

Metacognitive Training Program: It`s Effect on Staff Nurses` Decision Making Abilities

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Abstract: Background: Metacognition is a process that is at the top of all executive cognitive processes and key psychological factor that involved in decision making. **Purpose:** Examine the effect of metacognitive training program on staff nurses` decision making abilities. **Method:** A quasi-experimental (one group pretest/posttest) design was utilized. The study was conducted in Medical and surgical departments at Beni-Suef University Hospital. A simple random sample of 64 staff nurses was included. Metacognition Knowledge Questionnaire, Metacognitive Awareness Inventory and Decision Making Abilities Scale were used for data collection. **Results:** Revealed that the majority 90.6% of staff nurses had unsatisfactory knowledge level at pre program which improved to 95.3% had a satisfactory knowledge post program and decreased to (78.1%) at follow up.. More than one third 42.2% of staff nurses had a moderate level of metacognitive awareness at pre program which improved to 87.5% had a high level post program and decreased to (81.3%) at follow up. About two thirds 64.1% of staff nurses had a moderate level of decision making abilities at pre program which improved to 93.7% had a high level post program and decreased to (92.2%) at follow up. **Conclusion:** The metacognitive training program had a greater effect on improving staff nurses` metacognitive knowledge and awareness that was reflected in their decision making abilities. **Recommendations:** Encourage staff nurses to implement metacognitive strategies that improve their abilities to make effective and sound decisions. Involve metacognition concept into nursing curricula and focus on its importance in different aspects of nursing profession.

Keywords: *Decision making abilities, Metacognition, Staff nurses, Training program*

Introduction

Nursing profession with the rapid change of medical knowledge and the continuous updating of nursing practice guidelines, the nursing profession is emphasizing that nurses need to be prepared to lead change and be able to use new and available information to make effective decisions that promote health and reduce costs. There are some core competencies that are thought to improve nurses` ability to make effective and sound decisions, one of these competencies is metacognition (Han, Lee, Kim, Heo & Choi, 2023).

Metacognition described as "thinking about thinking", it refers to one` ability to regulate thinking and learning through three self-assessment skills: planning, monitoring and evaluating. Metacognition is an important consideration in the process of becoming and practicing as a professional nurse. Metacognition involves knowing how to reflect and analyze thought, how to draw conclusions from that analysis, and how to put what is learned into practice (Nisly, Sebaaly, Fillius, Haltom & Dinkins, 2020).

Metacognitive skills can be acquired and enhanced by instruction and training. Research has shown that adequate metacognitive instruction and training lead to lasting improvements in metacognitive skills and, consequently, to better performances. Metacognitive training enables planning, goal setting, initiating work, sustaining future oriented problem solving activities, monitoring and managing progress on tasks to detect

and correct errors, and keeping the track of the effect of one`s behavior towards others (Taghani & Razavi, 2021).

Metacognitive skills training allows nurses to monitor and regulate their own thinking, to be aware with their knowledge, to maximize their abilities to think, learn, and evaluate, to embed new information in their existing knowledge and create connections among ideas which drive them to deeper understanding. Also it can help them to develop better confidence by improving decision making strategies and increasing the ability to skillfully plan and implement activities in their units (Garbayo, Harris, Fiore, Robinson & Kibble, 2023).

Decision making is a fundamental aspect of nurses` clinical practice and has a direct impact on the health and well-being of each patient. It is a process that nurses undertake on a daily basis when making judgments about the care they provide to patient. Clinical decision making requires nurses to be knowledgeable in relevant aspects of nursing, to have access to reliable sources of information and to work in a supportive environment (Fernandes, Santos, Sa & Neves, 2023).

Metacognition allows staff nurses to be aware of the decision making process, know what factors may influence their` decisions, monitor and regulate their decision making process. Also, it can enable them to self- critique their decisions and use this critique to develop more knowledge and skills to enhance future decisions. These

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metacognitive skills help staff nurses to avoid making the same mistakes twice and avoid overcommitting resources and time to decisions that are based on unreliable evidence (Lins, Pamplona, Lins & Lyra , 2023).

Nurse managers play an important role in improving staff nurses` metacognitive skills, by providing nurses the opportunity to use metacognitive strategies at key stage of the task, and by improving nurses` abilities to predict how well they perform a task. Giving immediate feedback for nurses regarding effectiveness of their performance and strategies used can increase nurses` metacognitive awareness. Also, encouraging nurses to reflect on which resources to use, why these resources are useful than others and how nurses will use them improves metacognitive skills among nurses (Sethares, Kristen, Asselin & Marilyn, 2022).

Significance of the Study

Although extensive research exists on decision making abilities, there was few researches examining the effect of metacognitive training program on staff nurses` decision making abilities. The findings of the present study will assist in filling the gap for identifying the effect of metacognitive training program on staff nurses decision making abilities at Beni-Suef University Hospital in medical and surgical departments, because the majority of them didn't attend any previous training program about metacognition. This could improve staff nurses` decision making abilities which in turn improve the overall

quality of patient care, while maintaining efficient costs. So, the current study was conducted to examine the effect of metacognitive training program on staff nurses` decision making abilities.

Purpose of study

This study aimed to examine the effect of metacognitive training program on staff nurses` decision making abilities.

Research hypotheses

- 1) Staff nurses who receive metacognitive training program have a satisfactory level of knowledge about metacognition on posttest than pretest.
- 2) Staff nurses who receive metacognitive training program have a higher level of metacognitive awareness on posttest than pretest.
- 3) Staff nurses who receive metacognitive training program have a higher level of decision making abilities on posttest than pretest.

Method

Research design

A quasi-experimental (one group pretest/posttest) design was utilized to conduct this study.

Setting

The study was conducted at Beni-Suef University Hospital in medical and surgical departments. The hospital consisted of two separate building; General Hospital and Oncology building. The bed capacity of the hospital was about 680 beds during data collection period.

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Sample

A simple random sample technique was used to select participants in the current study through taking a random ball, each of which represented a member of population, out of a container after proper mixing. The sample size was 64 staff nurses. It was determined by the following equation: $n = N / (1 + N(e)^2)$ (Tejada & Punzalan, 2012)

Where:

n= Number of samples

N= total population (76 nurses)

E= Error tolerance (0.05)

1= A constant value

Instruments for data collection

Data were collected using three instruments:

- **First instrument** was metacognition knowledge questionnaire that consists of two parts: Part (1): Personal data of staff nurses including age, sex, marital status, nursing educational qualification, department, years of experience in nursing and attend training courses about metacognition. Part (2): It included 20 multiple choice questions and 10 true or false questions related to metacognition; its concept (2 items), importance (4 items), components (5 items), skills (3 items), strategies (13 items) and its difference with cognition (3 items). The questions were scored as "1" for correct, and "zero" for incorrect. Total knowledge score was calculated as follow; Unsatisfactory (< 60%), Average (60% - <75%), Satisfactory (\geq 75%).
- **The Second instrument** was metacognitive awareness inventory. It contained 55 items divided into two major domains related to metacognition each domain divided into subscales distributed as the following: knowledge of cognition domain {declarative knowledge (8 items), procedural knowledge (4 items) and conditional knowledge (5 items)} and regulation of cognition domain {planning (8 items), information management strategies (11 items), monitoring (8 items), debugging strategies (5 items) and evaluation (6 items). Each item was rated on three point likert scale that ranged from (1) never, (2) sometimes, (3) always. Scores of each dimension summed up and converted into percent scores. Possible range of scores was from 55 to 165. The total level of metacognitive awareness was calculated as follow; high (>75%), moderate (60% - 75%), low (< 60%).
- **The third instrument** was decision making abilities scale. It consisted of 43 items divided into six subscales: Establishing a positive decision making environment (8 items), generating potential alternatives (7 items), evaluating the alternatives (7 items), deciding (choosing the alternatives) (8 items), checking the decision (8 items) and communicating and implementing the decision (5 items). Each item was rated on three point Likert scale that ranged from (1) never, (2) sometimes, (3) always. Scores of each dimension was summed up and converted into percent scores. Scores range from 43 to 129. The total level of decision

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making abilities was calculated as follow; high (>75%), moderate (60% - 75%), low (< 60%).

The validity of the instruments:

The tools were presented to panel of jury for face and content validation. The jury included (7) Experts from Nursing Administration (1) Professor and (3) Assistant Professors from Cairo University, (1) Professor from Menoufia University, (1) Professor from Ain-Shams University and (1) Assistan professor from Benha University. Minor modifications were done based on jury comments such as modifying some words to give the right meaning for example, technical associate diploma was modified to associate degree in nursing.

The reliability of the instruments:

The reliability of questionnaires sheets was tested for the internal consistency using alpha coefficient as follow; Metacognition knowledge questionnaire: Cronbach`s Alpha = 0.94, Metacognitive Awareness Inventory: Cronbach`s Alpha = 0.95 and Decision Making Abilities Scale: Cronbach`s Alpha = 0.95.

Pilot study

A pilot study was conducted before data collection. The purpose of the pilot study was to ascertain clarity of the study's instruments and to determine obstacles that may be encountered during data collection. It also helped to estimate the time needed to fill in the questionnaires. The pilot study was carried on 7 nurses which presented (10%) of sample size. No modification was needed, so, the sample of the pilot study was included in the main study sample.

Procedure

Data collection took about six months from beginning of March to the end of

August 2022. It was divided into four main phases: assessment, planning, implementation and evaluation.

Assessment phase:

- The data was collected to assess staff nurses' knowledge regarding metacognition, nurses` metacognitive awareness levels and decision making abilities levels before implementation of the educational program through using of the different tools of data collection in the available hospital classroom and during their work hours.
- Before beginning to collect data from the study subjects the researcher introduced herself to them, explained the aim of the study, and informed them that their information will be treated confidential and will be used only for the research purpose; additionally, each participant was notified about the right to accept or refuse to participate in the study.
- Data was collected in the morning, and afternoon shifts according to the monthly schedule as selected nurses are available to fill the questionnaire. The subjects fill in the questionnaires in the presence of the researcher to clarify any ambiguity and ascertain all questions were answered. the time required to fill the questionnaires was estimated to be 15 to 30 minutes for each questionnaire.

Planning phase:

- The training program was developed based on determined needs from assessment phase and review of relevant literature. The researcher designed hand out for the metacognitive training program. Different instructional strategies, methods of teaching, media and methods of evaluation

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were selected to suit the learner's needs and achieve the objectives and content of the program. The schedule was set and the place to carry out the training program was booked, after consultation with the nursing director, and coordination with the head of training and development center. The audiovisual aids as data show also booked.

Implementation phase:

- The training program was conducted in the Training and Development Center, it consisted of 12 hours distributed as 6 Sessions 3 theoretical and 3 practical, the duration of each session was about two hours depending on workload and including periods of discussion according to their achievement, progress and feedback. Subjects classified into three groups; number of each group ranged from 20 to 22 subjects. Two sessions were given each week and for three weeks, it started at 11.00 am to 1.00 pm, In the first session the investigator explained training program aim, objectives, plan, content outlines and methods of evaluation. Daily feedback was done at the beginning of each session about the previous one and at the ending of each session about the current session. At the end of each session the investigator give participants summarization regarding the content of the session.
- Teaching sessions were achieved by using available resources, relevant content and instructional strategies for each session. Different methods of teaching were used such as lecture, group discussion, brain storming, role play, clinical scenarios and hand

out prepared by the researcher and distributed to all staff nurses.

Evaluation phase:

- During this phase the impact of the training program was evaluated. Immediate evaluation was performed immediately post program implementation for all subjects using the same tools which were used before the program. Follow up evaluation was performed after three months of program implementation, all the study tools were applied to the study subjects to test the follow up gain in their knowledge regarding metacognition and change in nurses' metacognitive awareness and decision making abilities levels.

Ethical considerations

Ethical approval was obtained from an ethical research committee of the Faculty of Nursing, Menoufia University. Official letters from Faculty of nursing to the selected study hospital to obtain an approval for data collection was submitted. Anonymity of participants' information was totally assured. Participation in the study was voluntary and was assured the right to accept or refuse to participate in the current study. Withdraw from the study at any time was assured and allowed for all participants.

Consent was obtained from all participants who agreed to be part of the study. The consent was implicit by participant's decision to return the completed questionnaire. The data was treated as strictly confidential and for research purposes only. Anonymity of participants were maintained as they weren't required to mention their names.

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Statistical test analyses

Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Descriptive statistics were expressed as number and percentage for qualitative data, or mean and standard deviation for quantitative data.

For qualitative data, a comparison was done using the Chi-Square test (χ^2). For comparison between means for two variables in a sample, a paired-samples T-test was used. Correlation between variables was evaluated using Pearson` correlation coefficient r . A significance level value was considered when p - value ≤ 0.05 and a highly significance level was considered when p -value ≤ 0.001 , while p -value >0.05 indicated non-significance results.

Results

Table (1): Represents percentage distribution of staff nurses regarding their personal characteristics. This table showed that more than half of staff nurses had less than 30 years with (Mean \pm SD= 31.82 \pm 3.59). As regards their sex and marital status, the highest percent of them were females and married. Concerning their work departments, less than two thirds of them were working at medical departments. Regarding their nursing educational qualification, less than two thirds of them had associate degree in nursing. As for their years of experience in nursing, more than two thirds of them had less than 10 years of experience with (Mean \pm SD= 12.92 \pm 4.41). Finally, the majority of them didn't attend any training program about metacognition.

Figure (1): Demonstrates total knowledge level among staff nurses about metacognition thorough program

phases. This figure clarified that the program had greater effect on improving nurses knowledge about metacognition through post and follow-up phases of the program compared with the pre program; the majority (90.6%) of staff nurses had unsatisfactory knowledge level that improved to (95.3%) had satisfactory knowledge immediately post program and decreased to (78.1%) at follow up 3 months program that still more than pre program.

Figure (2): Shows total metacognitive awareness levels among staff nurses thorough program phases. This figure clarified that the program had greater effect on improving staff nurses metacognitive awareness levels through post and follow-up phases of the program compared with the pre program; more than one third (42.2%) of staff nurses had a moderate level of metacognitive awareness that improved to (87.5%) had a high level at post program and decreased to (81.3%) at follow up 3 months phase of the program that still more than pre program.

Figure (3): Shows total decision making abilities levels among staff nurses thorough program phases. This figure illustrated that the program had greater effect on improving staff nurses decision making abilities levels through post and follow-up phases of the program compared with the pre program; less than two thirds (64.1%) of staff nurses had a moderate level of decision making abilities at pre program that improved to (93.7%) had a high level at post program and decreased to (92.2%) at follow up 3 months program that still more than pre program.

Table (2): Highlights partial correlation matrix among staff nurses` metacognitive knowledge, awareness and decision making abilities at post

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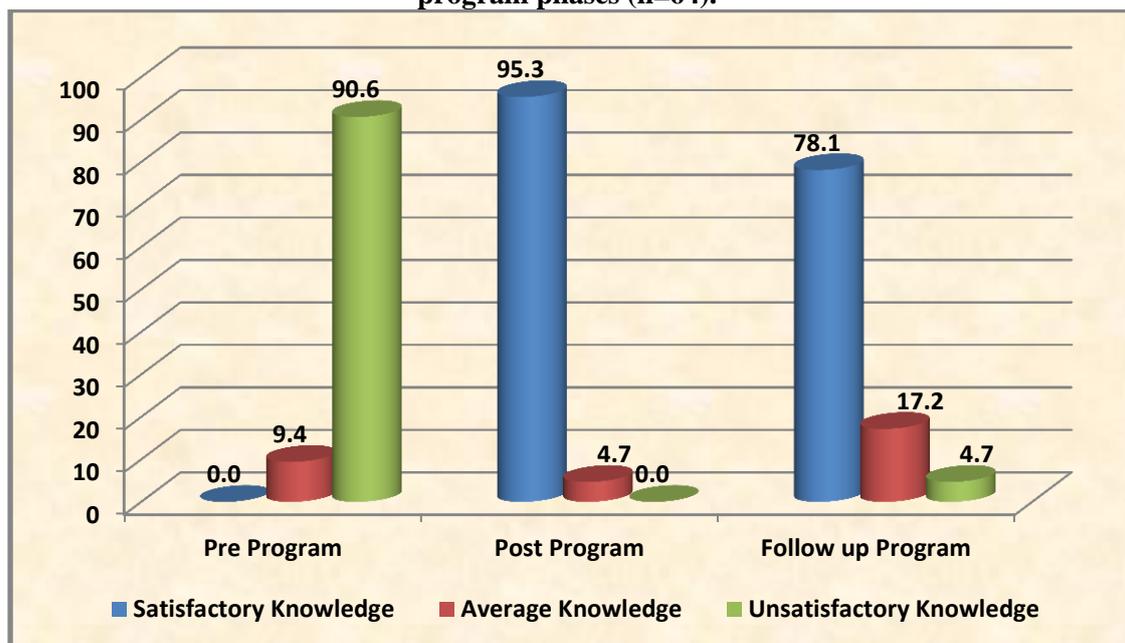
program phase. This table showed that there were highly statistical significant correlations among staff nurses` metacognitive knowledge, awareness and decision making abilities levels at

post program phase. This means that the program had a greater effect on improving staff nurses` metacognitive knowledge, awareness and decision making abilities.

Table (1): Distribution of staff nurses regarding their personal characteristics (n= 64).

Personal characteristics items	No	%	
Age	< 30 years	39	60.9
	30:< 35 years	14	21.9
	≥ 35 years	11	17.2
	Mean ± SD	31.82±3.59	
Sex	Male	14	21.9
	Female	50	78.1
Marital status	Married	53	82.8
	Unmarried	11	17.2
Department	Medical	41	64.1
	Surgical	23	35.9
Nursing educational qualification	Technical diploma	11	17.2
	associate degree in nursing	39	60.9
	Baccalaureate degree	14	21.9
Years of experience in nursing	< 10 years	43	67.2
	10:< 15 years	11	17.2
	≥ 15 years	10	15.6
	Mean ± SD	12.92±4.41	
Attending training program about metacognition	Yes	7	10.9
	No	57	89.1

Figure (1): Total knowledge level among staff nurses about metacognition thorough program phases (n=64).



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Figure (2): Total metacognitive awareness levels among staff nurses thorough program phases (n=64).

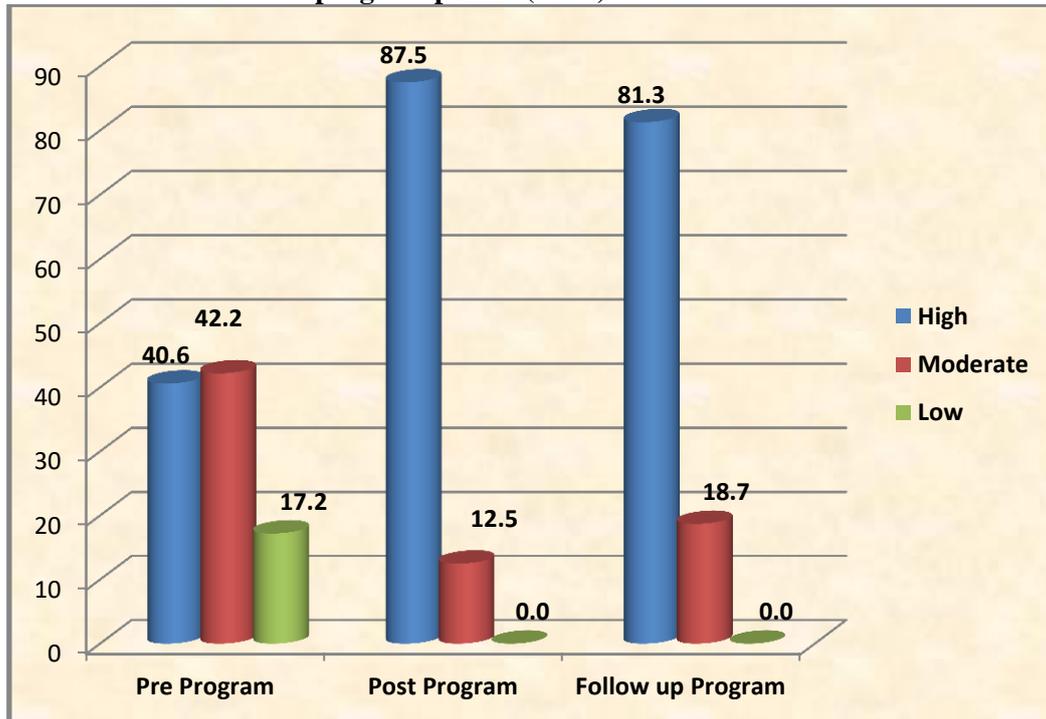
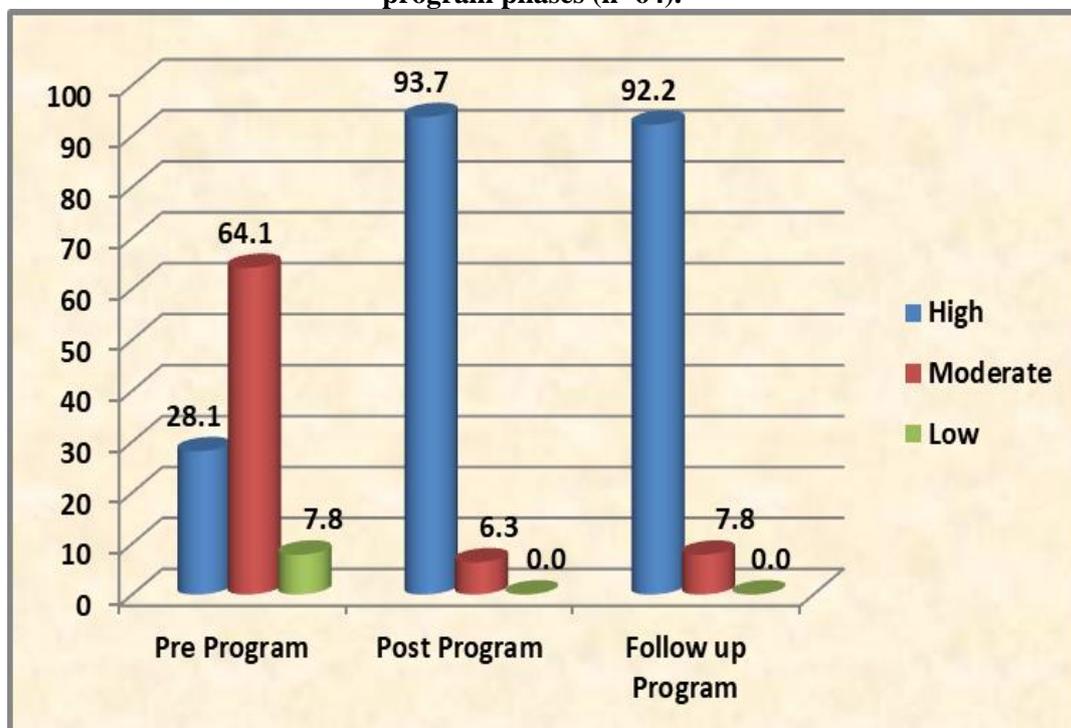


Figure (3): Total decision making abilities levels among staff nurses thorough program phases (n=64).



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about metacognition as the majority of them didn't attend previous training program about metacognition. On the other hand, a slight decrease in the total level of knowledge about metacognition at the follow up phase of the program, can be rationalized as the follow up phase was conducted after a period of time (3 months), and most studied that conducted in the follow up phase after three months showed decline in the taught variables regardless the phenomena being studied.

This finding was in harmony with Mokhtari, Hassanzadeh and Mirzaeeyan, (2020) who reported that there was improvement in students' total knowledge about metacognition at post and follow up phases relative to pre program. Also, this study concluded that metacognitive training program has a significant effect on students' knowledge and academic performance.

Also, this finding was consistent with Mohseni et al, (2020) who reported that there was a significant improvement in students' knowledge at post program compared with pre program. Moreover, this finding was matched with Kajika & Kulik (2023) who reported that there was a highly statistically significant difference in metacognitive knowledge after the implementation of the training program and concluded that the program has significant effect on childrens' metacognitive knowledge and awareness.

However, this finding was in contrast with Engeler and Gilbert, (2020) who reported that subjects were had satisfactory level of knowledge at pre program phase and there was no statistical significant difference between pre and post program. In addition this finding was in disagreement with Drigas, Papoutsi

and Skianis, (2021) who reported that there was no statistical significant difference among subjects in relation to their knowledge about metacognition at post program relative to pre program.

The present study illustrated that more than one third of staff nurses had a moderate level of metacognitive awareness at pre progeam phase. While there was a highly statistical significant improvement in staff nurses' total metacognitive awareness level throughout immediate post and follow-up phases of the program compared with the pre program. This means that the majority of staff nurses had a high level of metacognitive awareness immediately post program and at follow up 3 months phase of the program. This finding reflected that the program had a greater effect on improving staff nurses' metacognitive awareness level throughout phases of the program.

From the researcher' point of view, this finding may be due to that improvements in metacognitive knowledge which affect their awareness after implementation of the training program. As, staff nurses learned and gained knowledge and skills about metacognition from all program content as well as learned how to implement these skills in different situations.

This finding was in the same line with Teng, (2021) who reported that there was a highly statistical significant difference in students' total mean score of metacognitive awareness at post-test relative to pre-test. Also, the majority of students were had high levels of metacognitive awareness at post-test compared with pre-test.

In addition, this finding was supported with Wang et al., (2022) who revealed that there was a significant increase in total metacognitive` level in

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experimental group immediately after the intervention (metacognitive training) and at the 12 week follow up phase compared with pre-test. Also, this study concluded that the metacognitive training had greater effect on increasing metacognitive and neurocognitive function scores.

Moreover, this finding was consistent with Fischer et al., (2022) who study "you are trying to teach us to think more slowly!": Adapting metacognitive training for the acute care setting. This study reported that the majority of subjects were had high level of metacognition immediately after training and at the 12 week follow up phase compared with baseline. In addition, this study concluded that the training program was had a positive effect on improving metacognition throughout the phases of program.

However, this finding was in contrast with Waryold, Holliday and Rodriguez, (2021) who showed that the majority of students were had high level of metacognitive awareness. Likewise, Ata and Abdelwahid, (2019) who reported that the studied participants were had a high level of metacognition.

Also, this finding was in disagreement with Karatas and Arpacı, (2021) who investigated the role of self-directed learning, metacognition, and 21st century skills predicting the readiness for online learning. This study reported that the majority of students were had high level of metacognition.

The current study finding showed that about two thirds of staff nurses had a moderate level of decision making abilities at pre program phase. While there was a highly statistical significant improvement in staff nurses` total decision making abilities level throughout immediate post program and follow up phases of the program. This means that the majority of staff

nurses were had a high level of decision making abilities immediately post program and at follow up 3 months phase of the program. This finding reflected that the program had a greater effect on improving staff nurses` decision making abilities level throughout phases of the program. From the researcher` point of view, this finding may be due to the positive effect of the training program that resulted in improvement in their decision making abilities.

This finding was in harmony with Siebert, Kunz and Rolf, (2021) who examined the effects of decision training on individuals` decision making proactivity. This study revealed that there was a significant improvement in subjects` decision making abilities throughout phases of the training program. Also, the majority of subjects were had high level of decision making abilities immediately post and at follow up phase of the program.

Similarly, this finding was consistent with Pai et al., (2022) who illustrated that there was a highly significant improvement in nursing students total mean scores related to decision making abilities throughout phases of the training. Also, the majority of students were had high level of decision making abilities at post-test relative to pre- test. Furthermore, this finding was similar with Neumann et al., (2022) who concluded that there was significant improvement in subjects decision making skills at post training compared with pre training.

In this respect, this study was in the same line with Ladin et al, (2023) who showed that there was a significant improvement in subjects` decision making abilities throughout phases of the program. Also, the majority of subjects were had high level of

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decision making abilities at post-test relative to pre-test.

On contrary, this finding was inconsistent with Akadyan, Yorulmaz and Cokcaliskan, (2020) who reported that the majority of students were had high level of decision making skills. Likewise, this finding was dissimilar with El-Guindy et al, (2022) who reported that the majority of head nurses were had high level of decision making abilities.

Also, this finding was disagree with Mees and Collins, (2022) who reported that the majority of mid-career instructors were had high level of decision making skills. Moreover, this finding was in contrast with Morales, (2020) who showed that the majority of subjects were had high level of decision making abilities. Furthermore, this finding was inconsistent with Lins et al., (2023) who demonstrated that the majority of subjects were had high level of decision making abilities.

The current study finding showed that there was a highly statistical significant correlation between staff nurses` knowledge about metacognition and metacognitive awareness levels at post program, but there was no statistical significant correlation between staff nurses` knowledge and metacognitive awareness levels at pre program and follow up. From the researcher` point of view, this finding may be due to that the empowerment with knowledge leads to improvement in staff nurses` metacognitive awareness and skills.

This finding was congruent with Muhid et al., (2020) who concluded that there was statistical significant correlation between students` knowledge and metacognitive levels at post- test. Also, this finding was similar with Mohamed et al, (2020) who reported that there was a highly statistical significant correlation between nursing students` knowledge

about metacognition and metacognitive awareness levels at post educational program.

Furthermore, this finding was similar with Han et al., (2023) who reported that there was statistical significant correlation between individuals` knowledge and metacognitive awareness levels at post- test. Also, this finding was in agreement with Taghani and Razavi, (2021) who reported that there was no statistical significant correlation between students` knowledge and metacognitive levels at pre-test.

On contrary, this finding was dissimilar with Wang et al., (2022) who concluded that there was statistical significant correlation between subjects` knowledge and metacognitive levels at the 12 week follow up phase. Moreover, this finding was inconsistent with Kajka and Kulik, (2021) who reported that there was no statistical significant correlation between subjects` knowledge and metacognitive levels at post-intervention.

The current study finding showed that there was a highly statistical significant correlation between staff nurses` knowledge and decision making abilities levels at post program, but there was no statistical significant correlation between nurses` knowledge and decision making abilities levels at pre program and follow up phase of the program. From the researcher` point of view, this finding could be resulted from the knowledge gained through metacognitive training program allows staff nurses to be aware of the decision making process, know what factors may influence their` decisions, monitor and regulate their decision making process. Also, it enables them to self-critique their decisions and use this critique to develop more knowledge and skills to enhance future decisions.

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This finding was supported by Rosi et al, (2019) who reported that there was statistical significant correlation between subjects` knowledge and decision making abilities levels at post-test. In addition, this finding was in the same line with Hsu and Lin, (2017) who illustrated that there was statistical significant correlation between subjects` knowledge and decision making abilities levels at post-test. In contrary, this finding was in disagreement with Batha and Carroll, (2017) who reported that there was no statistical significant correlation between subjects` knowledge and decision making abilities levels at post-test.

The current study finding illustrated that there was a highly statistical significant correlation between metacognitive awareness and decision making abilities of staff nurses immediately post program and at follow up phases of the program, but there was no statistical significant correlation between metacognitive awareness and decision making abilities of staff nurses at pre program. From the researcher` point of view, this finding may be attributed to that, the training program had positive effect on improving staff nurses metacognitive awareness which reflected in their abilities to make decision. As, staff nurses who can accurately assess their knowledge base, monitor, regulate and implement changes to cognitive strategies are able to make right and effective decisions.

In similarity with this finding, the study finding Basu and Dixit, (2022) who illustrated that there was statistical significant correlation between subjects` metacognitive level and decision making abilities level at post-test. Also, this finding was congruent with Batha and Carroll, (2017) who reported that there was a positive

correlation between subjects` metacognitive level and decision making abilities level at post-test.

Furthermore, this finding was in the same line with Rosi et al, (2019) who reported that there was statistical significant correlation between adults` metacognitive level and decision making abilities level at post-test. Likewise, this finding was in agreement with Hsu and Lin, (2017) who illustrated that there was statistical significant correlation between subjects` metacognitive level and decision making abilities level at post-test.

On contrary, this finding was inconsistent with Bektas et al., (2020) who revealed that there was statistical significant correlation between metacognition level and decision making abilities level among nursing students. Additionally, this finding was dissimilar with Lins et al., (2021) who reported that there was a positive correlation between metacognition and decision making. Moreover, this finding was in contrast with Abedini, (2021) who reported that there was statistical significant correlation between metacognition and decision making.

Conclusion:

In the light of the current study findings, it was concluded that: the program had a greater effect on improving staff nurses` metacognitive knowledge, awareness and decision making abilities levels through post and follow-up phases of the program compared with the pre program. Staff nurses who receive metacognitive training program had a satisfactory level of knowledge about metacognition on posttest than pretest. Staff nurses who receive metacognitive training program had a higher level of metacognitive awareness on posttest than pretest. Staff nurses who receive

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metacognitive training program had a higher level of decision making abilities on posttest than pretest. These findings confirmed the research hypotheses.

Recommendations:

According to the findings of the present study, it is recommended that:

At practical level:

- Encouraging nurses to use strategies that enhance metacognition such as planning, monitoring, reviewing after a task, asking questions, self-reflection, thinking out loud and making sure to get feedback.
- Encourage staff nurses to implement metacognitive strategies (planning, monitoring and evaluation) that improve their abilities to make effective and sound decisions.
- Hospital management has to support nurses when deciding and provide the resources required to implement the decision.
- Encourage periodic staff meeting between nurses and their supervisors to allow them express their feelings, seeking opinions, exchange their experiences during different situations and getting feedback and support.
- Represent nurses in hospital committees, sharing and participating in decision making about patients` problems and hospital policies.

At educational level:

- Involve metacognition concept into nursing curricula and focus on its importance in different aspects of nursing profession.
- Conducting continues training programs for staff nurses about metacognition and decision making skills.
- Provide staff nurses with opportunities for continuous

education and for attending conferences and courses.

At research level:

Further researches are required such as:

- Conduct research to study factors affecting nurses` awareness regarding metacognition.
- Examine metacognition and nursing care process among staff nurses.
- Study the relation between metacognition, self-directed learning and academic achievement among nursing students.
- Conduct research to study challenges facing nurses` involvement in decision making process.

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