

Effect of Applying Bloodborne Prevention Guidelines Using Mobile Learning on Nursing Students Knowledge and Practice



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1.ABSTRACT

Background: The majority regarding bloodborne pathogens are dangerous, extremely infectious, and common between healthcare professionals. Undergraduate nursing students in particular are at higher risk of exposure and infectious accidents. The method of education based on the creation of technology tools another great tool for effectively delivering content is an excellent substitute for virtual meetings is Zoom cloud meetings. **Aim of the current study:** to evaluate the effect of applying bloodborne prevention guidelines using mobile learning on nursing student's knowledge and practice. **Method:** a quasi-experimental design was used. All available female nursing students 100 students who are registered in the first, second and third levels at Technical Nursing School for Girls at Mahelt Damna City were included. Two tools were used for data collection; I- Student nurses' knowledge about bloodborne pathogens which consist of two parts; socio-demographic characteristic and student' knowledge about bloodborne pathogens, II- Student nurses' practice regarding to bloodborne pathogens. **Results:** The statistically significant difference between nurses' knowledge and practise was found in the current study. pre and post applying bloodborne prevention guidelines using mobile learning. **conclusion:** It is possible to draw a conclusion from the results of the current investigation. That applying guidelines using mobile learning as zoom cloud meeting is an effective learning method for nursing students and had a significant effect on the improvement of studied nurses' knowledge and practice for preventing the bloodborne infection. **Recommendations:** Performed routinely training guidelines for preventing blood-borne infection in current study setting every year with the beginning of the school year.

Keywords - Bloodborne pathogens, , Mobile learning, Nursing students, zoom cloud meeting, knowledge and practice.

2.Introduction:

Health care professionals are at great danger from Human blood contains microbes called bloodborne pathogens, which can cause fatal infections. Coming into contact with blood or OPIMs such semen, vaginal secretions, saliva, and serous fluids (pleural, pericardial, peritoneal, and amniotic), that are clear or obviously tainted with blood, has the ability to spread the pathogen and induce infectious disease. Bloodborne pathogens are frequently spread in the medical field by mucocutaneous contact with contaminated patient's fluids, unintentional punctures, wounds, and abrasions. Percutaneous injuries from needles or other sharp objects are the main cause of bloodborne illnesses in the workplace (Wicker et al., 2014).

Based on their eagerness to accept challenges and greater responsibility, more students studying nursing motivated to place themselves in dangerous circumstances for which there is unprepared. Furthermore, the frequency of the biological hazards that they had experienced throughout the exercise was rarely disclosed to the students. Nursing

students among undergraduate healthcare students are more likely to come into contact with viruses because to their close patient interaction, a lack of raining and a culture of safety, and greater readiness to accept risks. (Huang et al., 2016).

Although it is a severe issue, Bloodborne infections can be brought into the workplace via needle sticks and other sharp injuries. frequently avoidable. According to estimates originating from the World Health Organization (WHO), the 35 million health care professionals (HCWs) worldwide, about 3,000,000 are exposed to blood-borne diseases through percutaneous means each year. 0.9 million had HCV, 170,000 people had HIV and. 2,000,000 of these are exposed medical personnel had HBV (Samargandy et al., 2016).

Infection prevention is referred to as "standard precaution" for blood-borne infection measures for pathogenic microorganisms which are prevalent in human blood and are dangerous to people. Any approach to avoid infectious diseases must

include health care professionals taking conventional precautions against bloodborne infections. Nurses, surgeons, laboratory technicians, and housekeepers, mortuary technicians, and non-nursing the attendants among the healthcare workers who are susceptible to bloodborne pathogen infections. Because they work closely with patients on a daily basis the risk of exposure for nurses to microbes. (Kale et al., 2014).

The use of safe universal precautions and vaccination of health care personnel against blood-borne diseases are the only means for the prevention of these disease among health care personnel. Existing information about the effect of increasing awareness to infection control guidelines implemented in hospitals, hepatitis B vaccination in relation to existing immunity, and other risk factors for exposure to blood-borne infections with their effective outcome on the sero frequency level of hepatitis among HCWs still needs to be evaluated. (El-Melligy, 2016).

Nursing staff needs to yearly continue training education in different health care settings; moreover, blood-borne pathogens. There is always news to cover regarding diseases. It acts as a tool for education on the seriousness of infectious diseases and the precautions needed to protect staff in a healthcare setting, as well as a reminder to established staff. (Hunter, 2017).

Speaking of online education, it goes without saying that we require a tool such as What's App, Google Classroom, Skype, Zoom Cloud Meeting, and other educational applications to connect instructors and students, other Even though it doesn't involve face-to-face interactions , Online education can still accustomed to improve the process of teaching and learning. (Febrianto, Mas'udah, & Megasari, 2020).

With the use of zoom features like raise hands and group messages, which support video conferences, Zoom facilitates talks between professors and students as well as among students. If there are issues with the audio, the students are assisted by the chat capabilities that are available. An excellent

substitute programme for virtual meetings is Zoom cloud meetings, which enables communication with numerous individuals without physical contact and can serve educational goals. (Guzacheva, 2020).

2.1 Significance of the study

The assessment of knowledge among medical students has been seen as a supporter of strengthening their education and safety culture, but it has also been shown to compromise the students' professional safety and security precautions. A crucial factor in enhancing the safety culture of students is the creation of new teaching approaches to enhance training and understanding regarding accident prevention and post-exposition measures. On the basis of other information and communication technology, including computers (I.C.T.s), academic researchers and institutions have simultaneously developed models and innovative methodological approaches that may be integrated in the classroom (Gao, 2019).

Tomorrow's nurses are the nursing students of today. The danger of needle stick injuries, exposure to blood and bodily fluids, and subsequent blood borne diseases, particularly hepatitis B, C, and AIDS, is high for healthcare workers. In a considerable number of cases, these infections can be followed by a serious, prolonged illness. About 30 injuries per 100 hospital beds are reported annually, according to estimates. (Mahran&Qalawa,2012).

2.2 Aim of the study:

To assess the effect of applying bloodborne prevention guidelines using mobile learning on nursing student's knowledge and practice.

2.3 Research hypothesis:

There'll be a distinction between student nurse's knowledge and practice before and after implementing bloodborne prevention guidelines using mobile learning.

3. Subject and methods

3.1 Study design:

The research design for this study was a quasi-experimental one.

3.2 Setting

This study was carried out at Technical Nursing School for Girls at Mahelt Damna City affiliated to Dakahlia government- Egypt.

3.3 Sample size:

In the academic year 2021–2022, there were 100 undergraduate nursing student enrolled in Mahelt Damna City's Technical Nursing School for Girls.

3.4 Sampling technique:

Convenience sampling technique was used to recruit the study subjects.

3.5 Subjects:

The nursing school is female nursing students who are studied in the first, second and third levels were included in the study

3.6 Tool of data collection

After reviewing the relevant literature two self-administered questionnaires were used in this study for data collection.

Tool I: Nursing students' knowledge regarding bloodborne diseases:

The researcher created this technique after studying the related recent national and international literature to assess part (1): socio-demographic characteristic such as age, level of education and part (2): knowledge level about bloodborne diseases among student nurses. It consists of 5 main categories (overview about blood borne pathogens, hepatitis B virus, hepatitis C virus, infection prevention measurements, and sterilization principles) these categories are composed of 61 multiple choice questions . The total. This data was collected by the researcher from each student. The tool questions were collected before the intervention of bloodborne guidelines by using zoom cloud meeting. It was designed in Arabic language.

Scoring system:

Measure as the following and each correct answer was given one score while incorrect answered was given zero. The total score is divided into three levels; low score = <50% of total scores, moderate score= 50 % to 74% of total scores and high score= ≥75% of total score covering knowledge level about bloodborne diseases.

Tool II: Nursing students' practice regarding to blood borne diseases

This tool will be prepared by the researcher after going through a thorough and pertinent literature review. This device was including observational checklists to assess performance for most common procedures adopted in the hospital regarding infection control measures. This tool was used prior to starting the educational sessions and, after finishing by using zoom cloud meeting. It consists of 79 statements requiring a response of (done or not done).

Scoring system:

Each item in the checklist has two options done or not done to be checked by the investigator. The items observed to be done were scored "1" and not done scored "0". The total score is divided into three levels; low score = <50% of total scores, moderate score= 50 % to 74% of total scores and high score= ≥75% of total score covering knowledge level about bloodborne diseases.

3.7 Validity and reliability

a five-person panel professionals the discipline of medical surgical nursing received the assessment instrument from the nursing student to evaluate its content reliability (covering, clarity, wording, length, format, and overall appearance). A little adjustment was made to a legitimate and trustworthy professional tool.

3.8 Field work

The current study includes four phases (preparation, planning, implementation, and evaluation phase).

1-Preparation phase:

Agreement was approved to conduct this study from Mansoura University's nursing faculty has an ethical committee. Official written permission was obtained from responsible authorities at nursing school after describing the study's purpose.

The researcher included the students who take part in the research. The study's objective was clarified to the students after take their oral consent. Personal data was taken by a pre-test for bloodborne precaution

knowledge was assessed using tool I part I and 2, followed by tool - II to assess student's performance. the first tool was submitted manually to students by using. The second tool was collected by the researcher at clinical setting of related hospital.

2- Planning phase:

The researcher used the assessment data and recent related literature in developing the educational guidelines booklet about bloodborne diseases based on the study objectives: a-The knowledge part covered the general information concerning the bloodborne diseases (description, causes, methods of transmission, signs and symptoms, treatment and control measures of bloodborne diseases). b- Practice part was developed based on observational checklist related to precaution for bloodborne diseases(Hand washing, wearing personal protection equipment's (gloves, mask and gown), handling sharp instruments, visitors, environmental hygiene, laboratory specimen and safe injection practice.

3-Implementation phase:

The educational guidelines booklet was implemented for six electronic units each unit was lasting 6 sessions, 2 session per week, Each session lasted for 45 minutes. The duration of this part of study lasted for about 6 weeks. This phase started from December 2021 to February 2022. The guide was submitted to the students through mobile learning using zoom cloud meeting application after having the pre- test. The steps for using zoom meeting applied during the educational guidelines as the following: The researcher gives the students instructions on how to download the Zoom app to their smartphones, then provides an ID meeting and passcode so that they may log in and participate in the online class. Finally, the researcher provides a link so that the students can join the meeting. 4) The researcher used the screen sharing capability to share and show the information being discussed to the students following they had all entered the virtual classroom. Class generally starts with the presentation of the topic. At the next

meeting, discussion, questions, and answers follow the explanation.

4-Evaluation phase:

This phase includes evaluation of nurse's knowledge and practice through using the same tools which used in pre-test after completing sessions of preventing guidelines regarding bloodborne infectious diseases.

3.9 Pilot study

The researchers randomly chose 10 nursing students to participate in the study, which involved 10% of the subjects (100 participants). It was done to evaluate the tools' viability and applicability in order to enable the researcher estimate how much time will be required to answer all the questions, the needed correction& modifications were made.

3.10 Ethical consideration

An ethical acceptance will be acquired from the Faculty of Nursing at Mansoura University's Research Ethics Committee. Prior to the research, written consent will be obtained from the students enrolled into the study after clarifying the nature and purpose of the study. The investigator will emphasize that participation is voluntary. Participants will be also assured that, privacy, safety and confidentiality will be assured throughout the study. Will also be made aware that participants have the option to quit the study at any time.

3.11 Statistical design:

SPSS (Statistical Package for the Social Sciences) is used, version 24, The information gathered was coded, calculated, and statistically evaluated. The quantitative variables (frequency and percentages) and mean SD of the data were reported (quantitative continuous variables). When comparing categorical variables, the Fisher exact test (FET) was employed instead of the chi square (2) if any cell's expected value was less than five. The evaluation of continuous quantitative elements was done using the paired t test (two groups- pre and post). For the comparison of continuous quantitative elements (involving two groups), the One-Way ANOVA (F test), and the Student's t test were both utilized (more than two groups).

The correlation coefficient (r) between two continuous quantitative variables was calculated with the Pearson correlation test .At P 0.05, the difference was deemed significant.

4. Results

Table 1: displays the traits of the studied students. Out of 100 female students; 35students were in class I, 28 students in class II and 37 students were in class III. Their ages were 15 years (23%), 16 years (25%), 17 years (37%) and 18 years (15%).

Table (2): Clarifies the percentage of correct knowledge of nursing students about Blood borne diseases before and after the application of blood borne prevention guidelines. It is found that the percentage of correct answers after application of the program are significantly (P<0.001) higher for all items.

Table (3) and figure (1): show a significant increase in the total average score of knowledge of the studied students about blood borne diseases after applying preventive guidelines program in relation to the student's age. It is noticed that the knowledge score increase with increasing age.

Table (4): shows that six items of hand washing practices have significant (P<0.001) increased after applying preventive guidelines program and most of the items completely done (100.0%) after the program.

Table (5): and **figure (2):** show a significant increase in the total average score

of practices of the studied students about blood borne diseases after applying preventive guidelines program in relation to the student's class. It is noticed that the knowledge score increase significantly (P0.002, P<0.001) among students of class II and III.

Table (6) and figure (3): show the percentage of proper dealing with a blood spill Practices done before and after the application of blood borne prevention guidelines. It is found that after applying preventive guidelines program all seven items of proper dealing with a blood spill practices are significantly (<0.05) increased

Table (7): shows that there is a significant (P<0.001) improvement in knowledge levels of the studied students about blood borne diseases after the application of blood borne prevention guidelines.

Table (8): shows that there is a significant (P<0.001) improvement in practices levels of the studied students about blood borne diseases after the application of blood borne prevention guidelines.

Figure (4): shows the correlation between general knowledge and practices rating of the studied students about blood borne diseases after applying preventive guidelines program. It is found the correlation is moderate, positive and significant (r=0.562, P<0.001); by means with increasing knowledge score the practice score increase

The tables and figures:

Table (1): Characteristics of the studied nursing students (100)

Characters	Items	No	%
Age (years)	15	23	23.0
	16	25	25.0
	17	37	37.0
	18	15	15.0
Class	I	35	35.0
	II	28	28.0
	III	37	37.0

Table (2): Percentage of correct knowledge of nursing students about Bloodborne diseases before and after the application of bloodborne prevention guidelines

Knowledge about Bloodborne diseases	Before		After		Significance test
	No	%	No	%	
1- Definition of bloodborne diseases?	69	69.0	100	100.	$\chi^2=36.69, P<0.001$
2- What are the types of bloodborne diseases?	65	65.0	86	86.0	$\chi^2=11.92, P<0.001$
3- What are the modes of transmission of bloodborne diseases?	56	56.0	88	88.0	$\chi^2=25.401, P<0.001$
4-What are the signs and symptoms of bloodbornde diseases?	60	60.0	95	95.0	$\chi^2=35.131, P<0.001$
5. What are the complications of bloodborne diseases?	42	42.0	90	90.0	$\chi^2=51.341, P<0.001$
6-What are the modes of prophylaxis of bloodborne diseases?	68	68.0	82	82.0	$\chi^2=5.231, P 0.022$
7-Who are the people most at high risk group of bloodborne disease?	39	39.0	96	96.0	$\chi^2=63.881, P<0.001$
8-Blood is the only fluid that contains infectious viruses?	15	15.0	92	92.0	$\chi^2=119.16, P<0.001$
Average score (Mean \pm SD)	4.05 \pm 0.74		6.69 \pm 0.53		t=20.717, P<0.001

Table (3): Relationship between average total knowledge score of nursing students before and after the application of blood borne prevention guidelines and students' age

Age	No	Before	After
		Mean \pm SD	Mean \pm SD
15 years	23	27.60 \pm 5.25	57.83 \pm 4.20
16 years	25	27.00 \pm 7.38	58.88 \pm 3.50
17 years	37	30.46 \pm 7.44	60.92 \pm 3.46
18 years	15	33.67 \pm 7.23	63.27 \pm 2.12
Significance test		F = 3.734, P 0.014	F = 8.673, P<0.001

Figure (1): Relationship between average total knowledge score of nursing students before and after the application of blood borne prevention guidelines and students' age

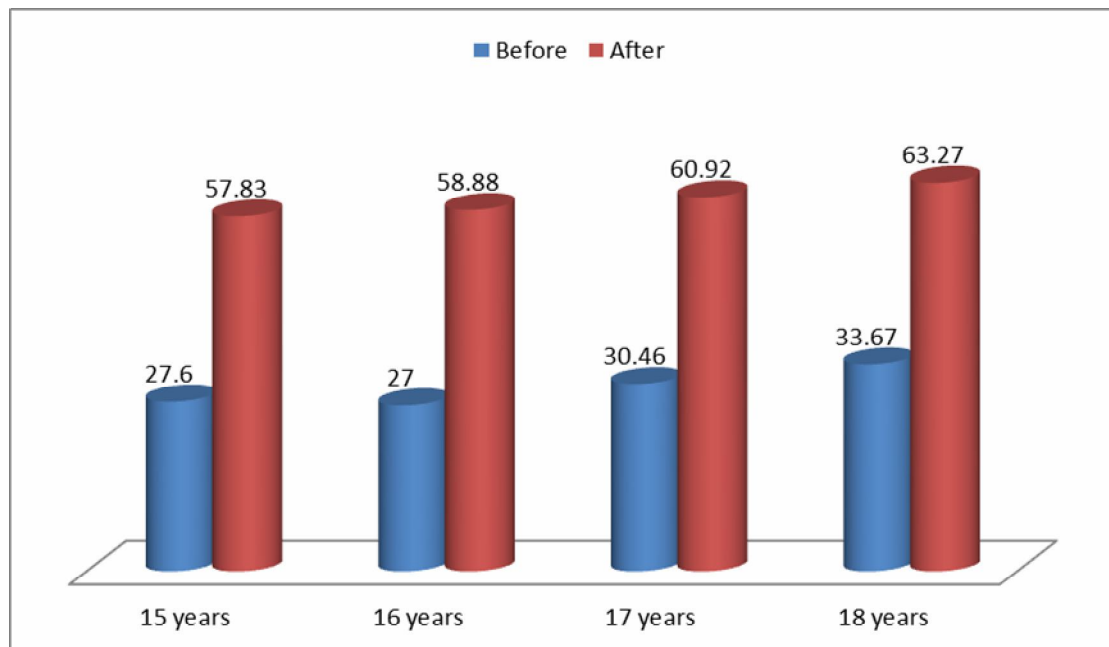


Table (4): Percentage of proper hand washing Practices done before and after the application of blood borne prevention guidelines

Hand washing Practices	Before		After		Significance test
	No	%	No	%	
1- Before touching the patient, such as helping the patient to move and performing a clinical examination	100	100.	100	100.	-----
2- Before caring for the patient, such as drawing blood and giving treatment	87	87.0	100	100.	$\chi^2=13.90$, P<0.001
3- After the risk of exposure to body fluids such as to withdraw secretions and withdrawals the blood	91	91.0	100	100.	$\chi^2=9.42$, P 0.002
4- After touching patients	81	81.0	100	100.	$\chi^2=20.99$, P<0.001
5- After touching the patient's surroundings, such as after changing the bed linen	59	59.0	95	95.0	$\chi^2=36.59$, P<0.001
6- Immediately after removing the gloves	84	84.0	100	100.	$\chi^2=17.39$, P<0.001
7- In the condition of visible soiling of the hands	82	82.0	100	100.	$\chi^2=19.78$, P<0.001
Average score (Mean \pm SD)	5.84 \pm 1.18		6.95 \pm 0.22		t=9.548, P<0.001

Table (5): Relationship between average total practices score of nursing students before and after the application of blood borne prevention guidelines and students' class

Class	No	Before	After
		Mean \pm SD	Mean \pm SD
I	35	52.61 \pm 9.29	79.00 \pm 4.64
II	28	56.94 \pm 7.71	81.64 \pm 2.75
III	37	60.94 \pm 9.23	84.81 \pm 1.45
Significance test		F = 6.651, P 0.002	F = 29.216, P<0.001

Figure (2): Relationship between average total practice score of nursing students before and after the application of blood borne prevention guidelines and students' class

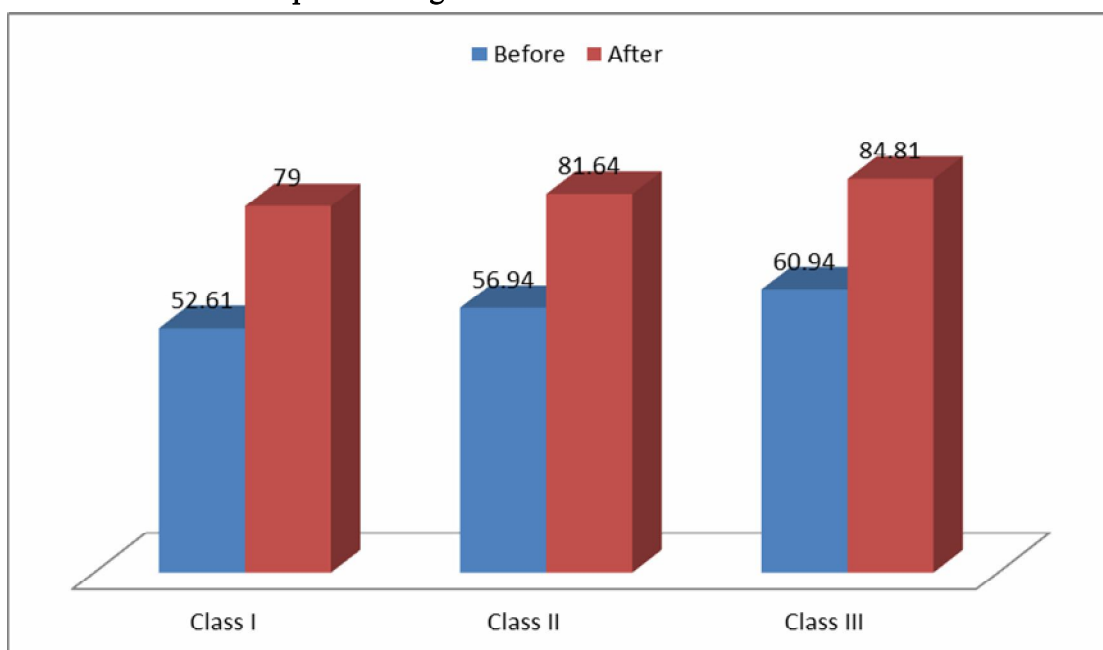


Table (6): Percentage of proper dealing with a blood spill Practices done before and after the application of blood borne prevention guidelines.

Dealing with a blood spill Practices	Before		After		Significance test
	No	%	No	%	
1- Wearing a sterile gloves	87	87.0	97	97.0	$\chi^2=6.97, P 0.009$
2- Use a spill box	50	50.0	75	75.0	$\chi^2=13.33, P<0.001$
3- Putting absorbent materials that absorb blood	65	65.0	92	92.0	$\chi^2=21.60, P<0.001$
4- Clean the area with soap and water and dry it	52	52.0	100	100.	$\chi^2=63.16, P<0.001$
5- Disinfect the area with chlorine	57	57.0	97	97.0	$\chi^2=45.17, P<0.001$
6- Leave the chlorine for 10 minutes	36	36.0	100	100.	$\chi^2=94.12, P<0.001$
7- Wash hands	59	59.0	97	97.0	$\chi^2=42.07, P<0.001$
Average score (Mean \pm SD)	4.06 \pm 1.16		6.58 \pm 0.83		t=17.429, P<0.001

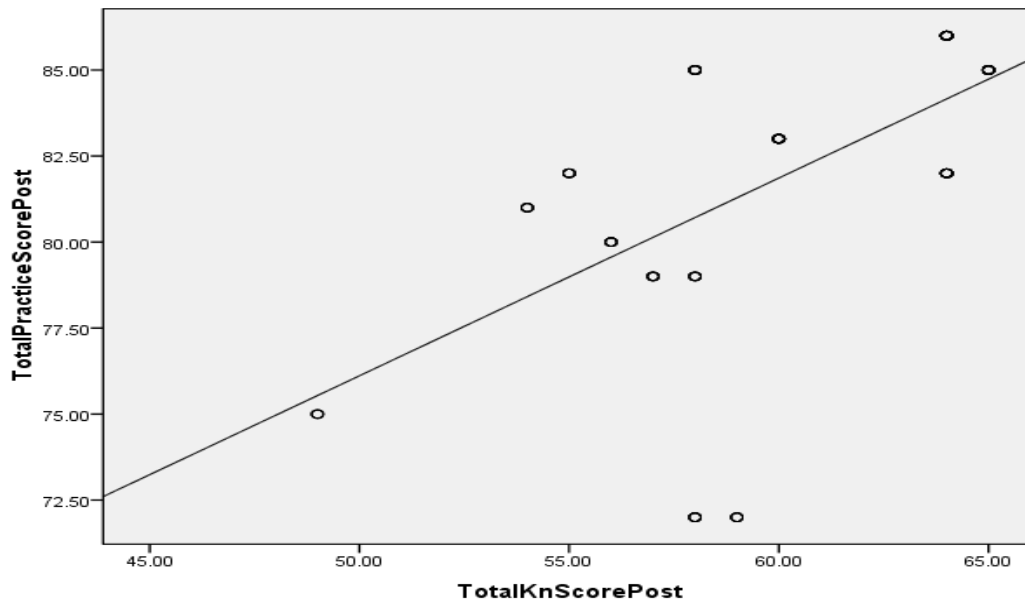
Table (7): Knowledge level before and after program

Knowledge Levels	Values	Before		After	
		No	%	No	%
Poor knowledge	< 50.0%	83	83.0	0	0.0
Average Knowledge	50.0 - < 75.0%	17	17.0	7	7.0
Good Knowledge	$\geq 75\%$	0	0.0	93.0	93.0
Significance test		$\chi^2=100.17, P<0.001$			

Table (8): Practice level before and after program

Practice Levels	Values	Before		After	
		No	%	No	%
Unsatisfactory	< 85.0%	94	94.0	9	9.0
Satisfactory	$\geq 85.0\%$	6	6.0	91	91.0
Significance test		$\chi^2=140.63, P<0.001$			

Figure (3): Total knowledge and practice scores after intervention: correlation



5. Discussion

A disease known as infection occurs when microorganisms enter the body and quickly multiply, creating harmful effects that are typically accompanied by symptoms. Disease is not necessarily brought on by infection (Ochie et al., 2022).

A blood-borne disease is spread through direct exposure to contaminated blood and other body fluids. Three Blood-borne microorganisms are cited as of primary concern to health team members mainly nurses that include [Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus] According to the (National Institute for Occupational Safety and Health, 2020).

The study aims to assess the effect of applying bloodborne prevention guidelines using mobile learning on nursing students' knowledge and practice In this study we found that the percentage of correct answers after application of the program are significantly ($P < 0.001$) higher for all items.

Ameen et al. 2019 observed that 29.0% of HCP showed good score level of knowledge with a mean of 5.54 ± 2.74 marks related to overview about blood borne pathogens before completion of web-based course. However, post debased course, 93.5% of them showed good score level of knowledge with a mean of 9.50 ± 1.23 marks. The difference was significant between pre and posttest regarding the previous item.

In this thesis we illustrated that all questions of knowledge about hepatitis B and hepatitis C, there are significant ($P < 0.001$) growth in the percentage of correct knowledge after applying preventive guidelines program. These results were supported by the results of Swetharani, 2016 who demonstrated that more than half of the nurses in the study had awareness about diseases transmitted through blood including HIV and hepatitis B as a result of awareness programs conducted in the hospital.

Abd El-Nasser, 2013 found that between pre and after educational intervention, there was a significant improvement in students' scores on various viral hepatitis-related issues. (p -value < 0.001).

In this study we cleared that there is a significant ($P < 0.001$) growth in the percentage of correct answers of the three items about standard precautions after applying the preventive guidelines program. Ali et al. 2020 found that about universal safety precaution measures in PCCU., there was marked the practice of nurses has improved immediately following completion of the educational Program for all items compared to before intervention with a highly significant difference in terms of statistics at ($p < 0.001$).

Fatma et al. 2020 found that knowledge of nurse's staff about standard precaution pre & post intervention. There was statistical significance difference (p value < 0.001) after training program than before.

In this thesis we illustrated that five out of six items about hand washing showed significant ($P < 0.001$) growth in the percentage of correct knowledge after applying preventive guidelines program. Phan et al. 2018 illustrated that the educational intervention significantly improves level of knowledge of the staff nurses about hand hygiene.

According to the 2011 study by Mohamed and Wafa, the frequency with which nurses washed their hands was low before the pretest but increased after they took part in an education program. This could be attributable to a lack of understanding of the need of washing your hands before and after procedure. In this study we demonstrated that the three items of knowledge show a significant ($P < 0.001$) growth in percentage of correct knowledge about dealing with dirty linens after applying preventive guidelines program. El-Shafey et al., 2019 found that the majority of the examined nurses had poor experience managing soiled linens prior to the program's introduction, but that percentage improved to include most of them during the program's follow-up phase.

This result is consistent with Abd El-Aziz's 2008 finding that fewer than half of the nurses in the study had enough experience handling soiled linens. Additionally, according to Gad Allah's 2007 study, the ward should use a color-coded method to separate the filthy linen. Because of possible negligence on the part of nurses or a lack of attentive supervision, linens were gathered in bags and taken to the laundry.

In this research we found that there was a considerable rise in the overall average score of knowledge of the studied students about blood borne diseases after applying preventive guidelines program. This result was consistent with **Abdel-Rasoul et al. 2016** who reported that health education interventions have successful effect in enhancing the expertise of healthcare professionals including nurses regarding transmission and prevention of HCAs, improving the risk perception and increasing compliance of universal precautions.

In this research we cleared that there was a considerable rise in the overall average score of practices of the studied students about blood borne diseases after applying preventive guidelines program in relation to the student's age. It is noticed that the average practice score increases significantly ($P < 0.001$) with increasing age after applying program **Arafa et al. 2016** found that in the univariate analysis, age was the only statistically significant factor influencing knowledge and practice scores ($P < 0.001$).

In this study we found that the total knowledge and practices correlation scores of the studied students about blood borne diseases after applying preventive guidelines program. It is found the correlation is moderate, positive and significant ($r = 0.562$, $p < 0.001$); by means with increasing knowledge score the practice score increase. **Ali et al. 2020** found that concerning the correlation between studied nurses' total practices and their total knowledge, the results of this research showed that there was favorable correlation regarding blood-borne infection control

Given the results of this study, it can be said that mobile-based learning is a successful learning method for health care professionals in different health care settings that are able to overcome traditional education obstacles. The developed mobile-based blood-borne course resulted in improvement in health care professionals' knowledge, and practice regarding blood-borne pathogens. They were satisfied with the course content and the illustration methods. It was recommended to disseminate the current mobile-based -based blood-borne course to others. It is recommended that further studies be conducted to evaluate retention in these teaching methods.

6. Conclusion

The findings of this research suggested that mobile learning was a successful method for learning method for nursing student's knowledge and practice in different care setting that are able to overcome traditional education obstacles

The present study concluded that the fulfillment of educational guidelines regarding the prevention of blood-borne infection had a significant effect on the improvement of studied student nurses' knowledge and practice for prevention of blood-borne infection, with a positive correlation between studied student nurses' total practices and their total knowledge regarding blood-borne infection prevention.

7. Recommendation

Performed routinely training guidelines for preventing blood-borne infection in current study setting annually with the beginning of the school year to know the new first grade nursing students and remind the second and third grade nursing students.

Emphasize on fulfillment of educational guidelines using mobile learning to prevent blood-borne infection in other different technical nursing school settings.

Incorporation of mobile learning courses into the continuing education system as a recognized learning method that could enhance health care staff knowledge and practice.

Increase awareness of nursing students on the risk of bloodborne diseases and its complications.

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