



## Effect of Self-Learning Package about Critical Thinking on Intern-Nurses' Knowledge, Disposition and Skills

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### ABSTRACT

**Background:** Critical thinking skills are imperative, nowadays, since nurses are challenged to face complex situations, taking reasonable decisions and assessing alternative solutions critically. **Aim:** This study aimed to assess the effect of a self-learning package about critical thinking on intern-nurses' knowledge, disposition, and skills. **Methodology:** A Quasi-experimental design was conducted at Beni-Suef University Hospital. **Sample** of the study was conducted on 114 of intern-nurses divided into two groups; the study group (57) and the control group (57). Four tools were used to collect data: *The first tool:* Critical Thinking Knowledge Questionnaire, *the second tool:* California Critical Thinking Disposition Inventory, *the third tool:* Critical Thinking Skill Questionnaire and *the fourth tool:* Self-Learning Package Attitude Questionnaire. **Results:** There were improvements in the levels of dispositions and skills regarding critical thinking among studied intern-nurses in both study and control groups throughout immediate post and follow up phases from the preprogram phase. There were statistically significant positive correlations between levels of critical thinking knowledge, disposition and skills of the studied intern-nurses. **Conclusion:** The training program was effective. There were general improvements in the levels of critical thinking knowledge, dispositions, skills and attitude toward self-learning package. **Recommendations:** Nursing staff and nursing management need to work together to provide a conducive atmosphere for critical thinking and innovation. Adopting self-learning packages in the orientation program of intern-nurses by nursing faculties and conducting longitudinal research designs that will enable future researchers to track nurses' critical thinking development over the course of their entire undergraduate careers

**Key words:** Critical thinking disposition, Critical thinking skills, Intern-nurses, Self-learning package.

### Introduction:

The modern healthcare system is complex. The World Health Organization (WHO) emphasized that excessive quality care needs to be “safe, effective, people-centered, timely, efficient, equitable and integrated”. Likewise, quality health care entails doing the proper thing at the proper time in the proper manner for the proper patient or the proper individual to perform the excellent possible results. Globally, there's

additionally a need to enhance the quality of healthcare for attaining and maintaining healthy populations and enhancing safe patient outcomes (Byrd & Asunda, 2020).

In reaction to the above challenges, preparing nursing students to think critically is very essential and has been a primary intention of nursing education (Kaddoura, Van-Dyke, & Yang, 2016). Critical thinking (CT) is described as a purposeful, self-

regulatory judgment that makes use of a cognitive technique to interpret, analyze, evaluate, and derive meaning through reasoning. Critical thinking is designated as a key indicator of quality in higher education (Nguyet Ngyen & Robertson, 2020).

Critical thinking is an important outcome metric in the evaluation and accreditation of bachelor and higher degree nursing programs in nursing education. Critical thinking is used in the problem-solving and decision-making processes (Demgrbuken, 2019). Nursing students must enhance their critical thinking abilities and dispositions as part of their education, knowledge, and practice. The importance of critical thinking dispositions in the development of effective critical thinking abilities is emphasized. The "constant internal motivation to use CT skills to decide what to believe and what to do" is defined as "the consistent internal urge to utilize CT skills to decide what to believe and what to do." As a result, nursing students must develop strong critical thinking dispositions in order to increase patient safety and healthcare quality (Kaya, enyuva, & Bodur, 2017; Facione, Giancarlo, and Chan, 2000).

The practice of nursing calls for critical thinking. Critical thinking is the technique of intentional higher-level thinking to outline a client's problem, observe the evidence-based practice in caring for the patient, and make alternatives in the provession of care. Critical thinking is identifying problems, assessing sources and producing possible solutions and skills; including the capacity to analyze, synthesize, infer, and examine situations. In addition, critical thinking is a disciplined, self-directed cognitive manner that results in high quality selections and judgments via the analysis, evaluation and reformulation of thinking (Byrd & Asunda, 2020).

Critical thinking is reflective and reasonable thinking is centered on determining what to believe or

do. Critical thinking consists of critical thinking skills (CTS) and critical thinking dispositions (CTD). For critical thinking to efficiently occur, students have to increase their dispositions to think critically. Unfortunately, a few students have CTS but do not use these skills (Zhang, Kubota & Kubota, 2020).

The improvement of critical thinking (CT) is imperative, nowadays, because intern-nurses are challenged to face complicated situations through, taking reasonable selections and assessing alternative solutions critically. Consequently, students need to promote their CT so as to be capable to dispute supplied claims (e.g. through authorities), consider more than one perspective and deciding in accountable manner about the importance of current clinical and technological progress to their life (Byrd & Asunda, 2020).

Healthcare employees are at the front lines of the COVID-19 pandemic response and are susceptible to pathogen exposure, lengthy working hours, mental discomfort, tiredness, professional burnout and stigma, in addition to bodily aggression (WHO, 2020a). Healthcare employees with a bad awareness of the disease can also additionally postpone diagnosis and treatment, permitting infections to spread quickly. COVID19 has claimed the lives of over a hundred Healthcare employees, an international tragedy and a roadblock in the combat in opposition to the disease (MedScape, 2020). WHO, educational institutions, colleges, and numerous governmental organizations in many nations have installed guidelines for healthcare employees and online refresher publications to enhance understanding and prevention efforts (WHO, 2020b).

Intern nurses have hands-on experience in the clinical setting, which allows them to hone their critical thinking skills. However, clinical education may not provide each student with enough time to do so for a

variety of reasons. Other learning modalities that can help nursing students develop critical thinking are being sought by educators. Self-learning package (SLP) is employed with clinical education by some educators (Zuriguél-Pérez et al., 2018).

The goal of teaching is to make learning easier. The traditional form of classroom instruction is rapidly losing its relevance in this era of knowledge explosion and technological innovation. Many newer teaching approaches have been introduced in nursing education, particularly after the advent of Covid-19. In the last few decades, self-directed learning (SDL) has also been a major topic in nursing research and practice. Self-directed learning is a process in which individuals diagnose their learning requirements, formulate learning goals, find learning resources, choose and implement learning strategies, and evaluate learning outcomes on their own, with or without the assistance of others. Because of the tremendous increase of knowledge, simple access to information, and a greater emphasis on reflection, it has become a crucial component of nursing education (Poathen, Vadakkedom & Devi, 2017).

The idea of self-directedness in learning became first mentioned in instructional literature as early as 1926. From these writings, an initial description of self-directed learning emerged (Kim, et al., 2021). A Self-Learning package (SLP) is one of the most appropriate teaching techniques for adult learners. SLP is designed in which the learner is free to select what, how, when and where to learn. Self-learning package technique is an information on one idea provided according to few particular objectives in a format that permits student skipping of a section; generally includes self-checks (pre-post-tests) of student studying throughout the self-contained package (Kheder, 2018).

Active learning shifts the point of interest from the teacher and delivery of course content material to the student and active engagement with the material. Through active learning strategies and modeling through the teacher, students abandon the traditional function of passive receptors and learn and exercise how to catch information and skills and use them meaningfully. Research and anecdotal proof overwhelmingly support the claim that students learn excellent when they engage with course material and actively take part in their learning (Cole, Johnson & Eickholt, 2017). Yet, in the traditional educational model teachers simply pour concepts and information into students as receptacles. Meanwhile, active learning needs suitable learning environments with implementation of correct strategies (Collins, 2020).

Self-learning package (SLP) is one such teaching technique used for self-directed learning which is complementary to traditional teaching. The percentage of students efficiently using SLP varies. There can be technical in addition to personal factors influencing this. Till date, no study has been performed on how it affects the learning of students. Hence, this study was designed to investigate the usefulness of these self-learning packages and to conform strategies to improve their effectiveness (Ahmed, et al., 2020).

#### **Significance of study:**

The complexity of today's workplace increases in technology and communication ability, and the globalization of business environments has produced a work environment in which graduates encounter ever-changing problems in new contexts (Elkeles, Phillipis & Phillipis, 2017), who suggest "the inefficient learning that occurs in traditional learning and development has caused some organizations to focus more on new ways of learning" as self-learning methods. From the researchers' experiences and

working with intern-nurses, the researchers found that intern-nurses faced unstructured challenges and problems beside transition from learning environment to clinical setting. All of this needs intern-nurses to use critical thinking for better accommodation in their work setting and patients care.

#### **Aim of study:**

This study aimed to assess the effect of a self-learning package about critical thinking on intern-nurses' knowledge, disposition and skills through:

1. Assessing intern-nurses' knowledge regarding critical thinking throughout program phases.
2. Assessing intern-nurses' critical thinking disposition throughout program phases.
3. Assessing intern-nurses' skills regarding critical thinking throughout program phases.
4. Identifying intern-nurses' attitude toward self-learning package throughout program phases.
5. Designing and implementing the critical thinking program using a self-learning package and traditional teaching methods for intern-nurses.
6. Assessing the effect of using a self-learning package on intern-nurses' critical thinking knowledge, disposition, skills and attitude.

#### **Research hypotheses:**

Implementation of a self-learning package will improve intern-nurses' knowledge and skills toward critical thinking; it is more stimulating and engaging for them to gain knowledge and skills than traditional methods.

#### **Subjects and methods:**

The methodology was portrayed according to the four following designs: technical, operational, administrative, and statistical design.

#### **I. The Technical Design:**

Technical design was portrayed according to the four following items: research design, setting, subjects, and tools of data collection.

##### **Research design:**

The current study used a quasi-experimental design to attain its goal. The term "quasi-experimental design" refers to a type of design that is similar to an experiment yet Examine whether the independent and dependent variables have a causal relationship. It entails the manipulation of an independent variable, namely the lack of treatment group randomization, which marks actual studies.

##### **Research Setting:**

The study was conducted at Beni-Suef University Hospital. The hospital's bed-capacity is 432. The Beni-Suef University Hospital consists of seven main departments and units providing multiservice. The hospital consists of a six-floor building. The first floor includes the emergency department and hemodialysis unit along with kitchen, laundry room and sterilization unit. The second floor hosts the oncology unit, orthopedic unit, radiology, and laboratory department beside outpatient clinics. The third floor consists of a general intensive care unit, a cardiothoracic intensive care unit and an operation department that subdivided into general and specific operation units. The fourth floor hosts surgical departments and a physician resting suit. The fifth floor consists of medical departments, cardiac department and pediatric department. The sixth floor includes obstetric department, an ear, nose and throat unit (E.N.T) and an endemic unit. This study was done at the above-mentioned departments where the intern-nurses were trained.

##### **Subjects:**

The study subjects were composed of all intern-nurses who were enrolled in the internship year (2019-

2020) at Beni-Suef University Hospital at the time of the study. The sample was composed of (114) enrolled intern-nurses were divided randomly into two groups; a control group (traditional method) and a study group (self-learning package). Every group composed of (57) intern-nurses.

### Tools of data collection

Data for the present study was collected using the following four tools:

#### First Tool: Critical Thinking Knowledge Questionnaire

A structured questionnaire was developed by the researchers based on the review of related literature (Shahin & Tork, 2013; Kallet, 2014; Mohammed & Mohammed, 2016; Aboushady, et al., 2019). It included two main parts; *Part (1)*:- Intern-Nurses' personal characteristics such as (gender, marital status, previous education, age, place of residence and have you attend a course in critical thinking). *Part (2)*: It was used to assess intern-nurses' knowledge of critical thinking. It consisted of (30) question categorized under two main dimensions: **The first dimension:** **Critical thinking concepts' knowledge:** consisted of multiple choice questions and true or false question (total number was=16) related to intern-nurses' knowledge of critical thinking concepts, benefits, and barriers. **The second dimension:** **Critical thinking disposition and skills knowledge:** It consisted of multiple choice questions and true or false questions (total number was=14) related to intern-nurses' knowledge of critical thinking dispositions and skills. This questionnaire was used throughout the three phases of the program implementation (pre, immediate post and follow-up after three months of the program).

#### The scoring system

The questions were scored as "1" for correct answer, and "zero" for incorrect answer so the total

scores were (30), and cut point was done at 60%= 18 scores. The total knowledge score was calculated as follow:

- In-adequate = < 60% (0 - <18 score)
- Adequate =  $\geq$  60% (18-30 score).

**The reliability** of critical thinking knowledge questionnaire was measured by using Cronbach's Alpha and the value was (0.713).

#### Second Tool: California Critical Thinking Disposition Inventory (CCTDI):

To assess intern nurses' disposition toward critical thinking. It was developed by **Facion (2011)**, which was modified by **Nour El-din, Mostafa & Mahfouz (2019)**. It consists of 77 items grouped under seven dispositional characteristics; truth seeking (12 items), analyticity (11 items), systematicity (12 items), self-confidence (9 items), inquisitiveness (11 items), open-mindedness (12 items) and cognitive maturity (10 items). The inventory was used throughout the three phases of the program implementation (pre, immediate post, and follow up after three months of the program).

#### The scoring system

The scoring system of inventory was based on a five-point Likert scale as follows: strongly agree (5 points), agree (4 points), uncertain (3 points), disagree (2 points) and strongly disagree (1 point). The total scores was (385). The range scores of inventory were expressed as follows:

- Negative CT disposition = < 50 % (77 - <193 score)
- Ambivalence CT disposition =  $\geq$  50% - <75% (193 - <289 score)
- Positive CT disposition =  $\geq$  75% (289-385 score)

The **reliability** of California critical thinking disposition inventory was measured by using Cronbach's Alpha and the value was (0.926).

### Third Tool: Critical Thinking Skill Questionnaire:

A structured questionnaire was developed by the researchers based on the review of related literature (AI-Fadhli, 2008; Butterworth & Thwaites, 2013; As'ari, et al., 2017; Aboushady, et al., 2019). It aimed to assess the intern-nurses' critical thinking skills such as inference analyzing and comprehension. It consisted of 20 nursing situations with multiple choice answers categorized under two dimensions namely: analysis (11 items) and evaluation (9 items). This questionnaire was used throughout the three phases of the program implementation (pre, immediate post, and follow-up after three months of the program).

### The scoring system

The critical thinking skills test consisted of 20 situations, with every situation scoring one mark for correct answer and zero for a wrong answer. The total scores of tests were 20 marks. The cut point of intern nurses' critical thinking skill was done at 60%= 12 scores. The total critical thinking skills score was calculated as follows:

- Un satisfactory critical thinking skills = < 60 % (0 - < 12 score)
- Satisfactory critical thinking skills =  $\geq$  60% (12-20 score)

The **reliability** of critical thinking skills questionnaire was measured by using Cronbach's Alpha and the value was (0.738).

### Fourth Tool: Self-Learning Package Attitude Questionnaire:

A structured questionnaire was developed by the researchers based on the review of relevant related literature (Naz, 2016; Ergas, 2017; Kheder, 2018;

Panuntun, et al., 2018 & Coulardeau, 2019). It consisted of 10 items to assess intern-nurses' attitude toward self-learning package.

### The scoring system

The scoring system of self-learning package attitude questionnaire was based on a five-point Likert scale as follows: strongly agree (5 points), agree (4 points), uncertain (3 points), disagree (2 points) and strongly disagree (1 point). The total score was 50 and cut point was set at 60 % (30 scores). The range scores of the attitudes' questionnaire were expressed as follows:

- Negative attitude toward self-learning package = < 60 % (0 - < 30 score)
- Positive attitude toward self-learning package =  $\geq$  60% (30-50 score)

The **reliability** of self-learning package attitude questionnaire was measured by using Cronbach's Alpha and the value was (0.902).

## II. The operational design:

The current study was carried out in three phases: preparation, implementation, and evaluation.

### A) The preparation phase

This phase started from May 2019 to February 2020. It was concerned with the preparation and construction of different data collection tools, and designing a critical thinking program through the following steps:

- Developing the tool for data collection; critical thinking knowledge questionnaire, critical thinking disposition inventory, critical thinking skills questionnaire, and self-learning package attitude questionnaire.
- Revising and judging the tools of data collection and critical thinking self-learning package by five experts of nursing professors from different Faculties of Nursing (Three assistant professors of

nursing administration from Cairo, Helwan, and Benha Universities), two professors of nursing administration from Ain Shams and Menoufiya Universities.

- Modifications of the tools and self-learning package were made according to experts' instructions. The modifications concern some items of language construction and arrangement.

### **The pilot study**

A pilot study was conducted in March 2020 to assess the tools' clarity, validity, and reliability. It has also served for estimating the time needed for filling the questionnaires. It was done on 10% of the total intern-nurses twelve intern-nurses; six intern-nurses from each group. The time needed for answering tool was ranged between "25-30 minutes for each participant. No modifications were made so subjects involved in the pilot were included in the study.

### **B) The implementation phase**

- Data of the current study were collected from April 2020 to July 2020. The researchers held online meetings with intern-nurses and gave orientation about the critical thinking program.
- Data collection tools were converted and designed in electronic form to be used for online data collection in response to the **virus corona (COVID-19)** outbreak and Ministry of Health restrictions.
- The knowledge questionnaire was answered by the intern-nurses in online basis before beginning the program. This pre study questionnaires was designed to allow the researchers to collect a base line assessment of intern- nurses' critical thinking knowledge, critical thinking disposition, critical thinking skills and self- learning package attitudes in order to compare it with their critical thinking

knowledge, disposition, and skills and self-learning package attitudes after the program.

- Implementation of the program was done in an online basis as the circumstances of the virus **corona (COVID-19)** outbreak at April 2020.
- Implementation of program was done in two ways at the same time; a self-learning package sent to intern-nurses in electronic form of WhatsApp chat group created for communication with students and answering any concerns or questions throughout the period of implementation that extended for two weeks.
- The self-learning package consisted of different learning methods to make information pleasing and interesting for intern-nurses beginning with concepts mind-mapping to presenting information in the form of concepts and activities.
- Continuing discussions with intern-nurses during period of self-learning implementation to clarify any concerns or questions.
- Regarding program implementation; a Google website was created and intern nurses were invited to participate.

In traditional methods, the contents of the program were converted into videos divided into six sessions: Critical Thinking Concept and its important in nursing, Components of critical Thinking Process, Skills and Characteristics of effective Critical Thinkers, Critical Thinking Dispositions, Barriers of Critical Thinking and Ways to Think More Critically

- And intern nurses who had the freedom to view contents at any time suitable for them beside, with an offer of 24-hours availability of the researchers to answer and explain any question or concern from intern nurses.

- The implementation period was taken two weeks at the same time of self-learning package implementation.

### C) The evaluation phase

- The critical thinking knowledge questionnaire was filled out by intern-nurses after the implementation of the program via online basis using Google forms. The forms were sent to intern-nurses personal pages. Besides, the Google link was sent to the intern-nurses official group and asked to fill it out.
- Critical thinking disposition inventory and critical thinking skills questionnaire were completed by intern-nurses after the implementation of the program and self-learning package to assess intern-nurses' disposition and skills regarding critical thinking using Google forms on an online basis as forms sent to intern-nurses personal page and asked to fill them out. Beside, the Google form link was sent to intern-nurses official group and asked to fill it out.
- In addition to the self-learning package attitudes' questionnaire was completed by intern-nurses after completion of the program and self-learning package to assess their attitudes toward self-learning package using Google forms in an online basis as forms were sent to intern-nurses personal page and asked them to fill it out. Besides, the google form link sent to intern-nurses official group and asked to fill it out.
- Three months later following program and self-learning package implementation, tools of data collection (electronic form) were sent to intern-nurses official Facebook group and their personal pages, and intern-nurses were asked to fill it out.

### **The ethical considerations:**

At the interview with intern-nurses to collect data, they were informed about the purpose and benefits of the study, their participation was voluntary, and they had the right to refuse participation in the study without giving any reason. Besides, withdrawal from the study at any time without penalty. In addition, confidentiality and anonymity of the subjects' responses were assured through coding of all data.

### **III. The Administrative Design:**

A letter was taken from Faculty of Nursing, Benha University to the director of Beni-Suef University Hospital and then an official approval was obtained from the director of Beni-Suef University Hospital to allow the researchers to collect data. Also, oral consent of intern-nurses to participate in the study was obtained to gain guidance and support to carry out the current study.

### **IV. The Statistical Design:**

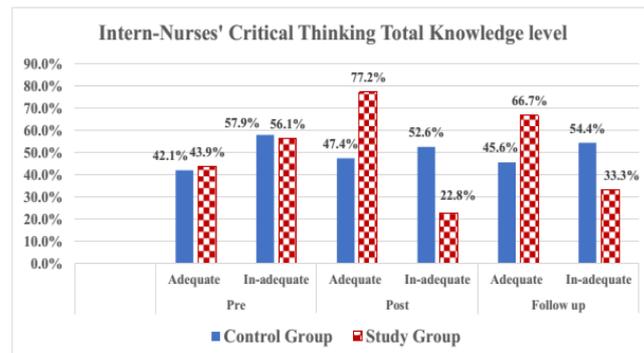
Data were verified prior to entry into the computer. The Statistical Package for Social Sciences created by IBM, Illinois, Chicago, USA (SPSS. version 25.0) was used for that purpose, followed by data analysis and tabulation. For numerical values, the mean and standard deviations were calculated. For testing factors levels, Chi Square test was used. The correlation between variables was used Pearson's correlation coefficient. The level of significant was adopted at  $p < 0.05$  and a highly significant level value was considered when  $p \leq 0.001$ .

**The Results:**

**Table 1: Percentage distribution of intern-nurses' personal characteristics. (N= 114)**

Items	Study Group (N= 57)		Control Group (N= 57)		Test	
	N	%	N	%	$\chi^2$	P-value
<b>Gender</b>						
Male	23	40.4	16	28.1	1.9	0.167
Female	34	59.6	41	71.9		
<b>Marital status</b>						
Single	41	71.9	39	68.4	0.168	0.682
Married	16	28.1	18	31.6		
<b>Previous education</b>						
General Secondary	47	82.5	45	78.9	0.49	0.807
Technical Nursing Diploma	9	15.8	10	17.5		
Associate Nursing Diploma	1	1.7	2	3.5		
<b>Age</b>						
23-	35	61.4	36	63.2	0.186	0.996
24-	18	31.5	17	29.7		
25-	4	7.1	4	7.1		
Mean± SD	23.4±.8					
<b>Place of residence</b>						
Rural	32	56.1	30	52.6	0.141	0.709
Urban	25	43.9	27	47.4		
<b>Have you attend a course in Critical Thinking</b>						
Yes	19	33.3	20	53.1	0.039	0.843
No	38	66.7	37	64.9		

**Table (1):** illustrates the personal characteristics of study participants. There were no statistically significant differences between control and study group intern-nurses' personal characteristics. Regarding the study group of intern-nurses, approximately two thirds (59.6%) of them were females, around three quarters (71.9%) were single. The majority (82.5%) had general secondary school, more than half (61.4%, & 56.1%) aged 23 years old with mean score 23.4±.8 and resided in rural area respectively. More than two thirds (66.7%) of intern-nurses didn't attend a previous critical thinking course. Regarding the control group intern-nurses, approximately three quarters of them (71.9%) were female, (68.4%) of them were single, (78.9%) had general secondary school, (63.2%) of them aged 23 years old with the mean score 23.4±.8, (52.6%) of them were resided in rural area and (64.9%) of them were from rural area and didn't attend a previous critical thinking course.



**Figure (1): Percentage distribution for study and control groups of intern-nurses regarding knowledge of critical thinking total levels throughout pre, immediate post, and follow up program.**

**Figure 1** exhibits intern-nurses' critical thinking total knowledge level: as shown in this figure intern-nurses' critical thinking total knowledge level improved throughout post and follow up phases after three months of the program implementation from the pre-program phase. The highest percentage (77.2%, 47.4%) of study and control group in immediate post program had adequate level of critical thinking knowledge respectively. In general, there was improvement in study group intern-nurses total knowledge level throughout post and follow up phases after three months of the program implementation as the highest percentage (77.2%, 66.7%) of study group had adequate total knowledge level and were better than in the control group as less percentage (47.4%, 45.6%) of them have adequate knowledge level.

**Table (2): Mean scores for study and control groups of Intern-Nurses' critical thinking knowledge throughout pre, immediate post and follow up program (N=114).**

Group	Program phases	Maximum score	Pre	Post	Follow up	F1	P1	F2	P2
			$\bar{X} \pm S.D.$	$\bar{X} \pm S.D.$	$\bar{X} \pm S.D.$				
Control Group	Critical thinking concepts	16	8.4 ± 2.8	9.2 ± 3.9	8.95 ± 3.8	9.6	0.247	6.5	0.42
	Disposition and skills	14	8.35 ± 2.35	9.0 ± 2.8	8.8 ± 2.85	5.5	0.202	6.01	0.356
	Total knowledge levels	30	16.8 ± 4.27	18.5 ± 5.6	17.69 ± 6.1	11.7	0.073	20.2	0.366
Study Group	Critical thinking concepts	16	8.4 ± 2.9	10.56 ± 3.85	10.1 ± 3.83	12.3	0.001**	15.1	0.009**
	Disposition and skills	14	8.55 ± 2.45	10.2 ± 3.7	9.8 ± 3.8	17.9	0.006**	26.6	0.037*
	Total knowledge level	30	16.9 ± 4.58	22.77 ± 6.5	20.66 ± 7.5	6.4	0.000**	30.3	0.002**

(\*) Statistically significant at  $p < 0.05$  (\*\*\*) highly statistically significant at  $p < 0.01$   
 F1 & P1 = between pre and post F2 & P2 = between pre and follow-up

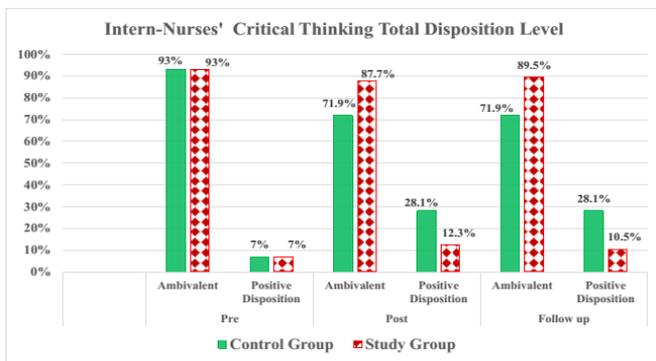
**Table 2** illustrates that there was a highly statistically significant improvement in the study group of intern-nurses' knowledge regarding critical thinking concepts ( $P= 0.001$  &  $P=0.009$ ), critical thinking disposition and skills knowledge ( $P= 0.006$  &  $P=0.037$ ) and total critical thinking knowledge ( $P= 0.000$  &  $P= 0.002$ ) between pre and immediate post and between pre-program and follow up phase of the program respectively. Regarding control group intern-nurses, there were no statistically significant differences.

Self-Confidence	Control Group	9-45	31.5 ± 4.7	31.6 ± 5.2	31.8 ± 5	1.96	0.925	1.08	0.728
	Study Group		31.6 ± 4.97	33.2 ± 2.6	32.9 ± 2.7	12.4	0.028*	10.3	0.087
Inquisitiveness	Control Group	11-55	37.7 ± 4.2	39.1 ± 5.4	39.5 ± 5.1	3.4	0.123	2.1	0.038
	Study Group		38.1 ± 4.03	39.8 ± 3.4	39.5 ± 3.6	4.04	0.012*	2.12	0.037
Open-Mindedness	Control Group	12-60	40.7 ± 4.1	41 ± 6.5	41.2 ± 6.4	7.04	0.78	5.8	0.63
	Study Group		40.9 ± 4.2	43.2 ± 2.4	42.8 ± 3.2	19.3	0.001**	8.7	0.008**
Cognitive Maturity	Control Group	10-50	30.9 ± 3.4	32.9 ± 2.03	32.6 ± 2.9	3.8	0.93	3.8	0.8
	Study Group		30.7 ± 3.4	30.7 ± 3.3	30.9 ± 5.3	12.5	0.000**	3.4	0.007**
Total critical thinking disposition	Control Group	77-385	259.7 ± 21.6	266.7 ± 10.5	268.5 ± 14.5	10.3	0.213	8.5	0.103
	Study Group		261.4 ± 21.5	275 ± 10.5	272.9 ± 14.5	21.0	0.000**	10.2	0.001**

(\* ) Statistically significant at  $p < 0.05$  (\*\*\*) Highly statistically significant at  $p < 0.01$

F1 & P1= between pre and post

F2 & P2= between pre and follow-up



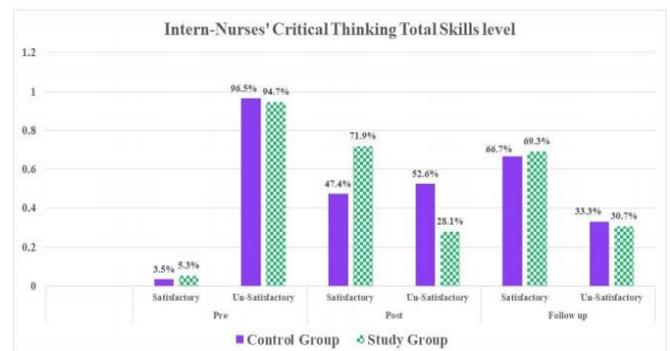
**Figure (2):** Percentage distribution for study and control groups of intern-nurses regarding critical thinking disposition total level throughout pre, immediate post and follow up program.

**Figure (2):** It is obvious from the above figure, that there was an improvement in the total level of critical thinking disposition of intern-nurses throughout post and follow up after three months of the program implementation from the pre-program phase. The highest percentage (28.1% & 12.3%) of control and study group intern-nurses had positive disposition toward critical thinking respectively.

**Table (3):** Mean scores for study and control group of intern-nurses' critical thinking disposition throughout pre, immediate post and follow up program (N=114).

Dimensions Program phases		Minimum-Maximum score	pre	Post	Follow up	F1	P1	F2	P2
			$\bar{X} \pm S.D.$	$\bar{X} \pm S.D.$	$\bar{X} \pm S.D.$				
Truth-Seeking	Control Group	12-60	41 ± 3.6	41.6 ± 4.8	41.9 ± 4.6	4.9	0.47	3.13	0.26
	Study Group		41.5 ± 3.67	43 ± 3.15	42.7 ± 3.39	1.06	0.019*	0.49	0.083
Analyticity	Control Group	11-55	37.7 ± 4.9	39.5 ± 5.6	39.8 ± 5.4	1.6	0.07	0.58	0.032*
	Study Group		37.6 ± 4.86	39 ± 2.5	38.9 ± 5.4	18.8	0.042*	14.1	0.087
Systematicity	Control Group	12-60	40.3 ± 5.5	43 ± 6.03	43.5 ± 5.9	0.93	0.015*	0.77	0.003**
	Study Group		40.75 ± 5.13	43.8 ± 3.7	43.5 ± 4.04	1.35	0.000**	0.54	0.002**

**Table (3)** demonstrates that there was a highly statistically significant improvement in study group intern-nurses critical thinking disposition dimensions in the immediate post and follow-up phases respectively related to systematicity ( $P= 0.000$  &  $P= 0.002$ ), open-mindedness ( $P=0.001$  &  $P= 0.008$ ), cognitive-maturity ( $P=0.000$  &  $P= 0.007$ ) and total critical disposition ( $P= 0.000$  &  $P= 0.001$ ) throughout the program phases. Regarding control group intern-nurses, there was a highly statistically significant improvement in control group intern-nurses critical thinking disposition dimensions in the immediate post and follow-up phases respectively related to systematicity ( $P= 0.015$  &  $P= 0.003$ ) throughout program phases.



**Figure (3):** Percentage distribution for study and control groups of intern-nurses regarding critical thinking skills total level throughout pre, immediate post and follow up program.

**Figure (3):** As shown in the figure above there was a significant improvement in intern-nurses' critical thinking skills total level throughout post and follow up phases after three months of the program

implementation from the pre-program phase. The highest percentage (71.9% & 69.3%) of the study group and (47.4% & 66.7%) of control group had satisfactory critical thinking skills in the immediate post and follow-up program implementation respectively.

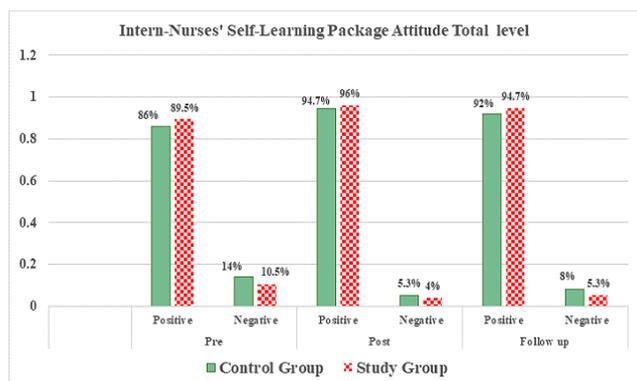
**Table (4): Mean scores for study and control group of intern-nurses' critical thinking skills throughout pre, immediate post and follow up program (N=114).**

Group	Program phases	Maximum Score	Pre	Post	Follow up	F1	P1	F2	P2
			$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$				
Control Group	Analysis	11	2.96 ± 1.63	6.35 ± 3.07	6.26 ± 3.03	34.9	0.000**	34.9	0.000**
	Evaluation	9	2.9 ± 1.8	5.55 ± 2.65	5.6 ± 2.65	15.7	0.000**	15.7	0.000**
	Total skills level	20	5.85 ± 3.02	11.82 ± 5.5	12.55 ± 5.2	29.4	0.000**	13.6	0.000**
Study Group	Analysis	11	2.93 ± 1.9	8.25 ± 3.60	8.3 ± 3.63	31.9	0.000**	31.9	0.000**
	Evaluation	9	3.02 ± 1.98	6.8 ± 2.8	6.9 ± 2.79	12.9	0.000**	12.9	0.000**
	Total skills level	20	5.93 ± 3.44	15.16 ± 6.34	15.2 ± 3.5	31.9	0.000**	31.9	0.000**

(\* Statistically significant at p<0.05 (\*\* Highly statistically significant at p<0.01

F1 & P1= between pre and post F2 & P2= between pre and follow-up

**Table 4** exhibits that there was a highly statistically significant improvements in study and control group intern-nurses' critical thinking regarding analysis skills (P=0.000), evaluation skills (P= 0.000) and total critical thinking skills (P= 0.000) throughout program phases.



**Figure (4): Percentage distribution for study and control groups of intern-nurses regarding self-learning package attitudes total level throughout pre, immediate post and follow up program.**

**Figure (4):** As shown in the figure above there was improvement in intern-nurses' attitude toward self-learning package throughout post and follow up phases after three months of the program implementation from

the pre-program phase. The highest percentage (96% & 94.7%) of study group and (94.7% & 92%) of control group intern-nurses have positive attitude toward self-learning package in the immediate post and follow-up program implementation respectively.

**Table (5): Mean scores for study and control group of intern-nurses regarding self-learning package attitudes throughout pre, immediate post and follow up program (N=114).**

Intern group	Program phases	Maximum Score	Pre-program	Post-program	Follow up-program	F1	P1	F2	P2
			$\bar{X} \pm SD$	$\bar{X} \pm SD$	$\bar{X} \pm SD$				
Control Group		50	35.3 ± 5.62	37 ± 5.47	36.4 ± 6.26	0.11	0.094	1.07	0.33
Study Group		50	35.26 ± 6.38	37.79 ± 2.99	36.95 ± 4.52	10.8	0.008**	2.9	0.11

(\* Statistically significant at p<0.05 (\*\* Highly statistically significant at p<0.01

F1 & P1= between pre and post F2 & P2= between pre and follow-up

**Table 5** demonstrates a highly statistically significant differences in study group intern-nurses self-learning package attitude (P=0.008), between pre and immediate post phase of the program.

**Table (6): Correlation between critical thinking knowledge and critical thinking disposition and skills and self-learning package attitude among intern nurse throughout program phases (N=114).**

Study variables	Critical thinking knowledge					
	Pre		Post		Follow-up	
	r	P-value	r	P-value	r	P-value
Critical thinking Skills	0.247	0.8	0.651	0.000**	0.600	0.000**
Critical thinking Disposition	0.325	0.07	0.371	0.000**	0.316	0.001**
Self-learning package Attitude	0.013	0.892	0.048	0.610	0.100	0.289

(\* Statistically significant at p<0.05 (\*\* Highly statistically significant at p<0.01

**Table 6** indicates that there was a highly statistically significant positive correlation between critical thinking knowledge, disposition and skills of the studied intern-nurses (P= 0.000 & P=0.001) at immediate post and follow up phases of the program implementation respectively. Also, there was statistically positive correlation between critical thinking knowledge and self-learning package attitude of the studied intern-nurses at immediate post and follow up phases of the program implementation.

## Discussion

Critical thinking is a philosophical and multidisciplinary development concept, with philosophy, education, and psychology being the sciences that have inquired into and contributed to the development of the concept. (D'Alessio, Avolio & Charles, 2019). Moreover critical thinking known as a wide range of intellectual dispositions and cognitive skills needed to effectively analyze, identify, and evaluate arguments and truth claims. In order to overcome and discover personal biases; to present and formulate convincing reasons in support of conclusions; and to make sound, intelligent decisions about what to believe and what to do (Brookfield, 2020; Nguyet Nguyen & Robertson, 2020).

The results of the present study revealed general improvement in the intern-nurses' critical thinking total knowledge level throughout post and follow up phases after three months of the program implementation from the pre-program phase. The highest percentage of study and control group had an adequate total knowledge levels in immediate post and follow up program but the improvement in the study group was better and more than in the control group. Additionally there were highly statistically significant improvements in the study group knowledge regarding critical thinking concepts, critical thinking disposition and skills in the immediate post program and slightly declined in the follow up program but still more than pre-program.

From the researchers' point of view, the previous findings could be explained as new knowledge presented to intern-nurses beside activities results in acquisition of more knowledge related to critical thinking that improves and retains knowledge of them immediately, and post program implementation, which was higher than follow up, as not all knowledge is reserved in the long term memory as a biological fact

and needs to be periodically refreshed and updated. Additionally, the improvement in knowledge of intern-nurses indicates that the program was effective and could have resulted from comprehensive content of the program, using creative teaching approaches that encourage participants to open questions, facilitate collaboration in the learning process, and the handout that was given to them, with the advantage of taking the learning on their own piece according to their preferences and time planning.

Moreover, the variation in improvement between study and control groups in favor of study group could be explained by the active learning methods that have better effects than traditional methods, as these methods stimulate higher thinking levels and track learners' more involvement in the learning process. As a result, this study group who used a self-learning package acquired more knowledge than the control group who used traditional methods.

These findings are consistent with Phelan, (2012), who conducted their study in the USA about enhancing student critical thinking knowledge, skills, dispositions, application and transfer in a higher education technology course. This study revealed that there was an increase in critical thinking knowledge that can occur over the course of an instructional intervention and that active learning exercises that integrate the language and concepts of critical thinking may explain the significant gains found in this study.

This finding is supported by some Egyptian studies as Chen, et al., (2020), conducted their study on students in Egypt and revealed that there was a statistically significant improvement in students' knowledge scores at the post phase following program implementation. Also, Liao & Wang, (2016), who conducted their study on students in Taiwan, found that with regard to critical thinking, both groups who

participated in the literature course had significant pre- to post-test learning gains. In addition to **Khalil (2020)**, who conducted their study on university students about critical thinking and programing in Egypt, reported that there is a statistically significant difference between the mean levels of pre-program and post-program measurement for the experimental group.

These findings are similar to the national study **Metwally & Zaton, (2020)**, who conducted their study in Benha with secondary school students and found that there was statistically significant improvement in students' critical thinking knowledge following an active learning strategy program implementation and there was a statistically significant difference in critical thinking improvement between study and control group in favor of study group. In the same line, these findings are consistent with those of a study done by **Ahmad et al., (2017)**, who conducted his study on students in Kingdom of Saudi Arabia, reported that there statistically significant improvement in students' critical thinking knowledge following program implementation using metacognitive strategies, and the results of the post-test demonstrated a statistically significant effect between the experimental group and control groups on knowledge and skills.

The findings of the present study revealed that there was general improvement in the total level of critical thinking disposition of intern-nurses throughout post and follow up after three months of the program implementation from the pre-program. The highest percentages of study and control group have a positive disposition toward critical thinking. Also there was a highly statistically significant improvement in study group critical thinking disposition dimensions in relation to systematicity, open-mindedness, and

cognitive-maturity. While in the control group, it was related to systematicity throughout program phases.

From the researcher's point of view, this improvement in the critical thinking disposition of intern-nurses could result from their increasing knowledge regarding critical thinking. This leads to an elevation of the importance of critical thinking skills use and application in their mind, so they have a more favorable disposition toward critical thinking. Ultimately, teaching and learning to become a better critical thinker is not an automatic process. However, as the current study has shown, when critical thinking has been made explicit and is implemented intentionally, it can result in positive gains in intern-nurses' critical thinking knowledge, skills, dispositions, and application.

In addition, this result could be explained in the light of total critical thinking disposition improvement. Indeed, the critical thinking disposition dimensions were interdependent on each other and on total critical thinking disposition, and vice versa. Also, with the improvement of intern-nurses critical thinking knowledge critical thinking disposition improved. Also the control group received traditional learning experience and this resulted in an improvement in their knowledge regarding critical thinking and a subsequent increase in their critical thinking disposition.

This finding was congruent with the results revealed by **Hong & Yu, (2017)**, whose study compared the effectiveness of two styles of case-based learning implemented in lectures for developing nursing students' critical thinking ability in the Nursing School of Qianqian College of Hangzhou Normal University in China, which reported that both groups of nursing students significantly improved their critical thinking dispositions. This finding is in line with **Huang et al., (2012)**, who conducted their study on

hospital based nurses reported that there was an overall significant difference from pre-test to post-test and significant differences in open-mindedness, analyticity, systematicity, self-confidence, and inquisitiveness for both the study and control group.

In the same context, **Al-Mubaid & Bettayeb, (2017)**, conducted study on higher education students before graduation in the USA, reported a significant improvement regarding their critical thinking dispositions and skills following instructional intervention. Furthermore, the results of the current study were consistent with those of a study conducted by **Dale, (2020)**, who found that the overall level of participants' critical thinking improved in post program implementation.

This finding is in agreement with **O'Flaherty & Costabile, (2020)**, who conducted a study on nursing students in Australia and revealed a significant improvement in intern-nurses' critical thinking dispositions. Also, these findings were consistent with those of a study carried out by **Tang et al. (2020)**, who conducted their study on clinical nurses in China and revealed a statistically significant improvement regarding critical thinking disposition dimensions and total critical thinking disposition.

Consistent with current study findings a study conducted by **Dehghanzadeh & Jafaraghaee (2018)**, who compared the effects of traditional lecture and flipped classroom on nursing students' critical thinking disposition in Iran, reported that after the intervention, the mean scores of critical thinking disposition and its domains were significantly higher than pre intervention. Also, **Bilik, Kankaya & Deveci, (2020)**, who studied the effects of web-based concept mapping education on students' concept mapping and critical thinking, suggested that web-based education could be utilized as a tool to enhance nursing students' critical

thinking. In the same line, **Liao & Wang, (2016)** reported that the students in the study group significantly outperformed those in control group in overall scores concerning critical thinking disposition.

The findings of the present study revealed that there was a significant improvement in intern-nurses critical thinking skills throughout post and follow up phases after three months of the program implementation. Also the highest percentage of the study and control group had satisfactory critical thinking skills in the immediate post and follow-up program. In addition, there were a highly statistically significant improvements in both the studied and controlled groups regarding analysis and evaluation skills. The improvement in the study group was better and more than in the control group.

From researchers' opinions, these results could be explained as "critical thinking is a learned skill that can be applied by nurses in solving problems and decision-making processes with creativity when dealing with patient". Moreover, the use of effective instructional strategies result in critical thinking skills improvement, this applied to self-learning package learning strategy more than traditional learning strategy. For this reason study group using self-learning package improved their critical thinking skills better and more than control group.

These findings agree with the Australian study of **O'Flaherty & Costabile, (2020)** that revealed a significant improvement in intern-nurses' critical thinking skills following instructional intervention and recommended the use of simulations to enhance active learning, knowledge transfer and ability to develop self-confidence and critical thinking. In the same line, a study conducted by **Al-Mubaid & Bettayeb (2017)** reported the presence of a significant improvement in students' critical thinking dispositions and skills

following instructional intervention. The study of **Schmidt (2017)** revealed improvement in critical thinking skills following his challenging problems intervention.

In congruent the Malaysian by **Hussein et al., (2019)** revealed that an active learning intervention resulted in an improvement of study subject critical thinking skills. The study of **Collins (2020)** showed a significant difference between study and control group regarding their critical thinking.

In this aspect, a study conducted by **Zandvakili et al., (2019)** indicated presence of statistical significant difference between study and control group critical thinking. Additionally, agreeing with this result a study conducted by **Ambarwati et al. (2019)** revealed a difference between the mean of post-test value in the experimental group and the mean of post-test score in the control group.

The foregoing findings revealed a significant improvement in intern-nurses' attitudes toward self-learning package throughout post and follow up after three months of the program implementation. The highest percentage of study and control group had a positive attitude toward self-learning package immediately post and follow-up program. There were a highly statistically significant differences in study group toward self-learning package attitudes between pre and immediately post program. Also, the current study results indicated no statistically significant difference in the intern-nurses' self-learning package attitudes among the studied intern-nurses in both control and study groups. From researchers' point of view, this improvement in the intern-nurses attitudes toward self-learning package could be due to the privilege presented by self-learning package over traditional learning methods as they can take the

learning experience at their own pace and according to their preference regarding their time management.

Similarly, **Nuangpirom et al. (2020)**, who reported that the trainee satisfaction towards developed self-learning package obtains the average score of very good, which interpreted as very satisfactory. Therefore, self-learning package can be used promptly in training course also in knowledge acquisition. In the same line, **Alsufyani et al., (2019)** discovered a significant improvement in post-test scores achieved by the experimental group after completing the self-learning package. The international studies that are in agreement with this result as **Hughes et al., (2020)**, who reported that the most frequent use of self-learning package on young adults who are experiencing moderate depression have a significant and positive effect, with a positive attitude from participants toward these learning methods.

The present study's results revealed a highly statistically significant positive correlation between critical thinking knowledge, disposition and skills of the studied intern-nurses at immediate post and follow up program. Also, there was a positive correlation between critical thinking knowledge level and attitude toward self-learning package of the studied intern-nurses at pre, immediate post and follow up of the program implementation.

In the researchers' opinion, this result follows the logic that increasing knowledge of any topic leads to greater potential of its application. Intern-nurses acquisition of more knowledge about critical thinking that leads to an improvement of their critical thinking skills and increased use of critical thinking skills for acquiring more knowledge. Also the highly statistically significant positive correlation between knowledge and disposition of the intern-nurses means that a positive change in critical thinking results in a positive change

in thinking disposition and vice versa. This may be due to the acquisition of intern-nurses of new information about critical thinking, which results in their desire to use these important skills and thus increase their critical thinking dispositions.

These findings are consistent with **Phelan, (2012)**, concluded a correlation between level of knowledge and level of critical thinking skills. In addition, **Green et al., (2003)** stated a positive statistical correlation between the level of knowledge and the level of critical thinking skills.

These findings are congruent with those of a study carried out by **Yao et al., (2018)**, revealed a significant positive correlation between critical thinking skills and critical thinking disposition. Similarly, these findings are in agreement with the Korean study of **Choi, Lindquist & Song, (2014)**, which found a positive correlation between self-directed learning and critical thinking. Moreover, the studies of **Al-Degether (2009)** and **Green et al., (2003)** revealed a correlation between level of knowledge and level of critical thinking dispositions.

The above mentioned study's findings supported the research's hypotheses, which indicates that implementation of self-learning package will improve the intern-nurses' knowledge, disposition and skills toward critical thinking; it will be more stimulating and engaging for gaining knowledge, disposition and skills than traditional methods accepted.

### **Conclusion**

Based on the current study's findings, it can be concluded that there were improvements in the levels of knowledge, dispositions and skills regarding critical thinking and also the level self-learning package positive attitude among studied intern-nurses in both studied and controlled groups throughout immediate post and follow up phases than the preprogram phase.

In addition, improvement in critical thinking knowledge and skills was higher among study group of intern-nurses than control group.

### **Recommendations**

Based on the current study's findings, the following recommendations are proposed:

#### **Educational level**

- Adopting self-learning packages in the orientation program of intern-nurses by nursing faculties.
- Enhancing awareness of the faculty teaching staff and their assistants on the importance of critical thinking in improving nursing students' leadership skills.
- Using self-learning packages as an active learning method for intern-nurses training and education.

#### **Organizational level**

- Nursing staff and nursing management need to work together to provide conducive atmosphere for critical thinking and innovation.
- Encouraging critical thinking as a requirement for job promotion through healthcare organizations.
- Building a positive work environment that enhances nursing staff critical thinking in health care organization.

#### **Intern-Nurses need to:**

- Improve intern-nurses' critical thinking skills by approaching problems using critical thinking models.
- Enhance intern-nurses' knowledge and skills using self-learning packages and online-learning courses.

#### **Further research can be conducted to:**

- Conducting longitudinal research designs that will enable future researchers to track nurses' critical thinking development over the course of their entire undergraduate careers.

- Examining a wider variety of antecedents of critical thinking; including concept mapping and problem-based learning.
- Investigating the effectiveness of using self-learning packages in teaching different nursing administration concepts.

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