgery during college years. Figure 4

Lifestyle factors

Prevalence of daily smoking among the participants was 11.5%, of them, 5.4% smoked more than 10 cigarettes per day. Five percent of the students claimed that they already tried substance abuse and two students are currently using (0.8%). Almost one third of the students (30.3%) were not practicing physical exercise and 20.7% reported unhealthy eating habit. Only 13.8% of the students reported often go to vacation/travel whereas 14.9% never travel or had vacation. More than one-third of the students (40.2%) reported daily smart device use between 4 and 6 hours for entertainment. Usual sleep time was at 12 pm or less among 52.2% of the students and after 2 am among 12.6% of them. Usual wake up time was at 8 am or less among 70.9% of the students and after 10 am among 22.6% of them. Almost two-thirds of them (63.2%) sleep usually between 6 and 8 hours/night. Minority of the students (5.4%) reported poor sleep quality whereas 16.5% reported good sleep quality. More than one-third of them (37.9%) reported good compliance with religious duties. However, only 2.7% reported regular study of religion-oriented materials. Only 12.3% of them are members in charity association.

. In India**,** Singh and Kamra (2016) [24] reported that most of the modifiable life style factors did not influence academic performance of medical students. They observed prolonged internet surfing other than study purpose was a significant risk factor for low academic achievement. In a Saudi study carried out at Tabuk University, spending fewer hours on social media was signicantly associated with high academic achievement [25].

Table 1: Demographic and socio-economic characteristics of participated senior medical students, Taif University

Variables	Frequency	Percentage	Variables	Frequency	Percentage
Marital status			**Family monthly income in**		
Single	250	95.8	**SAR**		
Married	11	4.2	<5000	12	4.6
			5000-1000	30	11.5
Having a job			10001-20000	80	30.7
No	260	99.6	>20000	102	39.1
Yes. Part time	1	0.4	Don`t know	37	14.2
Having children			**Father`s educational level**		
among married			Illiterate	10	3.8
students (n=11)			Primary/intermediate	38	14.6
No	6	54.5	Secondary	53	20.3
Yes	5	45.5	University	160	61.3
Accommodation					
Urban	252	96.6	**Mother`s educational level**		
Rural	9	3.4	Illiterate	10	3.8
Town of origin			Primary/intermediate	38	14.6
Taif	240	92.0	Secondary	53	20.3
Mkkah/Jeddah	15	5.7	University	160	61.3
Others	6	2.3			
Residence			**Source of financial support**		
With parents	234	89.7	Parents	229	87.8
With spouse	8	3.1	Self	22	8.4
University campus	1	0.4	Others	10	3.8
Alone	18	6.9			
Number of house			**Mean of transportation**		
occupants (family size)			Private car	154	59.0
≤5	103	39.5	Family car	91	34.9
6-9	139	53.2	Public transportation	7	2.7
≥10	19	7.3	University transportation	9	3.4

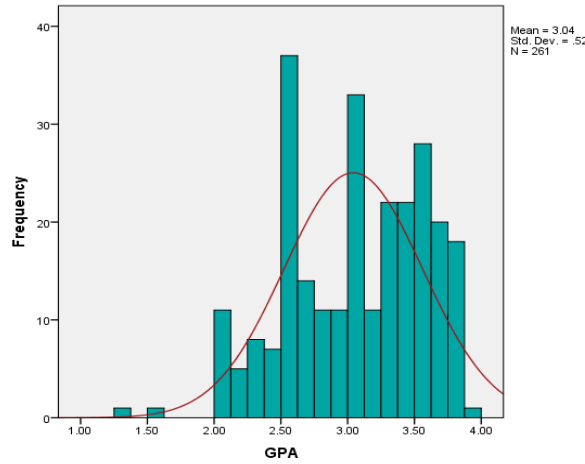| Number of siblings			Time between home and university (minutes)		
None	7	2.7	<15	41	15.7
1-3	50	19.2	15-30	141	54.0
4-6	127	48.6	31-60	75	28.7
>6	77	29.5	>60	4	1.5

Figure 1: Distribution of the GPA among the senior medical students, Taif University
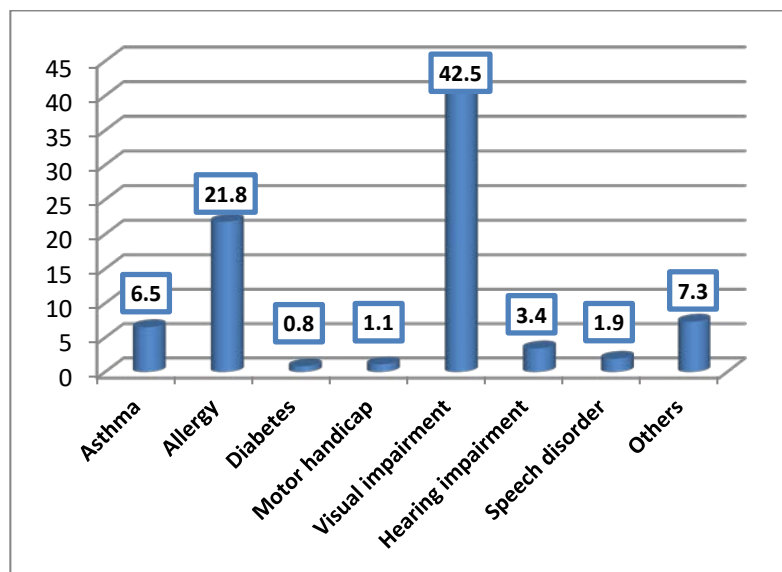

Figure 2: History of chronic health problems among the senior medical students, Taif University
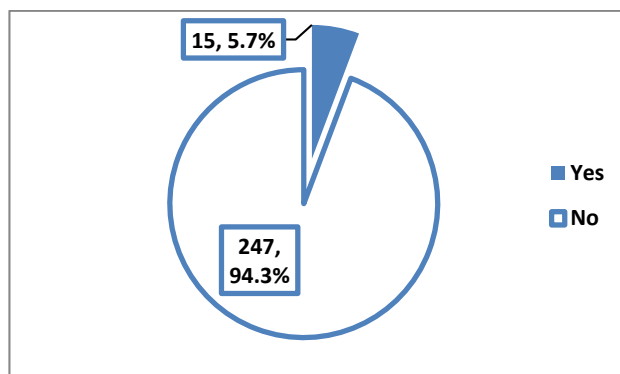

Figure 3: History of suffering from a significant acute disease during college years among senior medical students, Taif University
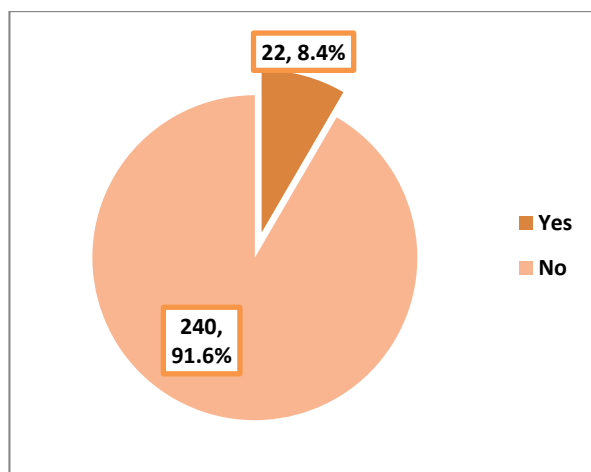
Figure 4: History of undergoing a significant surgery during college years among senior medical students, Taif University

Table 2: Lifestyle factors among senior medical students, Tain University

		Frequency	Percentage
Smoking	No	200	76.6
	Yes, Occasionally	31	11.9
	Yes daily (≤10 cigarettes)	16	6.1
	Yes, daily (>10 cigarettes)	14	5.4
Substance abuse	Never tried	246	94.2
	Already tried	13	5.0
	Currently use	2	0.8
Physical exercise	None	79	30.3
	<once per month	79	30.3
	One per week	53	20.3
	≥2 times per week	50	19.1
Eating habits	Unhealthy	54	20.7
	Not very healthy	93	35.6
	Rather healthy	110	42.2
	Very healthy	4	10.5
Vacation/travel	Never	39	14.9
	Rarely	76	29.1
	Sometimes	110	42.2
	Often	36	13.8
Daily smart device use for entertainment	<2 hours	24	9.2
	2-4 hours	85	32.6
	4-6 hours	105	40.2
	>6 hours	47	18.0
Sleep Pattern Usual sleep time	≤12 pm	136	52.2
	>12pm-2 am	92	35.2
	>2 am	33	12.6
Usual wake-up time	<8 am	185	70.9
	8-10 am	17	6.5
	>10 am	59	22.6
Average hours of sleep	<6	85	32.6
	6-8	165	63.2
	>8	11	4.2
Sleep quality	Poor	14	5.4
	Unsatisfactory	71	27.1

	Acceptable	133	51.0
	Good	43	16.5
Spiritual/religious habits Compliance with religious duties	Poor	13	5.0
	Unsatisfactory	45	17.2
	Acceptable	104	39.9
	Good	99	37.9
Study of religion-oriented materials	Rarely	118	45.2
	Sometimes	108	41.4
	Often	28	10.7
	Regularly	7	2.7
Membership in charity association	No	229	87.7
	Yes	32	12.3

Quality of life

Physical domain

Physical domain of quality of life ranged between 6 and 88 on a 0-100 scale with a mean of 53.65 and standard deviation of 12.04. It was abnormally distributed; p-value of K-S test<0.001 (Figure 5)

Previous studies indicated that the academic performance and physical health of students run in parallel [26]. In USA, students with high GPA were more engaged in physical health in comparison to their colleagues with low academic performance [27]. Shareef data suggested that as students move from one level of GPA to a higher one, an increase of approximately 5 % is observed in the physical health domain of QoL [28]. However, a study among college of science students revealed a lack of significant effect of physical health on GPA [29].
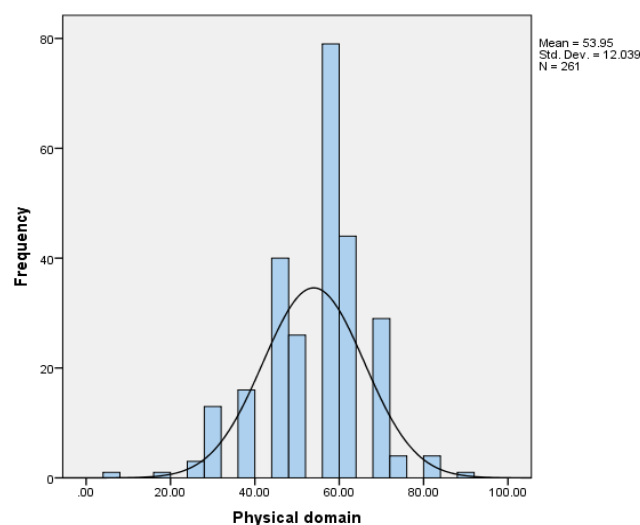

Figure 5: Distribution of the physical domain of QoL among senior medical students, Taif University.

Psychological domain

Psychological domain of quality of life ranged between 19 and 94 on a 0-100 scale with a mean of 62.21 and standard deviation of 15.0. It was abnormally distributed; p-value of K-S test<0.001 (Figure 6).

The present study, in accordance with many other studies, proved the association between academic performance and psychological health, even after controlling for counfounders. Very few studies investigated the association between psychological domain of the short version of WHO-QOL survey as happened in the present study. In a study carried out by Shareef et al. (2015) [28], gaining 5 points in psychological health was associated with one level increase in the GPA and all items belonged to psychological domain were positively correlated with the GPA. It has been documented that medical students demand spirituality, motivation, and self-esteem and positive feelings to deal with long working hours in their future clinical endeavors [24].
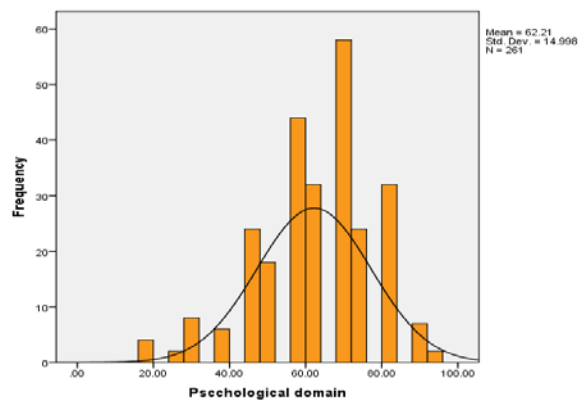
Figure 6: Distribution of the psychological domain of QoL among senior medical students, Taif University.

Social domain

Social domain of quality of life ranged between 0 and 100 on a 0-100 scale with a mean of 58.46 and standard deviation of 26.98. It was abnormally distributed; p-value of K-S test<0.001 (Figure 7).

The social domain of QOL assesses social support and personal relationships of medical students and these two items are essential for their future clinical life. Despite of that and it was in agreement with others [24, 30], social domain of QoL was not significantly associated with GPA in the current study.

Environmental domain

Environmental domain of quality of life ranged between 19 and 100 on a 0-100 scale with a mean of 69.63 and standard deviation of 16.78. It was abnormally distributed; p-value of K-S test<0.001 (Figure 8).

Many studies have approved the association between the academic achievement and environmental factors [27, 28]. However, this study did not find an association between environmental domain of Qol and academic performance.
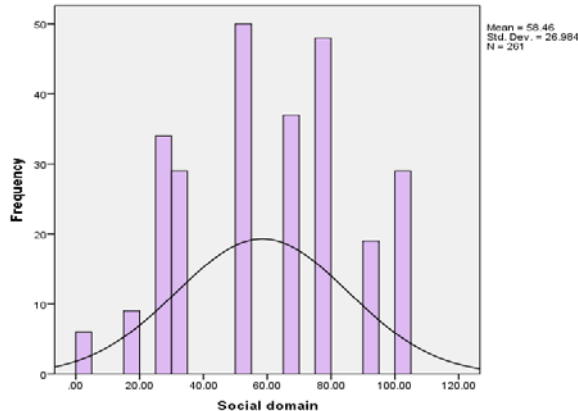

Figure 7: Distribution of the social domain of QoL among senior medical students, Taif University.
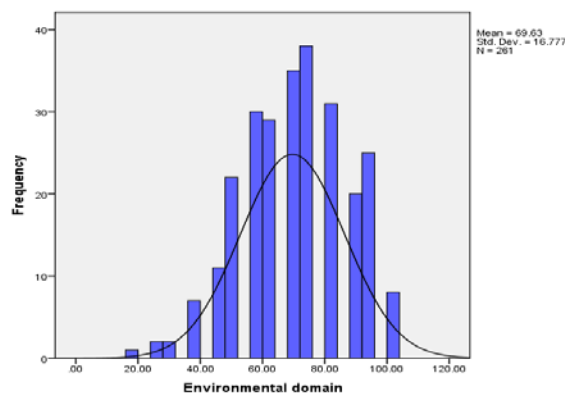

Figure 8: Distribution of the environmental domain of QoL among senior medical students, Taif University.

Overall quality of life was moderate among most of the students (70.1%) whereas poor and relatively high QoL were reported among 6.9% and 23% of them, respectively as shown in figure 9.
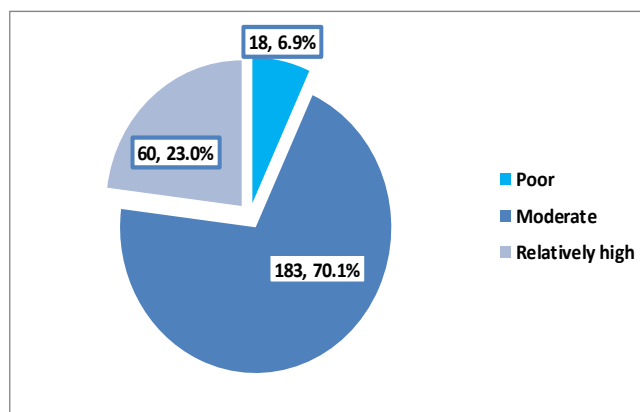

Figure 9: Overall quality of life among senior medical students, Taif University

Perceived Social Support

Social support, as a viable psychological construct, has been linked empirically to several state measures of psychological factors, including low levels of anxiety and depressive symptoms, and enhanced levels in areas of physical health and emotional well-being (e.g., [31, 32]).

Majority of the participants (87.7%) agreed (mildly, strongly, very strongly) that their family really tried to help them, they got the emotional help and support they need from their families (81.2%) and their families are willing to help them make decisions (80.3%). Almost three-quarters of them agreed that their friends really tried to help them (75.8%) and there are special persons with them they can share their joys and sorrows (74.8%). Only 55.9% of the students agreed that they can talk about their problems with their family (Table 3).

Social support is a multidimensional and complex construct that has both structural and functional aspects [33]. The structural aspects of social support include quantitative properties of the social network such as size, range, proximity, and accessibility [33]. As [34] argued, functional support refers to the quality of the support served by the structural component [33]. Both structural and functional aspects depend on the perception of the recipient of support. Hence researchers differentiate between perceived and received social support [35]. Perceived support refers to the perception of the recipient of accessibility and quality of support [36].

Table 3: Responses of the senior medical students at Taif University to statements of the multidimensional scale of perceived social support (MSPSS).

	Response						
	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)	6 N (%)	7 N (%)
There is a special person who is around when I am in need.	13 (5.0)	6 (2.3)	17 (6.5)	41 (15.7)	61 (23.4)	57 (21.8)	66 (25.3)
There is a special person with whom I can share my joys & sorrows.	10 (3.8)	9 (3.4)	15 (5.7)	32 (12.3)	56 (21.5)	60 (23.0)	79 (30.3)
My family really tries to help me.	1 (0.4)	5 (1.9)	8 (3.1)	18 (6.9)	37 (14.2)	70 (26.8)	122 (46.7)
I get the emotional help and support I need from my family.	1 (0.4)	11 (4.2)	11 (4.2)	26 (10.0)	41 (15.7)	53 (20.3)	118 (45.2)
I have a special person who is a real source of comfort to me.	12 (4.6)	10 (3.8)	18 (6.9)	38 (14.6)	43 (16.5)	43 (16.5)	97 (37.1)
My friends really try to help me.	11 (4.2)	8 (3.1)	13 (5.0)	31 (11.9)	78 (29.9)	63 (24.1)	57 (21.8)
I can count on my friends when things go wrong.	14 (5.4)	9 (3.4)	15 (5.7)	33 (12.6)	49 (18.8)	74 (28.4)	67 (25.7)
I can talk about my problems with my family.	26 (10.0)	15 (5.7)	25 (9.6)	49 (18.8)	51 (19.5)	40 (15.3)	55 (21.1)

I have friends with whom I can share my joys and sorrows.	11 (4.2)	11 (4.2)	14 (5.4)	37 (14.2)	57 (21.8)	56 (21.5)	75 (28.7)
There is a special person in my life who cares about my feelings.	14 (5.4)	14 (5.4)	18 (6.9)	43 (16.5)	36 (13.8)	52 (19.9)	84 (32.1)
My family is willing to help me make decisions.	5 (1.9)	5 (1.9)	12 (4.6)	32 (12.3)	55 (21.1)	50 (19.2)	102 (39.0)
I can talk about my problems with friends.	30 (11.5)	11 (4.2)	18 (6.9)	39 (14.9)	67 (25.8)	39 (14.9)	57 (21.8)

1: Very strongly disagree   2: Strongly disagree   3: Mildly disagree
4: Neutral   5: Mildly agree   6: Strongly agree   7: very strongly agree

Student's academic motivation
Self-efficacy in learning

From table 4, it is shown that about two-thirds of the students (66.7%) either agreed or strongly agreed that whether the science content is difficult or easy, they are sure that they can understand it and most of them (75.1%) either agreed or disagreed that they are sure that they can do well on science tests. Slightly more than two-thirds of them (69%) either disagreed or strongly disagreed that they are not confident about understanding difficult science concepts, most of them either disagreed or strongly disagreed that no matter how much effort they put in, they cannot learn science (74.7%) and when they find the science concept difficult, they do not try to learn it (71.3%). More than half of them either disagreed or strongly disagreed that during science activities, they prefer to ask other people for the answer rather than think for them self (59%) and when science activities are too difficult, they give up or only do the easy parts (54.4%).

In this study, self efficacy in learning and learning strategies were significantly associated with GPA of the students in univariate analysis. However, although both of them retained in the final best fit model, only learning strategies score was significantly associated with GPA. In Saudi Arabia, a qualitative study was conducted by Abdulghani et al. (2014) [4] to investigate the impact of learning strategies, with other factors such as resource management, motivation and dealing with non-academic issues including sleep quality, English language barrier, stress and homesickness for undergraduate medical students. They indicated significant effect of learning strategies on academic performance and in addition, results suggested that low level of preparedness to examinations and low proficiency in English language were also significant factors of poor academic achievement.

Learning strategies

Majority of the students either agreed or strongly agreed with all the eight statements concerning the learning strategies. The percentage of agreement ranged between 74% for the statement of "When they do not understand a science concept, they find relevant resources that will help them" to 84.3% for the statement that "when learning new science concept, they attempt to understand them". Table 5

The students' motivation was assessed in 3 international schools in Finland using the Motivated Strategies for Learning Questionnaire (MSLQ)[16] and they reported significant correlation with academic achievement [8]. Moreover, Ferguson (2002) [2] investigated factors of academic performance among medical students by examining cognitive and non-cognitive factors revealed that both deep learning and strategic learning models (versus surface learning) showed relative effect on performance in separate studies.

Table 4: Responses of the students to statements concerning with self-efficacy in learning

	Strongly disagree N (%)	Disagree N (%)	No opinion N (%)	Agree N (%)	Strongly agree N (%)
Whether the science content is difficult or easy, I am sure that I can understand it.	4 (1.5)	33 (12.6)	50 (19.2)	116 (44.5)	58 (22.2)
I am not confident about understanding difficult science concepts	79 (30.3)	101 (38.7)	41 (15.7)	33 (12.6)	7 (2.7)
I am sure that I can do well on science tests.	3 (1.1)	25 (9.6)	37 (14.2)	124 (47.5)	72 (27.6)
No matter how much effort I put in, I cannot learn science.	110 (42.1)	85 (32.6)	34 (13.0)	26 (10.0)	6 (2.3)
When science activities are too difficult, I	58	84	62	46	11

give up or only do the easy parts.	(22.2)	(32.2)	(23.8)	(17.6)	(4.2)
During science activities, I prefer to ask other people for the answer rather than think for myself.	48 (18.4)	105 (40.2)	59 (22.6)	42 (16.1)	7 (2.7)
When I find the science concept difficult, I do not try to learn it.	84 (32.2)	102 (39.1)	42 (16.1)	27 (10.3)	6 (2.3)

Table 5: Responses of the students to statements concerning learning strategies

	Strongly disagree N (%)	Disagree N (%)	No opinion N (%)	Agree N (%)	Strongly agree N (%)
When learning new science concept, I attempt to understand them	3 (1.1)	7 (2.7)	31 (11.9)	140 (53.6)	80 (30.7)
When learning new science concept, I connect them to my previous experiences.	7 (2.7)	10 (3.8)	35 (13.4)	134 (51.4)	75 (28.7)
When I do not understand a science concept, I find relevant resources that will help me.	1 (0.4)	22 (8.4)	45 (17.2)	132 (50.6)	61 (23.4)
When I do not understand a science concept, I would discuss with the teacher or other students to clarify my understanding.	8 (3.1)	27 (10.3)	32 (12.3)	141 (54.0)	53 (20.3)
During the learning processes, I attempt to make connections betweenthe concepts that I learn.	1 (0.4)	15 (5.7)	34 (13.0)	145 (55.6)	66 (25.3)
When I make a mistake, I try to find out why.	3 (1.1)	12 (4.6)	27 (10.3)	144 (55.3)	75 (28.7)
When I meet science concepts that I do not understand, I still try to learn them.	1 (0.4)	14 (5.4)	34 (13.0)	133 (51.0)	79 (30.2)
When new science concepts that I have learned conflict with my previous understanding, I try to understand why.	6 (2.3)	11 (4.2)	25 (9.6)	137 (52.5)	82 (31.4)

From the results it could be recommended that the modifiable factors associated with poor academic performance should be identified early in the medical course and prompt modifications should be taken by reducing the hours of passive lecture provided to students and utilizing the patient-based clinical education in settings of small group of students, and applying the strategy of multiple teaching methods that can help students to enjoy learning and develop different learning abilities.

REFERENCES

1. Profanter A. (2016). University is a Private Matter: Higher Education in Saudi Arabia. In: Rethinking Private Higher Education [Internet]. Brill; 2016. p. 158–92.
2. Ferguson E. (2002). Factors associated with success in medical school: systematic review of the literature. BMJ [Internet]. 2002 Apr 20; 324(7343):952–7.
3. Abdulghani HM. (2009). Admission criteria for Saudi Health Colleges: The current status and a literature review. Med Channel., 15(3): 18–21.
4. Abdulghani HM, Al-Drees AA, Khalil MS, Ahmad F, Ponnamperuma GG and Amin Z. (2014). What factors determine academic achievement in high achieving undergraduate medical students? A qualitative study. Med Teach [Internet]. 2014 Apr 11;36(sup1):S43–8.
5. Linnenbrink EA and Pintrich PR. (2002). Motivation as an enabler for academic success. School Psych Rev. 2002; 31(3):313.
6. Kivinen K. (2003). Assessing motivation and the use of learning strategies by secondary students in three international schools. Tampere University Press; 2003.
7. Pintrich PR, Smith DAF, Garcia T, McKeachie WJ. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). Educ Psychol Meas. Sage Publications Sage CA: Thousand Oaks, CA; 1993;53(3):801–13.
8. Taylor RT. (2012). Review of the motivated strategies for learning questionnaire (MSLQ) using reliability generalization techniques to assess scale reliability. Auburn University; 2012.

9.   Trockel MT, Barnes MD, Egget DL. (2000). Health-Related Variables and Academic Performance Among First-Year College Students: Implications for Sleep and Other Behaviors. J Am Coll Heal [Internet]. 2000 Nov; 49(3):125–31.

10. Chemers MM, Hu L, Garcia BF. (2001). Academic self-efficacy and first year college student performance and adjustment. J Educ Psychol [Internet]. 2001; 93(1):55–64.

11. Powell CL, Arriola KRJ. (2003). Relationship Between Psychosocial Factors and Academic Achievement Among African American Students. J Educ Res [Internet]. 2003 Jan; 96(3):175–81.

12. Bonomi AE, Patrick DL, Bushnell DM, Martin M. (2000). Validation of the United States' version of the World Health Organization Quality of Life (WHOQOL) instrument. J Clin Epidemiol [Internet]. 2000 Jan; 53(1):1–12.

13. Skevington SM, Lotfy M, O'Connell KA. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial. A Report from the WHOQOL Group. Qual Life Res [Internet]. 2004 Mar; 13(2):299–310.

14. Ohaeri J, Awadalla A. (2009). The reliability and validity of the short version of the WHO quality of life instrument in an Arab general population. Ann Saudi Med [Internet]. 2009; 29(2):98.

15. Al Sayah F, Ishaque S, Lau D, Johnson JA. (2013). Health related quality of life measures in Arabic speaking populations: A systematic review on cross-cultural adaptation and measurement properties. Qual Life Res [Internet]. 2013 Feb 18; 22(1):213–29.

16. Bani-Issa W. (2011). Evaluation of the health-related quality of life of Emirati people with diabetes: integration of sociodemographic and disease-related variables. EMHJ 2011; 17(11): 825-830

17. Zimet GD, Powell SS, Farley GK, Werkman S, Berkoff KA. (2009). Psychometric Characteristics of the Multidimensional Scale of Perceived Social Support. J Pers Assess [Internet]. 1990 Dec; 55(3–4):610–7.

18. Ramaswamy V, Aroian KJ, Templin T. (2009). Adaptation and Psychometric Evaluation of the Multidimensional Scale of Perceived Social Support for Arab American Adolescents. Am J Community Psychol [Internet]. 2009 Mar; 43(1–2):49–56.

19. Azaiza F. (2008). The perception and utilisation of social support in times of cultural change: the case of Arabs in Israel. Int J Soc Welf [Internet]. 2008 Jul; 17(3):198–203.

20. Aroian K, Templin TN, Ramaswamy V. (2010). Adaptation and Psychometric Evaluation of the Multidimensional Scale of Perceived Social Support for Arab Immigrant Women. Health Care Women Int [Internet]. 2010 Jan 13; 31(2):153–69.

21. Tuan H, Chin C, Shieh S. (2005). The development of a questionnaire to measure students' motivation towards science learning. Int J Sci Educ [Internet]. 2005 Jan; 27(6):639–54.

22. Al Shawwa L, Abulaban AA, Abulaban AA, Merdad A, Baghlaf S, Algethami A. (2015). Factors potentially influencing academic performance among medical students. Adv Med Educ Pract [Internet]. 2015 Jan; 65.

23. Bahammam AS, Alaseem AM, Alzakri AA. (2012). The relationship between sleep and wake habits and academic performance in medical students: a crosssectional study, BMC Medical Education. 2012; 12:61.

24. Singh S, Kamra D. (2016). Study of factors affecting academic achievement in medical students JMSCR 2016 Dec; 4(12): 14968-72.

25. Mohammed OS, Alyoussef AA, Mirghani HO, Ahmed MA, Elbadawi AS. (2015). Impact of lifestyle on academic performance of medical students at University of Tabuk. Indian J Appl Res 2015; 5(7):131-133

26. Currie LK, Pisarik CT, Ginter EJ, Glauser AS, Hayes C, Smit JC. (2012). Life-skills as a predictor of academic success: an exploratory study. Psychol Rep. 2012; 111(1):157–64.

27. Keating XD, Castelli D, Ayers SF. (2013). Association of weekly strength exercise frequency and academic performance among students at a large university in the United States. J Strength Cond Res. 2013; 27(7):1988–93.

28. Shareef AM, AlAmodi AA, Al-Khateeb AA, Abudan Z, Alkhani MA, Zebian SI. (2015). The interplay between academic performance and quality of life among preclinical students. BMC Med Educ. 2015; 15: 193.

29. Gonzalez EC, Hernandez EC, Coltrane AK, Mancera JM. (2014). The correlation between physical activity and grade point average for health science graduate students. Occup Participat Health. 2014; 34(3):160–7.

30. Henning MA, Krageloh CU, Hawken SJ, Zhao Y, Doherty I. (2012). The quality of life of medical students studying in New Zealand: a comparison with nonmedical students and a general population reference group. Teach Learn Med. 2012; 24(4):334–40.

31. Decker, D. M., Dona, D. P., & Christenson, S. L. (2007). Behaviorally at-risk African American students: The importance of student–teacher relationships for student outcomes. Journal of School Psychology, 45, 83–109.

32. Vilchinsky, N., Dekel, R., Leibowitz, M., Reges, O., Khaskia, A, & Mosseri, M (2011). Dynamics of support perceptions among couples coping with cardiac illness: The effect on recovery outcome. Health Psychology, 30, 411–419.

33. Nausheen B, Gidron Y, Peveler R, Moss Morris R. (2009). Social support and cancer progression: A systematic review. J Psychosom Res 2009; 67:403 15.

34. Berkman LF, Blumenthal J, Burg M, Carney RM, Catellier D, Cowan MJ, (2003). Effects of treating depression and low perceived social support on clinical events after myocardial infarction: The enhancing recovery in coronary heart disease patients (ENRICHD) randomized trial. JAMA 2003; 289:3106 16.

35. Burg MM, Barefoot J, Berkman L, Catelier DJ, Czajkowski S, Saab P, (2005). Low perceived social support and post myocardial infarction prognosis in the enhancing recovery in coronary heart disease clinical trial: The effects of treatment. Psychosom Med 2005; 67:879 88.

36. Coventry WL, Gillespie NA, Heath AC, Martin NG. (2004). Perceived social support in a large community sample: Age and sex differences. Soc Psychiatry Psychiatr Epidemiol 2004; 39:625 36.