Original Article

The Effect of Metacognition Regulation Evaluation on Medical Student Progress

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ABSTRACT

Cognition is the scientific term referring to the mental processes involved in gaining an understanding of knowledge including, judging, thinking, reasoning, knowing, remembering, and problem-solving. **Objective:** To observe metacognition's impact on medical students' academic achievement. **Methods:** It was a cross-sectional analytical study. Three medical colleges were surveyed to obtain data from second-year medical students**.** The data from the Metacognitive Awareness of Reading Strategies Inventory (MARSI) and each student's first-year academic achievement information were collected from January to June 2021. A simple random sampling procedure. Academic performance was a dependent variable, while the metacognitive score was an independent variable. Three hundred thirty-two students participated in the survey. **Results:** With a correlation coefficient value of 0.257, the findings indicated a significant link between metacognition and academic success (p 0.01). Metacognition levels among medical students from various colleges are nearly identical. **Conclusions:** Current study findings have shown that all three dimensions are positively and strongly correlated to each other.

INTRODUCTION

Cognition is the scientific term referring to the mental processes involved in gaining an understanding of knowledge including, judging, thinking, reasoning, knowing, remembering, and problem-solving So, Metacognition refers to thinking and regulating one's cognition. It constructs active learning and higher educational performance, likely because it gives the students a way to evaluate and take charge of their own learning [1,2]. "Metacognition" is thinking about thinking or re-thinking [3]. Metacognition includes control of planning, monitoring, awareness, repairing, reasoning, summarizing, evaluating, devising a goal, and appropriate behavior [4]. First is metacognition awareness, in which a person is aware of their own cognitive process, and second is metacognition management [5]. Global reading strategy, problem-solving strategy, and support reading strategy are all necessary for the management of metacognition. Every person chooses a strategy based on the occasion and context [5, 6]. Academic accomplishments are some learning goals that students have [7]. These goals can be met by putting an emphasis on learning, having a solid comprehension of the material, and completing difficult

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assignments [2, 3]. According to Özsoy (2009), students' accomplishments can be evaluated by their high levels of performance, self-efficacy, and metacognition regulation [8]. Metacognition plays an important role in learning processes, in particular among medical students to reach their intended objectives. Metacognition enables the student to be more engaged in the learning process by enabling them to construct, monitor, and evaluate a plan to maximize its effectiveness [9]. Many studies reveal a high correlation between students' metacognition levels and academic success [10-12]. These medical students may be on the front lines conducting evaluations when resources and time constraints are at play because metacognitive abilities are becoming an increasingly important part of the training of health professionals [13]. As there is trace evidence that explores metacognition evaluation and its regulation in undergraduate medical students of Pakistan [14], Determining how medical students regulate their metacognition and how it affects their academic performance is the goal of the current study. This study will help medical students develop their metacognitive abilities and meet their academic objectives because doctors are expected to function flawlessly, professionally, and independently as lifelong learners who can continually add to and expand upon their prior knowledge. Students will be assisted in achieving their academic objectives by the study's findings, which will also help policymakers and other interested parties make better decisions.

METHODS

The current study was analytical cross-sectional. The duration was six-month from January to June 2021 at three different medical colleges in Punjab. In this study, a probability sampling technique called simple random sampling was applied. Students were selected randomly from new 2nd-year MBBS classes. The questionnaire was filled out under the supervision of a class representative. The student's verbal consent was obtained and secrecy and privacy were ensured. The data was compiled using SPSS 20.0 after the response forms from the students were gathered, coded, and collected. Collected academic performance (first annual professional part 1 results) was the dependent variable. Inclusion Criteria: All those students who cleared the first professional MBBS exam on the first attempt. Exclusion Criteria: All detainees and absent students were excluded. The selected questionnaire, the Metacognitive Awareness of Reading Strategies Inventory (MARSI) was introduced by Kouider Mokhtari and Carla A. Reichard [6], were used. This 30-item questionnaire was created specially to assess reading comprehension and adult metacognition. Three broad areas of reading strategies make up the questionnaire. including Global-Reading Strategies: Setting a

determination for content reading, text previewing, or assuming what the material is about involves doing this. Problem-Solving Strategies: This is a restricted and focused problem-solving strategy used when problems develop in understanding documented information. Support-Reading Strategies: This entails the use of support systems or technologies designed to maintain receptivity to reading.

RESULTS

This study focuses mainly on the relationship between the metacognition skills of undergraduate medical students and their academic records. Academic achievements have been measured in relations of first professional examination scores. And we used freely available standard scale for the measurement of "Metacognition awareness regulation score inventory" (MARSI). After that, correlation tests were used to see the relationship between the main study variables. Figure 1 chart is the presentation of a qualitative variable (college type). This chart has shown that respondents of the current study have been selected from three different medical colleges. Approximately 36.2% of data sample have been selected from the first college type. and 35.2% of the sample was from 2-second college, remaining part was selected from college three.
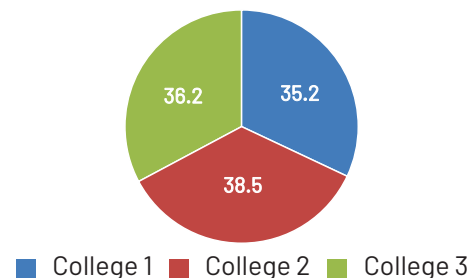

Figure 1: Pie chart for college type

Table 1 has data about the study variables like scores of first professional examinations and three main dimensions of Metacognition awareness, like mean score of global reading strategies, the total score of global reading strategies, etc.

Main Variables	N	Minimum	Maximum	Mean±SD
Marks	331	323.00	472.00	397.4156±38.68300
Mean of Global Reading Strategies	332	1.46	4.77	3.6012±.60244
Total Score of Global Reading Strategies	332	19.00	62.00	46.8147±7.83074
Mean of Support Strategies	332	1.56	5.00	3.5809±.61263
Total Score of Support Strategies	332	14.00	45.00	32.2284±5.51538
Mean of Problem-solving	332	1.38	5.00	3.8907±.62357
Total score of Problem-solving	332	11.00	40.00	31.1034±4.98896
Mean score of Metacognition	332	4.47	14.37	11.0702±1.64779
Total score of Metacognition	332	45.00	143.00	110.1466±16.50043

Table 1: Descriptive Statistics

Table 2 shows the three dimensions of metacognition and total Metacognition were explained through their total scores and mean scores. Further, each variable is mentioned here in its minimum and maximum value in the

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respondents, mean score, and standard deviation of variables. Variable marks were used as a determinant of academic achievement. In the sample of 332 students, the minimum score was 323 and the highest score was 472.thus with standard deviation, the student's average marks were approximately 398±38. The first dimension of Metacognition is Global reading strategies which have a minimum mean value is 1.46 and a maximum is 4.77 with a standard deviation is 0.60. All dimensions of Metacognition almost have similar variation levels and minimum and maximum values. It shows that medical students have similar scores on three dimensions of Metacognition; Global reading strategy, support strategy, and problem-solving strategy. There are 30 items of questionnaires measured on a 5-point Likert scale. This average score showed that medical students have a sufficient level of Metacognition and respective dimensions.

		Total Global Reading Strategies score	Total Support Strategies score	Total Problem-solving score
Total Score of Global Reading Strategies	Pearson Correlation	1	.730**	.708**
	Sig. (2-tailed)		.000	.000
	N	332	332	332
Total Score of Support Strategies	Pearson Correlation	.730**	1	.676**
	Sig. (2-tailed)	.000		.000
	N	332	332	332
Total score of Problem-solving	Pearson Correlation	.708**	.676**	1
	Sig. (2-tailed)	.000	.000	
	N	332	332	332

Table 2: Correlations among three dimensions of metacognition **. Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

This study has mainly focused on analyzing and comparing the ability and regulation of metacognition in medical college students and their relationship with academic achievements. A researcher assumed that the ability of the student to think (Metacognition) is related to student grades (Predictor of academic achievement). Second, the researcher assumed that there is no difference in metacognitive abilities among students from different medical colleges. Both hypotheses were tested earlier through correlation coefficient and independent sample t-tests respectively. Previously, researchers have had a great discussion on the relationship between academic accomplishment and metacognition abilities. Because of its versatile nature and applications, this issue has been addressed by health educators, medical professionals, and psychologists. This study has the hypothesis that there would be a positive relationship between these two concepts. And the results have been found. There is a significantly strong and positive relationship between metacognition scores and academic achievements. Many researchers have shown and reported that academic

performance is a correlate of metacognitive ability [15]. The greater the ability, the higher the academic scores, and vice versa. According to research results, students with high scores of Metacognition scores are good organizers, active planners, have tasks completed in a given period of time, have the ability to monitor the path of their learning and understanding, and are swift and flexible by nature. These all support them in their academic endeavors, and as a result, they perform well [16]. Similarly, another showed that both types of goals are linked with academic performance and success through Metacognition skills. He also highlighted that students having higher mastery goals would be able to comprehend the phenomenon and ultimately have higher metacognition abilities which further elaborates its impact on academic achievement [7]. This result was corroborated by a different researcher, who showed that there is a substantial correlation between metacognition, learning, and goal mastering, all of which have a favorable impact on student's academic success. These findings were adjusted for gender, age, and intellectual ability [17]. Another researcher reported a similar type of finding, namely that students with higher levels of metacognitive skills perform better in summative exams [18]. All these researches which have been discussed here have found the same conclusion that there is a significant correlation between these two educational psychology concepts; Metacognition and academic achievement. It shows that the researcher's main hypothesis of the study has been proved. Further, it would be beneficial for the students that if there is a low academic achievement in the students then it can be raised and made better by creating and enhancing their metacognitive skills. Another finding from our study is that there are no appreciable learning style differences among medical college students as a whole. The study anticipated that all applicants to medical schools would typically be exceptional students, high performers, and have stellar academic records [19]. They have proven their skills in classes for intermediate students. Their modes of thought, venues for teaching and learning, academic assessments, and workload are quite similar. It is quite likely that they have the same level of metacognitive abilities in each of these circumstances [20]. An Independent sample t-test was used to evaluate this investigation. The fact that all student groups fall into the same age category is a key justification for these findings. Many Researchers support different studies that have shown that metacognitive abilities change with age [5, 21]. In other words, it may be deduced that individuals of similar ages will possess nearly identical metacognitive abilities. Additionally, to these findings, it has also been found that medical students have a high level of Metacognition scores in both colleges

(approximately 109 and 110 respectively). This finding is indirectly measuring the first hypothesis of the study which is about the awareness level of Metacognition in medical students [1]. According to this study, medical students have strong metacognitive control skills. Numerous studies have revealed that medical students excel in their metacognition and academic performance [22]. These researchers compared medical college students and other college students and discovered that their metacognition scores differed significantly. Medical students have higher scores in academic activities and metacognitive skills. As they have to perform in multiple ways in medical education which enhance their thinking pattern about thinking and comprehending the situations of learning.

CONCLUSIONS

Current study findings have shown that all three dimensions are positively and strongly correlated to each other. Because they are all predictors of the basic concepts of metacognition, it is a chance that they will be correlated. Higher the score in one dimension, the higher the score in another dimension, and vice versa. In general, working on one dimension would be useful for mentors and trainers because it would improve other learning techniques and tactics.

Conflicts of Interest

The authors declare no conflict of interest.

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