Effect of Mobile-based learning Intervention on Clinical Competence of the Internship Nursing Students during The COVID-19 Pandemic

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Abstract

Background: Clinical competency of internship nursing students is a vital element for hospitals' survival to ensure the quality of care provided and patients' satisfaction. COVID-19 pandemic had great effect on students learning process all over the world. The Aim of the current study was to evaluate the effect of a mobile-based learning intervention on the clinical competence of the internship-nursing students during the COVID-19 pandemic. A Quasi-experimental research design was applied. A convenient sample of all available internship-nursing students who were training at five hospitals in Mansoura city, Egypt were included (248). The Clinical competence Questionnaire (CCQ) was used to evaluate the clinical competence. Results revealed that there was marked increase in total competence rate of the studied internship-nursing students; high competence rate represents 96.8% in post-test instead of 56.9% in pre-test. Conclusion: During COVID-19 Pandemic, the mobile-based learning intervention had a high positive effect on the clinical competence of the internship-nursing students. The results of the study recommended including the distant learning methods in the learning process of the nursing students.

Keywords: Clinical Competence, COVID-19 Pandemic, Internship, Nursing students.

Introduction

Our way of life has changed as a result of the global coronavirus disease pandemic of 2019 (COVID-19), including the manner that standard health-care education is delivered. By March 2020, laws requiring social exclusion and/or incarceration have been implemented everywhere. These regulations have forced us to change the way we teach, and it has been particularly challenging to incorporate practical nursing courses and other hands-on health care activities **(Rose, 2020).**

The first case of COVID-19 was reported in Wuhan, China **(Gorbalenya, 2020).** Globally, By February 2022, World Health Organization (WHO) had received reports of 404,910,528 confirmed cases of COVID-19, with 5,783,776 deaths. According to the World Health Organization, there were 446,308 confirmed cases of COVID-19 in Egypt from January to February 2022, with 23,110 deaths. A total of 67.211.589 vaccine doses has been delivered as of February 2022 **(WHO, 2022).**

Around the world, the COVID-19 epidemic had a significant impact on students, teachers, and educational institutions **(Mailizaret al., 2020).** Due to the pandemic, educational institutions around the world had to close their doors so that students could adhere to social segregation policies **(Toquero, 2020)**. Mobile learning represents a new phase in the development of distance learning and electronic learning. Learning that takes place on wireless mobile devices such smartphones, tablets, and computers is referred to as mobile learning, and it allows learning to take place at any time and in any location **(Abu-Al-Aish & Love, 2013).** For rapid access to information, mobile devices are being used increasingly often in nursing

clinical practice and education **(Nikpeyma et al., 2021).**

Koohestani et al. (2019) found that health students consider mobile devices as instruments help to improve learning, enhance self-management of learning, and stimulate theoretical knowledge, and clinical skill development. Mobile applications are used to connect instructors and students, submit clinical reports, get peer assistance, and obtain information about medications. Access to clinical guidelines, pharmacological information, videos, and webinars can promote patient safety **(Kim & Suh, 2018)**.

Nursing students acquire practical experience through internships, which are supervised by faculty members, head nurses, senior nurses, and hospital administrators **(Ahmadi, et al. 2020).** The benefits of internship programs for students include exposing them to actual clinical situations, workplaces, and workers. Additionally, it encourages innovation and adaptation, offers additional chances to acquire new skills, strengthens analytical skills, and results in professional experience. Nursing student internship programs also boost students' preparation to take jobs by enhancing their personal and professional qualities, as well as their self-development and work dedication **(Esteves et al., 2019).**

Nurses' Clinical Competence is defined as "the ability to take action as a nurse by combining knowledge, skills, values, beliefs, and experience". It has a direct impact on patient safety and health, and a lack of it can lead to medical errors and serious consequences for patients. As a result, novice nurses' clinical performance and competence have been a major professional and corporate issue for nursing care providers and buyers **(Bahreini et al., 2011).** The nursing profession as a whole places a high value on clinical competence since it is a prerequisite for providing high-quality care **(Manoochehri et al., 2015).**

Significance of the study

One of the prerequisites for internship-nursing students is clinical competence; it is a crucial part of nursing care, which has a significant impact on the quality of nursing services given **(Kemppainen, et al., 2013).** Internship is necessary for acquiring cognitive, reflective, and affective nursing skills, as well as the most important factor in nursing student retention **(Crombie, et al., 2013),** it's critical for the internship-nursing students to continue their education process and training programs during the Covid-19 pandemic to provide meaningful learning opportunities and to keep students in nursing education. The aims of the present study was to evaluate the effect of a mobile-based learning intervention on clinical competence of the internship-nursing students during the COVID-19 pandemic.

Aim of the Study

The aim of the present study was to evaluate the effect of mobile-based learning intervention on clinical competence of the internship-nursing students during the COVID-19 pandemic.

Research questions

1. What is the level of clinical competence of the internship-nursing students?

2. Is there a relation between mobile-based learning and the clinical competence of the internship-nursing students during the COVID-19 pandemic?

Subjects and Methods
Research design:

A Quasi-experimental research design was utilized in this study.

Setting:

This study was conducted at five hospitals in Mansoura city, Egypt, including the Main Mansoura University Hospital, the Gastrointestinal Surgical Center, the Medical Specialist Hospital, the Kidney and Urology Center, and the Oncology Center. The internship-nursing students were enrolled in the following units; medical wards, surgical wards, the operating rooms, dialysis units, burn units, chest & cardiovascular wards, endoscopic unit, and outpatient clinics.

Subjects:

A convenient sample of all available internship students (both sexes) who were training at the previous settings and Agreed to participate in the study. A sample size of (248) out of a total 391 internship students during the academic year 2021/2022.

Tool for data collection:

A self-administered electronic questionnaire: comprised two parts

▪ Part I: The sociodemographic data sheet of the internship-nursing students including; age, sex, marital status, present training area, and duty hours.

▪ Part II: The Clinical competence Questionnaire (CCQ): Adopted from **Liou & Cheng, 2014.** The CCQ is made up of four subscales; the nursing professional behaviors (16 items), the general performance (13 items), core nursing skills (12 items), and advanced nursing skills (6 items). The Cronbach's alpha of this tool was 0.990, which reflects high reliability.

Scoring System

A five-point Likert scale with item response values ranging from 1 ("do not know what you are doing") to 5 ("know in principle, competent in practice without any supervision"). A higher score reflects the individual's self-perception of having a higher level of clinical competence. The total scores range from 47 to 235.

Pilot Study:

Used to determine whether the tool is clear and applicable and to determine how long it will take to complete the questionnaires. It involved 10% of the total subjects (25 nursing interns), who were later dropped from the main study.

Ethical Considerations

A Written approval to was obtained from the ethical research committee of faculty of nursing at Mansoura University, Permission was attained from all participants through a starting question in the online self-administered questionnaire. Reassurance that their data is protected and utilized only for research. Participants had the right to leave the study at any time.

Field Work

The actual field work started from the beginning of January to the end April 2021.The study comprised the following phases:

▪ **Preparatory phase:** The Preparatory Phase started from the beginning of January 2021 to the end of January 2021 (A period of one months). It included developing the structured tools and the educational program based on the review of related literature and manual procedures.

▪ **Implementation Phase:** Started from the beginning of February 2021 to end of April 2021. The program was implemented in period of three months, each group receive six days training at two weeks duration based on the training schedule, including pretest, program implementation, and post-test, the program was carried out over 12 weeks for all students. The survey was sent to internship-nursing students through the WhatsApp group and Google drive link. The time consumed to fill the questionnaire was about 15-20 minutes.

▪ **Intervention:** The implementation of the mobile-based learning program was conducted through WhatsApp group and a Google drive link according to the formal schedule of the internship. Nursing students were divided into 12 groups distributed into five hospitals, each group of internships included from 25 to 38 student. The program was applied on six sessions covering all topics of clinical competence.

▪ **Evaluation Phase:** Post-test was applied after implementation of the program immediately via Google drive link.

Statistical Analysis

Data analysis was done using SPSS version 22 (Statistical Package for Social Studies). Application of descriptive statistics including frequency, percentage distribution, mean, and standard deviation was made. Independent t-test was used to compare relations, significance was determined at $p<0.05$.

Results

Table (1) reveals that the studied internship-nursing students were in age group between 22 and 24 years with mean age "**22.59 ± 0.465**". (71.8) of them were females, (89.5 %) of them were singles, and (61.3%) of them had 8 hours shift duty.

Figure (1) shows that the internship-nursing students had covered their training at different specialties, (18.1% & 16.1%), and (12.9%) of them had their training in medical, surgical, and orthopedic wards respectively, while only (3.2%) of them had trained at outpatient clinics.

Table (2) shows that there was a highly significant statistical difference between the

pre- and post-intervention mean scores clinical competence of the internship nursing students' (p-value < 0.05).

Figure (2) reveals that there was marked increase in total competence rate of the studied internship-nursing student; high competence rate represents (96.8%) in post-test instead of (56.9%) in pre-test.

Table 3 reveals that there was no significant relation between the total mean scores of the clinical competence of the internship-nursing students as regards to their sociodemographic variables, except the marital status related significantly with the clinical competence in the post intervention phase.

Table (1): The Sociodemographic Data of the Studied Internship-Nursing Students (n = 248).
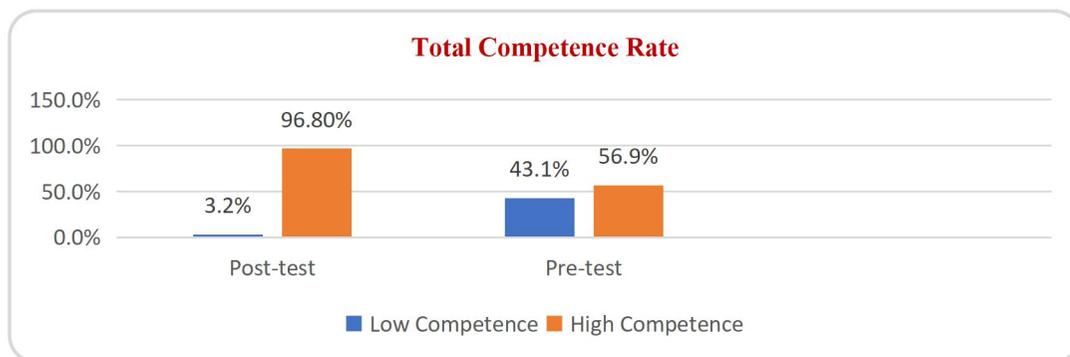
Sociodemographic Variables	No.	%
Age (years)		
• 22 years	122	49.2
• 23 years	104	41.9
• 24 years	22	8.9
Mean ± SD: 22.59 ± 0.65		
Gender		
• Male	70	28.2
• Female	178	71.8
Marital Status		
• Single	222	89.5
• Married	26	10.5
Duty hours		
• 8 hours shift	152	61.3
• 12 hours shift	96	38.7

Figure (1): Distribution of Studied Internship-Nursing Students according to The Present Training Area (n = 248).
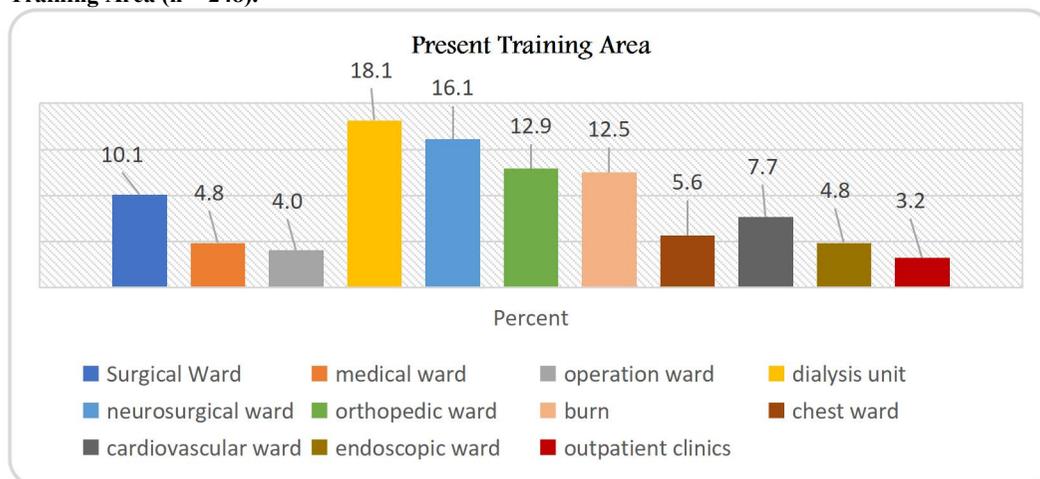
Table (2): The Mean Scores of the Clinical Competence Scores of the Studied Internship Students in Pre & Post Intervention (n= 248).

The Clinical Competence Questionnaire Sub-scales		Mean Scores		Significance	
		Pre-test	Post-test	t-test	P-value
1	Total Professional Behaviors	61.964	73.254	8.964	0.000
2	Total General Performance	45.915	57.927	11.983	0.000
3	Total Core Nursing Skills	43.786	58.932	15.876	0.000
4	Total Advanced Nursing Skills	21.544	34.081	23.281	0.000
Total Overall Clinical Competence		176.653	224.194	13.242	0.000

Figure (2): The Overall Competence Rate of the Studied Internship Students

Table (3): Relation between the Sociodemographic Characteristics of the Internship Nursing Students and the Mean Scores of Total CCQ in Pre-& Post Intervention.

Sociodemographic Variables	Total CCQ (Pre-test)		Total CCQ (Post-test)	
	Test of Sig.	p-Value	Test of Sig.	p-Value
Age (years) • 22 years • 23 years • 24 years	F= 1.469	0.212	F= 2.102	0.081
Gender • Male • Female	t= 0.847	0.398	0.465	0.642
Marital Status • Single • Married	t= 1.854	0.299	t= 3.419	0.001**
Duty hours • 8 hours shift • 12 hours shift	t= 1.602	0.110	t= 0.835	0.405

Discussion

Clinical competency has long been a continuous issue in Nursing profession, low competency can lead to job dissatisfaction and occupational disengagement, as well as affecting the quality of care. During COVID-19 Pandemic, it was difficult to apply the traditional direct methods of education and training, the E-learning was the other way used. The aim of this study was to evaluate the effect of a mobile-based learning intervention on the clinical competence of the internship-nursing students during the COVID-19 pandemic.

The results of the present study revealed that the studied internship-nursing students were in age group between 22 and 24 years with mean age "22.59 ± 0.465". This result is supported by the results of **Keshk et al. (2018)** who stated that more than half of the internship-nursing student's aged 23 years. However, **Nikpeyma et al. (2021)** found that less than half of the studied sample aged 21 years old. Regarding gender, approximately three quarters of the studied internship-nursing students were females. **Thabet et al. (2020)** also mentioned the same finding. Regarding marital status, most of the studied internship-nursing students were singles, this is could be related to the young age of this group as they are still students.

According to this study finding, there was a significant statistical difference in the clinical competence mean scores of the internship-nursing students' regarding their professional behaviors in pre and post intervention. These results are similar with those of **Chandran et al. (2022)**, who discovered that mobile applications are beneficial instruments for enhancing knowledge and abilities among healthcare practitioners. The results are also supported by **Dziurka et al. (2022),** who said that modern technology like telemedicine, virtual reality, and medical simulations should be used to teach nursing students how to handle challenging and novel circumstances.

Additionally, the results of the present study reflected that there was a significant statistical difference in mean scores of the clinical competence of the internship students' related to their general performance in pre and post intervention. These finding are consistent with **Pourteimour et al. (2019),** who stated that there was a good impact of the smartphone messaging app on nursing students' performance, incorporating mobile technology like smartphone apps into teaching, learning, and clinical practice was beneficial and significant. **Mosalanejad et al. (2018)** also reported that smartphone-based e-portfolios could help with continuity of work and provide students with consistent frameworks to demonstrate their performance and learning effectiveness.

The results of the current study showed a statistically significant difference in the mean clinical competence scores of the core nursing skills of the internship students after intervention. This finding conforms with, **Zarshenas et al. (2022),** who found that distance learning had a greater impact on nursing students' clinical education than traditional teaching approaches. Furthermore, **karakuş and Ozer, (2014)** said that E-learning is a viable, valid, and efficient teaching method for nursing students learning of drug administration, it improves students' skills in drug administering. Moreover, a different study by **Ramadan et al. (2019)** asserted that implementing a training program enabled nursing interns to gain knowledge and obstetric skills.

This study revealed that there was a significant statistical difference in mean scores of the internship-nursing students' related to advanced nursing skills clinical competence" in pre and post intervention. This finding is consistent with **Kim & Park (2019)** who stated that smartphone-based mobile learning significantly improved the skills, and performance confidence of nursing students. Furthermore, **Jen et al. (2022)** stated that the mobile-video online learning technique improved the students' professional skills, raised their levels of learning achievement, critical thinking, and self-efficacy.

Regarding the overall competence rate, the current study showed that there was marked increase in total competence rate of the studied internship student. This result can be attributed to the effectiveness of the mobile based program in the educational process. This result is in line with **Hoveyzian et al. (2021),** who discovered that there was an improvement in clinical competence ratings after applying the portfolio technique and concluded that teaching techniques had an impact on developing nursing students' clinical competence in a clinical setting. In addition, **Tohidi et al. (2019)** found that there was a significant difference between the control and intervention groups in the clinical competency.

As regards to total compliance mean scores and its relation with sociodemographic data of the studied sample, the findings of our study reveal that there was a significant relation between the total mean scores of the clinical competence of the internship-nursing students as regards to their marital status in the post intervention phase. While there was no significant relation between other all sociodemographic variables (age, gender, and duty hours) and total CCQ mean scores. These findings disagree with **Farshi et al. (2015)**, who reported no significant relationship between clinical competence and the gender. While this result disagrees with **Albagawi et al. (2019)** who indicates a significant correlation between the fourth year nursing students' clinical competence level with their age and gender.

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