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Using Mobile -Based learning Versus Traditional Method for Cardiopulmonary Assessment among Nursing Students

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Abstract: **Background**: In today's world, technology is developing rapidly, mobile learning has been playing an important crucial role in nursing education. There is a significant relationship between the use of mobile technologies and learning process of acquiring knowledge and practice.so, it is important to develop effective teaching methods to boost students' knowledge, skills, and satisfaction. **Purpose**: To assess effect of using Mobile -Based learning Versus Traditional Method for Cardiopulmonary Assessment among Nursing Students **Design:** A quasi-experimental study. **Settings**: This study was carried out at the Faculty of Nursing, Beni-Suef University. **Sampling:** Purposive sample of 190 nursing students at First-year. **Instruments**: Three instruments were used for data collection: students' structured questionnaire, nursing students' observational checklist and students' satisfaction scale. **Results**: Students who received mobile based learning were more skillful compared to students who received traditional education (p = 0.013). They also acquired higher knowledge scores (p = 0.029) and greater satisfaction (p = 0.019). **Conclusions**: It was concluded that students who received Mobile based learning had higher levels of academic practice, knowledge and satisfaction. **Recommendations**: The study recommended that nursing faculties should adopt mobile based learning to maximize learning experiences and skills development.

Keywords: *Cardiopulmonary assessment, Mobile-based learning, Traditional method.*

Introduction:

Traditional teaching is direct and efficient approach to instruction. When learners are confronted with challenges or disputes, teachers can successfully control and inspire them. They adopt a flexible teaching method, adapting the content to the real need within the overall teaching arrangement, which is

beneficial not only to the development of a basic approach but also to the formation of students' self-study abilities. Furthermore, in the realm of healthcare, where promoting health is a priority for both patients and healthcare professionals, smartphones have come to serve as indispensable tools (Shaw & Sergueeva, 2019).

Common strategies of instruction and learning that are frequently encountered in the context of nursing education include lecture and dialogue classes and skills practicing. (Romero-Rodríguez, et al, 2020). This approaches to support the development of clinical skills in nursing, students have centered on demonstration in small-group, hands-on learning in clinical labs. However, as curricula evolve, student enrollment increases, and scheduling constraints in labs mount, it becomes imperative to explore alternative delivery methods to ensure students can effectively build confidence in their clinical skill development (Chang et al., 2020).

Presently, nursing students' utilization of mobile devices for educational objectives is widespread. Mobile device integration has been shown to enhance nursing education by actively involving students in the learning process. Universities and academic institutions are extremely concerned with the integration of mobile learning (M-learning) into the educational environment (Snezhko et al., 2022).

Mobile learning is the incorporation of mobile devices into the learning process, including smartphones, tablets, and laptops for educational purposes, provides the user personalized access to information at any given location and time. Mobile learning can be identified, in light of these findings, as the capacity of learners to manage their own learning processes in accordance with their specific requirements and time constraints via mobile devices (Naveed et al., 2023).

As a result, nursing educators are utilizing video to link face-to-face learning with clinical practice in a variety of health settings, improve practical skills, students' knowledge, interpersonal learner competencies. Also, it provides students with more flexibility with online and mobile technologies and blended delivery of nursing content. Additionally, web-based video lectures provide the advantage of allowing students to watch videos repeatedly and at any time, this places the student at the center of their learning experience, as they can access content on multiple devices synchronously and/or asynchronously. (Goode et al., 2021).

One of the important skills for nursing students is physical examination. It has been an important role in diagnostic evaluation of illnesses. Additionally, it enables confirmation of the suspected diagnosis based on the patient's medical history at no additional cost. The disease severity and pattern are also detectable through physical examination (Jain, 2021).

A variety of conditions that impact the heart and lungs are described as cardiopulmonary disease. Due to their close proximity, a problem in one of these organs may potentially affect the other. Globally, cardiovascular disease

is the most common cause of death (CDC, 2023). Consequently, cardiopulmonary evaluation reveals important information about functional status of an individual's respiratory and cardiovascular systems. Obtaining the knowledge and skills necessary to accurately evaluate the cardiopulmonary system and distinguish between normal and abnormal evaluation results will enable the nurse to offer high-quality, safe patient care (Ernstmeyer, Christman , 2021).

A cautious physical examination can help the clinician in improving the subsequent stages of the diagnostic procedure, avoid unnecessary diagnostic testing, and facilitate the establishment of relations with the patient through touch contact. Inadequate or non-performance of a physical examination poses a risk to patient safety due to the increased likelihood of diagnostic errors. So, it is important to improve knowledge and skills of students regarding cardiopulmonary assessment with different teaching method (Verghese et al., 2015).

There is a relation between students' perceptions of the quality of education services and their satisfaction level with their learning experiences (Nastasić et al., 2019). Particularly in the current global environment, student satisfaction in higher education is not only vital for institutions but also for students themselves. In recent years, the higher education sector has experienced heightened competition due to the rapid progression of technology (Wong, Chapman, 2023).

In addition to facilitating more active learning, mobile applications enable the construction of knowledge through the use of a vast array of web-based clinical applications that are implemented by educational institutions around the world. The primary purpose of this survey was to assess mobile learning effect on the academic performance of students, improve student clinical learning outcomes during clinical rotations, and enhance faculty-student interactions (Al-Fraihat, et al., 2020).

Significance of the study

In the younger generations, mobile devices are an integral component of daily life. The rate of mobile penetration has increased exponentially. The Egyptian Ministry of Communications and Information Technology reported that 95% of Egyptian individuals and 98.8% of Egyptian households owned mobile phones in 2020 (Ezzat & Khamees, 2021).

There are a large number of studies conducted on the efficiency of mobile learning in nursing education. In some studies, that conducted in Taiwan and Canada with the participation of nursing students, it was reported that mobile learning gave positive results in nursing education (Masat Harbali, Koç ,2022). The most recent cohort of students entering the world of higher education undoubtedly considers mobile devices and smartphones to be cultural necessities (Delungahawatta et al., 2022).

Learner satisfaction has increased as a result of the incorporation of new

technologies into clinical skill education, including Web-based applications, e-learning, and computer-assisted learning, compared to traditional methods (Lee et al., 2016). A recent study on video clips impacts revealed that medical students viewed clinical skills videos available through mobile devices as easier to use than those viewed on computers. Therefore, using mobile-based video clips into nursing skill education may ultimately result in enhanced learning outcomes by increasing the accessibility of these videos (Clerkin et al., 2023).

Purpose:

To assess the effect using Mobile - Based learning Versus Traditional Method for Cardiopulmonary Assessment among Nursing Students

Methods

Research design:

Quasi- experimental design was conducted to achieve the purpose of this study.

Setting:

The present study was conducted at Faculty of Nursing, Beni-Seuf University. Egypt

Sampling:

Sample size calculation

Using Steven and Thompson equation to calculate the sample size from the next formula

$$n = \frac{Np(1-p)}{(N-1)(d^2/z^2) + p(1-p)}$$

N= Population (370)
Z= confidence level 95% (1.96)
P= probability (50%)
d= margin of error (0.05)
So, sample size (n) = 190
Purposive sample of 190 nursing students divided into two groups: an experimental group includes (95 students learning techniques through web-enhanced learning) and a control group includes (95 students using traditional method).

Inclusion Criteria:

Participants must be first-year nursing students enrolled in the 2023-2024 academic year, willing to attend the practical and theoretical parts of the procedure, then hands-on the procedure, take part in assessments, have internet access, Microsoft Teams proficiency, and personal computers or mobile devices

Exclusion Criteria:

Students who failed in the last year 2022-2023 academic years, students who have prior training or workshop about cardiopulmonary assessment. Student who are working at private hospitals.

Research hypotheses

H1: Students' who are exposed to mobile based learning are expected to have higher level of knowledge than students who only received traditional education
H2: Students' who are exposed to mobile based learning are expected to have higher level of performances than students who only received traditional education

H3: Students' who are exposed to mobile based learning are expected to have higher level of satisfaction than students who only received traditional education

Instruments:

The following three instruments were used to collect data: established by the researchers and consists of two parts:

- **Part 1**: Students' Characteristics: It was developed by researcher to assess nursing students' characteristics including sex, age, socioeconomic status, and learning drive.
- **Part 2**: Students' Knowledge questionnaire: It was developed by the researchers, following a review of recent international and local literatures (Chen et al., 2021& Ish et al., 2024). It has 20 multiple-choice questions, including 10 questions related to knowledge of respiratory assessment and 10 questions related to knowledge of cardiac assessment.

Scoring system:

The score for each item was 0 for the incorrect answer and 1 for the correct answer. The total scores were 20 points, ranging from 0 to 20, with 0 representing the lowest and 20 representing the highest. Satisfactory level of knowledge equal or more than 80% (equal 16 marks). Unsatisfactory level of knowledge less than 80% (equal 16 marks)

Instrument two: Nursing Students' observational checklists:

The observational checklist was adopted from Bickley et al., (2023) to assess students' practices related to cardiopulmonary assessment techniques. The checklist is divided into two parts. Part 1 cardiovascular assessment checklist. It contained 16 steps about assessment of neck, heart and peripheral vascular. Part 2 respiratory assessment checklist. It contained 12 steps for assessment of trachea and lung. Each step of practice was graded as follows: not done (0 degrees), done but not appropriately (1 degree), or appropriately done (2 degrees). The total score was 56, with 0 as the lowest and 56 as the highest. Competent level of practices was equal or more than 85% (equal 47.6 score), Incompetent level of practices was less than 85% (equal 47.6 score)

Instrument three: Student Satisfaction Likert scale:

The satisfaction scale for students contained seven items, it was developed and validated by Kuo et al., (2014) to evaluate students' satisfaction of the learning experience e.g., contributed to personal, educational, professional development, the level of interaction and online learning experience. Scoring system: These Items were rated from 1 (strongly disagree) to 5 (strongly agree) on a five-point. The total score was between 1 and 35, with 1 being the worst and 35 representing the greatest. Low satisfaction level less than 50 % (<17 score), Moderate satisfaction level from 50 to 75 (17-26 score), High satisfaction level more than 75 (>26 score).

Validity;

a panel of five experts' (professors in medical surgical nursing) from Benha University were selected to evaluate the instruments' face validity. The panel's feedback helped determine the necessary changes,

Reliability:

The assessment of knowledge questionnaire reliability was conducted utilizing Cronbach's alpha coefficient, which was 0.780, practice 0.838 and satisfaction 0.991. collection methods on 20 nursing students 10% of the sample. They were excluded from the study.

Ethical considerations:

Ethical approval was obtained from the Beni-Suef University Faculty of Medicine's ethical committee (Approval NO: 03122023). The nursing students were assured that their participation was anonymous with protection to confidentiality Prior to data collection, the researchers obtained written consent from the students who met the inclusion criteria for the study and were confirmed as participants, during which time they were informed of the purpose and nature of the study.

Answering the questions will not cause undue hardship; and their scores will not affect their semester or final grades. At any time, they were permitted to withdraw from the study at any time without legal penalty.

Procedure: -

This study was actually conducted from mid- February to the end of March 2024. Data were gathered from students throughout the second term of their first academic year 2023-2024. Data collection lasted for a period of 6 weeks. Data was collected about knowledge and practices of students about cardiopulmonary assessment using instruments number one and two. At first questionnaires about knowledge of students were distributed between them in class. Then, practices of students related to respiratory assessment, cardiovascular assessment were individually observed by the researcher in the laboratory.

According to the obtained educational needs of students, an educational program was developed at first by welcoming students and providing them orientation that included the study objectives to gain their maximum cooperation. Then, the researchers divided students into two equal groups (control and intervention), in a random manner.

- For the control group: The first session included theoretical and practical parts necessary for cardiopulmonary assessment. The theoretical aspect was conveyed through lectures accompanied by discussions, and available handouts were provided for each student in the control group; The second session included practical aspect of cardiopulmonary assessment. The teaching staff member performed procedure Infront of students. Subsequently, control group students performed redemonstrations in the laboratory. Each session lasted from30 -45 minutes.
- For the intervention group, students were divided into 4 subgroups Each subgroup contained 24 students. The content was delivered to each

student via mobile-based video and handouts. The content was divided into two sessions. The first session was theoretical and contained definition, purpose, and methods of cardiopulmonary assessment, - The second session covered the practical part, the researchers using Microsoft teams, WhatsApp applications Video was shared about methods of cardiopulmonary assessment Students were asked them to watch the video

- Posttest was conducted two week later. Students were assessed for knowledge, practices and satisfaction.

Statistical Analysis:

The SPSS (version 25) software was utilized to conduct the data analysis. Qualitative data was presented as percent and numbers. Furthermore, quantitative data was described as mean or standard deviation Chi-square tests were utilized to compare nominal variables in the two groups. Fisher's exact test was applied on smaller sample sizes; alternative to the chi-square test, tests was used for comparison between means. Pearson method was utilized to test correlation between numerical variables. A statistically significant difference was considered if P-value < 0.05. a highly statistically significant difference was considered if P and <0.01 and a very highly statistically significant was considered if P<.001.

Results

Table 1 shows distribution of studied students according to their characteristics with insignificant differences between intervention and control groups respectively, revealing that 90.5 % and 94.7%, respectively were <20 years, Also, 78.9% and 85.3%, respectively were females and their economic family status was intermediate among 56.8% and 57.9%, respectively.. Besides 57.9% of intervention group and 66.3% of control group were residing in rural area, and 54.7% and 62.1% of the two groups had high participation in medical surgical nursing class.

Table 2 clarifies distribution of studied students according to their interests with insignificant differences between intervention and control groups respectively, revealing an intermediate interest in nursing profession among 46.3 % and 56.8%, respectively, Also, 52.6% and 49.5%, respectively revealed spending 2hrs to < 5hrs/ week in studying medical surgical course. Besides, 60.0% and 48.4% of intervention and control groups reported that they were interested in lectures as a learning method for clinical courses, and they were using mobile in studying for > 6hrs/day.

Table 3 displays comparison of students' total knowledge level post intervention showed that there was a statistical significant difference between intervention and control groups during post period (P= 0.029*), Besides,75.8% and 61.1%, of students respectively were satisfied.

Table 4 shows Level of students' practice of respiratory assessment in the study and control groups post intervention. It displays that statistically significant differences existed between the intervention and control groups during post period,

where there was a competent level of practice among 70.5% and 51.6% of students in the intervention and control groups respectively).

Table 5 shows Level of students practice in cardiovascular assessment in the intervention and control groups post intervention. Its intervention and control groups during post intervention period. Furthermore, 63.2% and 46.3% of students in the intervention and control groups respectively had competent practices.

Figure 1 illustrates Level of practices of students in the intervention and control groups post. displaying that 62.1% of students in the intervention group and 55.8 % in the control group had competent practices.

Figure (2). Illustrates level of students' satisfaction post intervention in the intervention group and control groups. It reveals that 57.9% of students in intervention group had high level of satisfaction compared to 37.9 % of the control group.

Table (1) Distribution of studied students in the intervention and control groups according to their characteristics.

Students' characteristics	Intervention group (n=95)		Control group (n=95)		X^2	p-value
	(No.)	%	(No.)	%		
Age (in years)						
- < 20	86	90.5	90	94.7	1.234	FE 0.406 n.s
- ≥ 20	9	9.5	5	5.3		
Gender						
-Male	20	21.1	14	14.7	1.290	FE 0.344 n.s
-Female	75	78.9	81	85.3		
Economic family status						
- Low	41	43.2	40	42.1	0.22	0.883 n.s
- Intermediate	54	56.8	55	57.9		
Residence						
- Urban	40	42.1	32	33.7	1.431	FE 0.295 n.s
- Rural	55	57.9	63	66.3		
The participation in medical surgical nursing class						
- Low	23	24.2	15	15.8	2.150	0.341 n.s
- Intermediate	20	21.1	21	22.1		
- High	52	54.7	59	62.1		

FE fisher's exact test Not Significant (P>0.05)

Table (2) Distribution of studied students in the intervention and control groups according to their interests.

Students' interests	Intervention group (n=95)		Control group (n=95)		X^2	p-value
	(No.)	%	(No.)	%		
The interest in nursing profession						
- Low	40	42.1	36	37.9		
- Intermediate	44	46.3	54	56.8	3.481	0.175 n.s
-High	11	11.6	5	5.3		
Number of hours spent in studying medical surgical course /week						
- < 2hrs/wk	20	21.1	26	27.4		
- 2hrs to < 5hrs/wk	50	52.6	47	49.5	1.875	0.599 n.s
-5hrs to < 8hrs/wk	19	20.0	19	20.0		
- 8hrs/wk	6	6.3	3	3.1		
The interesting learning method for clinical courses						
- Lectures	57	60.0	46	48.4	4.558	0.207 n.s
- Demonstrations and re-demonstration	23	24.2	26	27.4		
- Video learning	6	6.3	14	14.7		
- Self-learning	9	9.5	9	9.5		
Number of hours for using mobile in studying						
- < 2hrs/day	4	4.2	4	4.2	2.781	0.427 n.s
- 2hrs to 3hrs/day	10	10.5	8	8.4		
- 4hrs to 6hrs /day	22	23.2	14	14.8		
- > 6hrs/day	59	62.1	69	72.6		

Not Significant (P>0.05)

Table (3): Comparison of level of students' knowledge in the intervention and control groups

Total Knowledge	Knowledge level	Intervention group (mobile based learning) (n=95)	Control group (traditional learning) (n=95)	χ^2 test P value
		No. (%)	No. (%)	
knowledge about respiratory assessment	Satisfactory ≥80%	72(75.8)	56(58.9)	6.129 FE 0.013*
	Unsatisfactory < 80%	23(24.2)	39(41.1)	
knowledge about cardiac assessment	Satisfactory ≥80%	59(62.1)	45(47.4)	4.164 0.041*
	Unsatisfactory < 80%	36(37.9)	50(52.6)	
Total	Satisfactory ≥80%	72(75.8)	58(61.1)	4.774 0.029*
	Unsatisfactory < 80%	23(24.2)	37(38.9)	

* statistically significant at ≤0.05 FE: Fisher exact for chi square

Table (4): Level of students' practice of respiratory assessment in the study and control groups post intervention

Study periods / Practice of respiratory assessment technique	Practice level	Intervention group (mobile based learning) (n=95)	Control group (traditional learning) (n=95)	χ^2 test P value
		No. (%)	No. (%)	
Preparation	Competent ≥85%	71(74.7)	35(36.8)	27.88 FE <0.001**
	Incompetent < 85%	24(25.3)	60(63.2)	
Technique of chest inspection	Competent ≥85%	71(74.7)	58(61.1)	3.670 FE 0.050*
	Incompetent < 85%	24(25.3)	37(38.9)	
Technique of chest palpation	Competent ≥85%	85(89.5)	50(52.6)	31.850 FE <0.001**
	Incompetent < 85%	10(10.5)	45(47.4)	
Technique of chest percussion	Competent ≥85%	69(72.6)	33(34.7)	27.660 FE <0.001**
	Incompetent < 85%	26(27.4)	62(65.3)	
Technique of chest auscultation	Competent ≥85%	80(84.2)	51(53.7)	20.490 FE <0.001**
	Incompetent < 85%	15(15.8)	44(46.3)	
Post procedure	Competent ≥85%	85(89.5)	63(66.3)	14.450 FE <0.001**
	Incompetent < 85%	10(10.5)	32(33.7)	
Total	Competent ≥85%	67(70.5)	49(51.6)	6.820 FE 0.009*
	Incompetent < 85%	28(29.5)	46(48.4)	

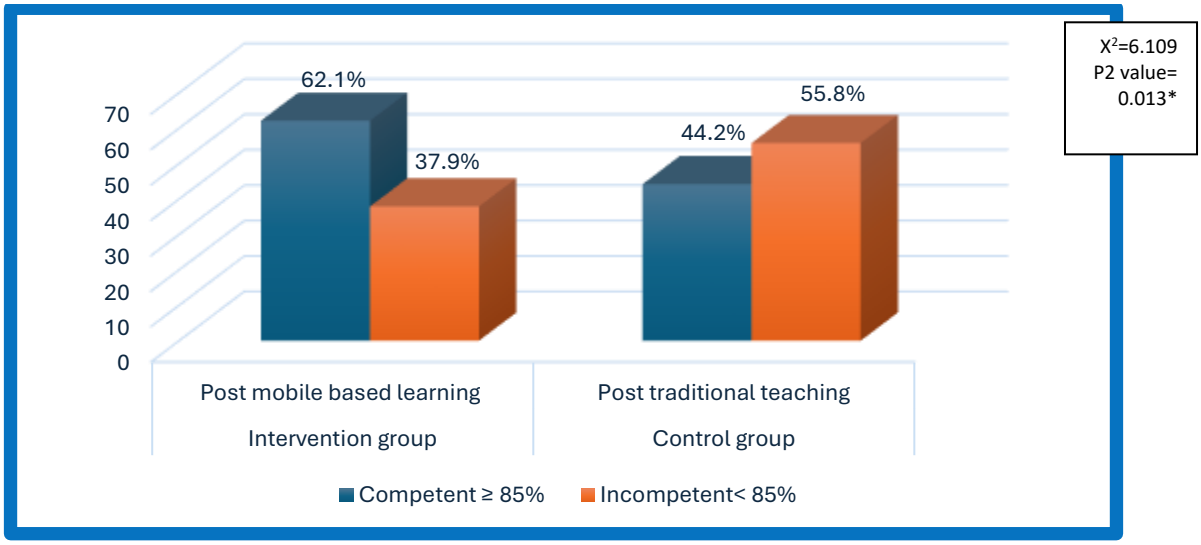
* Statistically significant at ≤0.05 ** highly statistically significant at ≤0.001 FE: Fisher exact for chi square

Table (5): Level of students' practice of cardiovascular assessment in the intervention and control groups.

Study periods / Practice of cardiovascular assessment technique	Responses	Intervention group (mobile based learning) (n=95)	Control group (traditional learning) (n=95)	χ^2 test P value
		No. (%)	No. (%)	
Preparation	Competent ≥85%	75(78.9)	52(54.7)	12.210 FE <0.001**
	Incompetent < 85%	20(21.1)	43(45.3)	
Technique of neck assessment	Competent ≥85%	71(74.7)	48(50.5)	11.640 FE <0.001**
	Incompetent < 85%	24(25.3)	47(49.5)	
Technique of heart assessment	Competent ≥85%	78(82.1)	54(56.8)	14.030 FE <0.001**
	Incompetent < 85%	17(17.9)	41(43.2)	
Technique of vascular assessment of arm	Competent ≥85%	79(83.2)	56(58.9)	13.470 FE <0.001**
	Incompetent < 85%	16(16.8)	39(41.1)	
Technique of vascular assessment of leg	Competent ≥85%	82(86.3)	52(54.7)	22.510 FE 0.001**
	Incompetent < 85%	13(13.7)	43(45.3)	
Post procedure	Competent ≥85%	75(78.9)	29(30.9)	45.040 FE <0.001**
	Incompetent < 85%	20(21.1)	65(69.1)	
Total	Competent ≥85%	60(63.2)	44(46.3)	5.150 FE 0.023*
	Incompetent < 85%	35(36.8)	51(53.7)	

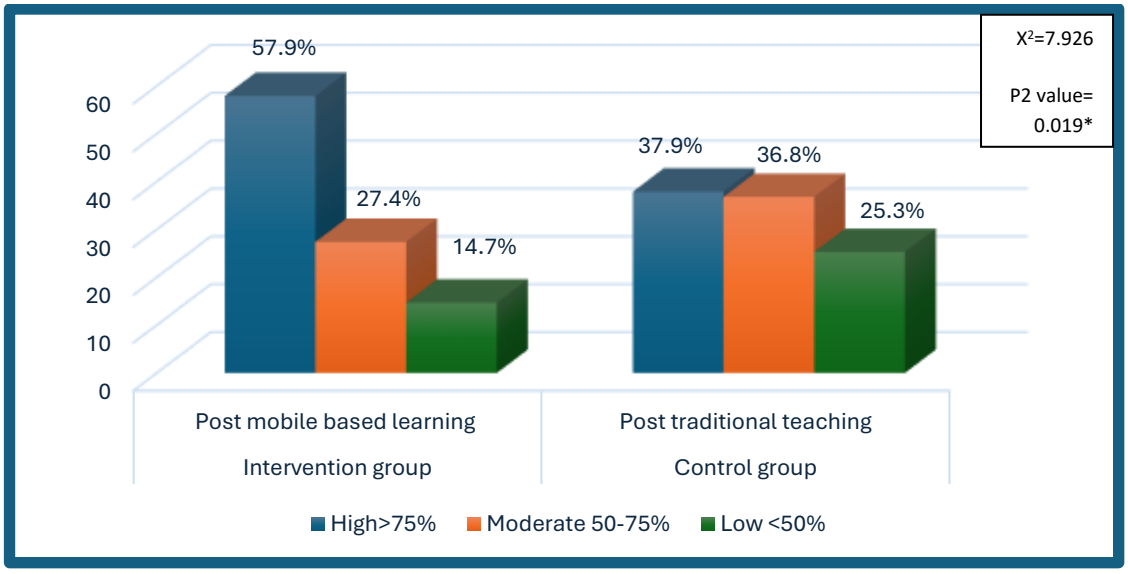
** highly statistically significant at ≤0.001 FE: Fisher exact for chi square

Figure (1): Level of practices of students in the intervention and control groups post intervention



* statistically significant ($p \leq 0.05$)

Figure (2): Level of students' satisfaction post intervention in the intervention group and control groups.



* statistically significant ($p \leq 0.05$)

Discussion:

Rapid development of new mobile technologies is influencing in all aspects of learning. In particular, mobile technology is rapidly affecting the field of education. Various mobile learning applications have already been developed and can be downloaded from application stores (Gupta, Khan & Agarwal,2021). Mobile learning has recently become a popular format for the delivery of continuing education to healthcare professionals and students. It has been extended to various medical education fields. Therefore, connecting mobile and nursing education may make

nursing education more accessible (Yoo & Lee, 2015).

This study compared the impact of using mobile based learning for cardiopulmonary assessment Versus Traditional method among Nursing Students. A statistically significant enhancement was observed in the overall scores of knowledges and practices pertaining to cardiopulmonary assessment following the intervention. Additionally, a greater proportion of students expressed satisfaction with the mobile-based learning method. So, this study's hypotheses were validated.

Regarding Knowledge acquisition the present study found that students who received mobile learning had higher level of knowledge acquisition than students who received traditional learning. In this study more than three quarters of students in intervention group have satisfactory level of knowledge about cardiopulmonary assessment, this was consistent with the study done by Kim & Suh (2018) which reveal that, after one week of treatment through their mobile application, the experimental group demonstrated a significantly greater value for knowledge in comparison to the control group.

Also, this study supported by study of Ghanbari, et al., (2019) stated that, the group that received assistance from mobile phones demonstrated greater level of knowledge, and there were significant differences in scores between the traditional and mobile education groups.

According to the researchers' point of view, this may be due to the nursing students' access to the ability to review the material more than once and learn at their own pace, time flexibility, and comfortable learning environment that permits taking notes for significant points.

This study shows regarding level of students' practice of respiratory assessment in the study and control groups post intervention. It shows that around three quarters in intervention group had competent level of practice, and in control group half of student had competent level of practice during post period (70.5% and 51.6% of students in the intervention and control groups respectively).

Students practice of cardiovascular assessment, around two thirds of students in intervention group had competent level of practice, and less than half in control groups had competent level of practice (63.2% and 46.3% of students in the intervention and control groups respectively).

Regarding total practice acquisition students in intervention group had higher level of practice than students who received traditional learning. It may be related to clarity of the procedure steps, feasibility to watch at their own pace or many times and the enhancement of their interest to learn through advanced technology. These finding in the same line with a study done by Arslan, et al., (2018) reported that, the student satisfaction concerning the video-based skills higher in study group than control group.

This result aligns with study conducted by Sobhy et al., (2022), which revealed a significant improvement of

students' skills concerning initiating IV access and administrating IV infusion procedures among the study group subjects after implementing mobile based video learning program compared with control group subjects on the traditional method of learning with a highly statistically significant difference P= 0.000.

In the other hand, there are some studies have reported different results. In the study of Lahti et al., (2014) there were no statistically significant differences in clinical skills between two groups of traditional learning and e-learning. No significant differences were detected between two groups of mobile phone training and traditional method examined for the effectiveness of mobile phone intervention in improving student competence, self-sufficiency and quality of the clinical environment, however, significant differences were recorded after five weeks of training (Strandell-Laine and et al., 2018).

Concerning students' satisfaction of learning method, reveals that 57.9% of students in intervention group had high level of satisfaction compared to 37.9 % of the control group. So, the present study found statistically significant differences in student satisfaction between the control and intervention groups. This may be attributed to the implementation of various instructional approaches and media, including videos, demonstration, and re-demonstration, which proved to be beneficial and helpful in instructing students on the correct carrying out of the procedures. The teaching material was also clear and simple.

The finding is consistent with Morrison's (2018) finding that the majority of students were satisfied with their choice to enroll in competency-based education. The study's findings suggest that in order to develop knowledge more effectively, institutions of higher education should prioritize this learning pathway.

This finding is further corroborated by the research conducted by Shah et al. (2023), which indicates that student happiness is influenced by factors such as the accessibility of online learning platforms, schedule flexibility and multimedia resources. Complementary or even greater levels of student satisfaction may be achieved through the use of online learning platforms as opposed to conventional classroom environments, according to the findings of this study. It may be related to that online learning platform accessibility, easy to use and can be used in many different ways, schedule flexibility, and multimedia resources.

In comparison students in the control group, mobile-based learning was found to significantly improve nursing students' knowledge of nursing skills and their satisfaction with performing cardiopulmonary assessments on patients.

On the contrary to the findings of Dutta et al. (2021), which indicated that online learning failed to satisfy first-year students, furthermore, it was determined that while online learning is crucial in the present day, it might not serve as alternative method for nursing and medical education. The study suggests that a combination of face-to-face classes, practical sessions,

and online learning can be a viable approach.

CONCLUSION

Students' who received mobile based learning had higher level of knowledge and practices than students who only received traditional education. Also, they were more satisfied with this method of education than students who only received traditional education.

Recommendations:

The study recommended that nursing faculties should adopt mobile based learning as an innovative teaching and learning techniques to improve students' knowledge and practices. Faculty should regularly assess student satisfaction and work to improve the motivating learning environment. Further research in this direction is essential to enhance nursing education and the overall student learning experience.

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