Research Paper

Detecting Metacognitive Awareness among Female Nursing Students

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ABSTRACT

Background: Metacognition is one of the important components for successful learning. It is also important to teach the students to apply the concept of metacognition to attain their goal with self-regulatory learning. *Objectives:* To study the prevalence of metacognitive awareness among the female nursing students with respect to age and locality. *Sample:* It consists of sample of 261 (n = 261) female nursing students (131 urban students and 130 rural students). The sample was grouped based on their age from 17 years to 21 years. *Materials:* The participants who consented for the study were assessed. Socio-demographic data was collected followed by recording the responses of the participants using Metacognitive assessment inventory. *Methodology:* Mean, S. D., Percentile, t-Test and ANOVA were used to draw meaningful inferences. *Results:* The participants were selected approximately 25% from each age group. With high percentile score, Female nursing students of 20 – 21 years of age group have high metacognitive awareness and 17 – 18 years of age group of participants were having low metacognitive awareness. There is no significant mean difference between the students from the urban and rural background in metacognitive awareness. There is a significant difference between the age groups among the female nursing students with respect to metacognitive awareness. *Conclusion:* Senior students have increased metacognitive awareness than younger students. No differences between rural and urban students in metacognitive awareness. Significant difference was found between the age groups.

Keywords: *Metacognition, Metacognitive Awareness Inventory, Nursing Students, Female College Students*

Metacognition is the one important word that we used to hear every day. When we rethink and reflect what we are thinking which means metacognition. Reflecting our thinking process make us understand who we are and how we behave. It helps us to alter our behaviour by reflecting ourselves to increase self-regulatory behaviour.

Flavell (1976) was the first researcher to introduce and use the term metacognition in the educational and cognitive psychology discipline. Papleontiou-Louca (2003) mentioned that metacognition is a concept which means cognition about cognition; knowledge about knowledge or reflection about cognitions. It involves one's own higher mental functions

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such as perception, understanding, remembering etc., The term metacognition by Flavell (1976) means the monitoring the learning actively and regulating the concepts consequently in relation to cognitive objects or data which they acquire cognitive goals or objectives. Flavell (1987) mentioned that metacognition comprised of metacognitive knowledge and metacognitive regulation.

Wall, Kosior & Ferrero (2019) pointed out in their study that health profession students require the ability of critical thinking to practice better in the health care environment. Experts and teachers have created confusion unintentionally in the education leading to the lack of thinking critically, reasoning and decision-making. Transferring the academic concepts to clinical setting was considered as the clinician's cognitive abilities due to the problems in teaching. Metacognitive awareness helps the clinicians or health care professionals to develop a framework to analyze and teach the cognitive strategies linked to clinical setting.

Jaleel & P (2016) mentioned that metacognition includes the awareness of how things are learned, evaluated the needs and generating ways to meet the needs followed by implementing the strategies. Brown (1987) proposed a model in which metacognition involves two components which are represented in the Figure 1.
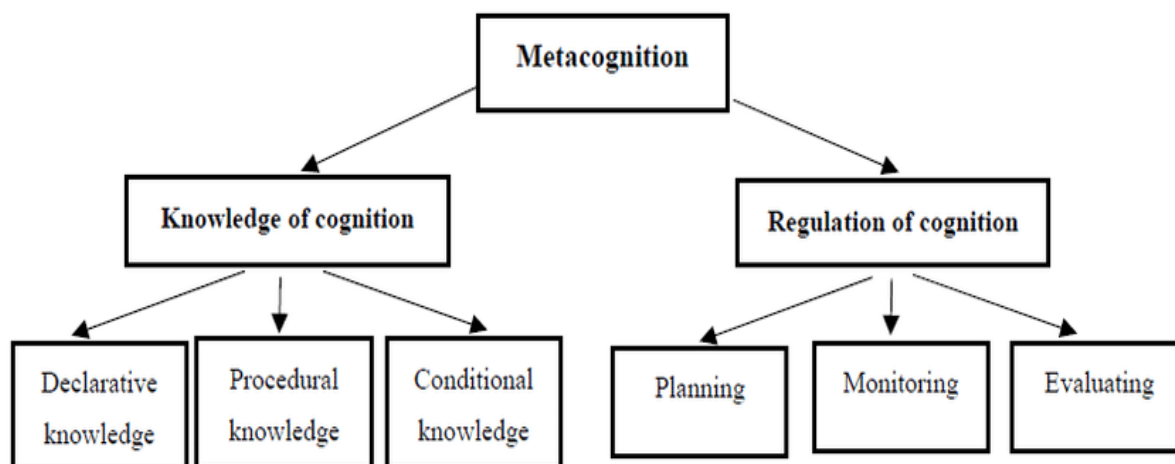

Figure 1. Components of Metacognition

Knowledge of Cognition – refers to the understanding of individuals about their cognition and cognition in general. *Declarative knowledge:* it refers to knowledge about themselves as a learner and how it influences one's performances. *Procedural knowledge:* it refers to knowledge about execution of procedural skills. People with high procedural knowledge use skills to sequence the effective strategies. *Conditional Knowledge:* It refers to the knowledge of applying of cognitive actions when and why. It continuously develops through middle childhood.

Regulation of cognition or Metacognitive regulation: refers to the use of metacognitive strategies that are sequential in nature used by the individuals to control cognitive activities such as one's thinking and learning. It includes the components such as planning, monitoring and evaluation. *Planning:* it involves selection of appropriate strategies as well as alleviating the resources that affects the performances. This includes making decisions prior to reading, sequencing strategies and time allocating or attending to a task prior to performing. *Monitoring:* it involves one's awareness of task performances and

comprehension. It is the ability to test oneself while learning. *Evaluation:* refers to judging the products and regulating one's learning processes.

Nursing profession is one of the important disciplines which require both practical and theoretical knowledge. One of the major obstacles faced by the nursing students from developing the effective learning strategies is neglecting to guide them. Since the profession involved transferring the learning to practice with cognitive abilities, understanding the metacognitive capacity is essential. Jaleel, et al., (2016) reported that metacognitive capacity increases with increase in self-confidence. A successful learning and motivation improve when there is an increase in self-efficacy.

Metacognitive thinking among the students helps them learn by self-directed method and to become more aware of what they learn. It also helps them to be more equipped to alter their way of learning to improve their ability level. The importance of metacognition in education is to improve the self-regulatory behaviour to increase competency skills to achieve the goals with much strength. Wall et al., (2019) said that when there is an increase in planning and evaluating of cognitive process there would be increase in more meaningful thought process to solve complex problems during the practice in the clinical setting.

Medina, Castleberry and Persky (2017) mentioned that in every profession metacognition plays an important role. It is also one of the important components in the field of mental health sciences which makes the learners learn to perform the medical services. It helps the learners to frame strategies during learning with that they can obtain the knowledge they lack. It also helps develop the critical thinking and problem solving skills.

Ata & Abdelwahid (2019) conducted a study to identify the academic motivation of nursing students by analysing the metacognitive thinking and goal setting. A total of 325 nursing students were selected and the assessments were made. The results revealed that most of the nursing students were having high levels of metacognitive thinking, academic motivation and goal orientation. Significant positive correlation was found between the metacognitive thinking, academic motivation and goal orientation. It was concluded that academic motivation was significant with metacognitive thinking and goal orientation among nursing students.

Naldoza (2018) conducted a study aimed at examining the students' achievement and engagement by applying active learning exercises which influences the nursing students' achievement and engagement. In this experimental study, a total of 124 (n=124) nursing students were selected. Of which the students in the experimental group received intervention (n=52) showed a significant increase in engagement with learning using metacognitive strategy than the students in the control group.

Safari & Meskini (2015) said that the nursing students may need metacognition to improve their academic performance. It helps the students in learning process to observe, understand, evaluate and adjust what was learnt.

Medina et al., (2017) pointed out that metacognition helps to develop the self-regulated and self-directed learning which helps the mental health service providers to increase their awareness, critical thinking and controlling or monitoring of actions to prevent the medical errors. The problems faced by the learners in the mental health professionals can be solved

when the teaching methods can be changed to effective learning activities involves the metacognitive skills and environmental experiences by the teachers.

Objectives
- To examine the level of metacognitive awareness among the female nursing students.
- To examine the metacognitive awareness of the female nursing students with respect to age.
- To examine the differences in the metacognitive awareness among the female nursing students with respect to locality.

METHODOLOGY

Sample
Sample consists of subset population selected randomly from each year of education to participate in the research study. A total of 261 (n = 261) female nursing students including 66 of the students between 17 – 18 years of age (33 urban and 33 rural students), 65 of them between 18 – 19 years of age (33 urban and 32 rural), 65 of them between 19 -20 years of age (32 urban and 33 rural) and 65 of them between 20 – 21 years of age (33 urban and 32 rural) of B. Sc. Nursing from different colleges in Tamilnadu. The participants were grouped based on the age and locality. The participants consented for the study was selected and their responses were collected.

Hypotheses
- The elder students may have a higher level of Metacognitive awareness.
- There will be no significant differences in the metacognitive awareness among female nursing students with respect to locality.
- There will be no significant differences in the metacognitive awareness among female nursing students with respect to age.

Tools
The following tools were used to collected data from the selected participants
1. **Demographic data sheet:** Demographical data sheet was used to collect the certain personal information of the participants. The information related to the study including Age, gender, locality and year of education were collected with the help of the data sheet.
2. **Metacognitive Awareness Inventory (MAI):** Metacognitive Awareness Inventory (MAI) was developed by Schraw and Dennison (1994) aimed at identifying the metacognitive awareness of the adults. It has 52 items with true or false options which was subdivided into 8 compnents under two broad categories. It has knowledge of cognition (with 3 subcomponents) and regulation of cognition (with 5 subcomponents) as the broad categories.
   - *Knowledge of Cognition* – refers to the acquired knowledge about oneself, the task that performs and the strategy to finish the task. The 3 subcomponents are :
   - *Declarative Knowledge* – knowledge about self and strategies, *Procedural Knowledge* – knowledge about the use of procedure and *Conditional Knowledge* – knowledge on when and how to use the strategies
   - *Regulation of Cognition* – refers to the awareness about the use of procedure of planning, monitoring and controlling. The 5 subcomponents are:
   - *Planning* – Setting the goal, selecting the suitable strategies, *Information Management Strategies* – implementation of strategies using the suitable

information, *Comprehension Monitoring* – Assessing oneself about the awareness of task performance, *Debugging strategies* – correcting the errors occurred during the task performance and *Evaluation* – assessing the end result of a task and the efficiency carried out.

The MAI has showed a Chronbach's α = 0.90, a good reliability for the factors of the inventory knowledge of cognition and regulation of cognition. These two factors were inter-correlated (r = 0.54). Omprakash, Kumar, Kuppusamy, Sathiyasekaran, Ravinder & Ramaswamy (2021) mentioned that the correlation was high (>0.80) between the factors of MAI which found to be a reliable tool for Indian students to assess the metacognitive awareness. Thus, the previous studies support the reliability and validity of the Metacognitive Awareness Inventory (MAI).

Procedure
Female nursing students of B. Sc. Nursing who volunteered for the study were asked to enter the details in the demographic data sheet followed by Metacognitive Assessment Inventory (MAI) by Schraw and Dennison (1994). The participants were asked to fill the inventory with the appropriate response after reading the instructions given in the inventory clearly. They were instructed that there will not be any time limit to record their responses. Further instructions such as, not skipping any of the items and giving the responses that what comes to their mind immediately were given. They were informed that the responses will be kept confidential and will be used only for the research purpose. The collected data were tabulated and the results were discussed.

Design
This experimental design have first independent variable was residential area i.e., Urban and Rural background. The second independent variable was the age groups i.e., age group of students from 17 – 18 years, 18 – 19 years, 19 – 20 years and 20 – 21 years.

Statistics Techniques
The collected data were analyzed using Mean, Standard deviation, Percentile score, T-test and ANOVA to test the proposed hypothesis and to draw meaningful inferences.

RESULTS AND DISCUSSION

Table No. 1 Socio-demographic detail of the Female nursing students

Sl. No.	Variable	Groups	Frequency	Percentage (%)
1	Age & Year of Education	17 – 18 years	66	25.3
		18 – 19 years	65	24.9
		19 – 20 years	65	24.9
		20 – 21 years	65	24.9
2	Gender	Female	261	100
3	Locality	Urban	131	50.2
		Rural	130	49.8

Table 1 shows the demographic representation of the participants involved in the study. In this, a total of 261 (n = 261) female nursing students (100%) from B. Sc. Nursing across different colleges volunteered for the study. Of which 66 (25.3%) of the population were from I B. Sc. Nursing and 65 (24.9%) of the students were from the II, III and IV B. Sc. Nursing respectively. 131 (50.2%) of the female students were from urban background and 130 (49.2%) of the female nursing students were from rural background.

Table No. 2 Range of Metacognitive Awareness based on Age and Locality of the Female Nursing Students

Descriptive Statistics			
Sl. No.	**Age**	**Locality**	**Range of Metacognitive Awareness**
1	17 – 18 Years	Urban	Very low
		Rural	Very Low
2	18 – 19 Years	Urban	Low
		Rural	Low
3	19 – 20 Years	Urban	Above Average
		Rural	Above Average
4	20 – 21 Years	Urban	Above Average
		Rural	Above Average

Table 2 shows the level of metacognitive awareness among the female nursing students with different locality and age were calculated based on the percentile score. Both urban and rural students between the age group of 17 – 18 years were having very low level of metacognitive awareness. Urban and rural students of 18 – 19 years of age were having low level of metacognitive awareness. Above average level of metacognitive awareness was found among the students of urban and the rural background between the age of 19 – 20 years and 20 – 21 years. From the table, it is evident that elder students compared to the younger students have a higher level of metacognitive awareness. The level of awareness was same between the students with different location. Thus the stated hypothesis that elder students may have a higher level of metacognitive awareness is accepted.

Table No. 3 Mean differences among Female Nursing students based on locality

Sl. No.	**Age Group**	**Locality**	**Mean**	**S. D.**	**t-value**
1	17 – 18 Years	Urban	34.79	4.46	0.85 NS
		Rural	33.94	3.63	
2	18 – 19 Years	Urban	43.10	1.91	0.63 NS
		Rural	42.73	2.73	
3	19 – 20 Years	Urban	47.88	1.62	0.30 NS
		Rural	47.76	1.56	
4	20 – 21 Years	Urban	49	1.44	1.61 NS
		Rural	48.36	1.73	

NS = Not significant at 0.05 level
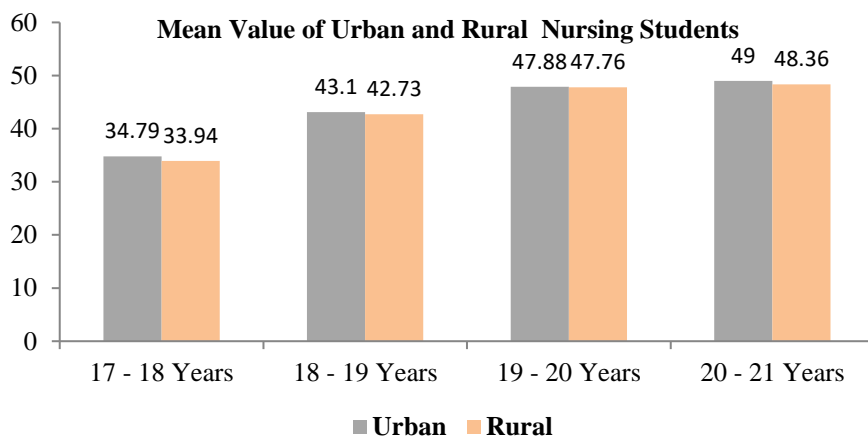
Figure 2. Mean differences among the Female Nursing students based on their age

Table 3 showed the mean, SD and mean differences among students of urban and rural background with different age groups which was represented in the Figure 2. The mean

differences between the groups were analyzed by using t –test. The mean value for urban students between the age of 17 – 18 years was 34.79 and SD was 4.46 and for rural students the mean value and SD were 33.94 and 3.63 respectively. The t-value for metacognitive awareness was 0.85 and was not significant at 0.05 level. The mean value for 18 – 19 years of age was 43.10 for urban students and 42.73 for rural students and SD was 1.91 for urban students and 2.73 for rural students with t-value of 0.63 which was insignificant at 0.05 level. The mean value for 19 – 20 years of age of students with urban background was 47.88 and SD was 1.62 and for rural students the mean value was 47.76 and SD was 1.73, the t-value for which was 0.30 which was not significant at 0.05 level. The mean value for the age group of urban and rural students was 49 and 48.36 respectively and the SD was 1.44 and 1.73 for the urban and rural students respectively. The t-value was found to be 1.61 which was not significant at 0.05 level. The stated hypothesis that there will be no significant difference in the metacognitive ability among female nursing students with respect to locality is accepted.

Table No. 4 Group difference among Female Nursing Students in their Metacognitive Awareness

Sl. No.	Age	Frequency	Mean	S. D.	F-value
1	17 – 18 years	66	34.36	4.06	
2	18 – 19 years	65	42.91	2.35	415.53*
3	19 – 20 Years	65	47.82	1.58	
4	20 – 21 Years	65	48.68	1.61	

* Significant at 0.05 level

Table 4 shows the results of Analysis of Variance (ANOVA) to identify significant difference among the groups. It is indicated that mean value of the students between 17 – 18 years was 34.36 and SD was 4.06 and for 18 – 19 years the mean value was 42.91 and SD was 2.35. The mean value for the students of age between 19 – 20 years was 47.82 and SD was 1.58 and for the age group of students between 20 – 21years, the mean was 48.68 and SD was 1.61. The obtained F value was 415.53 which were significant at 0.05 level. From the table, it is evident that metacognitive awareness has increased with respect to age. The results were supported by the study of Weil et al., (2013) that during adolescence the metacognitive ability increased with age significantly and reach its peak at late adolescence and plateued at adulthood followed by decline. Thus, the stated hypothesis that there will be no significant differences in the metacognitive awareness among female nursing students with respect to age is not accepted.

CONCLUSION

- Elder students were having a higher level of metacognitive awareness than the younger students.
- There will be a significant difference in metacognitive awareness among the female nursing students with respect to age.
- There will be no significant difference in metacognitive awareness among the female nursing students with respect to locality.

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