RESEARCH ARTICLE

Correlation between stress scores and self-regulated learning perception scores in Pakistani students

Faezah Siddiqui[1], Rehan Ahmed Khan[2]

Abstract

Objective: To find out the correlation between levels of stress and self-regulated learning skills in medical students.

Methods: The quantitative correlational study was conducted in January 2018 at the University College of Medicine and Dentistry, Lahore, Pakistan, and comprised regular medical students enrolled in first to fifth year. Data was collected using Perceived stress scale-14 and Self-regulated learning perception scale questionnaires to identify the levels of stress and self-regulated learning skills. Data was collected at one point of time and analysed using SPSS 25.

Results: Of the 350 students approached, 295(84%) filled in the questionnaire. Of them, 118(62.4%) were females and 111(37.6%) were males. No significant differences were found between the scores of male and female students ($p>0.05$). There was a moderate positive correlation between stress and self-regulated learning skills ($p<0.05$).

Conclusion: Self-regulated learning skills can play a vital role in coping with stress and identifying a goal.

Keywords: Stress, Self-regulation, Medical education, Challenges, Strategies, Coping, Students

(JPMA 70: 447; 2020). **https://doi.org/10.5455/JPMA.6674**

Introduction

Medical students all over the world come across challenges. Feelings of incompetence along with cultural and social issues further complicate the situation. It has been observed that stress at personal level results in impaired academic performance, suicidal thoughts and abrasion from profession.[1] On a professional level, studies have suggested that stress can lead to pessimism, which negatively affect a student's ability to care for patients, their rapport with the staff and eventually the culture of medical profession.[2] In our country the resources are limited, and, as a result, the sources of stress in the life of a Pakistani medical student differ from those in other countries.

The aim of medical education is to accommodate doctors who can aid society to the best of their ability. Consequently, the responsibility of the medical institution involves being able to identify stress and support their students individually on how to manage stress effectively throughout their academic and professional years.[3] A number of researchers have proposed different programmes for managing stress that is aimed at helping the students.[4-7] An effective strategy that can help medical students cope with stress is self-regulation.[8] Research also proves that promoting the use of self-regulated learning skills can improve the students' academic achievements, clinical performance and mental well-being.[8] The current study was planned to assess the correlation between levels of stress and self-regulated learning skills in medical students.

[1]Pak Red Crescent Medical and Dental College, Lahore, [2]Pakistan; Islamic International Medical College, Riphah International University, Islamabad, Pakistan.
Correspondence: Faezah Siddiqui. e-mail: faeexahsiddiqui8@gmail.com

Subjects and Methods

The quantitative correlational study was conducted in January 2018 at the University College of Medicine and Dentistry (UCMD), Lahore, Pakistan, and comprised regular medical students enrolled in first to fifth year. UCMD is affiliated with the University of Lahore. After gaining approval from the institutional review board, a pilot study was done on a group of 19 students representing all five years to address any issue related to ''item language and its understanding'' and ''time taken to complete the questionnaire''. The data from the pilot study was not included in the results.

The sample size was calculated through OpenEpi online software,[9] using confidence interval (CI) of 95% and margin of error 5%. Any threats towards internal validity of the study were identified and handled accordingly. Data was collected by using Perceived Stress Scale-14 (PSS-14)[10] and Self-regulated Learning Perception Scale (SRLPS)[11] after their validity and reliability were established. The questionnaire consisted of three sections designed on Google forms (Annexure 1). Students signed informed consent before they completed the questionnaire.

The PSS-14 scale consists of 14 questions with a range of options (never, almost never, sometimes, often, very often) on Likert scale from 0 to 4 for each item. These items inquire about the events that occurred one month prior to the survey. Items number 4,5,6,7,9,10 and 13 are positively stated questions. Therefore, their score is calculated as reversed (0=4, 1=3, 2=2, 3=1, and 4=0). The final score ranges between 0 and 56. High scores signify high level of stress, while low scores indicate lower level of stress. The range of PSS-14 scores were divided into stratified quartiles. The upper two and lower two quartiles were combined (28 being the operational cut-off value for the upper bound) and were labelled as severe stress, moderate stress, mild stress and no stress respectively. This cut-off value was set in accordance with similar studies in the region.[12-14]

The SRLPS incorporates 41 items with a range of options (never, almost never, sometimes, often, very often) on Likert scale from 1 to 5 for each item. The minimum possible score for SRLPS is 41 and the maximum 205.

Data was collected at one point of time and analysed using SPSS 25. Pearson's correlation was used in order to determine the relationship between the students' stress levels and the self-regulated learning skills. $P< 0.05$ was taken as significant.

Results

Of the 350 students approached, 295(84%) filled in the questionnaire. Of them, 118(62.4%) were females and 111(37.6%) were males. No significant differences were found between the the scores of male and female students ($p>0.05$). Mean PSS-14 score was 29.87±1.59 in females and 29.75±1.99 in males, whereas the mean SRLPS score was 114.66+26.49 in females and 117.91±28.31 in males.

Table-1: Demographic Characteristics and their Mean Scores of PSS-14 and SRLPS.

Variables	n (%)	PSS-14 Mean SD	SRLPS Mean SD
Gender			
Female	184(62.4)	29.87±1.59	114.66±26.49
Male	111(37.6)	29.75±1.99	117.91±28.31
Age (years)			
18-20 years	61(20.7)	29.28±2.37	112.33±23.02
21-23 years	177(60)	29.92±1.56	115.90±27.43
24-26 years	57(19.3)	30.12±1.43	119.63±30.34
Year of study			
First year	45(15.3)	29.47±2.52	115.04±25.64
Second year	57(19.3)	29.39±2.01	109.14±20.12
Third year	96(32.5)	29.98±1.41	120.03±29.68
Fourth year	60(20.3)	30.06±1.36	112.65±26.00
Fifth year	37(12.5)	30.32±1.31	121.78±32.61
Residence			
Hostel	112(38.0)	29.91±1.57	122.52±32.92
With Parents	136(46.1)	30.29±1.75	114.43±23.96
With Relatives	14 (4.7)	27.50±1.87	110.58±10.51
Rental house	33 (11.2)	28.61±0.75	110.57±10.51
Motivation to study MBBS			
Personal interest	144(48.8)	30.35±2.1	129.98±33.26
Parental pressure	130(44.1)	29.36±1.2	115.6±2.89
Random choice	21 (7.1)	29.09±0.44	107.81±8.29

Table-2: Comparison of SRLPS scores between "Stressed" and "Not Stressed" students.

Score of PSS-14	Stress level	n (%)	Mean SRLPS
Up to 14	No stress	--	--
Up to 28	Mild	184 (62.4%)	129.98+33.26
Up to 42	Moderate	111(37.6%)	115.6+2.89
Up to 56	Severe	--	--

SRLPS: Self-regulated Learning Perception Scale.

On the important factor of motivation to study MBBS, SRLPS score was higher in students 129.98±33.26 studying out of their own choice, and mean SRLPS score was lower in students 115.6±2.89 who were studying MBBS due to parental pressure. However, the mean PSS-14 score of students with personal interest 30.35±2.1 and those under parental pressure 29.36±1.2 was not significant (Table 1).

The highest SRLPS score was seen in final year students 121.78 ±32.61 followed by third year 120.03 ±29.68, first year 115.04 ±25.64, fourth year 112.65±26.00 and second year 109.14±20.12.

PSS-14 scores ranged 21-34 SRLPS ranged 82-172 (Table-2).

Pearson's correlation indicated moderate positive correlation between stress and SRLS (Figure).

Annexure: PSS-14 and SRLPS instrument; Levels of Stress and Self-Regulated Learning Skills among Medical Students of UCMD.

Dear Student,

The objective of this study is to measure stress levels and self-regulation skills in medical students of UCMD. Your information will remain confidential. Your participation in the research is highly appreciated. Please, select I agree if you are willing to participate.

Socio Demographic Characteristics

Gender: ☐ Female ☐ Male

Age in years: ☐ 18 to 20 ☐ 21 to 23 ☐ 24 to 26

Year of Study: ☐ first year ☐ second year ☐ third year ☐ fourth year ☐ fifth year

Residence ☐ Living with parents ☐ Hostel ☐ Living with relatives ☐ Rental house

Motivation to study MBBS: ☐ Personal interest ☐ Parental pressure ☐ Random choice

Perceived Stress Scale 14

The questions in this scale will ask you about your feelings and thoughts during THE LAST MONTH. In each case, you will be asked to indicate your response by selecting one of the options. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

In the last month, how often have you been upset because of something that happened unexpectedly?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt that you were unable to control the important things in your life ?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt nervous and "stressed"?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you dealt successfully with day to day problems and annoyances?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt confident about your ability to handle your personal problems?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt that things were going your way?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you found that you could not cope with all the things that you had to do?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you been able to control irritations in your life?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt that you were on top of things?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you been angered because of things that happened that were outside of your control?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you found yourself thinking about things that you have to accomplish?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you been able to control the way you spend your time?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

☐ Never ☐ Almost Never ☐ Sometimes ☐ Fairly Often ☐ Very Often

Dimensions and items of the SRLPS

I take action to learn according to my interests.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I search for possibilities to learn new things.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

When faced with a problem, I take action to solve it.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I take every opportunity to learn new things.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I am curious about the causes of things I see, hear or read.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I attentively observe/examine things around me.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I derive new learning assignments for myself from the things I observe around me.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I make a plan to utilize resources and strategies in order to reach my goal.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I make a plan as to how I will carry out the learning process.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I prioritize my goals.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I manage my time in order to learn as efficiently as possible.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I make a plan to utilize learning resources efficiently.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I identify the resources needed during the learning process

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I clearly identify the objectives to be achieved at the end of the learning process.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I identify the learning materials that will help me to learn.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I search for ways to facilitate learning in new situations.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

After any learning assignment, I assess whether I learned the material completely.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I use different learning strategies for the acquired knowledge to be sustainable.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I search for new strategies if those used in implementing my plan are inadequate.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I use different learning strategies for the knowledge I acquire to be meaningful.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I assess whether or not my goals are accomplished

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I strive to eliminate any difficulties I face during the learning process.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I continuously improve my problem-solving methods.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

I strive to improve my weaknesses in learning.

☐ Never ☐ Sometimes ☐ About half the time ☐ Most of the time ☐ Always

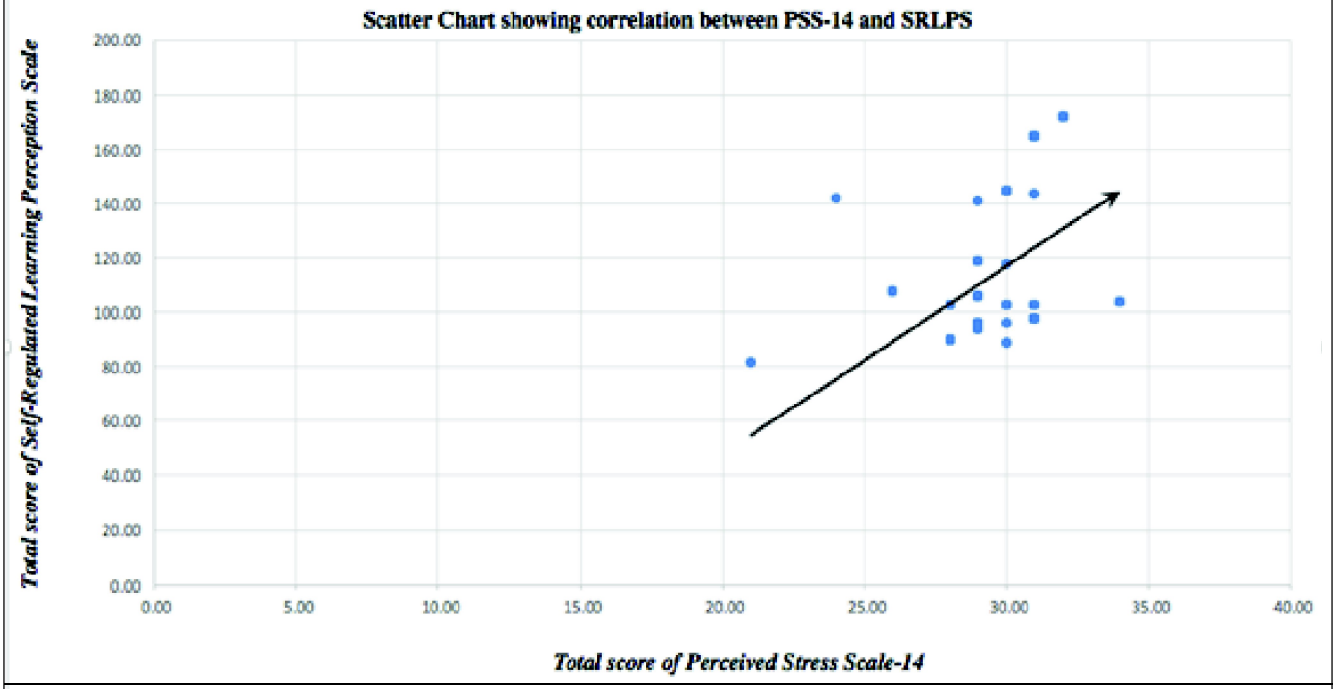

Figure: Graphical representation of correlation between Perceived Stress Scale-14 (PSS-14) and Self-regulated Learning Perception Scale (SRLPS).

Discussion

The fact that no statistically significant differences were found between PSS-14 scores of female and male students was not unexpected.[15,16] The total SRLPS scores calculated between male and female students showed little variation which was in contrast with a study.[17] One possible reason for it could be the "private" study setting. Given that a majority of the medical students were from a higher socioeconomic class, it is assumed that their stress and self-regulation levels were not affected by gender.[16,18] Personal interest is an intrinsic motivator, which helps to identify goals and to make plans to achieve them.[19-21] Therefore, it was no surprise that PSS-14 score was lower and SRLPS was higher in students who were studying MBBS with their own personal interest.

A number of studies have proved that self-regulation skills are refined over time and are usually highest in final/fifth year.[22-24] But the fact that self-regulation skills are second most developed in third year was unexpected. One possible explanation to this finding can be the type of curriculum the students are following. The students of fourth and final years studied the traditional curriculum divided as first two years for Basic Sciences and the last three years for Clinical Sciences. In contrast, the current first, second and third year are exposed to an integrated problem-based learning (PBL) curriculum. As third year students have been learning to apply integration for almost three years, their self-regulation skills improve a lot. [25-27]

In our study a moderate positive correlation between stress and self-regulated learning skills was observed which was contradictory to previous studies.[8,28]

One way to explain this finding is the possibility that some amount of stress is natural part of medical education and might be a motivator for some students.[29] Looking at the total scores of PSS-14, out of 295 students, 90 scored a maximum of 26 that fall in the lower quartile of stress.[12,13,14] Since majority of the medical students fall in the lower quartile of stress, it is assumed that mild stress can direct students towards self-regulation. It is a positive sign that the students care about their learning and take stress to make plans accordingly. On the bright side, it can be considered that students are dealing with stress through self-regulation.

As our study was conducted at a single centre, its scope is restricted. Another limitation was related to PSS-14 that can only evaluate the level of stress during the preceding month. Longitudinal surveys should be used to measure stress throughout an entire academic year. A final concern was regarding the total scores obtained through the

questionnaires. It might be a possibility that students under- or over-estimated their stress levels and self-regulated skills.

In future studies it will be prudent to compare self-regulated learning scores of two medical colleges; one following the traditional, and the other following an integrated curriculum.

Conclusion

Stress and self-regulation were found to be independent of gender but self-regulated learning skills played a vital role in coping with stress and identifying a goal. Although stress can be a motivator for some medical students, only low levels of stress helped students to remain focussed.

Disclaimer: The text is part of a Masters in Medical Education thesis.
Conflict of Interest: None.
Source of Funding: None.

References

1. Osama M, Islam MY, Hussain SA, Masroor SM, Burney MU, Masood MA, et al. Suicidal ideation among medical students of Pakistan: a cross-sectional study. J Forensic Leg Med 2014;27:65-8.
2. Rennie SC, Rudland JR. Differences in medical students' attitudes to academic misconduct and reported behaviour across the years--a questionnaire study. J Med Ethics 2003;29:97-102.
3. Brydges R, Butler D. A reflective analysis of medical education research on self-regulation in learning and practice. Med Educ 2012;46:71-9.
4. Chang E, Eddins-Folensbee F, Coverdale J. Survey of the prevalence of burnout, stress, depression, and the use of supports by medical students at one school. Acad Psychiatry 2012;36:177-82.
5. Fares J, Saadeddin Z, Al Tabosh H, Aridi H, El Mouhayyar C, Koleilat MK, et al. Extracurricular activities associated with stress and burnout in preclinical medical students. J Epidemiol Glob Health 2016;6:177-85.
6. Nelson NG, Dell'Oliver C, Koch C, Buckler R. Stress, coping, and success among graduate students in clinical psychology. Psychol Rep 2001;88:759-67.
7. Shaikh BT, Kahloon A, Kazmi M, Khalid H, Nawaz K, Khan N, et al. Students, stress and coping strategies: a case of Pakistani medical school. Educ Health (Abingdon) 2004;17:346-53.
8. Van Nguyen H, Laohasiriwong W, Saengsuwan J, Thinkhamrop B, Wright P. The relationships between the use of self-regulated learning strategies and depression among medical students: an accelerated prospective cohort study. Psychol Health Med 2015;20:59-70.
9. Dean AG, Sullivan KM, Soe MM. OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version 3.01. [Online] 2013 [Cited 2018 February 10]. Available from URL: www.OpenEpi.com
10. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav 1983;24:385-96.
11. Turan S, Demirel O, Sayek I. Metacognitive awareness and self-regulated learning skills of medical students in different medical curricula. Med Teach 2009;31:e477-83.
12. Thangaraj S, D'souza L. Prevalence of stress levels among first year medical undergraduate students. Int J Interdiscip Multidiscip Stud 2014;1:176-81.
13. Amr M, Hady El Gilany A, El-Hawary A. Does gender predict medical students' stress in mansoura, egypt? Med Educ Online 2008;13:12.
14. Örücü MÇ, Demir A. Psychometric evaluation of perceived stress scale for Turkish university students. Stress Health 2009;25:103-9.
15. Yusoff MS, Abdul Rahim AF, Yaacob MJ. Prevalence and Sources of Stress among Universiti Sains Malaysia Medical Students. Malays J Med Sci 2010;17:30-7.
16. Waqas A, Khan S, Sharif W, Khalid U, Ali A. Association of academic stress with sleeping difficulties in medical students of a Pakistani medical school: a cross sectional survey. PeerJ 2015;3:e840.
17. Cleary TJ, Durning SJ, Artino AR, Jr. Microanalytic Assessment of Self-Regulated Learning During Clinical Reasoning Tasks: Recent Developments and Next Steps. Acad Med 2016;91:1516-21.
18. Muzafar Y, Khan HH, Ashraf H, Hussain W, Sajid H, Tahir M, et al. Burnout and its Associated Factors in Medical Students of Lahore, Pakistan. Cureus 2015;7:e390.
19. Ertmer PA, Newby TJ. The expert learner: Strategic, self-regulated, and reflective. Instr Sci 1996;24:1-24.
20. Sitzmann T, Ely K. A meta-analysis of self-regulated learning in work-related training and educational attainment: what we know and where we need to go. Psychol Bull 2011;137:421-42.
21. Zimmerman BJ. Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. Am Educ Res J 2008;45:166-83.
22. Cho KK, Marjadi B, Langendyk V, Hu W. Medical student changes in self-regulated learning during the transition to the clinical environment. BMC Med Educ 2017;17:59.
23. Dunlap JC. Problem-based learning and self-efficacy: How a capstone course prepares students for a profession. Educ Technol Res Dev 2005;53:65-83.
24. Regehr G, Eva K. Self-assessment, self-direction, and the self-regulating professional. Clin Orthop Relat Res 2006;449:34-8.
25. Fisher M, King J, Tague G. Development of a self-directed learning readiness scale for nursing education. Nurse Educ Today 2001;21:516-25.
26. Stentoft D, Duroux M, Fink T, Emmersen J. From cases to projects in problem-based medical education. Journal of Problem Based Learning in Higher Education 2014;2:45-62.
27. Thomas L, Bennett S, Lockyer L. Using concept maps and goal-setting to support the development of self-regulated learning in a problem-based learning curriculum. Med Teach 2016;38:930-5.
28. Jouhari Z, Haghani F, Changiz T. Factors affecting self-regulated learning in medical students: a qualitative study. Med Educ Online 2015;20:28694.
29. Al-Basri SF, Al-Afari R, AlHibshi AM, Al-Sayes F, Soo PY, Tekian A. Readiness for self-directed learning among King Abdulaziz University medical students. Int J Res Med Sci 2017;5:xxx-xx.