Metacognitive Awareness and Academic Achievement of Medical Students in Different Medical Colleges of Lahore, Pakistan

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ABSTRACT

Introduction: To determine medical students' metacognitive awareness and its impact on their academic performance. Study design: Cross-sectional analytic study. Place and Duration of Study: Two different private medical College's from Lahore. From March 2016 to September 2016.

Material and Methods: Study was done among second year students of two private medical colleges in Lahore. Students' first year academic achievement information was collected and they also filled the semi- structured questionnaire on metacognition regulation by the metacognitive awareness of reading strategies inventory (MARSI) based on three dimensions of metacognition (GLOB, SUB and PROB). Simple random sampling, a type of probability sampling was used for this study. The data were entered in SPSS 20, Metacognitive score was taken as an independent variable while academic performance (first professional part 1 results) was the dependent variable. For descriptive data, mean and standard deviation were used. For categorical data, percentage and frequencies were used. Pearson correlation coefficients were calculated to examine the item-total score correlation

Result: A total 232 students participated. The reliability coefficient of MARSI was 0.88 and there was strong correlation among all dimensions of Metacognition score and academic achievement with Correlation coefficient value was 0.257 (p<0.01). Medical students of different colleges have almost equal (college 1 std. deviation 109±15.3, college 2 std. deviation 110.6±17.3) Metacognition levels.

Conclusion: All dimensions of metacognition are positive and strongly correlated with each other's. Higher the score in one dimension will cause positive change in other dimension score and vice versa. Overall it would be beneficial for the trainers and other mentors that to work on one dimension and it would also cause positive impact on other skills and strategies.

Keywords: Metacognitive Knowledge, Metacognitive Regulation, Metacognition Awareness, Medical Students, Academic Achievement, Regulation of Cognition, Reading Strategies, Reading Skills

INTRODUCTION

Metacognition is thinking about thinking or re-thinking. It envelops self-information of learning strategies and the capacity to utilize this information in a productive and viable way. The thinking systems required in several ranges crosswise over co-operative, individualistic, and aggressive structures.[1]

Metacognition in the learning process plays a fundamental role, especially among medical students to achieve their goals. It helps learners to be capable of develop a plan, monitor and evaluate how much it is effective, that means metacognition helps the learner to be more involved in learning process.[2] According to Flavell (1979) Schraw and Moshman, (1995) the metacognition is "knowledge and cognition about cognitive phenomena".[3]

Metacognition refers to one's ability to know and regulate cognitive processes. It is a construct that has been linked to effective learning and higher academic achievement presumably because it enables students to evaluate and effectively control their own learning.[4]

Metacognition encircle knowledge of learning strategies and the capacity to utilize this information in a productive and viable way and thinking.

Metacognition has two main components, first is metacognition awareness in which a person is aware of own cognition process and second is his metacognition regulation.[3]

Metacognition regulation depends upon global reading strategy (this strategy can be thought of as generalized or intentional reading strategies), problem solving strategy (this strategy can use when problems develop in understanding textual information) and support reading strategy (this strategy can involve use of outside reference materials, taking notes, and other practical strategies). Every person select the strategy according to the time and situation.[5,3]

Academic achievements are encouraging students to focus on scoring better than others or avoiding the appearance of incompetence. These are certain goals of students towards learning[6] Such goals can be achieved by focusing on learning and good understanding of content and challenging the tasks.[7] Student's achievements can be assess by their good self-efficacy, performance, skill, competency and metacognition regulation.[8] Many studies shows a strong relationship between metacognition levels and academic performance of the students.[7,9,1]

This study will be useful for medical students to improve their metacognitive skills and to achieve academic goals,

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as doctors they are expected to perform excellently and be independently lifelong. The results of this study will also help students to achieve their academic goals and policymaker in better policymaking.

MATERIAL AND METHODS

The current study was a cross-sectional co-relational study. Sampling technique was simple random sampling a type of probability sampling. This study was conducted in the six months period from January to June 2016 in two different medical colleges of Lahore Pakistan.

The Sample size of the current study was 232 students from the selected medical colleges. The sample size of Epi Info version 7 comes out to be 207. Non- response possibility 10% was added.

The ethical approval/permission was obtained from University of Lahore Research and Ethics Board. Participation in this study was voluntary, Students were selected randomly from both colleges, 2nd year MBBS classes and the students were explained that the results of this study will be presented collectively and no individual participant will be identified plus no financial help will be provided to the participants for participation in the study. 20 minutes given for the response. Consent from students was taken and privacy and confidentiality was ensured. All students who cleared the exam in first attempt were included and all detainee students were excluded. For maintaining internal validity, the study population was not informed about the final conclusion of the study as it might affect their results. The questionnaire, Metacognitive Awareness of Reading Strategies inventory (MARSI) (Version 1.0) developed by K Mokhtari and C.A. Reichardin 2001.[5] This is a very useful inventory for researchers and the data obtained from the instrument as a means of monitoring students' progress in reading: estimating, schedule, regulation, and conditional the knowledge. This 30 item inventory was specifically developed to measure adult metacognition and reading comprehension. This instrument has been utilized in several

countries and has shown satisfactory results. This instrument has an established validity and reliability.[10,11,12] The inventory was elected because it was easily understandable for student. The questionnaire has been divided into three broad categories of reading strategies including:

Global Reading Strategies (GLOB): 1, 3, 4, 7, 13, 14, 17, 19, 22, 23, 25, 26 and 29. This is the setting a purpose for reading, previewing text, content or predicting what the text is about.

Problem Solving Strategies (SUB): 8, 10, 11, 16, 18, 21, 27 and 30. This is localized, focused problem-solving strategies used when problems develop in understanding textual information.

Support Reading Strategies (SUB): 2, 5, 6, 9, 12, 15, 20, 24, and 28. This involves using the support mechanisms or tools aimed at sustaining responsiveness to reading.

RESULTS

This study was focused on the relationship of metacognitive abilities of medical students and their academic performance. Academic performance has been measured in terms of marks, whereas a standard scale for the measurement of Metacognition score was used.

Reliability Analysis is an important concept in applied research. The reliability analysis has shown that there are 30 item MARSI scale was used for Metacognition evaluation in medical students. Value of cronbach's Alpha was 0.787.[13] It is also called reliability coefficient. It is a simple rule in the description of the reliability coefficient that higher the value higher will be the reliability of data and instrument.[14]

Approximately 47% sample respondents have been selected from 1 college and 53% from 2 college. Academic performance has been measured in terms of first professional part 1 marks, figure no 1 pie chart is the presentation of qualitative variable.

Table no I have the information about main variables of study like marks in last exams and the total and mean scores of all three main dimensions of Metacognition. The minimum
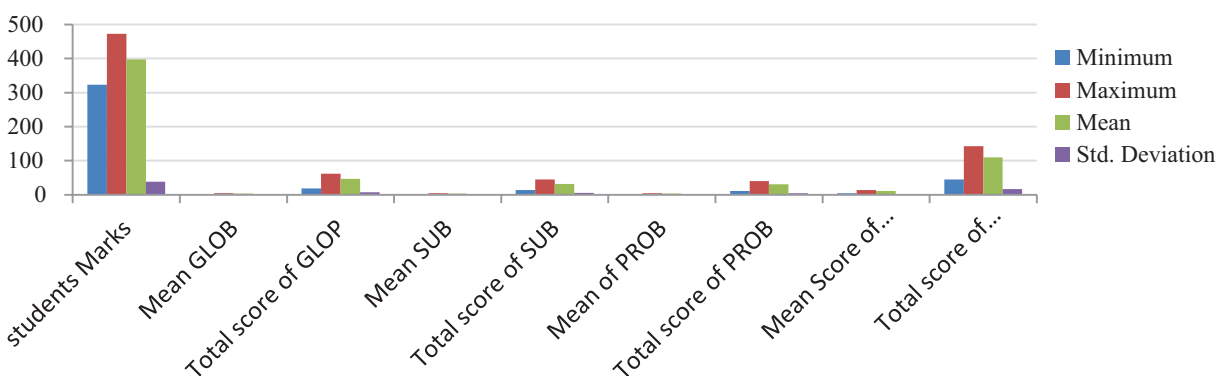
Table-1: Descriptive statistics of quantitative variables of study

Total Score of Global Reading Strategies (N=232)	Pearson Correlation	1	.730**	.708**
	Sig. (2-tailed)		.000	.000
Total Score of Support Strategies (N=232)	Pearson Correlation	.730**	1	.676**
	Sig. (2-tailed)	.000		.000
Total score of Problem solving (N=232)	Pearson Correlation	.708**	.676**	1
	Sig. (2-tailed)	.000	.000	
** 0.01< level (2-tailed test).				
Table-2: Pearson Correlation between strategy subcategories of Metacognition				

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		Marks	Total score of Metacognition
Marks	Pearson Correlation	1	.257**
	Sig. (2-tailed)		.000
	N	231	231
Total score of Metacognition	Pearson Correlation	.257**	1
	Sig. (2-tailed)	.000	
	N	231	232
** p< 0.01 (2-tailed)			
Table-3: Correlations between academic achievement and Metacognition			
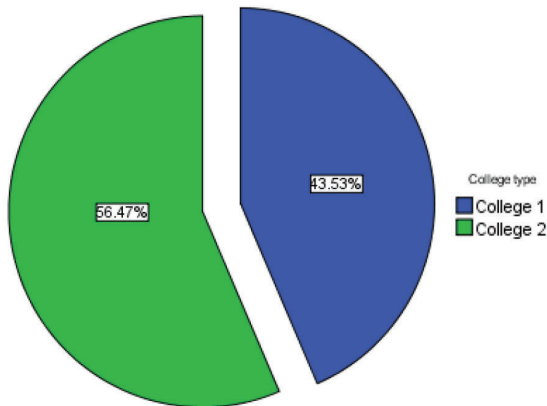
Figure-1: Pie chart for two types of medical colleges students

marks in the sample of 232 were 323 and maximum were 472. Average marks in the medical students were approximately 398 with standard deviation of 38 marks.

The table II has shown that there is a strong positive correlation between the score of global strategies and support strategies.

Research Question no1: Does metacognition awareness, enhance the academic performance of students?

The main hypothesis of this study to find out the association between academic achievement and Metacognition score of the students. For this purpose again, Pearson correlation was used. The table no III has shown that correlation coefficient value is 0.257 which is away from 1 but it has (**) which shows that there is strong positive relationship between academic achievement and Metacognition score. It means that, students who have higher the Metacognition score, higher will be the score of academic achievement/ results and vice versa.

Research Question no2: Are the metacognition of the students from two different medical colleges are same?

For this comparison students' independent sample t-test was used. Average Metacognition score of students of college 1 is 109.47 and college 2 students was 110.66 with almost similar standard error. Average scores of both colleges are very close to each other. It showed no significant difference between two different college students. May be because if same type of teaching and learning strategies. Almost all medical colleges in Punjab practicing the same curricula.

Research Question no3: Is there a relation between metacognitive awareness and academic achievement?

In this study academic achievement (marks used as substitution of academic achievement) is a dependent variable and metacognitive abilities and skills are act as independent variable. Regression analysis between metacognitive abilities and academic achievement variable

was shown very small (0.066) which means this regression model is not explaining too much variation in the dependent variable on the basis of metacognition scores. Analysis of Variance (ANOVA) is part of regression analysis. Its significance value is 0.000 which is less than defined level of significance (0.05). It shows that the overall model was good for prediction and academic achievement that can be predicted on the basis of metacognitive skills.

DISCUSSIONS

Metacognition is a complex phenomenon based on different dimensions; Global reading strategies, Problem solving strategies and support reading strategies. It is not a new concept in the field of psychology, but major work has been done two decades ago. According to Flavell (1979) Schraw and Moshman, (1995), Metacognition is "knowledge and cognition about cognitive phenomena".[15,16] Simply stated Metacognition is thinking about thinking.[9] This study has focused on the Metacognition ability of medical students and its relationship with academic achievement. We have hypothesized that metacognition has a relationship with marks of students (Predictor of academic achievement). According to Amzil, the group of students who got metacognition skills training achieve high scores than others.[4] Students metacognition correlated strongly with performance goal.[6] Researcher assumed that there is no difference between different medical college students with respect to metacognitive abilities.

Past researches have great debate on the relationship of academic achievement and Metacognition abilities.[17] This issue has been addressed by educationists, psychologists and medical professional as well due to its versatile nature and applications. Researcher has shown that students have high Metacognition score are more organized, good planners, complete tasks on time and according to schedule, having the abilities to monitor the path of learning and adaptive in nature.[12] All these things are very helpful in performing their academic activities and ultimately they perform well.[18] Results of current study shows that there is strong and significant positive correlation between academic performance and metacognition score.

Number of studies have also established these findings and proved that there is strong positive relationship between metacognitive pathway of learning and mastery goals which afterwards affect the academic performance of students.[19] These findings have been controlled by age, gender and intellectual ability.[20,21] Similar type of finding has been reported by another researcher that those students who have higher level of metacognitive skills, he will perform better in end term exam especially. The researcher has assumed that medical students who got admission in

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medical colleges usually are high achievers and have great academic potential.[22] They have been proved themselves in intermediate classes. They almost have similar type of thinking patterns, academic environment (recommended by PMDC), academic evaluations and academic burden. In these situations it would be possible they have similar levels of metacognitive skills.[23] This study has found that there is no difference between these two groups of students belongs to two different colleges. So these factors of change will be the controlling factors in this study. All these things have translated that both types of college students would have almost same in Metacognition skills. One important argument behind these findings that both groups of students belong to the same age group. Researchers have shown that metacognitive abilities change as age changes.[24,25] Inversely it can be concluded that same age groups will have almost similar skills.

This study highlighted that medical students have higher levels of metacognitive abilities. Different studies have reported that medical students usually have high skills of metacognition and academic achievement[26,22,12] than non-medical or other professional students. These researches have made a comparison between medical students and other students of colleges and found that Metacognition score are different significantly to each other.[27]

CONCLUSION

Metacognition is a complex concept which was measured through different dimensions. In this study the model[5] used for the measurement of this concept has used three dimension model; GLOB, PROB and SUP. It is very obvious that all are the predictors of the main concept of metacognition so there are chances that they would be correlated with each other's. Some authors have also reported that these dimensions should have link with each other. Higher the score in one dimension will cause positive change in other dimension score and vice versa.[10,18] Overall it would be beneficial for the trainers and other mentors that it is easy to work on one dimension and it would also cause positive impact on other skills and strategies.

Recommendations

On the basis of this study following are recommendations for medical educationists:

There is a strong impact of metacognition on academic evaluation and performance of students. So along these lines so as to move forward their performance, change of their metacognition abilities if be accentuated.

Teachers should be aware about the strategies and methodology in the classroom environment which prove helpful in upgrading the metacognition levels of students, consequently empowering them to achieve high aims in their lives.

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