

Nurses' Perception Regarding the Use of Technological Equipment in the Critical Care Units

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Abstract: A critical care unit is a high-technology environment. The use of technological devices can ensure better outcomes for patients' health and decrease morbidity and mortality. The critical care nurse needs not only to be aware of what benefits the technology holds for the patient, but also what adverse effects. The aim of the study is to assess the nurse's perception regarding the use of technological equipment in Critical Care Units. A descriptive study research design used in this study; this study was conducted in the critical care units of Main University Hospital in Alexandria, A convenient sample of all bed side nurses -102 nurses- who are working in this unit, and were available at the study time. Nurse's perception questionnaire regarding the use of technological equipment in Critical Care Units was used in this study. The results of this study revealed that nurses who work in critical care areas of Main University Hospital in Alexandria identified all positive aspects of using technological equipment and were not aware about most of the negative aspects of using technology. It is recommended courses about contemporary aspects of technology should be added to both pregraduate and continuing education. Further researches needed for investigate effect of the nurses' perception about using technology on patients.

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1. Introduction

An Intensive Care Unit (ICU) or Critical Care Unit (CCU) is a specialized department in a hospital that provides intensive care medicine and nursing, and it is place where the challenge of machine technology in nursing is greatest. In these settings, machines provide life support to patients and are vital to patient care management. The development of intensive care units made the care for more seriously sick patients possible. It allows utilizing more technically oriented tools to monitor and get information instantly about any changes of the patient's physiological parameters and developed new strategies to save life to the critically ill patient who is characterized by the presence of real or potential life-threatening health problems and by the requirement for continuous observation and intervention to prevent complications and restore health (1- 4).

Technology has been defined as interaction of people and tools to achieve some human purpose, technological developments become incorporated into nursing practice where nurses found that close observation could be accomplished through the use of screen technologies such monitors and with it nurses no longer need to be physically present at the patient's side in order to observe the patient. Technology can help to limit the effects of a shortage by encouraging efficiency in scheduling, medication administration, and clinical

decision support. With new technologies there will be an increase in data in the critical care environment, and the nurse must function as a critical decision maker integrating complex information. Benefits of the ICU technology include a reduction in mortality and morbidity as well as a decreased length of stay, and the presence of up-to-date technology helps in recruiting and retaining high quality ICU staff (5- 7).

Development of technology in health care has led to the growth of critical care facilities which have helped many individuals survive illness. On the other hand, new treatment modalities and technology may negatively affect the quality of care and positive outcome, whereas, they may produce many challenges to the critical care nurse. When approaching the individual as a whole, one of the major challenges that can face the critical care nurse is to be competent in both using a wide range of technological devices, many of them are necessary for life support, and meeting the patient needs (8, 9).

Technology creates challenges and crises for nurses and nursing. That is technology may dehumanize the caring of the patients. This means that technology may constitute a risk those patients will not be perceived as human beings in such a technological environment as ICU (10, 11). Some nurses have linked dehumanization with clinical environments characterized by standardization, the two palpable and audible presence

of machinery and equipment, and by the treatment of patients as extensions of that machinery⁽¹²⁾.

For many of us technology is still something nurses must work with, work around, or work hard to make compatible with, or supportive, nursing care. To this end, we have encouraged developing an ethical awareness, in order to temper the effects of technology but before that we need to assess the current perception about the effect of using technology in ICU; for this purpose this study was done.

2. Material and Methods

Design:

A descriptive study research design

Setting:

The study was conducted at the Intensive Care Units of Alexandria Main University Hospital namely; General, Casualty, Chest Intensive Care Unit, Coronary Care Unit, Open Heart Surgery Intensive Care Unit, and Neurosurgery Intensive Care Unit.

Subjects:

A convenient sample comprised (102) ICU nurses who have experience in Critical Care Units for two year or more.

Study tool:

Nurse's perception questionnaire regarding the use of technological equipment in Critical Care Units: this tool was developed by the researchers based on extensive review of related literature (11, 13, 14). It was composed of three parts:

Part 1: Socio-Demographic data form.

Part 2: Perception about the positive aspects of using Technology.

Part 3: Perception about the negative aspects of using Technology.

Likert scale scoring method was used; the stated items inquire the nurse's perception on five points Likert scale. As one (strongly disagree), two (disagree), three (uncertain), four (agree), and five (strongly agree). The tool was tested for content validity by 7 expert nurse educators from the Faculty of Nursing in Alexandria University. The tool was also tested for reliability by test-retest technique; the correlation coefficient was (84 %). A pilot study was carried out on 5 nurses in the previously mentioned settings to test the feasibility and clarity of the tool.

Data collection

After obtaining approval to conduct the study from the responsible authorities of the Alexandria Main University Hospital; the data was collected by using the nurse's perception questionnaire from nurses who were working in the critical care units of Main University Hospital in Alexandria, those nurses have two years or more experience in ICU. The data was collected within about two months. Nurses completed the questionnaire after taking their informed consent and after explaining the purpose of the study, and confidentiality and privacy were assured.

Statistical analysis:

- Statistical analysis were conducted using PC with the software SPSS (Statistical Package for Social Science), version 13.0.
- The 0.05 level and 0.01 level were used as the cut off value for statistical significance to assess significance of the result. Fisher's Exact Test (in case of chi Square test is not valid); was used to compare qualitative variables.

3. Results:

Regarding age 59.80% of the studied nurses were in the age group <25 years, and 32.40% in the age group 25-35 years and only 7.80% in age group >35, In relation to critical care experience about 51.00% have experience more than five years and 49.00% have experience 2-5 years. In relation to unit of employment; about 21.60% of studied group work in the General Intensive Care Unit, 17.60% work in Chest Intensive Care Unit, and 17.60% work in Neurosurgery Intensive Care Unit. In relation to educational level about 42.20% of studied group have Bachelor degree, 41.20% have diploma degree. In relation to receiving training on ICU technology about 84.30% received training on ICU technology (Table I).

Nurses who work in critical care areas of Main University Hospital in Alexandria identified all positive aspects of using technological equipment and some of the negative aspects of using technology. While nurses were not aware about most of the negative aspects of using technology as: using technological equipment increase patient risk from improper handling of equipment and misinterpretation of data provided by machines, using technological equipment extract attention and time from patients, technological equipment leads to loss of human sensitivity about patients...(Tables; II,III).

Table (I): Frequency distribution of sociodemographic characteristics

| Variables | N. | % | |
|----------------------------|--|-----|---------|
| Age | <25 | 61 | 59.80% |
| | 25-35 | 33 | 32.40% |
| | >35 | 8 | 7.80% |
| | Total | 102 | 100.00% |
| Critical care experience | 2-5 years | 50 | 49.00% |
| | >5 years | 52 | 51.00% |
| | Total | 102 | 100.00% |
| Unit of employment | General intensive care unit (Unit III) | 22 | 21.60% |
| | Casualty care unit (Unit I) | 13 | 12.70% |
| | Coronary care unit(CCU) | 15 | 14.70% |
| | Chest intensive care unit | 18 | 17.60% |
| | Open heart surgery intensive care unit | 16 | 15.70% |
| | Neurosurgery intensive care unit | 18 | 17.60% |
| | Total | 102 | 100.00% |
| | Total | 102 | 100.00% |
| Educational level | BSc nurses | 43 | 42.20% |
| | Technical Institute of Nursing | 17 | 16.70% |
| | Technical Nursing Secondary school | 42 | 41.20% |
| | Total | 102 | 100.00% |
| Training on ICU technology | YES | 86 | 84.30% |
| | NO | 16 | 15.70% |
| | Total | 102 | 100.00% |

Table (II): Frequency distribution of the nurse's perception regarding the positive aspect of using technology

| A. Positive aspect of using technology on patient. | Strongly disagree | | Disagree | | Uncertain | | Agree | | Strongly agree | |
|--|-------------------|-------|----------|--------|-----------|--------|-------|--------|----------------|--------|
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Higher care effectiveness | 7 | 6.90% | 6 | 5.90% | 13 | 12.70% | 30 | 29.40% | 46 | 45.10% |
| Technological equipment directs and controls medical treatment. | 1 | 1.00% | 8 | 7.80% | 15 | 14.70% | 31 | 30.40% | 47 | 46.10% |
| Higher patient safety through prompt and proper recognition of complications. | 1 | 1.00% | 9 | 8.80% | 20 | 19.60% | 25 | 24.50% | 47 | 46.10% |
| Technology makes treatment more secure. | 1 | 1.00% | 9 | 8.80% | 20 | 19.60% | 25 | 24.50% | 47 | 46.10% |
| B. Positive aspect of using technology on nursing practice, knowledge and skill. | Strongly disagree | | Disagree | | Uncertain | | Agree | | Strongly agree | |
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Easy completion of nursing duties. | 3 | 2.90% | 8 | 7.80% | 18 | 17.60% | 36 | 35.30% | 37 | 36.30% |
| Faster completion of nursing duties. | 5 | 4.90% | 4 | 3.90% | 19 | 18.60% | 40 | 39.20% | 34 | 33.30% |
| Improves nurse's knowledge and skill. | 2 | 2.00% | 7 | 6.90% | 16 | 15.70% | 41 | 40.20% | 36 | 35.30% |
| Requires high-technical skills. | 1 | 1.00% | 13 | 12.70% | 16 | 15.70% | 38 | 37.30% | 34 | 33.30% |
| Technology enhances patient care. | 7 | 6.90% | 9 | 8.80% | 15 | 14.70% | 36 | 35.30% | 35 | 34.30% |
| C. Positive aspect of use technology on nurse. | Strongly disagree | | Disagree | | Uncertain | | Agree | | Strongly agree | |
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Increase prestige of nurses. | 3 | 2.90% | 20 | 19.60% | 25 | 24.50% | 23 | 22.50% | 31 | 30.40% |
| Technological equipment is the eyes and hands of nurse. | 10 | 9.80% | 27 | 26.50% | 15 | 14.70% | 25 | 24.50% | 25 | 24.50% |

Table (III): Frequency distribution of the nurse's perception regarding the negative aspect of using technology.

| A. Negative aspect of use technology on patient | Strongly disagree | | Disagree | | Uncertain | | Agree | | Strongly agree | |
|---|-------------------|--------|----------|--------|-----------|--------|-------|--------|----------------|--------|
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Increase patient risk from improper handling of equipment. | 13 | 12.70% | 32 | 31.40% | 30 | 29.40% | 23 | 22.50% | 4 | 3.90% |
| Increase patient risk from misinterpretation of data. | 12 | 12.10% | 31 | 31.30% | 28 | 28.30% | 24 | 24.20% | 4 | 4.00% |
| Focusing of interest on equipment and technical skills. | 26 | 25.50% | 44 | 43.10% | 17 | 16.70% | 12 | 11.80% | 3 | 2.90% |
| Ignoring physical needs of patients. | 28 | 27.50% | 43 | 42.20% | 16 | 15.70% | 12 | 11.80% | 3 | 2.90% |
| Technology extracts time from patients. | 21 | 20.60% | 37 | 36.30% | 26 | 25.50% | 14 | 13.70% | 4 | 3.90% |
| Using technology leads to loss of human sensitivity about patients. | 26 | 25.50% | 39 | 38.20% | 20 | 19.60% | 9 | 8.80% | 8 | 7.80% |
| B. Complexity using technology | Strongly disagree | | Disagree | | Disagree | | Agree | | Strongly agree | |
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Nurse must be competent in managing technology and interpreting technological data. | 1 | 1.00% | 10 | 9.80% | 8 | 7.80% | 35 | 34.30% | 48 | 47.10% |
| Increase overall hospitalization cost. | 7 | 6.90% | 19 | 18.60% | 29 | 28.40% | 32 | 31.40% | 15 | 14.70% |
| Technology is complicate and not easy to handle. | 26 | 25.50% | 46 | 45.10% | 18 | 17.60% | 9 | 8.80% | 3 | 2.90% |
| Technology can create ethical dilemmas. | 36 | 35.30% | 31 | 30.40% | 23 | 22.50% | 7 | 6.90% | 5 | 4.90% |
| C. Negative aspect of use technology on nurse and nursing care. | Strongly disagree | | Disagree | | Uncertain | | Agree | | Strongly agree | |
| | N. | % | N. | % | N. | % | N. | % | N. | % |
| Increase nurse's psychological stress. | 12 | 11.80% | 35 | 34.30% | 15 | 14.70% | 30 | 29.40% | 10 | 9.80% |
| Importance to take a vacation regularly from ICU. | 10 | 9.80% | 16 | 15.70% | 13 | 12.70% | 36 | 35.30% | 27 | 26.50% |
| Technology restricts autonomy of nurses in making decision. | 17 | 16.70% | 27 | 26.50% | 28 | 27.50% | 21 | 20.60% | 9 | 8.80% |
| Technical tasks have downgraded the nursing profession. | 28 | 27.50% | 47 | 46.10% | 18 | 17.60% | 5 | 4.90% | 4 | 3.90% |
| Technology and machines often interfere with providing adequate nursing care. | 34 | 33.30% | 38 | 37.30% | 18 | 17.60% | 9 | 8.80% | 3 | 2.90% |

Also statistical significance relation was found between nurses' experience and positive aspects of equipment use such as "technology produce higher patient safety (P= 0.021), increase prestige of nurses with technology (P= 0.017) ". And with negative aspects of equipment use as "nurse must be competent in managing technological equipment and interpreting technological data (P= 0.030), technological equipment is complicate and not easy to handle (P= 0.039)".

Current study demonstrated statistical significant relation between unite of employment and all positive aspects of equipment use except " technology requires high-technical skills". And with all negative aspects of equipment use except " using technological equipment extract attention and time from patients, technological equipment restricts autonomy of nurses in making decision, technological equipment leads to loss of human sensitivity about patients, and the increase in technical tasks has downgraded the nursing profession".

Also statistical significant relation was found between level of education and positive aspects of technological equipment use "higher care effectiveness, controls medical treatment, higher patient safety, faster and easy completion of nursing duties, increase prestige of nurses, technological equipment requires high-tech skills (P= 0.000), and enhances patient care (P= 0.013)". And with negative aspects of equipment use " nurse must be competent in managing technological equipment and interpreting technological data (P= 0.001), it is important to take a vacation regularly from ICU pressure technology (P= 0.014), technological equipment increase overall hospitalization cost (P= 0.006), the increase in technical tasks has downgraded the nursing profession (P= 0.027), and technology often interferes with providing adequate nursing care (P= 0.025) ".

Also statistical significant relation was found between receiving training on technology and positive aspect of using technology "controls medical treatment (P= 0.002), higher patient safety (P=0.030), technological equipment requires high-tech skills (P=0.011), and enhances patient care (P=0.018)". And with negative aspects of equipment use "nurse must be competent in managing technological equipment and interpreting technological data (P=0.021), and importance to take a vacation regularly from ICU pressure technology (P=0.012) ".

4. Discussion

Critical care nursing has expanded beyond the walls of this traditional critical care units. Along with caring for critically ill patients, technology is part of the ICU staff's everyday life. Tools are useful, but technology can never replace the closeness and empathy of the human touch^(15, 16). So nurse in ICU need to recognize the positive and negative aspect of using technological equipment and therefore, this study conducted to assess

the nurse's perception regarding the use of technological equipment in Critical Care Units.

The studied group was asked about "higher care effectiveness with technology", "technology direct and controls medical treatment" and about " technology produce higher patient safety"; near half of the studied group are strongly agreed on this statements, this results may be related to nurses' daily experiences with technology, that provide them with accurate information about patients and help in controlling treatment; this will provide them sense of safety for patients. This results are supported by **Kiekkas et al.**,⁽¹³⁾ & **Wikstrom et al.**,⁽¹¹⁾ ,who found that nurses who are working in critical care areas of Greece identified the positive effects of equipment use, as more effectiveness, safer patient care, and direct patient care and considered technology decisive as it directs and controls medical treatment and it make treatment more secure.

Current study findings show positive perception toward positive aspect of using technology like "easy and faster completion of nursing duties". This is because in the presence of technology; nurses will be more able to work with several patients at the same time. Also nurses agreed that "technology improve nurse's skills and knowledge" because new machinery force nurse to accept more knowledge and skill to help them in dealing and interpretation of technical data. Nurses also agreed on "technology enhances patient care" which is related to nurses' belief that technology improves their knowledge and skills that lead to better care outcomes. **Walters**,⁽¹⁷⁾ support the current study result that technology improve nurse's skill. **Noh et al.**,⁽¹⁴⁾ in their study included Korean nurses; high technology requires high- tech skill, mastery of technology has helped nurses control their work environment, technology enhances patient care and well-being". There are these results in same line with current study findings.

Also in the present study findings; positive perception elicited toward the statement "technology increase prestige of nurses". This may be due to improving the image of nurse in front of patient and family because nurses know and work with unknown things to them; but it is stand in opposite to **Kiekkas et al.**,⁽¹³⁾ who found that nurses disagreed that devices could increase their prestige. Also positive perception was found toward the statement "technology is the eyes and hands of nurses" this may be related to their belief that technology direct and controls medical treatment. But this finding stand in the line with **Sandelowski**,⁽¹⁸⁾ who found that nurses see technology as offering a better way to see, hear, feel, care, and otherwise accomplish the purposes of nursing.

Current study findings illustrated nurses disagreement on that technology increase patient risk from improper handling of equipment or misinterpretation of data; this may be related to that nurses were not aware of this risks or not exposed to them, this finding are in contrast with **McConnell & Murphy**⁽¹⁷⁾ who found that increase in the number and complexity of equipment can easily lead to human errors, and overestimation of machine capabilities and a sense of safety may decrease personnel's awareness.

Nurses also disagreed that technology cause focusing of interest on equipment and technical skills and ignoring physical needs of patients, this clarify that nurses are able to manage technology and carry out routine care and this appear in agreement that technology provide higher care effectiveness, easy completion of nursing duties and faster completion of nursing duties. **Kiekkas et al.**,⁽¹³⁾ finding supported the current study finding that the majority of their studied group disagreed that technology extract attention and extract times from patient and also this stand in the same line of the current study findings that nurses disagree that "technology may extract time from patient". This result may be related to nurses' beliefs that technology provides faster completion of nursing duties and save patient time.

Nurses in current study disagree that "using technology leads to loss of human sensitivity about patients", this may be due to nurses' refuse toward "technology cause focusing interest on equipment and technical skills and ignoring physical needs of patients"; nurses focusing on humanity of patient not on machine. This finding was supported by **Barnard**⁽¹²⁾ who said that the power any technology exerts derives from how it acts in any given situation and from its meaningfulness. However in other side **Dean**⁽¹⁹⁾ show that high-tech environments dehumanize patients within them, and cause stress for patients, their families and nursing staff.

Current study revealed positive perception toward the importance of nurses' competence in managing technology and interpreting technological data. This result is consistent with nurses' perception that technology improve nurse's skill and knowledge and this finding is emphasized by **Alasad**⁽²⁰⁾ who found that technological competence which is required from the critical care nurses is seen as essential to their practice. In developing their technological competence, critical care nurses have to cope with the intellectual, physical and technical demands of the different machinery in the critical care unit.

In regards to "technology increase overall hospitalization cost"; the majority of participants demonstrated agreement, this may be due to high cost of technical equipment but this depend on equipment

needed by medical and nursing staff. Disagreement toward "technology is complicate and not easy to handle". And toward "technology can create ethical dilemmas", in the current study findings it may be related to nurses sense of control and direct medical treatment and feeling of more patient' safety, **Wikstrom et al.**,⁽¹¹⁾ findings stand in opposite to current study findings that technology can complicate the staff members everyday practice as it is not completely trustworthy, it is not easy to handle and may cause ethical dilemmas.

Considering nurses' perception regarding increasing nurse's psychological stress in technical environment; the current study illustrated disagreement. This may be related to their beliefs of positive aspects of technology and their refuse that technology can cause risk to patient. **Alasad**⁽²⁰⁾ finding wasn't supporting the current study finding found that technological competence which is required from the critical care nurses is seen as essential to their practice. However, the nurses gain this competence after they have experienced a high degree of stress and fear trying to come to terms with this technological environment. Furthermore, nurses in current study agreed on the importance to take a vacation regularly from ICU, this finding stand in opposite to previous finding refers to disorientation toward technical environment that cause stress toward nurses and patient. On the other hand this finding is supported by **Wassif**⁽²¹⁾ finding support nurse's need for vacation.

In relation to nurses' perception regarding "technology restricts autonomy of nurses in making decision", nurses disagreed; this may be due to lack of experience in making decision because of the presence of decision making in hand of other health personnel.

Nurses disagreed toward "technical tasks have downgraded the nursing profession", this may be related to nurses' trust with technology that appeared in agreement that technology enhance patient care, and in nurses' reject that technology causing risk, complicate and may cause ethical dilemma. Current study also demonstrates disagreement that "technology and machines often interfere with providing adequate nursing care". This related to their belief that technology enhances patient care. **Noh et al.**,⁽¹⁴⁾ results supported the current study finding; that the lowest scores were found toward increase technical tasks has downgraded the nursing profession also toward technology and using machine often interferes with providing adequate nursing care.

Considering the current study findings it revealed a statistically significant correlation between positive aspects of using technology in ICU and demographic characteristic. Regarding to nurses' experience in ICU the current study show statistical significant relations; the

results illustrated that positive perception regarding "technology produce higher patient safety" increased significantly among the nurses who had experience in ICU 2-5 years. Those also agreed on "technology increased prestige of nurses "; this may be related to their trust with technology and with their ability to dealing with technology.

Furthermore, current study revealed statistically significant correlations between negative aspects of using technology in ICU and demographic characteristic. As regards to nurses' experience the results show that the nurses who had experience in ICU 2-5 years their perception increased significantly regarding "nurse must be competent in managing technological equipment and interpreting technological data", while those also disagreed that technological equipment is complicate and not easy to handle. This may be due to their perception that technology provides more safety to patient and their trust with their ability to dealing with technology.

In relation to the level of education; results show statistical significant difference, as the majority of agreement toward the statements "technology produces higher care effectiveness, technology directs and controls medical treatment, technology produces higher patient safety using technology provides faster and easy completion of nursing duties. Using technology increase prestige of nurses, technological equipment requires high-technical skills, and technology enhances patient care" were among nurses who had bachelor degree; this may be due to the advanced knowledge they received which make them more understanding of technology and more orientated to the positive aspects of using technology. **Johnson**⁽²²⁾ in his study on differences in the performances of baccalaureate, associate degree, and diploma nurses: The results indicated significant differences between professional (BSc) and technical (associate degree and diploma) nurses on measures of nurse performance. Measures resulting in larger effects for professional nurses included knowledge, problem-solving, and professional role, this stand in the same line with the current study findings.

Also statistical significant relations between the level of education and perception regarding negative aspects of using technology; the results revealed that majority of agreement toward " nurse must be competent in managing technological equipment and interpreting technological data, it is important to take a vacation regularly from ICU pressure technology, and technological equipment increase overall hospitalization cost "; appeared among nurses who had bachelor degree, this can be interpreted by their advanced knowledge they received which make them more understanding of technology. Nurses who disagreed toward "increase in technical tasks has downgraded the nursing profession,

and technology often interferes with providing adequate nursing care" were have bachelor degree, because their knowledge make them trust with their ability to caring.

Furthermore, the relation between receiving training on technology and perception regarding positive aspects of using technology were statistically significant toward the statements "technology directs and controls medical treatment, technology produces higher patient safety, technological equipment requires high-technical skills, and technology enhances patient care". Results illustrated that the majority of nurses' agreements toward these items increased among nurses who received training on technology; this may be related to improved experience regarding technology by training. Therefore training programs improve their perception. **O'Connell et al.**,⁽²³⁾ in study on the training needs of Intensive Care Unit nurses to use computerized equipment demonstrated that nurses' level of confidence in using computerized technologies was clearly related to their years of experience.

Concerning the relation between receiving training on technology and perception regarding negative aspects of using technology; perception increased significantly toward the statements "nurse must be competent in managing technological equipment and interpreting technological data, and it is important to take a vacation regularly from ICU pressure technology ", among nurses who receiving training on technology. This may be due to improving skills and competence by training programs; this is supported by **Huggins**⁽²⁴⁾ who found that critical care nurses need to acquire knowledge and skills through lifelong learning process to maintain competence. On the other hand improving competence in dealing with technology will improve nurses' awareness about its effects on nurses and their need for vacation.

Conclusion

Based on the findings of the current study, it can be concluded that:

Nurses who are working in critical care areas of Main University Hospital in Alexandria identified all positive aspects of using technology. Also nurses were not aware about most of negative aspects of using technology. Also findings of the current study demonstrated statistical significant relation was found between nurses' experience, level of education and receiving training on technology with nurses' perception regarding most of positive and negative aspects of using technology.

Recommendations:

Based on the results of the study have been proposed following recommendations:

1. Courses about contemporary aspects of technology should be added to both pregraduate and continuing education, and provide training program to update critical care nurses' knowledge and skills about technology.
2. Hospital administrators should be aware of positive and negative aspects of using technology; and give adequate orientation about it to nurses and to maintain balance between technical tasks and nursing care in order to maintain profession of nursing.
3. Further researches needed for investigate effect of the nurses' perception about using technology in ICU.

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