Effect of Electronic Health Records Training Program Via Using Advanced Mobile Devices on Career Success among Intern-Nurses

Howida Hassan EL-Sayed Mahfouz[1], Manal Mohamed Bakr[2], and Mervat Abd Elmonem Aref[3]

(1) Assistant Professor, Nursing Administration, Faculty of Nursing, Benha University, Egypt

(2) Assistant Professor, Nursing Administration, Faculty of Nursing, Menoufia University, Egypt

(3) Lecturer, Nursing Administration, Faculty of Nursing, Damnhour University, Egypt

Abstract

Background: The nursing job market is undergoing a digital revolution, and those with the necessary digital experiences and possess a technology-driven skills will be better positioned to advance in their careers. **The study aimed to** assess the effect of electronic health records (EHRs) training program via using advanced mobile devices (AMDs) on career success among intern-nurses. **Design:** A Quasi experimental research design was utilized to conduct this study. **Setting:** The study was conducted in medical and surgical clinical departments at Benha University Hospital were intern-nurses trained. **Subjects:** Purposive sample consisted of 60 intern–nurses chosen randomly. **Tools:** To achieve the aim of the cuurent study the following three tools were used; I) Electronic health records EHRs knowledge questionnaire, II) Technological skills observational checklist and III) Career success questionnaire. **Result:** The study result revealed that 78.3% of study participants had inadequate knowledge related to EHRs in the preprogram phase, which it improved to be 90% & 80% of them had adequate knowledge at immediate post program and follow up program respectively, additionally, 58.3% of intern-nurses had low technological skills at pre-program, which it improved to 76.6% and 83.3% of study subjcts had high technological skills in the post program and follow up phases respectively, also 85% & 83.3% of study participants had high level regarding career success in post program and follow up phases respectively compared to 18.3% of them at pre-program phase. **Conclusion:** The study concluded that there were high significant statistical positive correlations between the study participants' total knowledge and total technological skills toward EHRs and career success throughout program phases. **Recommendation:** The administrations of health care organizations need to take essential actions to build the appropriate information communication technology ICT infrastructure that needed for the use of EHRs applications in the clinical setting and the progressive implementation of EHRs software program system in the general hospitals.

Key words: The advanced mobile devices AMDs, career success, electronic health records EHRs, intern–nurse and technological skills.

Introduction

Nurses assist in the delivery of daily life-saving medical care to patients all throughout the country and the world. They also interact and converse with patients to help them feel at ease and comfortable during their hospital care. A nurse's job is made much easier by advanced digital tools and technologies, which help ensure that patients receive the optimum medical and nursing care possible **(Mohammed, 2018)**. As technology advances, it does its

application and significance in nursing. The healthcare industry is facing issues such as increasing costs, reduced funding, nursing shortages, and growing patient intensity. As a result, technology can contribute in meeting patients' demands and optimising work. Electronic documentation is pivotal form representing technology in patient care **(Soliman et al., 2018)**.

The electronic health documentations is a record document that appeared in the electronic shape form and may be acquired

through the computer technologies & cutting-edge advanced mobile devices AMDs. (**Elliott et al., 2018**). The EHR is a digital form of a paper chart for a patient that can be shared over several health care settings with being integrated into network-connected enterprise-wide information management systems. It includes clinical care application/functions, reporting, clinical research function, management services, and financial operations (**De Groot et al., 2020**).

Moreover, EHR is a real-time, patient-centered record that make instant and secure information available to authenticated parties; and all components of clinical practice, from assessing a patient's major complaint to developing a treatment plan, are incorporated into EHR (**Rumball-Smith, et al., 2018**). Also, it serves a vital part in the healthcare system and has been used in a variety of contexts in the healthcare system by helping healthcare practitioners to eliminate medical errors, achieve greater effective coordination of care, improve safety and quality of patient care, and reduce expenditures in the healthcare system. (**Sim, 2019**).

The term "advanced mobile devices" (AMDs) refers to any laptop, androides or smartphone. It is a computer system and mobile communication device with cutting-edge features like word processors, clinical apps, internet access, and other computing skills. It can be identified by Wi-Fi or mobile web access, a battery that can last for many hours, a physical keyboard or touch screen for data entry, and weight, size, and proportions that make it simple to carry around the world with one hand while using the other hand to operate it. Most frequently, a touch screen interface is employed (**Mohammed, 2018**). Working with a virtual assistant like Siri or the Google Assistant The use of wireless technology and the capacity to download programmes and publications from the internet (**Choi et al., 2018**).

The Mobile androide technology has the possibility to improve nursing care practise by enabling nursing staff to locate, confirm or verify data about disease/illness, or physical harm, visualize or evaluate methods or types of health care to be provided, administer and ensure that the right medications are given to clients/patients, without having to go to nurses' counter, the operating room and locate a computer desktop. It also encourages patient participation and self-management, reduces errors, avoids duplication, and allows for the correct sequence of operations. Additionally, ensure continuity of care by avoiding patient runaways, having ,building relationships with patients, improving nurse-patient interactions, encouraging student and patient learning, and make electronic health record HER systems quickly accessible (**George et al., 2017**).

Nursing students strive to be successful professionals; nonetheless, nursing job seekers confront strong competition in the health care market. As a result, nursing graduates should sustain a touch of twenty-first century. Nursing faculties always put an emphasis on graduates' ability to demonstrate professional abilities such as communication, documentation, teamwork, problem solving, and self-management in order to attain success of their job (**Milon, et al., 2021**).

Success in the race provides nurses with a feeling of identity and significance, happiness through work satisfaction, interpersonal well-being, and hospital success (**Koekemoer, et al., 2020**). Carrer success is a construct that includes five factors: work, interpersonal relationships, finances, job hierarchy, and life aspects. Work activities that necessitate strong interpersonal skills and a good association between agreeability and job performance. Interpersonal success denotes the interpersonal abilities or social competency that enable a nurse's employability in a work setting (**Gordon, 2021**).

Financial success represents the individual's feeling of success based on financial benefits gained, as well as their high income in comparison to their colleagues in similar employment. (**Blickle, et al., 2018**). Work experience gives information and expertise connected to the carrer, enabling the nurse to advance in the organization's hierarchy (**Grimland, et al., 2012**). The organisational hierarchy is a component of the success sequence, which includes success in

interpersonal relationships, work, hierarchy, and finance **(Rossenkhan, et al., 2021)**.

The significance of the current study

Neumoures developments in the broader social, economic, political, cultural, and environmental factors have affected health care on a global and national level. As a result, AMD's technology offers solutions for dealing with the issues of modern life, such as increasing workloads, expanding healthcare worker shortages, and expanding elderly populations in many regions. Also, it enhances teamwork among healthcare professionals, eliminating wasted time and effort, minimizing medical errors, and making EHR data more accessible. Additionally, it promotes the integration of data, information, and knowledge to help patients, nurses, and other healthcare professionals in various roles, contexts, and locations with their decision-making **(West, 2016)**.

From researchers' readings; although, information technology utilization in nursing education and practice has been described in nursing research, there is a limited descriptions for implementing the advanced technology' procedures specifically. It is hoped that intern nurses can gain the important knowldge and skills related to advanced technology applications in health care. Also, it can help them to be adapted with new advanced in their workplace. Moreover, it hoped that they become able to acquire academic and occupational capabilities to achieve their better in career success. So, the current study aimed to assess effect of electronic health records training programe via using advanced mobile devices on career success among intern-nurses.

The aim of the study

The current study aimed to assess effect of electronic health records training program via using advanced mobile devices on career success among intern-nurses through the following:

1. Assessing intern-nurses' knowledge about electronic health records EHRs via using

advanced mobile devices AMDs throughout program phases.

2. Assessing intern–nurses' technological skills needed for utilizing EHRs via using AMDs throughout program phases.

3. Assessing intern-nurses' perception levels toward career success throughout program phases.

4. Designing and implementing the training program about electronic health records EHRs via using advanced mobile devices AMDs.

Hypotheses:

It was hypothesed that;

1. Intern-nurse' knowledge and technological skills regarding EHRs via using advanced mobile devices AMDs will be improved after programme implementation.

2. Intern-nurse' perception levels toward career success will be improved as a result of training program' application.

Subjects and Method

I-The technical design

Research design

A quasi-experimental research design with pretest, posttest, and was carried follow up assessments out in this study.

Setting

The current study was carried out in all inpatient units of Benha University Hospital's surgical and medical departments, where the intern nurses received their clinical education. According to the internship policy or committe, the following are the clinical training locations for nursing interns: **Firstly;** Medical-surgical units, critical care units, paediatric units, obstetric (maternal and new born health nursing), and nursing administration duty are the basic clinical training areas. **Secondly;** Haemodialysis, heart catheterization unit, brain and neurology departments, and cardiothoracic

surgery unit are the selectiveor optional clinical training areas.

Subjects

A purposive sample of the intern–nurses (n=60) who were trained during the internship academic year 2021–2022 and had advanced mobile devices AMDs and available in the time of data collection out of 240 intern–nurses, who were accepted to participate in the current study and chosen randomly. The sample was calculated according to the scientific formula, according to sample equation **(Chow et al., 2007)**.

$$\frac{NXP(1-P)}{[N-1X\ (d^2 \div z^2)]+P(1-P)]}$$

N= Community size

z= Class standard corresponding to the level of significance equal to 0.95 and 1.96

d= The error rate is equal to 0.05

P= Ratio provides a neutral property= 0.50

The tools of data collection:

To achieve the aim of the cuurent study the following three tools were used.

1-   Electronic Health Record Knowledge Questionnaire

A structured questionnaire was created by researchers after review of literature **(Soliman et al., 2018; O'Connor & LaRue, 2021; Rashed, et al., 2022)**. That contained two main components: *Firstly:* It contained the personal data of the intern–nurses including; (age, marital status, gender, place of living, pre–university education, owns a computer, setting up Medical Apps on their mobiles androids or AMDs, data about computer, do you deems or thoughts health orzanization staff should setting a personal communication devices policy). *Secondly*: EHRs knowledge test to evaluate intern nurses' understanding and knowledge regarding EHRs via using AMDS. It included 92 questions total, which were true or

false and multiple choice. It divided into three main dimensions: Nursing informatics NI (29 questions); AMDs (22 questions); and EHRs (41 questions).

The scoring system:

Each question was granted "one point" for right answer and "zero" for wrong one. Total scores for all questions was 92. The total scores ranged from 0-92 and were expressed according to the cut off point as percentages. The participants who had a percent 60% or more (56-90) it was considered adequate knowledge level and inadequate knowledge level (0-55) if less than 60%. **(Ahmed, et al., 2022)**

2- The Technological Skills Observational Checklist

The observational checklist regard technological skills was constructed by the researchers after review of the related literature **(Ghoneimy, 2015; Pordeli, 2017; O'Connor & Andrews, 2018; O'Connor, et al., 2020; Rashed, et al., 2022)** in order to evaluate intern–nurses' technological skills abilities needed for utilizing EHRs via using AMDs. It composed of "45" items grouped under three main categories: The nurses' actual performance (data entry) "14" items, the technological skills abilities necessary for utilizing EHRs "25" items, the informatics literacy and management skills "6" items.

The scoring system:

The study participants' technological skills were scored using a three-point Likert scale, it were allocated as follow: (2) done completely, (1) done incompletely and (0) not done. The score's range was between (0-90). The cutoff thresholds were set at 60%, which is equivalent to (54 scores). If the score was 75% or more equal 68-90 it was considered high level of technological skill, if the score from (60%-<75%) equal 54-67 it was considered moderate level of technological skill and if the score less than 60% equals 0-53 it was considered low level of technological skill **(Ahmed, et al., 2022)**

3- Career Success Questionnaire

The constructed questionnaire was created by researchers after reviewing literature (**Buddeberg-Fischer, et al., 2008; Metelski, 2019; Wu, et al., 2022**) in order to measure intern–nurses' perception levels toward career success. It contained of "22 items", which were broken down into five primary categories: the job success (8) items, the interpersonal success (4) items, the financial success (3) items, the hierarchical success (3) items and the life success (4) items.

The scoring system

The intern-nurses' comments rated by using three-points Likert Scale as follows; (1) disagree, (2) uncertain, (3) agree. Scores overall was ranged from 22-66. Cut off points was done at 60% equals 40 degrees. After carefully examining reading and the options, each intern nurse had to choose just one. The responses from the ntern-nurses were then given numerical values. The career success levels were classified as follows based on information provided by intern nurses:

■ High career success level at ≥75% that equals (≥ 50 points).

■ Moderate career success level was between 60-< 75% that equals (40- 49 points).

■ Low career success level at <60% that equals (< 39 points).

(**Ahmed, et al., 2022**)

II- The administrative design

After the purpose of the current study was made clear, an official approval was obtained from the Dean of the Benha Faculty of Nursing to the director of Benha University Hospital, and then an official permission was taken from the director of Benha University Hospital to permit the researchers to collect data and give the programme content. ensured total confidentiality of the collected data and that the study wouldn't have any negatively impact on the work or jeopardize patient care in any way

III- The operational design

Operational design of the current study consisted of; the preparatory phase, pilot study and field work. It took (14 months) from the beginning of September 2021 to the end of October 2022.

1- The preparatory phase:

The preparatory/pre-study phase: To develop the data collection tools, this phase took three months, from the beginning of September to the end of November 2021. It involved reviewing the national and international literature utilizing the internet, Journals, textbooks, periodicals, and theoretical knowledge of aspects pertaining to the topic of the current study.

The tools validity:

Seven Jury experts in nursing administration from various nursing facilities revised and verified the study tools in order to assess their accuracy, clarity, relevance, simplicity, and comprehensiveness. Minor alterations were made in accordance with the opinions of the Jury experts. It took three months, from December 2021 to February 2022.

The reliability of tools

The instruments' reliability were carried out using Chronbach's Alpha Coefficient test to determine the internal consistency and homogeneity; HER knowledge questionnaire was 0.89, technological skills observational checklist was 0.92, and career success questionnaire was 0.97. Indidcat accepted internal consistency of all study' instruments.

2- The pilot study

The pilot study was conducted on (6) intern–nurses who constitute 10% of the research sample in order to test the clarity, feasibility and applicability of the research instruments; in addition to it was important for estimating the time required to filling the data collection instruments. No adjustments were implemented and therefore the intern-nurses involved in the pilot study doesn't excluded from the main research subjects. The needed

time to fill each tool was about; 60 minutes for EHRs knowledge questionnaire, 50-60 minutes for technological skills observational checklist, and 20-25 minutes for career success questionnaire. It was done in March 2022.

3- The field work

To fulfil the current study's aim, the following four phases were used: Assessment, planning, implementation and evaluation phases. It took seven months from April, 2022 to October 2022.

A. Assessment phase

The researchers went to the above mentioned study setting two days per week at the morning and afternoon shifts throughout 10 AM. to 4 PM. by a rotational form in each clinical training area. In the beginning, the researchers met the intern-nurses to explain the aim and nature of the training program. Then, the researchers collected the necessary baseline data from subjects. The data collection process was conducted in April, 2022; about 7-9 sheet were collected / day from intern-nurses.

B.   Planning phase

The program was construction to enhance intern-nurses' knowledge and skills about EHRs via using AMDs based on baseline data gathered during the pre-test program phase and study of relevant literature in a form of a published English guidebooks. It took one month May, 2022.

C. Implementation phase

❖ The program implementation phase was conducted across ten sessions at June 2022. The intern nurses were assigned to six groups by the researchers. Each group had ten intern nurses. On the first day of the training programme, the researchers distribute the programme booklet to them.

❖ The researchers arrange meetings with intern nurses to describe the purposes and character of the training programme and EHRs system, teaching strategies, educational media and evaluation method, and appropriate time for

the training programme to achieve the best possible cooperation from them.

❖ The researchers held an orientation session in one of the dedicated classes for training at Benha University Hospital, where they presented a training video about the "techniques of how to use EHRs". The study subjects were notified about the programme time schedule, the class site in which the session carried out, and the time of each sessions to accommodate their schedual.

❖ The EHRs knowledge questionnaire was completed prior to starting the program in written form for comparing it with post as well as follow up phases. After that the researchers observed the study subjects' technological abilities. "pre assessment"; (sending the EHRs link that designed by **(Rashed, et al., 2022)** to the intern nurses for download on their advanced mobile, then opening the link, enter EHRs E-mail and password, open EHRs application by using their personal advanced mobile, by clicking on any title in the side bar of the page to represent it's nursing and medical contents, transferring between EHRs various sheets, going to open each sheet (as they mentioned earlier), document and can choose various items for each sheet "using patient' file from the hospital by visulizing it with following ethical considerations (don't write patient name for keeping the patient his/ her privacy) after getting the department' head nurse approval, and at last save it and sign out of EHRs various sheets.

❖ Once the researchers observed intern-nurses, they were asked to complete career success questionnaires before beginning the training program to comparing it with both post and follow up phases of the program.

❖ The researchers perform the study sessions in accordance with the training programme after finishing the data gathering instruments. The course lasts for ten days; with theoretical sessions lasting five days and practical sessions lasting five days. Each session lasts three hours. It is open from 9:30 am. to 12:30 pm., during the morning shift. An orientation to the training programme is

providing at the start of each session. Feedback on the previous session was given at the start of each session, and feedback on the current session was given at the end of each session.

The sessions of electronic health records EHRs training program:

The theoretical part:

- First session: Researchers explained the educational program aim, objectives plan, content outlines, methods, evaluation, introduction, concepts, goals, importance of nursing informatics NI, ethical consideration for NI, roles of NI, advantages and disadvantages of NI.

- Second session: Revision for previous explained NI goals, components, and categories of NI, fields for applying NI and phases for implementing NI.

- Third session: Concept, purposes, benefits, shapes, advantages, and disadvantages of using advanced mobile devices AMDs in clinical practice and what should the intern-nurses and nursing staff be aware when using AMDs.

- Fourth session: Concept, purposes, importance, types and principals of nursing documentation.

- Fifth session: Concept, benefits, stages, advantages and disadvantages of electronic health record EHRs, key capabilities of EHRs, challenges and barriers of EHRs.

The practical part:

- Sixth session: The study subjects Access to this URL link (http://localhost:4200) from the Google Chrome applications and the intern-nurses enter E-mail and password to enter our home page EHRs, open EHRs application, identify EHRs system different components, document data in selected sheet, save and log out from any EHRs sheets.

- Seventh session: Complete and document following EHRs sheets (patients' personal history, patients' admission and discharge sheet, patients' discharge summary sheet and patients' consultation request).

- Eighth session: Complete and document following EHRs sheets (patients' physical examination, review, numerical pain rating, the physical restraint orders and nurse follow up sheets).

- Ninth session: Complete and document the following EHRs sheets (vital signs, the fluid balance "intake and output sheets", patients' requested lab investigation sheets, and the medication administration record sheets).

- Tenth session: Complete and document following EHRs sheets (patients' abdominal ultrasonography, and intra operative anaesthetic sheets).

D. Evaluation phase

Following the implementation of the training program, an instant post-test was undertaken to assess knowledge and technological abilities (data entry) using the identical pre-test tools. This helps to assess the impact of the training program on intern-nurses' perception of career success. This was done both immediately following program execution and three months later (follow-up). Data collection took around five months, from the beginning of July 2022 until the end of the October 2022.

The ethical considerations:

Formal letter was obtained from faculty of nursing's dean, Benha University and presented to the hospital's administrators describing the purposes of the study. Before beginning the study, the researchers informed the subjects of the study to the study's purposes and nature, as well as the fact that participation in the current study was entirely optional. Each study participant provided oral concent. The study data collection methods were assigned a code number to ensure the confidentiality of the data obtained. The intern-nurses were informed that the data collected would be used solely for research purposes and that they had the right to terminate their participation at any time without

explanation. Aaditionally, oral consent was obtained from each patient prior to capturing their file, and they were provided with a brief explanation of the study's purpose. Patients were also informed that any information depicted will be kept confidential and used only for study's purposes and that they had the right to refuse without giving any reasons.

IV- The Statistical design

Data was coded, collected, categorized and examined through statistical testing. Statistical softwere Package for Social Sciences (SPSS version 26) used to perform statistical analysis. Mean and standard deviation were used to represent descriptive statistics for quantitative variables, and qualitative varibales represented through frequency and precentages. For parametrical tests were also applied; comparing mean scores between the same sample at various study program phases conducted by paried (t) test, the Chi square was utilized for percentage and number distribution, and test of pearsons correlation coefficient (r) was used to measure correlation between current study variables at different program phases. When P≤ 0.05 it indicated statistical significance relation, and when P≤ 0.001 it considered highly statistical significance. While, P> 0.05 indicated insignificant relation.

Results

Table (1): This table illustrates that, more than half (56.7 %) of intern–nurses' aged were more than 22 years with Mean score 23.34±0.68. The highest percentages of them (80% & 76.7%) were females and single women. In terms of where they resided, intern nurses (90%) mostly lived in rural areas. As well as, pre-university education 68.3% of intern-nurses had completed their Secondary school, and 71.7% of intern-nurses having a computer. In addition, all intern nurses (100%) had Medical Apps installed on their mobile device. And 38.3% of intern nurses have intermediate computer literacy skills. The majority of intern nurses (83.3%) believe that hospital staff should develop rules and policy for the use of personal communication devices.

Figure (1): Clarifies that, at the preprogram phase, less than one quarter (21.7%) of study participants had adequate knowledge related to the electronic health records EHRs, which it increased to (90%) mostly had adequate knowledge in the post-program with slightly declined to be (80%) of intern-nurses at follow up phase.

Table (2): Represents that, intern nurses' knowledge scores related to EHRs improved in a highly statistically significant way at the post and follow-up programme phases. The highest mean score of study participants' knowledge were related to advanced mobile devices at the post and follow up phases respectively (20.15±4.32 &18.79±4.89) as compared to the preprogramme phase (11.89±6.01). While the lowest mean scores (23.12±4.79 & 20.38±5.89) of them were regarding the nursing informatics at post- and follow-up programme phases respectively, as compared to the preprogramme phase (9.78±5.79).

Figure (2): Shows that, at the preprograme (16.7%) of study subjects had high total level of overall technological skills, which it improved to be (76.6%) at the post-program, with slightly increased to (83.3%) at the program's follow-up phase.

Table (3): Indicates that, there were highly statistically significant improvement in technological skills dimensions of the study participants at the post and follow-up phases of the programme. The highest total mean score of technological skills (10.97±2.48 and 11.62±2.35) were related to informatics literacy and management skills at the post- and follow-up phases of the programme respectively, as compared to preprogramme phase (2.39±2.38). While the lowest overall mean scores on the technological skills dimensions (41.37±7.81 and 43.12±9.21) of study participants' were related to technological skills needed to using EHRs at the post and follow up programme phases respectively, however, when compared to the pre-program phase (19.02±8.35).

Figure (4): Clarifies that, the majority (85% & 83.3%) of study subjects had high perception total levels regarding career success at the post program and follow up programme

phases respectively, as compared with the preprogramme phase was (18.3%).

Table (4): Demonestrates that, there was a high statistical significant improvement in study subjects' perception toward career success during the post- and follow-up programme phases. The highest mean scores of study participants' perception regarding career success (7.69±4.13 and 7.58±3.76) were associated with hierarchical success at the post & follow up phases of the programme respectively, as compared to the preprogramme phase (3.67±2.93). While the lowest mean scores of

intern-nurses' perception regarding career success (10.04±4.23 and 9.76±3.57) were associated with interpersonal success at the post- and follow-up program phases respectively, as compared to the preprogramme (5.02±2.87).

Table (5): Illustrates that, there were a highly significant statistical positive correlation between study participants' EHRs knowledge and technological skills toward EHRs and their perception regard career success at the pre, post and follow-up program.

Table 1: Frequency distribution of intern‒nurses' personal data (n= 60)

Personal data	No	%
Age with year		
< 22 years	26	43.3%
≥ 22 years	34	56.7%
Mean ± SD. 23.34±0.68		
Gender		
Male	12	20%
Female	48	80%
Marital status		
Married	14	23.3
Single	46	76.7%
Place of living/residence		
Urban area	6	10%
Rural area	54	90%
The pre university education		
The secondary school	41	68.3%
The technical nursing diploma	19	31.7%
Do you owns a computer		
No	17	28.3%
Yes	43	71.7%
Setting up Medical Apps on your mobiles androids device or AMDs?		
No	0	0%
Yes	60	100%
Intern- nurses' computer literacy skills		
Advanced	4	6.7%
Intermediate	23	38.3%
Beginner	20	33.3%
None	13	21.7%
The health orzanization staff should setting a personal communication devices policy use		
No	10	16.7%
Yes	50	83.3%

Figure 1: Precentage distribution of intern-nurses' total knowledge levels regard electronic health records throug program phases
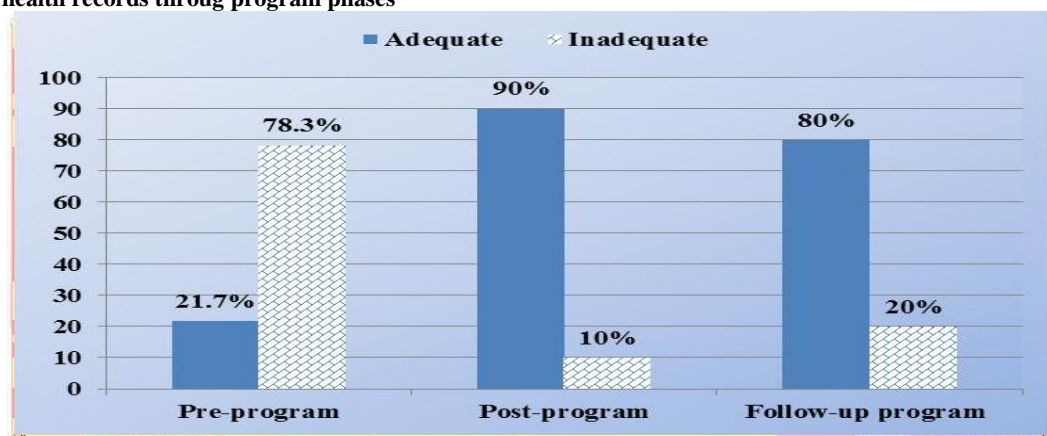

Table 2: Mean scores and Mean percentage of intern-nurses' the total knowledge dimensions regard electronic health records through program phases (n= 60).

The knowledge Dimensions	Maxi-mum Score	Pre-Program		Post-Program		Follow-up program		Paired t test	P value
		X±S.D.	Mean %	X±S.D.	Mean %	X±S.D.	Mean %		
Nursing informatics	29	9.78±5.79	33.72%	23.12±4.79	79.72%	20.38±5.89	70.28%	t1: 21.762 t2: 4.913 t3: 13.394	P1: 0.000** P2: 0.000** P3: 0.000**
Advanced mobile devices AMDs	22	11.89±6.01	54.05%	20.15±4.32	91.59%	18.79±4.89	85.41%	t1:10.647 t2: 3.600 t3: 9.085	P1: 0.000** P2: 0.001** P3: 0.000**
Electronic health records	41	15.98±8.76	38.98%	35..17±7.56	85.78%	31.46±9.76	76.73%	t1: 13.905 t2: 4.324 t3:10.868	P1: 0.000** P2:0.000** P3: 0.000**
Total	92	37.65±20.52	40.92%	78.42±15.24	85.24%	70.63±22.31	76.77%	t1:17.971 t2: 4.566 t3: 13.325	P1: 0.000** P2: 0.000** P3: 0.000**

t1 & p1: between pre & post programme, t2 & p2: between post & follow-up programe, and t3 & p3: between pre & follow up program

Figure 2: Precentage distribution of intern-nurses' technological skills total levels through program phases.
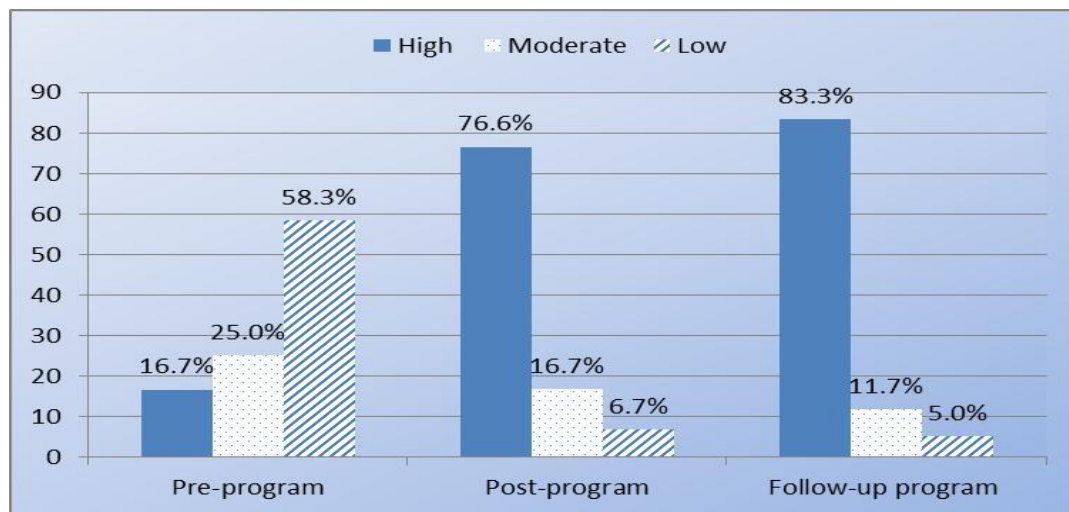

Table 3: Mean scores and Mean percentage of intern-nurses' total technological skills dimensions through program phases (n= 60).

The technological skills dimensions	Maxi-mum Score	Pre-Program		Post-Program		Follow-up program		Paired t test	P value
		X±S.D.	Mean %	X±S.D.	Mean %	X±S.D.	Mean %		
Technological skills required for using EHRs	50	19.02±8.35	38.04%	41.37±7.81	82.74%	43.12±9.21	86.24%	t1: 21.07 t2:2.963 t3:16.119	P1: 0.000** P2: 0.004** P3: 0.000**
Informatics literacy & management skills	12	2.39±2.38	19.92%	10.97±2.48	91.42%	11.62±2.35	96.83%	t1: 27.305 t2:2.374 t3: 21.262	P1: 0.000** P2: 0.001** P3: 0.000**
Total Technological skills	62	21.41±10.68	34.53%	52.37±9.46	84.42%	54.74±9.87	88.29%	t1: 23.989 t2: 2.953 t3: 18.28	P1: 0.000** P2: 0.004** P3: .000**
Actual performance (Data Entry)	28	17.01±4.97	60.75%	25.34±4.76	90.5%	26.14±5.46	93.39%	t1: 15.166 t2: 2.612 t3: 12.788	P1: 0 .000** P2: 0 .038* P3: 0.000**
Total scores	90	38.42±14.28	42.69%	77.71±14.47	86.34%	80.88±14.2	89.87%	t1: 23.855 t2: 2.999 t3: 24.583	P1: 0 .000** P2: 0 .004** P3: 0.000**

t1 & p1: between pre & post programme, t2 & p2: between post & follow-up programe, and t3 & p3: between pre & follow up program

Figure 3: Precentage distribution of intern-nurses' perception total levels regarding career success throughout program phases.
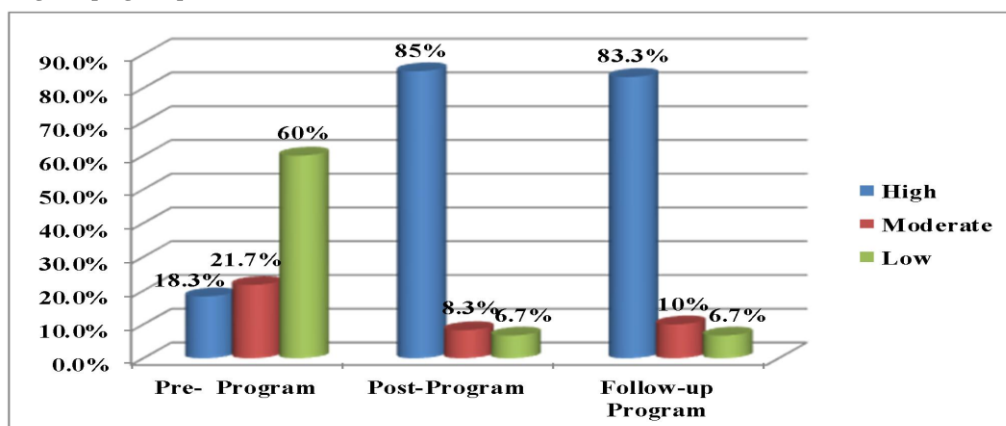

Table 4: Mean scores and Mean percentage of the intern–nurses' perception toward career success through the program phases (n= 60).

The career success	Maximum Score	Pre-Program		Post-Program		Follow-up program		Paired t test	P value
		X±S.D.	Mean %	X±S.D.	Mean %	X±S.D.	Mean %		
Job Success	24	9.01±3.36	37.54%	20.38±5.27	84.92%	19.98±4.38	83.25%	t1:22.78 t2: 3.47 t3:19.86	P1: 0.001 P2: 0.034 P3: 0.001
Interpersonal Success	12	5.02±2.87	41.83%	10.04±4.23	83.67%	9.76±3.57	81.33%	t1: 21.98 t2: 4.06 t3:18.97	P1: 0.001 P2: 0.042 P3: 0.001
Financial Success	9	3.57±3.23	39.67%	7.54±4.26	83.78%	7.37±3.48	81.89%	t1: 21.78 t2:3.55 t3: 17.98	P1: 0.001 P2: 0.033 P3: 0.001
Hierarchical Success	9	3.67±2.93	40.78%	7.69±4.13	85.44%	7.58±3.76	84.22%	t1: 23.42 t2: 5.79 t3:19.46	P1: 0.001 P2: 0.014 P3: 0.001
Life Success	12	5.01±3.16	41.75%	10.18±4.23	84.83%	9.87±3.16	82.25%	t1: 24.35 t2: 3.39 t3: 18.96	P1: 0.001 P2: 0.024 P3: 0.001
Total	66	26.28±5.23	39.82%	55.83±7.34	84.59%	54.47±6.34	82.53%	t1: 27.32 t2: 7.46 t3:22.67	P1: 0.001 P2: 0.032 P3: 0.001

t1 & p1: between pre & post programme, t2 & p2: between post & follow-up programe, and t3 & p3: between pre & follow up program

Table 5: Correlation matrix between intern-nurses' EHRs knowledge, technological skills, and perception about career success through the program phases

Study variable	Program phases	Intern-nurses' EHRs knowledge		Intern-nurses' EHRs technological skills		Intern-nurses' career success	
		r	P value	r	P value	r	P value
Intern-nurses' EHRs knowledge	Pre-program	1	----	0.805	0.0001	0.693	0.0001
Intern-nurses' EHRs technological skills		0.805	0.0001	1	----	0.816	0.0001
Intern- nurses' career success		0.693	0.0001	0.816	0.0001	1	----
Intern-nurses' EHRs knowledge	Post-program	1	----	0.895	0.0001	0.901	0.0001
Intern-nurses' EHRs technological skills		0.895	0.0001	1	----	0.964	0.0001
Intern- nurses' career success		0.901	0.0001	0.964	0.0001	1	----
Intern-nurses' EHRs knowledge	Follow-up	1	----	0.652	0.0001	0.849	0.0001
Intern-nurses' EHRs technological skills		0.652	0.0001	1	----	0.836	0.0001
Intern- nurses' career success		0.849	0.0001	0.836	0.0001	1	----

(A statistical significant difference $P \leq 0.05$ and A highly statistical significant difference $P \leq 0.001$)

Discussion

Adoption of digital technology has reshaped the labor market, opening up new opportunities and redefining the skills in demand. It is no longer sufficient to just have a degree or experience in a certain specialty in today's health care. Making use of digital technology and tools has become important to the success of many jobs, necessitating a certain level of digital competency for professionals **(Hooley & Staunton, 2021)**.

Concerning intern-nurses' knowledge levels regarding using of EHRs; the present study clarified that, the minority of study subjects' had adequate knowledge levelin relation to using EHRs at the pre-programme, which improved and increased at the post programme and declined at follow-up program phases.

According to the researchers' point of views, this outcome may have been caused by intern nurses' lack of familiarity with EHRs and the fact that the majority of them had not previously attended EHR training. The programme offered students an interactive and technologically rich learning environment, exposing them to evidence-based practise, standardised nursing language, and informatics capabilities. As intern nurses gained more knowledge, this could be used to explain that

learning was not a passive experience. Also, the researchers' capacity to use a variety of instructional strategies, including the usage of AMDs, to convey information. These generations are extremely enthusiastic about AMDs and new technologies in general. Additionally, after the program's execution, their understanding increased in ways beyond simple follow-up. Moreover, the knowledge is not stored for long period of time the memory as the biological truth and must be renewed and updated perodically & d   continuously on an the ongoing basis.

This result was supported by **Ghoneimy, (2015)**, who revealed that the intern-students' grasp of electronic clinical administrative records had improved overall. Also **Choi, et al., (2018)**, who reported that the application of EMRs was an optimal and effective educational method for practicing immediate documenting of the students' interventions and observations and were available at patients' bedsides and reported a significant increase in participant knowledge regarding nursing informatics competencies in the post-test.

These findings were in similarly with **Choi, et al., (2018)**, who reported that the participant's overall knowledge domain score in nursing informatics and electronic health records was improved significantly. Additionally, **Samadbeik, et al., (2020),** who

revealed that after implementing mobile academic EHR, nursing practitioners gained more knowledge and experience. Moreover, **Van Langen, et al., (2020) and Fennelly, et al., (2020),** who demonstrated how academic EHRs constitute a significant part of nursing courses. Students who are exposed to such technology while pursuing their professional education can build the health informatics knowledge, talents, and skills necessary to function successfully on the health.

According to **Mollart, et al., (2020)** and **Aruldass, (2019)**, who stated that it is critical to learn new healthcare practitioners, such as the nursing students, how to utilze EMR in a actual clinical learning enviroment. Higher education nursing programmes must provide immediate assistance to undergraduate nursing learners as well as educators in order for EMR to be properly integrated into the undergraduate nursing curriculum.

Regarding intern nurses' technological skills with regarding EHRs, the current study found that roughly two thirds of intern nurses had low level of technological skills at the pre-programme phase, which progressed, improved, and increased to be the three quarters had high level of technological skills at the immediate post-program phase, with a slight increase to the majority of them had high level of technological skills at follow-up programme. Additionally, there were statistically significant differences in the intern nurses' technological skills across programme phases; the lowest mean scores of intern nurses were related to the technological abilities needed to use EHRs, while the highest mean scores were related to informatics literacy and management skills.

From researchers' point of views before the program intern-nurses had low technological skills but, after the program the high technological skills of the intern-nurses, which positively lead to good task performance of them. This improvement can be attributed to using EHR software for intern nurses and teaching them how to send emails with attachments, use search engines to access the internet, register their email addresses and passwords, navigate through the documents in their EHRs, enter accurate and complete

information quickly and within a set time limit, save the information entered, and retrieve the records at a later time—all of which require the students to use PDAs and technology.

Furthermore, the improvement in the intern nurses' performance may also be attributed to their desire to acquire more sophisticated skills to streamline their work and boost their productivity. After all, they will be able to work in hospitals using this system once they graduate, and by then, they will have acquired knowledge and experience that will increase their competence and confidence. The occurrence and spread of COVID-19, which has driven a quick shift to online learning via desktop computers or mobile computers and stimulated blended learning, may, nevertheless, be a factor in the increase in competence in the follow-up phase. Organizations went into emergency mode as the pandemic grew worse, closing campuses to stop COVID-19 from spreading. All of these help new nurses hone their skills.

In the same line, **Ravert, et al., (2020),** who stated that implementation has been tremendously effective. Post implementation of the EHR, on students rated how well nursing program equipped them regarding documentation more than before the implementing of the EHR system on the course evaluations, the students reported that charting in the EHR assissted them know what to chart, and practice assissted them to be ready to actual life. The students, both the under-graduate and graduate, shows gratitude for their chance about EHRs education.

In the same context, **Samadbeik, et al., (2020),** who revealed the proficiency and technical skills of nursing interns improved in the EMR with the implementation of mobile AEMR. Also **Rathnayake, & Senevirathna, (2019),** who found that nearly half of the study sample reported adequate EHRs literacy skills. In addition to **Tissera, & Silva, (2017),** who found that the participants' technological skill is fairly satisfactory. Moreover, **Tubaishat, & Habiballah, (2016),** who showed that a moderate level of electronic literacy skills and **Park, (2016),** who reported that the nursing students held adequate electronic literacy skills.

In addition to **Chung, & Cho, (2017),** who revealed that academic EHRs systems for nursing documentation could assist students in preparing for the future of health information technology. Use of academic EHRs systems will aid in the development of undergraduate nursing students' competence in nursing documentation with EHRs systems.

These results were in contrast to those of **Choi, et al. (2018),** who found that the intervention's impact on the computer skills dimension of the nursing informatics competences was insignificant. This result could be explained by the fact that nursing students are already proficient computer users.

Concerning intern-nurses' perception levels regarding career success; the current study illustrated that, lowest percentage of study participants had high perception levels about career success at the pre program phase and that these perceptions increased during the training program's post-program and follow-up phases. Moreover, the results showed that intern nurses' perceptions of their career success had improved significantly throughout programme phases. The highest mean score at the post- and follow-up programme phases was related to hierarchical success dimension. While, the lowest mean score was related to interpersonal success dimension at the post and follow up phases of the programme compared to to the preprogramme phase.

From researchers' opinions, the increased impression of career success among study subjects after implementing of the program might be due to the success of the EHRs programme in boosting intern-nurse knowledge, technological abilities, performance, and attitude towards EHRs, which improves their perception of career success.

This result supported by **Metelski, (2019),** who clarified that participants had different ideas on what career success means in general. The achievement of personal goals was one of the most prevalent generic opinions held by the majority of participants. Also, setting and accomplishing personal objectives and desires was recognized as critical to achieving career success by participants.

As well**, Su, et al., (2017)**, who assumed that the rapid technological development, societal inclinations, and organizational transformation have resulted in a higher notion of job success, and downsizing is an inescapable result. In addition to **Trivellas, et al., (2015),** who found that workers with advanced scientific capabilities have proven greater career success.

On the other hand **Joo, & Ready, (2012)** who report that career satisfaction was weak because staff do not seek more promizing careers in other organizations in order to be pleased with their higher performance expectations. As performance-oriented people attempt to either demonstrate their capability through work performance or to avoid negative perceptions of their competence.

The findings of this study showed that, in the pre-, post-, and follow-up phases of the programme, there were highly statistically significant positive connections between intern nurses' overall knowledge & technological skills toward EHRs, and their perception of career success.

The findings of the study indicated that, there were a highly statistically significant positive correlations among study participants total knowledge, technological skills toward EHRs and their perception regard career success in the preprogram, post and follow up phases.

According to the researchers' opinions, this result can be inference as the improvement in the EHRs programe may be related to intern-nurses' information and abilities that were developed through the programe, knowledge and technological skills are essential for performance. It was also observed that there were significant improving in perception of career success following the training, that indicating the program's success and significant positive effect on career success. Also the study participants' knowledge about EHRs has been enhanced, technological skills developed & improved and their perception about career success has been increased. In addition to study participants' have positive attitude regarding EHRs software with AMDs they will be more

motivated and encouraged to use EHRs with AMDs which increases acquiring knowledge.

The findings of the present study were in line with those of **Olok et al. (2015),** who found a link between intern nurses' attitudes towards EHRs, knowledge of AMDs, and competence. Moreover, **Mijin et al. (2019**), who demonstrated a favourable relationship between perceived usefulness and the simplicity with which knowledge can be applied.

The current study's findings were in the same context with those of **Tubaishat, (2018),** who discovered a strong significant relationship between general information and attitude towards the use of EMR as well as a significant positive correlation between perceived usefulness, ease of use, and adequate training of EMR. While, these findings inconsistent with **Jenkins, et al., (2018),** who observed that nursing staff that have a good awareness of AMDs applications have a negative impression towards it, this result was at odds with their findings.

Conclusion

Based on the findings of the current study, it can be concluded that the intern-nurses' knowledge and technological skills toward EHRs and intern-nurses' perception toward career success improved in the immediate post and follow-up phases of the programme as compared to the pre-program. Also, there was a highly statistically significant positive correlation between intern nurses' knowledge & technological skills toward EHRs and career success.

Recommendations

In the light of the current results that obtained from the present study, the following recommendations were suggested:

I-For hospital administrators:

- The administrations of health care organizations need to take essential actions to build the appropriate ICT infrastructure that needed for the use of EHRs applications utilization in the clinical setting and the progressive implementation of EHRs software program system in the general hospitals.

- The hospital administration maintaining a supportive work environment for intern nurses and nursing staff by supplying all the resources necessary for the work and by using job enrichment to enhance job success.

II- For nursing education:

- With ongoing education, classroom instruction, and training with practical workshops, academic nursing leaders should help nursing students and recently graduated nurses develop their nursing informatics abilities.

- The faculty members should consider implementing electronic records and reports in classroom, simulation, and skills labs in order to positively influence students' behavioural intentions when utilizing them.

- Informatics educational program should be itegrated in orientation programs for intern-nurses to improve nurses' support, comfort and confidence when utilizing EHRs by using AMDs.

III- For nursing student:

- Providing intern nurses with education programs about their job description and road map for career advancement at the time of orientation and socialization.

- Developing systems for assessing and dealing with students' problems and complaints that facing them during online courses and giving the needed immediate support.

- Technical support team should be available for students through various communication methods (phone number, E-mail).

IV- For further research:

- The study needed to be replicated with a large number of subjects, and the level of the using of ICT in the helth care settings.

- Assessing the perception of the nursing personal and stakeholders about usefulness of

EHRs by using AMDs in the clinical practice that enhance for career sucess.

- Assessing factors of the nursing staff objections to adopt EHRs with using AMDs in the nursing care and causes that hindering career success.

Conflict of interest

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