Effect of Critical Thinking Training Program on Nurse instructor's Competency

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Abstract

Background: Assessment of nurse instructor critical thinking and their competencies. **The aim of the study:** was to assess the effect of critical thinking training program on nurse instructors' competency at Technical Nursing institutes. **Subjects & methods: Research design:** Aquasi-experimental intervention design was used. **Setting:**Zagazg university Technical Nursing institutes at Elsharkia Governorate. **Subjects:** All available nurse instructors. Their total number was 50 nurse instructors. **Tools of data collection:** A self-administered form including a knowledge questionnaire about reflective thinking and the California Critical Thinking Disposition Inventory (CCTDI), in addition to an observation checklist **Results** the post-intervention phase showed significant improvements in all areas of knowledge ($p<0.001$). Slight declines were found in all areas of knowledge at the follow-up phase, but they mostly remained significantly higher compared to pre-intervention phase. **Conclusion:** a training program in critical thinking is effective in improving their knowledge, and to some extent their performance of teaching role competencies. **Recommendations:** The curricula of nursing schools and institutions need to be innovated to give more emphasis to critical thinking skills. Further studies are needed for the developed training program should be implemented on a longer period of time, with more emphasis on the application and practice of critical thinking.

Keywords: Critical thinking, nurse instructors, teaching, competency.

Introduction:

Nowadays, the critical thinking skill is considered one of the most important outputs of university education, and it is taken into consideration in the training of professional individuals such as psychologists, nurses, doctors and teachers, who directly affect human life **(Kandemir, 2017).**

Globally, nursing education is needed to help nursing students develop critical thinking, clinical reasoning, and clinical judgment skills. Nursing students who wish to develop these skills will need to: (a) analyze collected data (critical thinking), (b) apply reasoning to the data obtained (clinical reasoning), and (c) appropriately act based on the specific situation (clinical judgment **(Victor-Chmil, 2013).**

A further exploration of the impact of reflection during the onboarding of graduate nurses, in light of the well-known nursing shortage, is warranted to facilitate the development of critical thinking in novice nurses. Critical thinking is the process of forming a reflective judgment about what to believe or what to do in any given context. It is reflective, because it is open to self-monitoring and self-correction **(Miraglia & Asselin, 2015).**

Critical thinking has relevance for the advancement of nursing education, as it provides nursing students with opportunities to examine how problems are framed, the quality of evidence, the adequacy of methods, the reasonableness of treatment criteria, and the applicability of theories and principles. Instead of reacting spontaneously to clinical situations, nursing students with good critical thinking skills will consider various factors, including clinical data and the patient's family situation. **(Facione PA. 2017).**

As part of the first and second steps of the nursing diagnostic process, holistic critical thinking can be used, because "when getting the right problem" this will be the first and most important step in solving the problem (**Riegel F. et al 2018**). Teaching models based on technology require students to develop autonomy in their learning and performance in practice, which can contribute to the quality of the training of nurses **(Bickhoff L. et al 2017).** It is frequently stated in many scientific studies that critical thinking skill is one of the most basic skills in the 21 centuries **(Ekici et al., 2017).**

A number of teaching strategies and methodologies that can facilitate students' ability to think critically can be identified, such as simulation, clinical discussions based on cases (collaborative) and role-playing, group discussions, clinical practice, are ways to improve critical thinking and problem-solving skills **(Kim Y 2016 & Raymod C et al 2018). According to Paul and Elder (2016**), critical thinking is the awareness of recognizing right from wrong. Critical thinking can be developed in many different ways and methods, through intelligence games and Science, Technology, Engineering and Mathematics (STEM) applications **(Adalar and Yuksel, 2017; Ozturk, 2018; & Savas, 2019).**

However, although some nurse instructors have begun to embrace and use evidence-based teaching strategies in the classroom, the changing landscape of healthcare delivery requires a more determined focus on instructors' intention to use innovative strategies for critical thinking in nursing students (**American Association of Colleges of Nurses, 2016).** Furthermore, critical skills for nursing students are the ability to think, apply, analyze, synthesize and evaluate situations(**Ambrose A., et al 2014).**

Critical thinking consists of two dimensions: a quest for thinking (disposition) and a set of operational cognitive skills. By definition, critical thinking disposition is having a consistent internal motivation to connect problems and make decisions based on critical thinking **(Bell and Loon, 2015).** There is evidence in the literature that teachers' critical thinking skills increase after receiving a critical thinking training **(Korkmaz, 2018; Slameto, 2014).**

Significance of the Study

A lack of critical thinking skills among new nursing graduates has been documented. Researchers have found that

this problem appeared due to the continued use of traditional teaching methods, as well as a lack of student-centered approaches for critical thinking development. Several institutions and organizations engaged in the safe delivery of patient care are concerned about this particular issue. As such, this study will contribute to the field of nursing education by expanding knowledge regarding the factors that influence nurse instructor' intention to use evidence-based critical thinking teaching strategies based on educator characteristics and the determinants of intention.

Aim of the study:

The aim of this study was to assess the effect of critical thinking training program on nurse instructor' competency at Technical Nursing institutes

Hypothese

1. The competencies of nurse instructors will be improved after implementation of critical thinking training program.
2. There will be significant positive correlation between critical thinking and instructors' competencies.

Subjects and methods:

Research Design:

A quasi-experimental intervention design was used to conduct the study, with three phases of data collection for assessment and evaluation. these were before intervention (pretest), immediately following the intervention (posttest), and three months after the intervention (second posttest or follow-up test).

Study Setting:

The study was conducted in all Technical Nursing institutes at zagazig universty Elsharkia Governorate.the first one at zagazig university building and the second at fakous city.

Study Subjects:

All available nurse instructors working in the above-mentioned Technical Nursing institutes and who agreed to participate were included. There total number was 50 nurse instructors.

Tools of Data Collection:

The researcher used a self-administered questionnaire and an observation checklist to collect the data for the study. A- ***Self-administered questionnaire:*** This tool encompassed a knowledge questionnaire about reflective thinking developed by the researcher. The tool consisted of 2 parts: ***Part I*** included some questions about the personal characteristics of the nurse instructors as age, nursing qualification, years of experience in nursing as well as in teaching, and attendance of previous training courses.

Part II consisted of a knowledge questionnaire about reflective thinking. It included 14 open-end questions covering reflective thinking areas of definition, attributes of critical thinking (CT) and enhancing it among students, levels of reflectivity, types of reflection, purposes of reflective practice, log, diary and journal, strategies of reflection-on-action, process of reflection-on-action, ways of reflective thinking, stages of intellectual development,

environment supporting reflective thinking, competency-based education, and role of teacher in reflective thinking.

❖ **Scoring system:**

Each correct answer (compared to a pre-prepared model answer) was scored one and the incorrect zero. A mean score was calculated for each area of knowledge by combining the scores of the items and dividing the total by the number of items. These scores had been transformed into percentage scores. nurse instructor's knowledge was considered satisfactory if the percent score was 60% or higher and unsatisfactory if less than 60%.

B- California Critical Thinking Disposition Inventory (CCTDI) developed by **Facione et al. (2001)**.

It was used to assess the critical thinking disposition of nurse instructors. The scale has 75 items on a 6-point Likert scale ranging from "strongly agree" to "strongly disagree." The items are grouped into seven dispositional characteristics, namely:

- Analycity (11 items)
- Inquisitiveness (10 items)
- Maturity (10 items)
- Open-mindedness (12 items)
- Self-confidence (9 items)
- Truth seeking (12 items)
- Systematicity (11 items)

❖ **Scoring system:**

The responses from "strongly agree" to "strongly disagree" are scored from 5 to 0 respectively. the scores of the items are summed–up and means are calculated. A higher score means more critical thinking disposition or positively disposed. For categorical comparisons, a score of 60% or higher (corresponding to "strongly agree/agree") is considered as high disposition, while a score <60% (corresponding to "uncertain, disagree, and strongly disagree") is considered low disposition.

***c*- Observation Checklist for training Competency** used to assess nurse instructor's performance of their teaching/training role competencies. It included 71 elements describing the competency of the participant in six areas as follows.

- Teaching competency (20items)
- Clinical skill (8 items)
- Personality traits (12 items)
- Collaboration (10 items)
- Role modeling (13 items), and
- Facilitator (8 items).

❖ **Scoring system:**

The item checked as "done" was scored one and the "not done" was scored zero. A mean score was calculated for each area of knowledge by combining the scores of the items and dividing the total by the number of items. These scores had been transformed into percentage scores. The performance was considered adequate if the percent score was 60% or more and inadequate if less than 60%.

Preparatory Phase:

Started with reviewing the literature of national and international resources related to the topics of the present study. The questionnaires were given to the nurse instructors to identify their knowledge regarding reflective practice, critical

thinking disposition and teaching competency. Based on the results of the pre-test, the learning needs of nurse instructors' were identified. ***Pilot study*** was carried out to test the tools feasibility, understandability and to estimate the time consumed for filling in the forms. The pilot study was carried out on six nurse instructor representing about 10% of study sample. The time consumed in answering the questions was about 30-45 minutes. Data collected from the pilot study were analyzed, and no modifications were required. Therefore, the pilot participants were not included in the main study sample.

validity and Reliability:

The tools were presented to five experts in nursing for validation. These experts were from Faculties of Nursing Zagazig, and Cairo Universities. They reviewed the tools' relevance, comprehensiveness, applicability, and clarity for face and content validation. It showed a high level of reliability with Cronbach's Alpha coefficient 0.833 .

Fieldwork

The fieldwork was done through assessment, planning, implementation, and evaluation phases. Work continued for five days per week. Data were collected through 6 months. **Assessment phase** researcher visited the study settings, met with the nurse instructors individually, explained to them the study aim and procedures, and invited them to participate. **Planning phase** based on the results of pretests, the objectives of the program were stated and the content was designed. Implementation phase the designed training program was implemented through 11sessions.

Evaluation Phase:

The researcher conducted an immediate posttest evaluation after the implementation of the program, and follow-up evaluation at the third month after program implementation.

Administrative design:

Before starting any step in the study, an official letter was directed to the Manger of Technical Nursing institutes from the Dean of the Faculty of Nursing, Zagazig University. It included explanation of the aim and procedures of the study, and asked for permission and cooperation to conduct the study. The official permission was granted accordingly.

Ethical considerations:

The study was approved by the Research and Ethics committee at the Faculty of Nursing, Zagazig University. A verbal informed consent was obtained from each participant before collecting any data after explaining the study aim and procedures in simple terms. They were informed about their right to withdraw from the study at any time . Data were considered confidential and not be used outside this study without participant's approval.

Statistical Analysis:

Statistical package for social sciences (SPSS) software version 20 was used to analyze the collected data. In summarizing the data, means and standard deviations, medians and percentages were used. Student's t test and Chi square test were used for testing significant differences and relations between variables. Pearson's

correlation test was used for testing linear relationship between numeric variables. Significant difference was considered if $p \leq 0.05$.

Results:

The study findings are presented in the following parts:

Table (1): Indicates that the study sample consisted of 50 nurse instructors whose age ranged between 24 and 47 years, with median 35.0 years . All of them had a bachelor degree in nursing, and 18.0% had a master degree. Their median total and teaching experience years were 12.0 and 10.5, respectively.؟Only one of them attended a training course in critical appraisal and 76.0% attended training courses in teaching methods.

Figure (1): Demonstrates that displays, only one-tenth (10.0%) of the nurse instructors in the study sample were having master degree.

Table (2): Points to generally low levels of satisfactory knowledge about critical thinking among the nurse instructors in the study sample. The highest percentage of satisfactory knowledge was related to the levels of reflectivity (58.0%). At the other extreme, only one (2.0%) nurse instructor had satisfactory knowledge of the environment supporting reflective thinking and of the role of teacher in reflective thinking, and two of them (4.0%) had satisfactory knowledge of the competency-based education.

Table (3): Concerning critical thinking disposition among nurse instructors in the study sample, Table 3 demonstrates a wide variability in its elements at the pre-intervention phase. It ranged between 20.0% for inquisitiveness, and 84.0% for truth seeking. The post-intervention phase showed slight improvements in the areas of inquisitiveness and maturity. Mean while, the follow-up phase demonstrated some improvements in the areas of open-mindedness, truth seeking, and systematicity, in addition to the improved maturity. However, none of these improvements was statistically significant.

Table (4): Total performance of teaching roles as observed among nurse instructors throughout study phases.table 4 points to the adequacy of teaching competencies among the nurse instructors in the study sample ranged between 44.0% for personality traits and 68.0% for the facilitator competencies before the intervention. Although the post-intervention phase demonstrated improvements in all types of teaching competencies, they did not statistical significance. The percentages ranged between 58.0%for the clinical skills and 80.0% for collaboration and facilitator competencies. The follow-up phase demonstrated statistically significant improvements in nurse instructors, competencies related to clinical skills ($P=0.03$), personality traits ($P<0.001$), and role modeling ($P=0.01$).

Table (5): Indicates no statistically significant relations between nurse instructors, knowledge of critical thinking from one side and their CCTDI and total performance of their teaching role competencies from the other side at both at both pre- and post-intervention phases. At the follow-up phase, a statistically significant association was revealed between their knowledge of critical thinking and their total performance of

teaching role competencies (p=0.001). it is evident that the percentage of nurse instructors with adequate performance was higher among those having satisfactory knowledge .

Table (6): points to no statistically significant relations between nurse instructors, critical thinking disposition (CCTDI) from one side and their total performance of teaching role competencies from the other side. This was noticed at all intervention phases.

Table (7): Concerning the correlations among the scores of nurse instructor, knowledge, CCTDI and performance of teaching role competencies, this table indicates that the only statistically significant correlation was between the scores of knowledges and performance of teaching competencies (r=0.333). the correlation was weak and positive.

Table (1): Personal characteristics of nurse instructors in the study sample (n=50).

Items	Frequency	Percent
Age:		
<40	35	70.0
40+	15	30.0
Range	24.0-47.0.	
Mean±SD	34.6±7.0	
Median	35.0	
Nursing qualification:		
Bachelor	41	82.0
Master	9	18.0
Experience years (total):		
<10	21	42.0
10+	29	58.0
Range	2.0-24.0	
Mean±SD	11.9±6.6	
Median	12.0	
Experience years (teaching):		
<5	12	24.0
5+	38	76.0
Range	2.0-22.0	
Mean±SD	11.0±6.2	
Median	10.5	
Attended courses in:		
Critical appraisal	1	2.0
Teaching methods	38	76.0

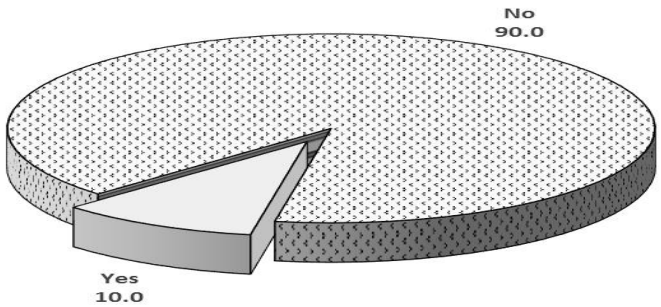

Figure (1): Master's degree among nurse instructors in the study sample (n=50).

Table (2): Knowledge of critical thinking among nurse instructors throughout study phases(n=50).

Satisfactory Knowledge (60%+) of:	Time Pre (n=50) No.	%	Post (n=50) No.	%	FU (n=50) No.	%	X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
▪ Definition of terms	21	42.0	46	92.0	41	82.0	28.27 (<0.001*)	16.98 (<0.001*)
▪ Attributes of critical thinking (CT)	12	24.0	44	88.0	37	74.0	41.56 (<0.001*)	25.01 (<0.001*)
▪ Enhancing CT among students	16	32.0	41	82.0	40	80.0	25.50 (<0.001*)	23.38 (<0.001*)
▪ Levels of reflectivity	29	58.0	46	92.0	46	92.0	15.41 (<0.001*)	15.41 (<0.001*)
▪ Types of reflection	17	34.0	44	88.0	42	84.0	30.64 (<0.001*)	25.84 (<0.001*)
▪ Purposes of reflective practice	11	22.0	44	88.0	37	74.0	44.00 (<0.001*)	27.08 (<0.001*)
▪ Log,diary and journal	23	46.0	42	84.0	41	82.0	15.87 (<0.001*)	14.06 (<0.001*)
▪ Strategies of reflection-on-action	18	36.0	49	98.0	43	86.0	43.46 (<0.001*)	26.07 (<0.001*)
▪ Process of reflection-on-action	19	38.0	46	92.0	42	84.0	32.04 (<0.001*)	22.24 (<0.001*)
▪ Ways of reflective thinking	11	22.0	42	84.0	32	64.0	38.58 (<0.001*)	17.99 (<0.001*)
▪ Stages of intellectual development	4	8.0	46	92.0	43	86.0	70.56 (<0.001*)	61.06 (<0.001*)
▪ Environment supporting reflective thinking	1	2.0	41	82.0	6	12.0	65.68 (<0.001*)	Fisher (0.11)
▪ Competency-based education	2	4.0	44	88.0	18	36.0	71.01 (<0.001*)	16.00 (<0.001*)
▪ Role of teacher in reflective thinking	1	2.0	39	78.0	8	16.0	60.17 (<0.001*)	Fisher (0.03)*

(*) Statistically significant at $p<0.05$

Table (3): Critical thinking disposition (CCTDI) among nurse instructors throughout study phases.

High (60%+)	Time Pre (n=50)		Post (n=50)		FU (n=50)		X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
	No.	%	No.	%	No.	%		
Analycity	21	42.0	18	36.0	16	32.0	0.38(0.54)	1.07(0.30)
Inquisitiveness	10	20.0	13	26.0	11	22.0	0.51(0.48)	0.06(0.81)
Maturity	31	62.0	38	76.0	38	76.0	2.29(0.13)	2.29(0.13)
Open-mindedness	38	76.0	36	72.0	42	84.0	0.21(0.65)	1.00(0.32)
Self-confidence	20	40.0	17	34.0	20	40.0	0.39(0.53)	0.00(1.00)
Truth seeking	42	84.0	42	84.0	43	86.0	0.00(1.00)	0.08(0.78)
Sytematicity	22	44.0	21	42.0	24	48.0	0.04(0.84)	0.16(0.69)

Table (4): Total performance of teaching roles as observed among nurse teachers throughout study phases.

Adequate (60%+)	Time Pre (n=50)		Post (n=50)		FU (n=50)		X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
	No.	%	No.	%	No.	%		
Teaching competency	24	48.0	31	62.0	29	58.0	1.98(0.16)	1.00(0.32)
Clinical skills	24	48.0	29	58.0	35	70.0	1.00(.32)	5.00(0.03*)
Personality traits	22	44.0	31	62.0	39	78.0	3.25(0.07)	12.15(<0.001*)
Collaboration	35	70.0	40	80.0	43	86.0	1.33(0.25)	3.73(0.053)
Role modeling	26	52.0	32	64.0	38	76.0	1.48(0.22)	6.25(0.01*)
Facilitator	34	86.0	40	80.0	41	82.0	1.87 (.17)	2.61(0.11)

(*) statistically significant at P<0.05

Table (5): Relation between nurse instructors, knowledge, CCTDI, and performance throughout study phases.

Items	knowledge satisfactory		unsatisfactory		X^2 test	p-value
	No.	%	No.	%		
PRE						
CCTDI:						
High	1	50.0	22	45.8	Fisher	1.00
Low	1	50.0	26	54.2		
Total performance:					fisher	.14
Adequate	2	100.0	17	35.4		
inadequate	0	0.0	31	64.6		
POST			4	80.0		
CCTDI:						
High	15	33.3	1	20.0	Fisher	.06
Low	30	66.7				
Total performance:					fisher	.64
Adequate	26	57.8	2	40.0		
inadequate	19	42.2	3	60.0		
FU						
CCTDI:						
High	17	48.6	8	53.3		.76
Low	18	51.4	7	46.7	.10	
Total performance:						
Adequate	28	80.0	5	33.3	10.19	
inadequate	7	20.0	10	66.7		.001*

(*) statistically significant at P<0.05

Table (6): Relation between nurse instructors, CCTDI and performance throughout study phases.

Items	performance adequate		inadequate		X^2 test	p-value
	No.	%	No.	%		
PRE						
CCTDI:						
High	11	57.9	12	38.7	1.75	.19
Low	8	42.1	19	61.3		
POST						
CCTDI:					.04	.83
High	11	39.3	8	36.4		
Low	17	60.7	14	63.6		
FU						
CCTDI:					.80	.37
High	18	54.5	7	41.2		
Low	15	45.5	10	58.8		

Table (7): Correlation matrix of knowledge, CCTDI and performance scores.

Items	Spearman's rank correlation coefficient		
	CCTDI	**knowledge**	**performance**
CCTDI			
knowledge	**-.050**		
performance	**.031**	**.333****	

(**) statistically significant at p<0.01

Discussion

Nurses who aspire to a teaching role seek professional development opportunities to enhance their teaching abilities ***(American Association of Colleges of Nursing, 2008)***. Excellence in teaching practice extends beyond theoretical and content knowledge to include exemplary performance of the task of teaching, knowing how to motivate students to think critically, and engaging in self-regulated learning and reflection ***(Sawatzky et al., 2009)***. The competent nurse instructor should be able to lead their students to adopt mindfulness and critical reflection, evidence-based skills, and clinical reasoning ***(Barradell, 2013; McKillop et al., 2014)***. However, nursing instructor are disillusioned by inconsistent critical thinking definitions, poor understanding about ways to teach critical thought processes, and a lack of reliable and valid tools to evaluate student reasoning. Thus, studies measuring nursing instructor's critical thinking skills are rare ***(Blondy, 2011)***.

When we use critical thinking, we avoid believing what others want us to believe without a good reason. This means that critical thinking keeps us from doing or believing things that are wrong **(*Bowell and Kemp, 2018).*** Therefore, the individual can be protected from being deceived and misled by determining what is relevant or important on their own ***(Cottrell, 2017).***

The study findings point to a general deficiency in nurse instructor's knowledge of critical thinking, with low critical thinking disposition. However, they have good performance of the competencies of their teaching role. The study intervention showed a success in improving their knowledge, which is positively reflected on their performance. Nonetheless, their critical thinking disposition was not improved.

The study sample included 50 nurse instructors', with a wide range of age between 24 and 47 years, which is also reflected in a wide range of experience years. This might be explained by the mix of nurse instructors who have bachelor and/or master degrees in nursing. They actually represent a number of different generations who were taught in different educational systems, which would allow the study of the effect of this on their knowledge, and more importantly their critical thinking disposition. None the-less, their median age is close to the age generally reported for nurse instructors ***(Yoder Wise, 2007).***

All nurse instructors in the present study were holding a bachelor degree or higher in nursing. This is a relatively recent

change since the era of diploma-degree nurse instructor has almost came to end with the graduation of good numbers of nurses from Faculties of Nursing. This would have a positive impact on the quality of teaching. In fact, a higher qualification turned to be a positive predictor of nurse instructors' knowledge score in the current study.

In line with the foregoing, a bachelor degree or higher is required in Jordan in order to be qualified to teach in nursing schools ***(Baker, 2010)***. Similarly, ***Creasia (2010)***, in Pennsylvania State University mentioned that the nurse instructor should have a bachelor degree in nursing, which would improve their career. ***Caille and Oermrann (2010)*** mentioned that the bachelor degree of science in nursing in Iran prepares nurse instructors for wide variety of professional roles; it qualifies its holder for administrative, research, counseling and teaching positions, which would not usually be available to those without it.

Moreover, about one-fifth of the nurse instructor in the present study were carrying a bachelor degree in nursing. This would be expected to further improve their competencies and performance in teaching and training. In congruence with this, a study conducted in European countries by ***Warne (2010)*** assessed the effectiveness of clinical educators from the perception of nursing students, and found that those educators having a master degree were more effective. Thus, ***Moonaghi et al (2010)*** who explored and described instructor' perceptions of teaching styles in nursing education in Iran, highlighted that nursing students are taught mostly by teachers who hold a master degree in nursing.

Nonetheless, training, particularly the specialized postgraduate and on-the-job training, is essential to acquire teaching competencies and skills. These latter are not sufficiently addressed in the curricula of the faculties of nursing. The present study findings point to a major deficiency in such training, where only one of the nurse instructor reported having attended a training course in critical appraisal. Moreover, only one-tenth of them were holding a degree in education, and approximately one-fourth never attended any training in teaching methods. This might explain the deficient knowledge and low critical thinking among them.

In line with this, some authors have argued against traditional teaching methods, such as lecturing, calling for an abandonment of these strategies ***(Weimer, 2015)***. Others have also promoted interactive methods placing the learner in an active rather than a passive role ***(Finotto et al, 2013)***. Moreover, student-centered teaching strategies continue to gain attention in nursing education ***(Wane and Lotz, 2013; Fahlberg et al., 2014; & Kong et al., 2014)*** as the demand grows for nurse educators to discover and use new ways to facilitate learning ***(Josephsen, 2014; Benner, 2015; De Oliveira et al., 2015)***.

The present study assessed nurse instructors' knowledge of critical thinking before implementing the training intervention. The results revealed deficient knowledge among them. This was particularly evident in the areas concerned with the environment supporting reflective thinking and related teacher role, in addition to the area of competency-based education. This deficiency in nurse instructors' knowledge could be attributed to two reasons. Firstly, the nursing faculties' curricula still do not give enough emphasis

to critical thinking as a skill to be gained by students. Secondly, there is a lack of continuing education activities, since none the nurse instructors in the sample, except one, had attended training in the area of critical thinking. The finding is in agreement with ***Boso and Gross (2015)*** who found that nurse educators in Ghana do not have a sound knowledge of critical thinking.

The deficient nurse instructor's knowledge about critical thinking is a serious finding, since they are ought to teach and train their students in this area. Moreover, they have to adopt this concept and skill, as well as the concept of reflective thinking in their teaching methods. In agreement with this, ***Degrandere (2012)*** who carried out a study in the United States emphasized the importance of possessing a broad knowledge base in critical thinking for better teaching.

Additionally, a study carried out in the United States demonstrated the crucial role of nurse instructors in preparing nursing students for professional practice after graduation. It also showed how this is affected by their teaching approaches and critical thinking experience ***(Krautscheid (2014)***. Similar findings were also reported by ***Ali W.G (2012)*** in a study in the Faculty of Nursing at Mansoura University, where nurse teachers' knowledge was identified by students as one of the most important and essential components for effective teaching.

On the same line, ***Haung (2011)***, in Australia, underscored the value of staff development activities for nurse instructors to meet the educational needs of the nursing students and for promoting best practice. Furthermore, ***Muijs et al (2014)*** stressed that critical thinking is needed to have clear a understanding of why, when and how each teaching practice can be effective, and exactly what it means to demonstrate it in a way that is optimal to promote students' learning. Additionally, the adoption of critical thinking approaches in teaching would help nurse instructors to engage actively in the needs of the students, and link the theory with practice ***(John, 2014)***.

The implementation of the training intervention program in the current study was associated with significant improvements in all areas of nurse instructor's knowledge. This independent effect of the program was confirmed through multivariate analysis. Such success could be explained by the fact that the program was designed based on identified needs of nurse instructors and responded to their unmet demands. These findings are in agreement with those of ***Shetawy (2014)*** showed that the mean score of knowledge of clinical teachers increased immediately after a training program.

At the follow-up phase of the present study, there were some declines in nurse instructors' knowledge, although the levels were still significantly better than the pre-intervention levels. The declines were in the areas of environment supporting reflective thinking, role of instructors in reflective thinking, and competency-based education. Such declines could be attributed to the fact that these areas are the most difficult to implement in their usual daily practices because they may need major changes in the educational system and the related environment.

Nevertheless, still more than two-thirds of the nurse instructors in the current study had overall satisfactory knowledge of critical and reflective thinking at the follow-up phase of the study. This indicates a good

retention of the information acquired by them during the training program. This could be due to the training module booklet designed by the researcher and distributed to them by the end of the training program. Thus, it was an important source for them for revision of their knowledge after the program was terminated.

The present study has also assessed the critical thinking disposition (CTD) among the nurse instructors before implementation of the training program interventions a requisite for thinking critically and for developing sound critical thinking skills ***(Foluso, 2014)***. The results showed that less than a half of the sample were having a high level of CTD. The finding is expected given that the majority of them had no previous training in critical thinking. Moreover, their undergraduate and graduate studies may give no due importance to this subject. The finding indicates the need to improve nurse instructors' CTD since the use of critical thinking is vital in examining simple and complex situations in their day-to-day responsibilities. In congruence with this**(*Ennis, 2013 & Smith et al., 2018*),**emphasized that giving students the opportunity to express and defend their opinions group work and debates are effective in a process that starts with questions & might be a need for a new curriculum in nursing***(Ozcan P. 2020).***

In agreement with this present study finding, ***Horan K. M. (2019),*** found that most nursing faculty members have had very little, if any, formal training on the topic of critical thinking, do not understand it well, and do not necessarily possess good critical thinking skills. ***Polat (2017)*** revealed that the critical thinking dispositions of instructors and preservice instructors were at a low level. This adds to the explanation that the graduate curricula a deficient in this area.

Meanwhile, and in disagreement with this current study finding, ***Wang-ensteen et al (2011)*** reported that nearly 80% of the respondents reported a positive disposition toward critical thinking.

The current study has also demonstrated a wide variation in nurse instructors' domains of critical thinking disposition. The highest levels of CTD were in truth seeking and open-mindedness. The high levels in these two domains might be explained by the recent increased use and application of Evidence-Based Nursing (EBN), which requires both of these two critical thinking abilities. In congruence with this, ***Smith-Blair and Neighbors (2000)*** clarified that seeking out new information have obvious links to the behaviors required for maintaining evidence-based practice standards.

Conclusion:

The study results lead to the conclusion that the nurse instructors in the study settings have deficient knowledge about critical thinking, and low critical thinking disposition; yet they possess generally high teaching competencies. The implementation of a training program in critical thinking is effective in improving their knowledge, and to some extent their performance of teaching role competencies, but has not significant effect on their critical thinking disposition. The improvements in knowledge and in performance are retained at the follow-up phase. The training intervention is a positive independent predictor of the knowledge score, whereas nurse instructor experience years, attendance of courses in critical thinking are

the predictors the critical thinking disposition score. Meanwhile, the improvement in knowledge is the only significant positive independent predictor of their score of performance of teaching role competencies. The improvements of the performance of the teaching role competences among the nurse instructors in the present study could not be attributed to a direct effect of the training program since the multivariate analysis identified the knowledge score as the only significant positive predictor of the performance score. Thus, the program had an indirect effect on performance through improving instructors' knowledge of critical thinking. The role of knowledge in fostering practice has been previously reported by **Mwale and Kalawa (2016)** who have also added that the nurse educator who do not have enough knowledge can almost not transmit necessary skills to the learners.

Nevertheless, although the nurse instructors' scores of knowledge and performance of teaching competences were positively correlated, the present study findings couldn't reveal any significant relation between critical thinking disposition and performance of teachin g role competences.

This could be attributed to the generally low level of CTD among these instructors, which has not improved through training most probably due to the short follow up period. The finding is in congruence with **Smith (2015)** who emphasized that the concept of critical thinking has many elements and definitions, and thus they pose difficulties for educators.

Recommendation:

In view of the main study findings, the following recommendations are proposed.

- The developed training program should be implemented on a longer period of time, with more emphasis on the application and practice of critical thinking.
- The nurse instructors in the study settings need urgent and intensive training workshop or courses in critical thinking as well as in teaching role competencies.
- The attendance of such courses in critical thinking and teaching methods should be a prerequisite for appointing new nurse instructors.
- Nurse instructors should also be encouraged to attend courses in education, or even obtain a related degree.
- Nurse instructor's performance should be regularly monitored, through students as well as school administration, with constructive feedback.
- The curricula of nursing institutions need to be innovated to give more emphasis to critical thinking skills.
- Further research is needed to assess the long-term effectiveness of training in critical thinking.

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