The Effect of Instructional Intervention about Competency-Based Nursing Education on academic's knowledge, planning skills, and their acceptance during COVID Pandemic.

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Abstract

Nursing professionals are at the forefront of the pandemic management of COVID-19 all over the world. Egypt almost suffers from a severe shortage of nursing staff. Thus, Egyptian nursing educators are obligated to provide the nursing students with essential competencies for approaching nursing work, mainly in such difficult situations. Therefore, Competency-based nursing education (CBNE) is an inevitable as an educational delivery option in nursing colleges as required by the Egyptian government. The current study aimed at determining the effect of CBNE instructional intervention on nursing academics' knowledge, planning skills, and acceptance to follow CBNE during the COVID pandemic in Egypt. A quasi-experimental design was operated at the Faculty of Nursing, Alexandria University. The study subjects comprized 84 academics (nursing educators from all the faculty departements) who were selected conveniently and divided into control and experimental groups. The CBNE triple-section assessment sheet was developed and used for data collection. Results revealed that there was a higher improvement in the experimental group's scores than control group regarding CBNE knowledge, planning skills, and their acceptance to follow CBNE during COVID pandemic, after the conduction of the CBNE instructional intervention. Thus, there was a statistically significant difference between the experimental and control groups after such intervention in favor of the experimental group. In conclusion, CBNE awareness, understanding and acceptance to follow it during the current risk time of COVID, among nursing academics are urgent Recommendation: the CBNE scheme requires a comprehensive understanding. Interdisciplinary healthcare contributions should be carried out to develop a CBNE model in nursing field. Further studies: Assessment of CBNE implementation progress in Egyptian colleges, Evaluate of the effect of the CBNE program on Egyptian nursing students' achievement, engagement, and patients' satisfaction.

Key words: Competency-based nursing education, academics, students, COVID-19 pandemic, instructional intervention, Egypt.

Introduction:

Competency-based education (CBE) is an educational delivery option that proves to be effective in meeting nursing students' essential competencies for approaching nursing practice. Nursing and its shortage in Egypt needs expert professional educational preparations to equip competent nursing students, fundamentally, in healthcare crisis situations, like COVID-19 pandemic. But, there is still considerable confusion about the concept of competence, competency, and competency based education, competency-based nursing education (CBNE) particularly in nursing. Correspondingly, curriculum, teaching strategies and evaluation frameworks in CBNE still need clarifications, explanations and application. (Western Governor's University 2016, Dashash et al, 2020, Englander et al., 2013, Brownie et al, 2018) Consistently, validity and reliability of such an educational paradigm have to be explored, comprehended and practiced, mainly in the developed countries. Nursing curricula require an inevitable improvement in competencey development during the Corona crisis that is at the same time, already, required from the Ministry of higher education by the Egyptian government. (National Authority for Quality Assurance and Accreditation of Education , 2017, Brownie et al, 2018, Ramoset al., 2019, Gravina 2017, Lucey 2018, Bohain et al., 2014) All health sectors and theministry of health or the ministry of higher education in Egypt have approved the critical nursing role in

Egypt, which needs empowerment and reforming. Therefore, as a national strategy, developing and implementation of Competency-Based Education (CBE) among healthcare colleges and particularly, in the nursing field becomes an important national need in Egypt. (National Authority for Quality Assurance and Accreditation of Education, 2017,Brownie et al., 2018, Watson, et al., 2002, El Tawil 2021, Wu and Martin, 2019)

The concept of competency firstly appears in the third quarter of the past decade within the work of Robert White in 1959 in his article about work motivation theory. In 1971, the competency term was used in recruitment in Human Resource Management (HRM) David Clarence McClelland in 1975 presents the criteria or competencies needed for a specific job. McCalland developed a list of competencies that are needed for each job in HRM which are called model for superior performance. (Spady 1977, Perry and Hamm 2017, Mahapatro 2010, Stern 2010)

Descriptions and definitions of Competence, competency, performance or learning outcomes, and competency-based nursing education are almost confused. (Brownie et al., 2018, Wu and Martin, 2019, Pijl-Zieber et al., 2014) There are many various ways of thinking about the concept of **competency** and several interpretations of its meaning, particularly in vocational work. But, all terms in the current study were handled them on an academic basis. Hager and Gonczi in 1996, Austin in 2019, Bates in 2020, Fukada in 2018, Brownie et al., in 2018, Wu and Martin, in 2019, Salman et al, in 2020 reported that competency describes that the people have a chain of required characteristics involving attitudes or values, knowledge, skills and capabilities such as critical thinking, leadership, and communication skills that allow them to do any task successfully. Or, it is the person's aptitudes to execute something successfully or efficiently. From Greek views, competency means the quality to be capable, or having skills and abilities to do something. Thus, the academic utilization of the competency concept was developed in vocational education then, spreading to all types of schools and colleges' education. The competency concept has appeared through knowledge application, not acquisition. Competency entails a group of knowledge, skills, attitudes that the learners obtain and develop through their teaching-learning experiences, training, and then, into the profession. Consequently, the competency concept built the personal abilities, and traits that were equipped by the students to be competent professionals. Competency refers to a cluster of cognitive, affective, and behavioral abilities that were explained in cognitivim, humanism, behaviorism, and social learning theories. (Hager and Gonczi, 1996, Austin, 2019, Bates, 2020, Fukada, 2018, Brownie et al., 2018, Wu and Martin, 2019, Salman et al, 2020, Mulder et al., 2006, , Jung et al. 2020, and Koster 2017) Competency is translated into the ability to confirm the link between the theory and the practice, in which the students develop multiple personal features and attributes.

For **competence** term, it refers to the level which comes after competency. When the student can link all his\her abilities and attributes with certain professional situations, after learning acquisition, the competence takes place. The concept of competence or competencies is a more precise term than competency because competence is more directed to a certain function or a specific job than competency. The students have to tie their abilities and characteristics with the learning knowledge, skills, and attitudes to fit certain functions in a particular practical situation. (Jung et al. 2020, and Koster 2017, Wilcox 2012, Hager and Gonczi 1996). Competence in nursing translates the students' abilities with the learning content into scientific awareness in work situation and life-long learning management for professional application. (Fukada, 2018, Austin 2019, Lucey 2018, Garneau et al, 2017, Koster et al, 2017) After learning and training, students can transfer knowledge into practice and can develop competencies along the course to manage certain tasks for professional success. Competence passes through certain phases (Unconscious incompetence, conscious incompetence, conscious competence, and Unconscious competence). Moreover, to acquire certain competencies, you will step by step follow hierarchy levels of competency

(basic, competent, advanced, and expert) Furthermore, competency has many types such as administrative, technical, people, and core competencies. For each professional discipline, there is a unique group of competencies involved and achieved in its profession. (Brownie et al., 2018, Wu and Martin, Fukada, 2018, Austin 2019, Lucey 2018, Garneau et al, 2017, Koster et al, 2017) Therefore, competence is a leading force for observed effective professional action.

Performance and learning outcome are the end obvious results of competency and competence. Smith, in 1993, Kennedy et al., in 2009, Blömeke et al., in 2013, Brownie et al., in 2018, Wu and Martin in 2019 documented that Performance\Learning outcome is a specific statement of what the student is able to do as a result of teaching experience in a measurable way. It describes exactly what a student will be able to carry out after the course of education in an observable and measurable manner. Therefore, the competence can be measured through observing or assessing its learning outcomes which are accomplished and observed by the students. Educators have to understand and determine all competencies for each course and its related learning outcomes for each competency that closely relies upon the professional attributes and performance in the workplace. (Jung et al., 2020, Weeks et al., 2017, Bates 2020) Accordingly, learning outcomes are the origins for an assessment and evaluation process of the program competencies.

In consistencec with Dreyfus, there are five phases for acquiring competencies for professional work that are: novice, advanced beginner, competence, proficiency, and expertise. Through such a gradual developed skill scale, the student's competencies in practice are developed and enhanced. (Blömeke et al., 2013, Bates 2020, Gravina 2017, Fukada, 2018, Nyoni and Botma 2019, Koster et al, 2017) Consequently, it is a significant shift in the nursing educational paradigm, to be focused on job requirements, not academic ones. Hence, there are six phases to develop a competency-based curriculum as the following: 1- Determine the needed attributes among graduates. 2-Obviously define the essential competencies and their performance outcomes. 3-Specify indicators for each developed competency and learning transfer. 4- Choose teaching-learning and training activities with fit instructional strategies. 5- Choose suitable assessment instruments that assess the student's advance of mastery with details. 6- Plan an overall assessment program.(Albanese et al, 2010, Frank et al, 2010, and Sistermans 2020, Getha-Taylor, 2013, Fukada 2018, Japanese Nursing Association 2005, American Nurses Association, 2006)

Competency-based nursing education is the main target of the current study. All over the world, and mainly in Arabian countries, in nursing colleges, there is necessitating transferring from the traditional educational system to CBNE. According to Garneau et al, in 2017, Gravina, in 2017, and Jung in 2020, who discussed that CBNE is an instructional system in which a performance-based learning process is used in nursing education that reflects to which extend the nurse students demonstrate their level of accomplishment on subject-area. In another word, it is an educational system structured to allow students to demonstrate their learning according to their abilities and attributes in nursing with their pace and under authentic assessment with high quality and validation. The study schedules in CBNE curricula are planned in a flexible individualized manner with extra hours, online, blended learning interactions, open labs, and with continuous reality practice to fit students' differences and needs, regardless of the time. CBNE focuses on students' achievement and the learning they obtained, not the credit hours of course time. Nursing students have their full self-dependency and responsibility about their learning place, nature, time, and content used. (Garneau et al, 2017, Gravina, 2017, and Jung 2020) If the students gain the required competencies in a limited time, this will meet work needs, save time, and money for students, teachers, and institutions.

The National Authority for Quality Assurance and Accreditation of Education in 2017 in Egypt discussed that the nurses play an essential role in the promotion, maintenance and restoration of health. Thus, the Egyptian healthcare district found it is a necessity to prepare competent nurses with expert competencies in the nursing field. Those competencies are highly required to enable

nurses to carry out their vital roles such as health promoters, educators, counselors, care coordinators, case managers, and researchers. (Bates 2020, Brownie et al., 2018, Jung et al., 2020, National Authority for Quality Assurance and Accreditation of Education 2017) Consequently, Five Competence-Domains are developed and included in the competence-based National Academic Reference Standards for Nursing Education by the National Authority for Quality Assurance and Accreditation of Education 2017: Domain 1: Professional and Ethical Practice, Domain 2: Holistic Patient-Centered Care, Domain 3: Managing People, Work Environment, and Quality, Domain 4: Informatics and Technology, Domain 5: Inter-professional Communication. Since 1991 there have been many trials to develop specific competency domains in nursing education, in Egypt. (The National Authority for Quality Assurance and Accreditation of Education 2017, Salem et al., 2018, Brownie et al., 2018) Nowadays, incorporating, carrying out, and evaluating CBNE nationally and internationally, is a hope in nursing colleges. In line with Fastre et al, in 2014, it is important to give the nurse students the assessment criteria and the learning skills during their training with specific performance criteria. Therefore, assessment criteria in implementing the CBNE ought to be performance criteria that are present in the checklist, rubrics, and rating scales. (Fastre et al, 2014, Fan et al, in 2015) All nursing courses in the program should be revised, mainly for clinical parts, to involve a content that parallels professional needs and standards with detailed statements of performance. Consequently, the CBNE curricula of each course can be easily comprehended, implemented, and evaluated. But, literature is still limited to give details about such valuable systems and how to operate it effectively, in Egypt, mainly in risk situations, like in the era of COVID-19.

Nurses are the soldiers who stay for and carryout patient care every minute, hour, and day that expose them to death and illness. Healthcare quality and success can't be established without competent nurses. Therefore, in Egypt, the ministry of higher education put a clear vision to incorporate CBNE in the nursing curricula that allow nursing students to demonstrate mastery in nursing practice and professional competencies through their work performance and against any healthcare risks. (Brownie et al., 2018, Salem et al., 2018, Western Governor's University 2016, Englander et al., 2013, Ramos et al, 2020, Dashash et al, 2020) The ministry of higher education obligated all universities to start incorporation of CBE planning in all courses in Bachelor programs in 2018-2020. The COVID-19 pandemic situation started in 2019-2020, parallel with the starting point of CBE, in Egypt, which is a valuable and beneficial coincidence. Therefore, academic staff's orientation and training for preparing courses in a form of CBE National Framework requires rapid organization, planned time, preparations and guidance. (National Authority for Quality Assurance and Accreditation of Education 2017, Wallace et al, 2021, Lucey 2018, Inter-professional Education Collaborative 2016)

During the pandemic era, Egyptian colleges competed in preparing the academics for using of online platforms and E-educational shifting as approaches to deal with the unanticipated crisis of Corona pandemic. Such methodologies used to adjust the students' situation of abrupt confinement of the crisis. At the same time, all colleges in Egypt start to incorporate CBE system and enhance all academics for shifting with the current policies and the current academic situation. Therefore, CBNE faced many challenges, some of those challenges are: 1) academics resistance and unawareness for planning, integrating and implementing of CBNE, 2) the gap between theory and practice for tailoring all nursing subjects according to professional standards and work market needs, 3) shifting of student's clinical procedures to be competencies nature, 4) clinical environment preparations for the settled competencies and 5) COVID-19 risks in the work place and so on. (Blömeke et al, 2013, Essa, et al, 2021, Albanese et al, 2010, Ramos et al, 2020) Nursing students' on hands training is ultimately beneficial in the past, nowadays and forever, which is still necessitated. (Blömeke et al, 2013, Essa, et al, 2021, Ramos et al, 2020, Gravina 2017, Wu et al, 2019)Therefore, CBNE is inevitable and beneficial in the crisis situation because the healthcare system needs expert and proficient nursing students with proper attributes and competencies to face any healthcare crisis. But

CBNE should be planned and implemented by trained academics that can plan, operate, manage, and accept it and keep nursing students safe. Conversely, still, in Egypt, nursing academics at many of nursing colleges, need comprehensive and well planned instructional sessions about CBNE to be incorporated and executed in nursing curricula in the current pandemic crisis. (National Authority for Quality Assurance and Accreditation of Education 2017, Ramos et al, 2020, Gravina 2017, Wu et al, 2019, Hussien et al, 2020) Obviously, academic staff resistance is anticipated. Some nursing academics may find CBNE is risky approach for nursing students. And others may find it the only solution to promote nursing students' qualifications, against any healthcare risks. Therefore, provision of CBNE guidance and orientation to nursing academics will correct any conflict.

Significance of the study

In Egypt, CBNE should be assumed broadly, correctly and strictly according to the Ministry of higher education requirements and to effectively equip our nurses with fit competencies against any healthcare risks. Using of professional standards in planning for CBNE system under the light of National Qualification Framework 2017 (National Authority for Quality Assurance and Accreditation of Education 2017) and integrating the competencies and its measurable outcomes, in the fluency of nursing education(curricula, teaching strategies, student's evaluation and its policies or rules), is a crucial issue for nursing academics. CBNE orientation, training, guidance, support and instructional interventions are essentially and mostly required for nursing academics, particularly, in the COVID era. Nowadays, there is minimal evidence about provision and support nursing academics with such guidance or training in Egypt, mainly in a form of experimental trial. Establishment of such educational interventions for nursing academics will help them in successfully and constructively spreading of CBNE culture and strengthening CBNE nursing academics' knowledge, skills and acceptance to follow it. CBNE will prepare nursing students to be competent mainly, against pandemic situations. CBNE finds some resistance among academics that can be resolved by their guidance and awareness about CBNE. Proper realization of CBNE value in preparing our nursing students' competencies, among academics, especially, during crisis situations is a beneficial step for nursing education. Accordingly, the current study aimed at determining the effect of CBNE instructional intervention on nursing academics' knowledge, planning skills, and acceptance regarding implementing CBNE during the COVID pandemic.

Theoretical framework

Staff development is an essential process in the educational organization. Construction of educational and training or orientation instruction for the employees (nursing academics), essentially, during crisis time, has a worthy impact on their achievement progress and work success. Mel Kleiman (2000) put a framework for the employee training and orientation construction for knowledge, management skills and their attitudes regarding any new mission in the risk situation. Anxiety, fear and restlessness during the crisis, enhance preparedness and initiation of the employee. It is a grassroots for employee educational trials that helps them to gain cooperation, positive thinking, motivation and work loyalty, particularly in risk conditions.

Research hypotheses:

The following hypotheses were developed:

***H1:** Nursing academics who receive CBNE instructional intervention will have higher scores in their knowledge regarding CBNE than those who do not receive such intervention.

***H2:** Nursing academics who receive CBNE instructional intervention will have higher scores in their planning skills for CBNE than those who do not receive such intervention.

***H3:** Nursing academics who receive CBNE instructional intervention will have higher scores in their acceptance to follow CBNE during the COVID pandemic than those who do not receive such intervention.

Materials & method

Research design: a quasi-experimental research design was operated.

Setting: This study was conducted at the Faculty of Nursing, Alexandria University in Egypt. CBNE instructional intervention was conducted at the College council venue (it was prepared well for experimental group only for four days). The control group was selected from all nine scientific nursing departments in the college, namely: Medical& Surgical Nursing, Critical Care and Emergency Nursing, Pediatric Nursing, Obstetric and Gynecological Nursing, Gerontological Nursing, Psychiatric and Mental Health Nursing, Community Health Nursing, Nursing Administration and Nursing Education Departments.

Study subjects: involved nursing acadenics who have a doctoral degree, and they are involving in the planning of nursing program' and course's spisification development in the faculty (lecturers, assisstant professors and professors).

The minimal sample size that was estimated based on Epi info program is 76.

Therefore, conveniently the study sampling recruitment reaches 84 nursing academics, as follow:

- **Group A:** A convenient sample of 42 nursing academics who were assigned as an expreimental group because they registered and attended the CBNE instructional intervention after announcement in the Nursing Faculty.
- **Group B:** A convenient sample of 42nursing academics who assigned as a control group and accepted to participate into the study and not registered or attend the CBNE instructional intervention. Group B was selected conveniently from all the nine scientific nursing departments, by proportionate random sampling approach from each department. The researchers recruited the control group sample number until it became approximately equal to the experimental group.

Tools: a triple section evaluation sheet was developed by the researchers which included three parts for data collection:

a. **Part one: CBNE knowledge test:** that was developed by the researchers after a thorough review of the related literature, (Dashash et al, 2020, Page 2020, Ramos-Morcillo et al, 2020, Brownie et al, 2018, Lucey 2018, National Authority for Quality Assurance and Accreditation of Education 2017, Gravina 2017, Inter-professional Education Collaborative 2016, Englander et al, 2013) to determine nursing academics' knowledge about CBNE. It comprised eleven Multiple Choice Questions (MCQ) about major and significant content of the CBNE in terms of; major concepts, components, stages, levels, principles and hazards or benefits of such system during COVID pandemic. Those questions were followed by three open ended questions about; CBNE domains in the NARS 2017, justifications about hazards or benefits of implementing CBNE during COVID era. Scoring for MCQs was dependent on the right answer that took one and wrong one that took zero. For open ended questions, the scoring was dependent on the number of nursing academics' responses for each open ended question. Analysis and interpretation of the open question' responses followed the process of grouping of similar responses and deriving a specific number of items for each question.

b. **Part two: CBNE planning skills rubric:** that was developed by the researchers after a thorough review of the related literature, (Page 2020, Austin 2019, Lucey 2018, Gravina 2017, Inter-professional Education Collaborative 2016, Albanese et al, 2010) to determine nursing academics' CBNE planning skills. It included six higher planning skills, in terms of: developing competencies statements for each domain in NARS 2017, developing learning outcomes for each competency, filling nursing bachelor program specification template, filling course specification template, and filling program competencies\learning outcomes\courses matrix, and mechanics, grammar and understanding. Each planning skill rated against four points rating scale; which is; poor = 1, inadequate= 2, adequate = 3, and exemplary = 4. Six is the minimum scoring which represents poor CBNE planning skills performance. Above 6 to 12 is indicated inadequate CBNE planning skill performance. In between 12 to 18 is showed adequate CBNE planning skill performance. From 18 to 24 is the maximum scoring which represents excellent CBNE planning skills performance.

c. **Part three: CBNE acceptance scale:** It was developed by the researchers based on a thorough review of related literature (Wallace et al, 2021, Dashash et al, 2020, Page 2020, Austin 2019, Lucey 2018, Gravina 2017, Inter-professional Education Collaborative 2016, Morris et al, 2012, Sangwan et al, 2012, Fieger 2012, Albanese et al, 2010). The scale was designed to assess and measure nursing academics' attitude, value and satisfaction toward using the CBNE that represented their acceptance to follow such oncoming system, during the COVID crisis in their nursing faculty. This scale included 30 statements; ten for the attitude, ten for the value and ten for the satisfaction. Each statement is rating against five points rating scale; that are ranging from strongly disagree= 1, to strongly agree = 5. The total score is 150. Above 75 represents high level of acceptance for following CBNE among nursing academics. Below 75 denotes their low level of acceptance.

Additionally, Academic's profile sheet is attached.

The three parts of study tool were checked for its face and content validity by five experts in the fields of Medical & Surgical Nursing, Psychiatric and Mental Health Nursing, Community Health Nursing, Nursing Administration and Nursing Education Departments, and accordingly, essential modifications were done. Moreover, the three parts of the study tool were statistically checked for reliability as follows: part one and three were tested by Cronbach Alpha Coefficient Statistical Test for internal consistency for its items that denoted = 0.74 to 0.77, and 0.68 to 0.73 respectively. Part two was tested by inter-rater reliability by Cohen's Kappa Coefficient Statistical Test to check its scores consistency when used by three different raters. This part indicated K =0.69 in such reliability, with 95% confidence interval.

Data collection procedure:

A pilot study was established on ten nursing academics that were excluded from the study sample, using the study tool with the developed CBNE templates (program specification, course specification and program learning outcomes/courses matrix) that were evaluated by part two of the study tool, and thus significant changes were made. The current study passed into four phases: pre-test, planning, conduction and post-test:

- **Pre-test phase:** both study groups received and filled the study tool with the developed CBNE templates (program specification, course specification and program learning outcomes/courses matrix) before conducting the CBNE instructional intervention, with the presence of the researchers to guide the nursing academics in answering them. (for control group, they filled the study tool on individualized bases and for the experimental group, they received the study tool, half an hour before the instructional intervention and on group bases)
- **Planning phase:** Based on the pre-test phase and a thorough review of the related literature, CBNE instructional intervention was planned and developed including aim, objectives, contents, active teaching strategies (such as discussion, brain storming, demonstration and presentation). Pictures, illustrative PowerPoint, descriptive diagrams, templates of program, course specifications, program and course matrix and handouts were developed. The content of the instructional intervention was checked and reviewed for content validity by a jury of three experts in nursing education, and administration departments. The jury scientifically investigated the instructional intervention content and decided if it includes typical elucidations and interpretations with explanation about CBNE outlines for concepts, definitions, features, rational, levels, development, implementation, student's assessment, writing competency and learning outcomes statements, program and course specification, policies and barriers, during COVID crisis. Additionally, the jury ensures the content details representation to the evidences and theories or literature that related CBNE and NARS 2017. Arrangements and announcement about the CBNE instructional intervention were established with student's affair department.

Registration and venue preparation were prepared by the researchers and the quality unit and academic affairs.

- **Conduction phase:** the developed CBNE instructional intervention was implemented with the experimental group only who received theoretical and application parts through four days and 16 hours (4 for each day). Examples, explanations, questions and justifications were delivered during the CBNE instructional intervention using the flip chart, presentation, and discussion or demonstrations. Each nursing academic in the experimental group received two teaching sessions in one day with half an hour break, on two sequential days.
- **Post-test phase:** the study tool with the developed CBNE templates (program specification, course specification and program learning outcomes/courses matrix) were used again with both study groups. The scores of the three parts of the study tool before and after CBNE instructional intervention for both study groups were calculated, compared, and then, the difference between both groups 'scores was estimated. Thus, the effect of the developed CBNE intervention during the pandemic era with nursing academics was determined.
- Part one and part three of the study tool were filled by self-reporting methodology, while, part two was filled by the researchers after observing and evaluating the CBNE planning skills of nursing academics when filling the CBNE templates, (program specification, course specification and program learning outcomes/courses matrix).

Ethical considerations: Written agreements were obtained from the ethical committee, for conduction of the study. Also, written informed consents were taken from the nursing academics in the study sample after full description of the purpose and the method of the study. The nursing academics were ascertained that they participated in the study with their full voluntary decision. Additionally, they were reassured that all their answers were used with a confidential approach. Also, anonymity was ascertained, by avoiding the participants putting their names on the study tool. Moreover, the participants were ensured that they can withdraw from the study at any time of the study phases.

Data Analysis:

The collected data was fed to the computer, coded, investigated and arranged and presented. Statistical Packages for the Social Sciences (SPSS) version 20.0 for Windows (Office 2010) were employed for calculating and revealed the study findings. Number, percentage, mean and standard deviation were used for descriptive data. Chi-square was used for test of significance with P values.

Results:

Table I clarifies that approximately one third of both groups (28.57%, 30.95 %) were in between 45, and 55yearsold and almost both of them (90.48%, 95.21%) were females. It is obvious that all college departments were representative in both study groups, just about equally. Nearly one third of both groups, for group A (35.71%, 30.95 %) and for group B (28.57%, 26.19%); are lecturers and assistant professors, respectively. Almost both groups did not attend any CBNE educational sessions during COVID crisis and likewise, the majority of both did not participate in any CBNE committee in the faculty. Generally, there was no apparent statistically significant difference among both study groups as regards their profile, and the level of significance ≤ 0.05.

Table II illustrates a higher improvement in the experimental groups' knowledge about CBNE before and after the instructional intervention than the control group, regarding all knowledge tests .Concerning, identifying the CBNE' major concepts among group A before conducting the instructional intervention, minimal percentages (2.38%, 4.76%, 14.29%, 7.14%, and 23.81) of them mentioned those concepts correctly. But, after conducting the instructional intervention, academics in group A approved an apparent improvement in understanding and reporting those major concepts, so, their percentages became high (78.57%, 71.43%, 95.24%, 78.57%, and 97.62). But, group B, did not show any improvement in identification of those CBNE' major concepts before, and after conducting the instructional intervention, respectively.

In relation to the CBNE components, stages and levels of development, few percentages of group A (11.9%, 16.67%, and 2.38 %) reported right answers, before conducting the intervention, however, after conducting it, great percentages of them (95.24%, 90.48%, 78.57%) documented right answers. On the other hand, group B, did not indicate any progress in awareness of those CBNE items before and after conducting the instructional intervention.

Pertaining to CBNE principles and domains, the majority of both groups (59.52%, 83.33% for group A and 71.43%, 73.81% for group B) provided wrong answers before conducting the instructional intervention. However, after conducting the instructional intervention, those percentages among group A became very minimal (4.76%, 2.38%), while, in-between group B, those percentages approximately remainedthe same (66.67%, 78.57%). This result denoted that almost all of experimental group didn't have any wrong answers about the CBNE principles and domains but the control group still, has wrong answers about such items.

For subjects' awareness of the CBNE difficulties among academics and students, about two thirds of both groups A & B (71.43%, 61.90%), before, conducting the instructional intervention reported that CBNE has no difficulties. But, after conducting the instructional intervention, these percentages became (95.24%, 66.67%) in favor of the experimental group who approve their refusal that CBNE has any difficulties for academics or students.

The study groups mentioned some CBNE difficulties according to their point of views; in terms of: Exposing nursing students to COVID infection, they are Exhaustion due to continuous physical presence, Difficulty in teaching and assessment, Provoking stress, fear and anxiety and wasting money and effort.

With reference to the subjects' awareness if CBNE benefits, for academics and students, the majority of both groups A & B (78.57%, 71.43%), before, conducting the instructional intervention, reported that CBNE is beneficial. But, after conducting the instructional intervention, these percentages became (90.48%, 69.05%) in favor of experimental group who admire their complete agreement that CBNE is beneficial for academics and students.

The groups mentioned some CBNE benefits according to their points of view; in terms of Enhancing students nursing skills, Consider a preparation to confront such a crisis, Meet work needs without errors, Maintaining high quality of nursing practice, Improve nursing educational services, and Saving effort and time

Generally, it was observed that there was a statistically significant difference between both groups particularly, after conducting the CBNE instructional intervention for almost all items in the knowledge test and P = 0.000. The CBNE instructional intervention showed a significant and effective influence in improving group A' CBNE knowledge.

Table III denotes that both study groups have inadequate CBNE's planning skills scores, before the instructional intervention. But, after the instructional intervention, the experimental group showed an apparent progress in all CBNE's planning skill in all rubric items, while, the control group showed no improvement. For example, regarding, developing competencies' statements according to NARS 2017, it was observed that there was significant percentages of group A (28.57%, 50%) that have an excellent and accepted skill scores, after the CBNE instructional intervention which were poor and inadequate before the CBNE instructional intervention. On the other hand, and with a comparison with group B, they have poor and inadequate skill scores before and after conduction of CBNE instructional intervention, unlike group A.

a. Perceived attitude toward CBNE

As regards table **IV**, it reveals the CBNE's attitude scores among experimental and control groups during COVID era. According to the scale's mean scoring, above 2.5 mean scores indicated CBNE positive attitude and below 2.5 mean scores denoted a CBNE negative attitude during COVID era. Therefore, it was clear that both study groups have CBNE negative attitude before conduction of CBNE instructional intervention during COVID era. While, after conduction of CBNE instructional intervention during COVID circumstances, group A mean scores were improved and became above 2.5

for all subscale items, but group B has no improvement and continued approximately the same.

Perceived CBNE value

Concerning **table V,** it clarifies the CBNE's value scores among experimental and control groups during COVID pandemic. According to the scale's mean scoring, above 2.5 mean scores indicated high CBNE value perception and below 2.5 mean scores denoted low CBNE value perception during COVID era. Therefore, it was obvious that both study groups have low perception of CBNE value before conduction of CBNE instructional intervention during COVID era. While, after conduction of CBNE instructional intervention during COVID era, group A mean scores were improved and became above 2.5 for all subscale items, but group B has no improvement and sustained almost the same.

Perceived satisfaction toward CBNE

Table VI elucidates the CBNE's satisfaction score levels among experimental and control groups during COVID pandemic. Inconsistency, with the scale' scoring, above 2.5 mean scores showed high CBNE satisfaction, and below 2.5 mean scores indicated low satisfaction level regarding CBNE during COVID era. Consequently, it was understandable that both study groups have low CBNE satisfaction level before conduction of CBNE instructional intervention during COVID era. While, after conduction of CBNE instructional intervention during COVID era, group A mean scores were improved and became above 2.5 for all subscale items, but group B has no improvement and continued approximately the same.

Figure 1 shows knowledge, planning skills, and acceptance scores about CBNE among the control group before and after conduction of CBNE instructional intervention during COVID pandemic as presented by score's percentages averages. They have limited scores before the intervention and after intervention; their scores approximately still the same.

Figure 2 clarifies knowledge, planning skills, and acceptance scores about CBNE among the experimental group before and after conduction of CBNE instructional intervention during COVID pandemic as presented by score's percentages averages. The improvement is obviously observed which approves the effectiveness of the CBNE instructional intervention among academics at knowledge, skills and attitude levels.

Table I: Nursing academics profile (N=84).

Nursing academic's profile	Group A (N=42)		Group B (N=42)		Test of Significant (X^2)
	No.	%	No.	%	
Age					
25 < 35	9	21.42	8	19.05	
35 < 45	6	14.28	8	19.05	**X^2= 1.0615**
45 < 55	12	28.57	13	30.95	**P= 0.9003**
55 < 65	6	14.28	7	16.67	
Above 65	9	21.43	6	14.28	
Sex:					
Male	4	9.52	2	4.76	**X^2= 0.7179**
Female	38	90.48	40	95.21	**P= 0.3968**
Department:					
Community Health Nursing	3	7.14	5	11.90	
Critical Care &Emergency Nursing	6	14.28	5	11.90	
Gerontological Nursing	5	11.90	5	11.90	
Medical & Surgical Nursing	5	11.90	4	9.52	
Nursing Administration	3	7.14	5	11.90	**X^2= 1.2573**
Nursing Education	5	11.90	4	9.52	**P= 0.996**
Obstetric and Gynecological Nursing	4	9.52	4	9.52	
Psychiatric and Mental Health Nursing	5	11.90	5	11.90	
Pediatric Nursing	6	14.3	5	11.90	
Academic position:					
Lecturer	15	35.71	12	28.57	
Assistant professor	13	30.95	11	26.19	**X^2= 1.4103**
Professor	5	11.90	7	16.67	**P= 0.8424**
Full time assistant professor	3	7.14	5	11.90	
Full time professor	6	14.29	7	16.67	
Previously attend CBNE session during COVID crisis:					
Yes	7	16.67	5	11.90	**X^2= 0.3889**
No	35	83.33	37	88.09	**P= 0.5329**
Participate in CBNE committee in the faculty:					
Yes	2	4.76	3	7.14	**X^2= 0.2127**
No	40	95.21	39	92.86	**P= 0.6447**

X^2 = ***Chi square*** test, **P**: level of significance≤ 0.05*** = p ≤ 0.05** **** = p ≤ 0.01** ***** = p ≤ 0.001**

Table II: CBNE's knowledge among experimental and control groups, before and after the instructional intervention, as presented by number, and percentage. (N=84)

CBNE Knowledge items	Group A (N=42)				Group B (N=42)				Test of Significant(X^2)P value
	Before		After		Before		After		
	No.	%	No.	%	No	%	No.	%	
Major CBNE concepts									
Competence	1	2.38	33	78.57	2	4.76	3	7.14	X^{2a} = 7.378 P= 0.122
Competency	2	4.76	30	71.43	3	7.14	4	9.52	X^{2b} = 0.202 P=0.995
Performance/Learning Outcome	6	14.29	40	95.24	4	9.52	4	9.52	X^{2c} = 1.142 P=0.888
Authentic assessment	3	7.14	33	78.57	2	4.76	3	7.14	X^{2d} = 1.931 P=0.748
CBNE	10	23.81	41	97.62	8	19.05	11	26.19	
Components of Competency based Education									
Knowledge, Skills, Attitudes, and personal characteristics	5	11.9	40	95.24	7	16.67	5	11.90	X^{2a} = 58.63 P= 0.000*
Wrong response	37	88.1	2	4.76	35	83.33	37	88.09	X^{2b} = 0.389 P=0.533
									X^{2c} =0.389 P=0.533
									X^{2d} =58.63 P=0.000*
Stages of competency development									
1-Unconscious incompetence, 2- Conscious incompetence, 3- Conscious competence, 4- Unconscious competence	7	16.67	38	90.48	3	7.14	5	11.90	X^{2a} =45.99 P= 0.000*
Wrong response	35	83.33	4	9.52	39	92.86	37	88.09	X^{2b} = 0.553 P=0.457
									X^{2c} = 1.816 P=0.177
									X^{2d} = 51.87 P=0.000*
Levels of competency development									
1-Novice, 2-Competent, 3-Experienced/ Advanced, 4- Master/Expert	1	2.38	33	78.57	4	9.52	3	7.14	X^{2a} = 50.59P= 0.000*
Wrong response	41	97.62	9	21.43	38	90.48	39	92.86	X^{2b} = 0.156 P=0.693
									X^{2c} = 1.914 P=0.167
									X^{2d} = 43.75 P=0.000*
Principles of CBNE ▲									
1. Offers learning flexibility	12	28.57	35	83.33	11	26.19	14	33.33	
2. Focuses on students' achievement	9	21.43	32	76.19	4	9.52	6	14.28	
3. Allows mastering of nursing skills	17	40.48	40	95.24	11	26.19	13	30.95	
4. Permits learning with student's pace	3	7.14	38	90.48	5	11.90	7	16.67	X^{2a} =85.31 P= 0.000*
5. Enhances student's engagement	5	11.90	36	85.71	5	11.90	5	11.90	X^{2b} = 4.398 P=0.819
6. Emphasizes on reality and job work	3	7.14	30	71.43	9	21.43	13	30.95	X^{2c} =7.774 P=0.456
7. Improve the educational services' quality	11	26.19	33	78.57	8	19.05	7	16.67	X^{2d} = 78.63 P=0.000*
8. Use of authentic assessment	4	9.52	28	66.67	3	7.14	10	23.81	
Wrong answer	25	59.52	2	4.76	30	71.43	28	66.67	
Listing the domains of competencies according to NAES 2017 ▲									
Domain 1: Professional and Ethical Practice	5	11.90	41	97.62	3	7.14	5	11.90	
Domain 2: Holistic Patient-Centered Care	5	11.90	36	85.71	5	11.90	4	9.52	
Domain 3: Managing People, Work Environment, and Quality	2	4.76	33	78.57	3	7.14	6	14.28	X^{2a} =126.79 P=0.000*
Domain 4: Informatics and Technology	7	16.67	34	80.95	11	26.19	9	21.43	X^{2b} =1.979 P=0.852
Domain 5: Inter-professional Communication	2	4.76	32	76.19	4	9.52	6	14.28	X^{2c} = 2.489 P=0.778
Wrong response	35	83.33	1	2.38	31	73.81	33	78.57	X^{2d} = 104.29 P=0.000*
During COVID pandemic, the implementation of CBNE is difficulties for nursing academics &students?									

Yes	12	28.57	2	4.76	16	38.10	14	33.33	X^{2a} = 8.571 P= 0.003* X^{2b} = 0.207 P=0.649 X^{2c} = 0.857 P=0.354 X^{2d} = 11.12 P=0.001*
No	30	71.43	40	95.24	26	61.90	28	66.67	
The hazards when implementing CBNE during COVID crisis ▲									
1. Exposing nursing students to COVID infection	5	11.90	1	2.38	6	4.28	7	16.67	
2. Exhaustion due to physical presence	4	9.52	0	0.00	5	11.90	6	14.28	X^{2a} = 2.427 P= 0.787
3. Difficulty in teaching and assessment	4	9.52	1	2.38	8	19.05	5	11.90	X^{2b} =1.284 P=0.937
4. Provoking stress, fear and anxiety	3	7.14	0	0.00	6	14.28	7	16.67	X^{2c} =1.621 P=0.898
5. Wasting money and effort	2	4.76	0	0.00	7	16.67	7	16.67	X^{2d} = 4.035 P=0.544
6. No response	3	7.14	0	0.00	4	9.52	6	14.28	
During COVID pandemic, the implementation of CBNE is beneficial for nursing academics &students?									
Yes	33	78.57	38	90.48	30	71.43	29	69.05	X^{2a} = 2.275 P= 0.132 X^{2b} =0.012 P=0.914 X^{2c} = 0.571 P=0.449 X^{2d} =4.429 P=0.035
No	9	21.43	4	9.52	12	28.57	11	26.19	
The benefits when implementing CBNE during COVID crisis ▲									
7. Enhancing student's nursing skills	3	7.14	18	42.86	4	9.52	3	7.14	
8. Consider a preparation to confront such crisis	2	4.76	9	21.43	3	7.14	3	7.14	
9. Meet work needs without errors	2	4.76	22	52.38	3	7.14	4	9.52	X^{2a} = 15.844 P= 0.015*
10.Maintaining high quality of nursing practice	2	4.76	26	61.90	2	4.76	4	9.52	X^{2b} = 2.162 P=0.904
11.Improve nursing educational services	2	4.76	17	40.48	2	4.76	4	9.52	X^{2c} = 1.722 P=0.943
12.Saving effort and time	3	7.14	12	28.57	1	2.38	2	4.76	X^{2d} = 10.70 P=0.098
13.No response	4	9.52	2	4.76	6	14.28	4	9.52	

X^2 = Chi square test, **P**: level of significance ≤ 0.05 **▲Some participants reported more than one response** *** = p ≤ 0.05** **** = p ≤ 0.01** ***** = p ≤ 0.001**

X^{2a}comparison between study group pre and post X^{2b} comparison between control group pre and post

X^{2c} comparison between study group and control group pre X^{2d} comparison between study group and control group post

Table III: CBNE's planning skills among experimental and control groups, before and after the instructional intervention, as represented by number and percentages. . (N=84)

CBNE planning skills RUBRIC	Group A (N=42)				Group B (N=42)			
	Before CBNE instruction		After CBNE instruction		Before CBNE instruction		After CBNE instruction	
	No	%	No	%	No	%	No	%
1- Developing competencies statements according to NARS 2017								
• **Exemplary (Excellent) (96-120)**	3	7.14	12	28.57	5	11.90	3	7.14
• **Adequate (Accepted) (66-95)**	4	9.52	21	50	6	14.28	10	21.81
• **Inadequate (Below standard) (36-65)**	15	35.71	8	19.05	22	52.38	19	45.24
• **Poor (6-35)**	20	47.62	1	2.38	9	21.43	10	21.81
2-Developing LOs for matching each competency								
• **Exemplary (Excellent) (96-120)**	1	2.38	10	21.81	3	7.14	5	11.90
• **Adequate (Accepted) (66-95)**	5	11.90	25	59.52	3	7.14	3	7.14
• **Inadequate (Below standard) (36-65)**	22	52.38	7	16.66	6	14.28	12	28.57
• **Poor (6-35)**	14	33.33	0	00.0	30	71.43	22	52.38
3-Filling program specification template								
• **Exemplary (Excellent) (96-120)**	4	9.52	11	26.19	5	11.90	4	9.52
• **Adequate (Accepted) (66-95)**	4	9.52	29	69.05	6	14.28	4	9.52
• **Inadequate (Below standard) (36-65)**	4	9.52	2	4.76	4	9.52	10	21.81
• **Poor (6-35)**	34	80.95	0	00.0	27	64.28	24	57.14
4-Filling course specification template								
• **Exemplary (Excellent) (96-120)**	5	11.90	15	35.71	6	14.28	4	9.52
• **Adequate (Accepted) (66-95)**	2	4.76	22	52.38	6	14.28	3	7.14
• **Inadequate (Below standard) (36-65)**	16	38.1	3	7.14	17	40.48	20	47.62
• **Poor (6-35)**	19	45.24	2	4.76	13	30.95	15	35.71
5- Filling program competencies\ learning outcomes\courses matrix								
• **Exemplary (Excellent) (96-120)**	2	4.76	12	28.57	3	7.14	2	4.76
• **Adequate (Accepted) (66-95)**	4	9.52	26	61.91	4	9.52	2	4.76
• **Inadequate (Below standard) (36-65)**	20	47.62	3	7.14	24	57.14	28	66.66
• **Poor (6-35)**	16	38.1	1	2.38	11	26.19	10	21.81
6-Mechanics, grammar and understanding								
• **Exemplary (Excellent) (96-120)**	10	21.81	22	52.38	13	30.95	10	21.81
• **Adequate (Accepted) (66-95)**	12	28.57	16	38.1	17	40.48	15	35.71
• **Inadequate (Below standard) (36-65)**	20	47.61	4	9.52	10	21.81	15	35.71
• **Poor (6-35)**	0	0.00	0	00.0	2	4.76	2	4.76

The following section represents the study subjects' acceptance scores toward implementing CBNE in the nursing college, before and after conduction of the instructional intervention during the COVID pandemic, in terms of their perceived attitude, value and satisfaction toward CBNE.

Table IV: CBNE's attitude among experimental and control groups, before and after the instructional intervention, during the COVID pandemic, as represented by mean and standard deviation (N=84)

Perceived CBNE attitude items	Group A (N=42)				Group B (N=42)			
	Before CBNE instruction		After CBNE instruction		Before CBNE instruction		After CBNE instruction	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1.I feel that CBNE is required in the nursing faculty for equipping students to fight healthcare crises.	2.07	0.58	4.32	1.26	1.56	0.58	1.78	1.65
2.I perceive that CBNE system allows teachers for creating, applying & sharing content materials easily in the current risk era.	1.11	1.78	4.61	1.09	2.11	1.11	2.22	0.67
3.I should have enough CBNE training on planning & application, in the current risk time.	1.62	0.58	4.11	1.11	1.98	1.08	1.71	1.54
4.I should be CBNE literate to have better future management with any healthcare crises.	1.73	1.49	4.92	0.78	1.95	0.89	2.02	1.18
5.I appreciate the use of CBNE in the nursing faculty in the present COVID time.	1.44	0.48	4.23	1.49	2.13	1.18	2.33	0.97
6.I feel that CBNE allows collaborative, flexible academic work during risk times.	1.67	1.39	4.25	1.01	2.03	1.89	2.11	1.44
7.CBNE will be interesting for students and academics in online, classrooms or in clinical and practical areas during such risk time.	1.78	1.33	4.55	0.49	1.54	1.95	1.88	1.54
8.Both students & academics will be more active, engaged, and productive with CBNE to face such healthcare crises	2.00	0.88	4.12	1.26	1.34	0.56	1.87	0.26
9. I feel that I will follow CBNE easily in the current COVID risk time.	1.74	1.35	4.01	1.98	1.55	1.22	2.01	1.53
10. I will be initiative to attend CBNE training workshops in the current risk era.	2.11	0.77	4.05	1.51	1.77	0.49	2.44	0.74
Total	**1,73**	**1.06**	**4.32**	**1.19**	**2.16**	**1.79**	**2.04**	**1.15**

Table V: CBNE's value among experimental and control groups, before and after the instructional intervention, during COVID pandemic, as presented by mean and standard deviation (N=84)

Perceived CBNE value items	Group A (N=42)				Group B (N=42)			
	Before CBNE instruction		After CBNE instruction		Before CBNE instruction		After CBNE instruction	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
11. CBNE will approve efficiency in student's & academic's achievement progress in work situation mainly in risk time as nowadays.	2.11	1.87	4.11	1.34	1.33	0.78	1.67	0.89
12. Nursing students will have experts skills to achieve high quality of nursing care and fight COVID complications in the society	2.12	0.78	4.32	0.69	1.87	1.43	2.01	1.43
13. CBNE will approve improvement in nursing academic's teaching performance, mainly with the current risk circumstances	2.27	0.66	3.77	1.44	1.56	1.23	1.98	0.84
14. CBNE will enhance the faculty educational quality and improve the value of it in the eyes of the community	1.89	1.15	4.18	1.13	1.23	1.45	1.77	1.74
15. Nursing students will use their ability to master skills at their own pace that allow them limit the hazards of COVID risks.	1.23	0.55	4.08	1.66	1.56	1.67	2.45	1.54
16. Academic's & student's learning needs differences will be met with CBNE in such critical situation	1.77	1.34	4.42	1.25	1.45	1.23	1.91	0.78
17. With CBNE, academics &students will be experts to save time, effort and cost	1.89	0.56	4.25	1.23	2.04	1.56	2.55	0.94
18. CBNE, will fit work requirements and enhance it without errors which is a necessary in the current risk time	2.34	0.79	3.78	0.96	1.55	0.78	1.89	1.43

Perceived CBNE value items	Group A (N=42)				Group B (N=42)			
	Before CBNE instruction		After CBNE instruction		Before CBNE instruction		After CBNE instruction	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
19. In CBNE, nursing academics will use many teaching methodology, assessment authenticity which strengthen their qualifications	1.74	1.56	3.66	1.11	1.45	0.73	2.51	1.11
20. CBNE will add positive effects to the reputation of nursing field.	1.95	0.86	4.34	0.78	2.11	0.47	2.32	0.89
Total	**1.93**	**1.01**	**4.09**	**1.16**	**1.62**	**1.13**	**2.11**	**1.16**

Table VI: CBNE's satisfaction among experimental and control groups, before and after the instructional intervention, during COVID pandemic, as presented by mean and standard deviation. (N=84)

Perceived CBNE's satisfaction level	Group A (N=42)				Group B (N=42)			
	Before CBNE instruction		After CBNE instruction		Before CBNE instruction		After CBNE instruction	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
21. I appreciate that CBNE can be used easily and with flexibility with distance precautions	1.31	0.69	3.67	0.94	1.11	0.34	1.77	0.56
22. I feel that with CBNE nursing academics and students' need will be recognized & understood, even in current crisis.	1.67	1.08	4.16	1.89	1.45	1.11	1.22	0.44
23. I appreciate that in CBNE, we will use blended teaching & online platforms which will fit COVID precautions	1.69	1.16	3.88	1.11	1.93	0.83	2.18	0.68
24. I anticipate that CBNE will upgrade academics potentials which are required in crises era	2.17	1.67	4.56	1.34	1.22	0.75	1.45	1.22
25. I have a confidence in authentic assessment and in CBNE ensures competency achievement that we need in crisis situations	1.90	0.78	4.78	0.86	1.26	1.14	2.12	1.34
26. I appreciate that in CBNE, teachers can identify strengths & defects of teaching, in such crisis era	1.45	1.11	3.67	1.11	1.85	1.44	1.67	0.89
27. I appreciate that in CBNE, nursing students will attain enough chances for training, even with COVID restrictions.	1.67	1.11	4.22	1.21	1.67	1.56	1.45	1.33
28. CBNE develop students' problem-solving skills that help them deal with any crisis.	2.11	1.45	3.89	0.89	1.45	0.72	1.34	1.11
29. CBNE helps students to be self-dependent, clinical judgers, even with any crisis.	2.09	0.89	4.44	1.54	2.44	1.07	1.55	1.45
30. CBNE improves students' soft & hard skills that permitted them to manage efficiently at risks.	1.56	1.21	3.78	1.45	2.12	0.67	2.11	0.78
Total	**1.76**	**1.16**	**4.11**	**1.23**	**1.65**	**0.96**	**1.69**	**0.98**

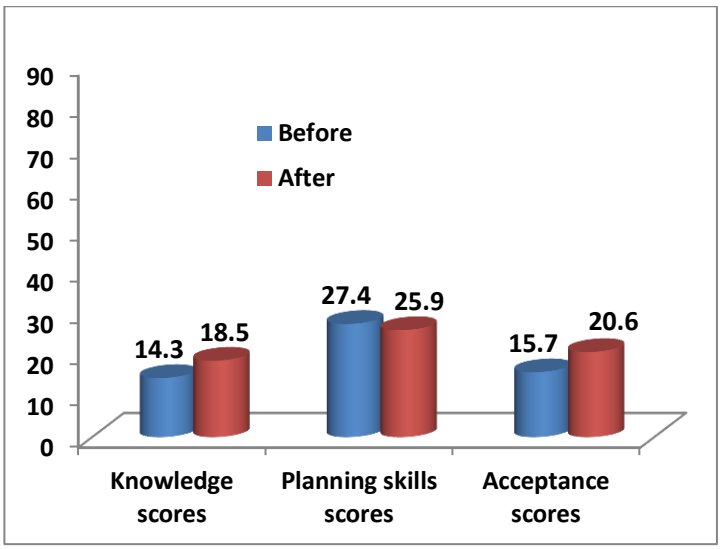

Figure 1: Illustrates knowledge, planning skills, and acceptance scores about CBNE among the control group before and after conduction of CBNE instructional intervention during COVID pandemic as presented by score's percentages averages, (N=84)

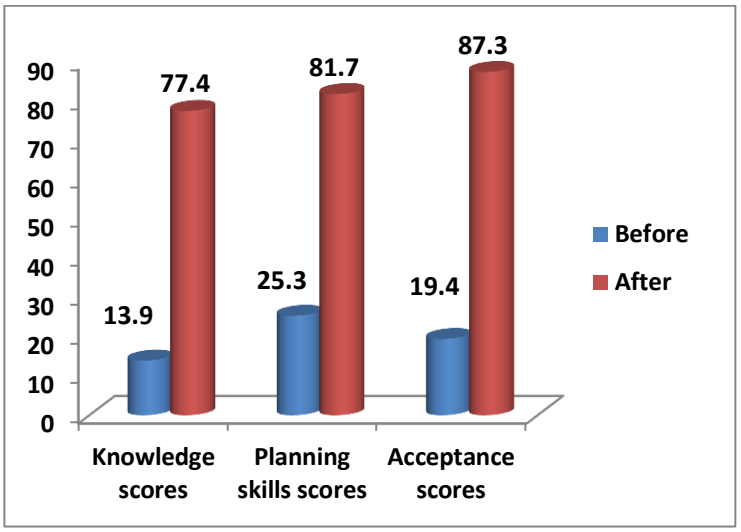

Figure 2: Illustrates knowledge, planning skills, and acceptance scores about CBNE among the experimental group before and after conduction of CBNE instructional intervention during COVID pandemic as presented by score's percentages averages, (N=84)

Discussion

Nurses are often the specialists for supporting and providing competent healthcare when necessary, advising, helping, saving sick or healthy people at any difficult health problem. They are attending at critical moments, and calming once patients feel worries or fear. Nurses are the fundamental and crucial professionals in healthcare system. In Egypt, there are many challenges faced nurses in their work; like: massive spreading of infectious (COVID and others), appearance of several health problems for women, children, the elderly, and adults. Additionally, intense staff shortage, practice' errors, poor salaries, overloading work, lacking of cognitive and behavioral skills and competition to approve

accepted quality and image of nursing serveries nationally and internationally, considered a great challenges. Therefore, upgrading of nursing education become has urgent. Nursing student's preparation becomes necessitate and national need. (Brownie et al., 2018, Ramos et al., 2019, Watson, et al., 2002, El Tawil 2021, Wu and Martin, 2019)

There are many nursing education programs in Egypt affiliated to two isolated governmental ministries: 1- TheMinistry of Health and Population (MoHP) covers secondary nursing schools and technical and associate nursing institutes which awarded a diploma and associate certificates, and 2-the Ministry of Higher Education (MoHE) which covers the graduate and postgraduate levels of nursing programs that provided bachelors and post-graduation certificates. Since 2017, the government has a vision to implement CBE allover Egyptian universities and in all specialties. Egyptian government stressed on the importance of implementing CBE in nursing and medical education as vital health specialties. (National Authority for Quality Assurance and Accreditation of Education2017, Brownie et al, 2018, Ma et al., 2012, Technical Institutes Directorate 2017)

Particularly, CBNE has created growing thoughtfulness, attention, and argument among healthcare academics and professionals since the beginning of the current decade, particularly in the developed countries. (Frank et al. 2010, Blömeke et al, 2013, Brownie et al, 2018, Salman et al, 2020) CBNE system becomes the necessitated educational approach in the bachelor nursing program as strong means to close the gap between theory and practice as a foundation for professional practice. (Boyle et al, 2016, Fukada, 2018, Garneau et al, 2017, Frank et al. 2010) Egyptian academic community has a great struggle and competition to prepare their graduates with such approach which allows efficiency, expertise, and proficiency in the clinical practice. Hence, to follow such crucial system, preparation of nursing academics by fit training intervention is essential.

According to the revealed results in the current study, after providing the CBNE instructional intervention, group A approved apparent improvement in acquiring CBNE related knowledge than group B whom have no observed progress in such variable. Group A reported such progress regarding CBNE concepts, components, stages, levels, principles, and identifying NARS 2017' domains of competencies. Therefore, and matching with the first research hypothesis, there is significant statistical difference between experimental and control groups as regards gaining the CBNE knowledge in favor of experimental group, after conducting of CBNE instructional intervention. The CBNE approve clear effectiveness in changing academic's knowledge that will have a wrathful reflection on their achievement in the future. Such educational programs required for the academics if there is any curricular change. Ahmed and Sayed in 2021conducted a study in Assuit, Egypt, and reported that competency based education is necessitated to build educator's understanding toward new knowledge, concepts and awareness with the change agent introduced in the collage. Also, the authors added that the educators need numerous formats of training, containing workshops, seminars, visits, case studies, coaching, and mentoring. (Ahmed and Sayed in 2021) supporting to this view, Kang and Pavlova in 2019discusses that to develop academic work identity, theories, models, principles, processes, and concepts of the related content of training, they should acquire deep, clear, accurate and comprehensive details about any induced subject or reform. Academic's education or instruction trials must be included all review and backgrounds which can improve trainee's comprehension and then, academic motivation and commitment will take place. In the same line, and additionally, Zhang et al., in 2017 illustrated that teachers and academics need wide range of knowledge and understanding with the training content as a grass root for professional development which enable them integrate such knowledge into practice and easily reaching the organization' target. (Kang and Pavlova 2019, Zhang et al., 2017) The academics should use theoretical part with the practical part, together, thus, knowledge base is necessary to achieve the application into reality.

The major goal of CBNE is to translate all content of teaching into doing. Similarly, CBNE, particularly in a crucial field like nursing, needs knowledge capitalizing, and integrate acquired knowledge into learning experiences building. Likewise, CBNE flexibility should be understood well by nursing academics through recognizing that CBNE methodology obligates the students to be accountable for achieving performance outcomes of competencies with no certain time or certain place for such achievement. CBNE has a wide range of concepts, principles, features and components that should be clarified with academics for allowing them having effective planning and implementation. (Zineb et al, 2017, Ahmed and Sayed, 2021, Brownie et al. 2018) Therefore, any educational program for academics should provide great considerations for the bulk of knowledge which is the fundamental ground for any training instruction.

Moreover, the CBNE instructional program showed positive effects on subject's awareness about the benefits and difficulties of CBNE. Before conducting the intervention both groups reported some CBNE benefits and difficulties, but after the intervention, the most of experimental group only, mentioned the benefits without difficulties. It can be due to their understanding of CBNE components and how they can manage any difficulty easily. Similarly to these views, Ahmed and Sayed in 2020 discussed that professional educators have to fit lot of professional potentialities in their teaching career which allow them to assess and manage any sufferings or problems. (Ahmed and Sayed 2020, Ahmed and Sayed 2021)CBNE have many benefits that upgrade the abilities of teachers and students, and if there are any limitations, it can be due to organization, fund, training, and timing or polices, and limitations are not related to the system itself.

Contradictory to the previous results, Friedler, in 2018 and Guo, &Qiu, in 2019, Ahmed and Sayed in 2021, and Nyoni& Botma in 2019 found that the CBE training program has many obstacles and misunderstanding may hinder the effectiveness of the CBE implementation. Those obstacles can be regarding the compliance to integrate knowledge with application, restrictive rules, regulation and policies, staff resistance, rigid organizational culture and language difficulties, limited economic preparations and infrastructure presence and environmental aspects. The didactic concepts of CBE requires action and interaction instructional trials for establishing the target of competence through people participation to close the gap between theory and practice in a vital field like healthcare and nursing practice. (Friedler, 2018, Guo, &Qiu, 2019, Ahmed and Sayed 2021, Nyoni& Botma in 2019) CBNE has great benefits and influences in the colleges of applied science because it allows joining the subjects with the needs of professional standards and work market that enforce the nations for educational, political, economic, and reproduction advances.

With referring to the finding in the current study and after providing the CBNE instructional intervention, group A showed apparent improvement than group B in executing the CBNE planning skills in terms of: Developing competencies statements according to NARS 2017, Developing LOs for matching each competency, Filling program specification template, Filling course specification template, and Filling program competencies\ learning outcomes\ courses matrix, plus their mechanics, grammar and understanding skills were better. Group B has no noticed improvement in such skills. Consequently, and corresponding with the second research hypothesis, there is significant statistical difference between experimental and control groups as regards performing the CBNE planning skills in favor of experimental group. It is clear that the planning phase is the huge phase in conduction any educational projects. In CBNE, the planning phase includes; planning for planning, planning for implementation and planning for evaluation that are clear in its program and course specifications or curricular matrix. Parallel to such result, Zineb et al, in 2017discussed that CBE curriculum is established and planned using many different teachers' skills. CBE requires a comprehensive reform of practical or clinical training systems and processes in the faculty for staff and students plus the environment at all. Such reform is clearly

noticed and followed through accurate and valid planning process. Likewise, in healthcare and nursing fields, Wuet al, in 2019, Sistermans in 2020 and Ahmed& Sayed in 2021detected that the teachers should be have the basic planning skills that enable them to plan suitable and feasible curricula. They have to be responsible for demonstrating the skills in writing the competencies and its learning outcomes. Flexibility and objectivity or authenticity of the CBE should be noticed in the curricular plan through the teaching methodology, assessment tools and time table. Representation of subjects for each competency should be apparent in the curricular matrix. Accordingly, CBE planning skills have to be acquired by the teachers through effective and comprehensive training. (Wu et al, 2019, Sistermans 2020, Ahmed& Sayed 2021) each competency should be settled with its learning outcomes, teaching strategies, and assessment\ evaluation tools. Similarly, for each competency the academics should plan for its concepts, learning activities, clinical or practical skills and put descriptions if needed.

Dissimilar to the previous finding, there are many references explained many obstacles and challenges that observed during the planning for CBNE, particularly among nursing academics and in nursing schools. Bates in 2020, Bohain, and Hofman, in 2014, Englander et al, in 2013, Frank et al, in 2010, Fukada in 2018, Pijl-Zieber et al, in 2013, Salman et al, in 2020, and Watson et al, in 2002, mentioned that there are some challenging and difficult aspects in the planning for application of CBNE. One of the areas that include the major troubles is planning for assessment and evaluation in which there is a serious lacking of instruments that are valid, objective, and reliable for competency measurement. Another aspect is planning for competency courses quality assurance that entails some problems to determine the criteria for operationalizing the competencies and its LOs with limited models or benchmarking examples. Additionally, some challenges are raised when conductingng curriculum planning with insufficient clear data and vague terms of competency implementation and its requirements in the clinical settings, which could be unclear in course specification. Furthermore, some troubles appear in tailoring the teaching methodology with fit teachers and various learning styles of the nursing students. In addition, there is an observable lacking of CBNE studies about planning and evaluation that may be a great source for academics guidance and support. These planning skills problems are provoking confusion and exhaustion among nursing academics. Also, in the area of instructional planning for CBNE teaching strategies, there is a challenge to plan and tailor all college services to enhance nursing student's full independency in learning competencies. (Bates 2020, Bohain, and Hofman, 2014, Englander et al, 2013, Frank et al, 2010, Fukada 2018, Pijl-Zieber et al, 2013, Salman et al, 2020, and Watson et al, 2002) Nursing is a vital disciple and needs close supervision and support CBNE planning that will be a huge beneficial shifting for nursing education advancement.

As regard the last finding in the current study, and after conducting the CBNE instructional intervention, group A gain high scores and has apparent progress than group B in CBNE acceptance scores during COVID pandemic, in terms of: attitude, value and satisfaction about the oncoming CBNE system in the nursing collage. Group B has no noticed improvement in such scores. Thus, and matching with the third research hypothesis, there is significant statistical difference between experimental and control groups as regards CBNE acceptance scores during COVID pandemic in favor of experimental group. Academics in both groups were having low scores in CBNE acceptance (attitude, value and satisfaction), during COVID pandemic before the instructional intervention. But, after the intervention, the improvement was clear with the experimental group only which reflected the great role of CBNE instructional intervention and to which extend the awareness and understanding of CBNE system may affect positively to change ones' attitude, value and satisfaction, even during healthcare crises. Nursing academics' CBNE acceptance has a major importance to help them in oncoming smoothly implementing and following such system successfully. Staff feelings may be the most crucial domain to be changed and will

support staff compliance and adherence to CBNE requirements during risk situation. In Egypt, because, COVID crisis is coming parallel in the same time with CBNE preparation and planning in all Egyptian colleges, some nursing educators may have some fear about assuming the clinical training or coming to college during COVID risk. But, currently the study provided an evidence that the guidance and educational trials with the staff can change their feelings positively, even they are facingrisks. Congruent to such finding, Harerimana and Beer in 2013, Satoh et al 2020, Ramos-Morcillo in 2020 and Wallace in 2021found and clarified that the nurse educators had positive attitude and perceptions toward utilization and following CBNE, because they found a great benefit for themselves and for nursing students academically and practically, during healthcare risks. Authors mentioned that the lacking of nursing academic's training can be a considerable reason for their negative feedback and perception toward such system and may aggravate their worries toward the pandemic situation. Therefore, staff orientation and guidance about CBNE strategies, rules, principles, evaluation and implementation is necessitated, particularly with any healthcare risks. Nursing academics should have positive professional attitudes, acceptance and contentment with work behaviors including using of innovative teaching strategies, audiovisuals, evaluation tools, and curricular management approaches. Mainly, with CBNE as a valuable direction for nursing practice, nurse educators have to be initiative, motivated and gratified and be sure that CBNE is a methodology for dealing with COVID emergency, not a source of fear or anxiety. (Harerimana and Beer 2013, Satoh et al, 2020, Ramos-Morcillo 2020, Wallace in 2021)

Dissimilarly with the previous results and discussions, Salem et al, in 2018 and Ramos-Morcillo in 2020declared that the nurse educators have some stresses and sufferings due to integration of CBNE quality requirements and safety of themselves and students in nursing practice, mainly during clinical risk time. These stresses may affect negatively on their attitude to follow and adhere to CBNE methodology effectively, particularly with COVID restrictions. CBNE and quality measurement needs certain standards, attributes, and preparation to graduate expert nurses, but COVID crisis may put some hinders. In the same time, nursing academics requires specific acceptable performance and hope that the nursing students meet professional expectations, fundamentally with CBNE. Similarly, numerous governing and accreditation organizations still need credit hours with restricted rules and use performance examinations for nursing graduates in using of CBNE. Hence, qualifies nurses will face any healthcare risks competently and the credit hours system will be more supportede, specially, by licensure boards by CBNE in recruitment and license exams. (Salem et al, in 2018 and Ramos-Morcillo in 2020, Fukada 2018, Pijl-Zieber et al, 2013, Salman et al, 2020)

Furthermore, and oppositely to the current study finding, Brownie et al, 2018, Khaled in 2011and Wallace in 2021 highlighted that particularly, in Egypt and Africa, nursing educators found an apparent obstacle in offering adequate facilities and equipment's in clinical nursing practice with CBNE. Most hospitals have a severe shortage of training requirements. Besides, lacking training chances and preparations of nursing educators for competency-based teaching approaches, plus COVID infection' fears may produce barriers in CBNE implementation in Egypt. Correspondingly, Bhutta et al, in 2010, Nicholas in 2012, Satoh et al 2020, Ramos-Morcillo in 2020 and Wallace in 2021and Brownie et al, 2018 clarified that the nursing curricula are mostly out-of-date and needed modifications to match the professional situations. Lacking of curriculum development models is considered a remarkable challenge among curricula developers in CBNE, essentially with some challenges as COVID situation. The governmental view to improvee the capacity of Egyptian nursing education and its position between healthcare professionals is allowing Egypt to determine the indicators of healthcare quality and advances in the healthcare system. Such view came in excellent time, to face healthcare crisis competently and confidently. Moreover, nursing academics will find some troubles in following the authentic

student's assessment which is a basic component of CBNE and may raise some confusion and restlessness among them. Morris et al, in 2012, Brannick et al, in 2011and Dashash reported that identification and deciding of competencies' scores are very difficult to be determined even with a checklist in objective structured clinical examination scores (OSCE) or in clinical or demonstration area, particularly in the COVID circumstances. A judgment for a student's passing or failing may be unreliable and may not determine if the skill is ideally achieved and the competency outcome is established or not. (Brownie et al, 2018, Khaled 2011, Wallace 2021, Bhutta et al, 2010, Nicholas 2012, Satoh et al 2020, Ramos-Morcillo 2020)Many references illustrated that competency assessment standardization in CBNE is still not clear that may be a cause for nursing students and educator's dissatisfaction.

Therefore, to overcome the previous challenges, that may hider nursing academics cooperation in CBNE, and affect negatively in their acceptance to such valuable system during the crisis time, the researchers suggested and implemented the CBNE intervention. It designed for encouraging and instructing nursing academics and leaders about CBNE development process, and curricular establishment. Orientation and training are essential steps for CBNE success among nursing educators and within emergency situations. The curriculum committee and all academics should participate in the refining of the nursing courses to match the professional requirements. Nursing curricula should be updated to match the CBNE and work market needs. Curriculum and program planning for various self-directed instructional strategies that parallel nursing students' pace and progress of mastery are necessary. Accordingly, clinical and practical preparation with enough facilities, resources, and training opportunities are required to implement effective CBNE in Egypt, during such emergency era.

Conclusion

CBNE instructional intervention among nursing academics in Faculty of Nursing, Alexandria, Egypt, showed significant value and positive impact in improving their CBNE knowledge, planning skills and acceptance, particularly during COVID pandemic. CBNE concepts of competence, competency, and authentic assessment are comprehended during the intervention and inherited in their organizational culture which is detected after the intervention among experimental group. Nursing academics have been equipped to plan and implement the CBNE approach effectively with nursing students during CORONA risk that was clearly reflected in their planning skills scores, after the educational intervention. Accordingly, CBNE awareness and understanding among nursing academics is clearly detected, by such educational trials which is a necessary for nursing students during the current pandemic time. There are scarce experimental trials or research evidences in such significant issue, consequently, the incorporation, carrying out, and evaluation of CBNE awareness among nursing educators need continuous in-service training programs. It is a crucial issue that will be assumed in Egypt to meet higher education, government, and community benefits for nursing education and nursing workforce advancement at all.

Recommendations and further studies:

There is a chronic and severe shortage in the nursing workforce in Egypt, mainly, during COVID pandemic. At the same time, there is a growing in chronic and acute diseases for adults, women, and children, and healthcare community needs. Therefore, upgrading in the nursing education approach is inevitable to be CBNE. This instructional scheme requires a comprehensive understanding of related concepts, implementation, and evaluation among nursing academics. Guidance is a great help for nursing academics in implementing CBNE in Egypt. Based on the current study' results, interdisciplinary healthcare contributions should be carried out to develop a comprehensive and valid insight or model about CBNE. Teamwork among nursing specialties and other healthcare professions should cooperate to develop valid, reliable, and declarative assessment tools for competency measurement. Obtaining all literature views about CBNE may help to implement it successfully and overcomee any challenges or healthcare crises that may confront such educational scheme, mainly in Egypt. Consequently, the present review highlighted

some thoughts for further studies such as (1) Assessment of CBNE implementation progress in Egyptian colleges. (2) Evaluate the effect of CBNE program on nursing students' achievement, engagement, and patients' satisfaction. (3) Replication the current study among nursing students and academics and evaluate achievement and compliance, mainly during healthcare risks. (4) Using valid competency assessment tools for effective nursing student performance. (5) Integrating and assessing CBNE curricula in nursing courses. (6) Using blended learning in CBNE to decrease the consequences of COVID risk on nursing students.

Conflicts Of Interest Disclosure

The authors declare that they have no conflicts of interest.

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