

Assessing Nurses' Attitudes toward the Use of Modern Technology to Care for Patients at Selected Public and Private Hospitals, Benin-City, Nigeria, 2020

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Abstract

Background: Modern technology in nursing practice is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to solve a health problem and improve quality of lives, but the compliance to the utilization of this new technology is still very low, especially in developing countries. It is therefore imperative to identify their fear and worries concerning the use of modern technology to care for patients. Consequently, this study objective is to assess the nurses' attitudes toward the use of modern technology to care for patients at Selected Public and Private Hospitals, Benin-City, Nigeria. **Materials and Methods:** A descriptive cross-sectional survey was conducted with stratified sample technique to select 250 nurses from three selected hospitals in Benin-City, Edo State. A self-structured questionnaire with open and Likert scale questions used as instrument was administered to assess the nurses' attitudes toward the use of modern technology to care for patients. Data collected were analyzed using tables, percentages, means, and standard Deviation at 0.05 level of significance, through Statistical Package for Social Sciences software. **Results:** The result showed mean score of 2.23 (1.29) toward nurses' attitudes about the use of modern technology to care for patients. This study also revealed the barriers and the benefits of its adoption. **Conclusion:** The adoption of these technologies would be very easy as the attitude toward the adaptation is relatively high among nurses, if all the identified barriers and limitations are properly managed.

Keywords: Attitude, barrier, benefits, modern technology, nurses

INTRODUCTION

Modern technology in nursing practice is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives.^[1,2] Implementation of modern technology in health care has become a global trend.^[3,4] The effect of global changes, especially, the arise of new diseases like Coronavirus, Ebola virus, Lassa fever and so on, has led to the increase in the development of technologies in nursing practice, to combat with the new challenges.^[5-7] Nurses in everyday work encounter with the application of new gadgets, instruments,

and other modern technologies used for patients' care.^[8] The implementation of modern technology in nursing practices increases nurses' efficiency, but it is also changing the way of care for patients.^[9-11] The use of Modern technology is one of the major components of basic competency areas in nursing practice.^[12] This has the potential to improve the health of patients and the performance of nurses, yielding improved quality, cost savings, and greater engagement by patients in

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their own health care.^[13] In Africa, despite emphasis being placed on the use of technology to improve patient's care and safety in addressing care problems, modern technology is not being utilized or less utilized.^[14] Only about 26% of nurses use modern technology in treating their patient and only a small percentage of the nurses demonstrated good knowledge of computers and IT, hence there is the suboptimal utilization pattern of modern technology in nursing practice.^[15] The fact that nurses by virtue of their profession had better training opportunities in the use of new gadget did not translate into better knowledge and utilization habits.^[16] A study in the Eastern Cape province of South Africa, which is one of the poorest provinces in the country with vast rural areas.^[17] A modern technology system was implemented in the province in order to improve health care services, but despite large investments from the National Department of Health, only one third of the modern technologies in the province are operational.^[17] Technological problems, such as unreliable electricity supply and low bandwidth, were identified as barriers to the successful implementation of modern technologies in South Africa, but these issues have since been addressed. Nevertheless, the uptake of modern technologies remains poor.^[17,18] Another study in Nigeria, the most populated nation in Africa, found that the knowledge of the health professionals on modern technology was poor, though majority of them were in support of the services.^[19,20] Therefore, there is the need to intensify training workshops for health professionals and more research in the field.^[21,22] The compliance of nurses to the use of this new technology is still very low especially in developing countries, where most of them feel incompetent and uneasiness especially in the clinical area, post a major threat to the safety of patients, safety of energy and time for patient and health providers, the survival of patients and safety of health-care workers.^[23,24] Based on this noted gap or problems, this study want to assess nurses' attitudes toward the use of modern technology in caring for patients in selected Hospitals, Benin-City, Nigeria.

MATERIALS AND METHODS

A descriptive cross-sectional survey was conducted with stratified probability sampling method through different wards of the hospitals. The population of interest in this study comprises all trained nurses in the selected hospitals who currently working in the clinical areas. The sample size was determining using Taro Yamane method of sample size calculation according to the formula, $n = \text{sample size}$, $e = \text{margin of error} = 0.05$, with confidence level of 95%. A sample size of 250 nurses were selected, and the setting was 150 nurses from university of Benin Teaching hospital, 70 nurses from Edo State central Hospital and 30 nurses from Faith Mediplex Hospital.

The Inclusion criteria were as follows: Nurses who were willing to participate in the study and who consented after carefully going through the detailed procedure of bioethical principles in conducting research studies on human participants. The exclusion criterion was any nurses who were, working in

the theatre recovery room as at the time of the research were excluded, to avoid distraction in taking care of the critical ill patient in their care.

A self-structured questionnaire was developed, using items from published questionnaire that was modified and developed specifically for the purpose of this study. The instrument had 30 items with score ranging from SA = Strongly agree, A = Agree, D = Disagree, SD = Strongly disagree. The 4-point Likert scale method and open-ended question was adopted. The questionnaire was assessed and scrutinized by an expert to verify the content validity ensuring the items measured what is ought to measure. In order to ensure the reliability of the questionnaire, the split-half method was used as an indicator of the instrument stability and consistency. This was done by administering the questionnaire to 10 respondents in Stella Obasanjo Hospital. A correlational score (s) of 0.76 was obtained showing a high level of reliability of the instrument. The researchers personally administered the questionnaire to the nurses at random at the University of Benin Teaching Hospital, Benin City, Edo State central Hospital and Faith Mediplex Hospital. The researchers were present during the filling of the questionnaire for correction as well as clarity and achieved 100% return of questionnaire.

Ethical approval for this study was obtained from university of Benin teaching hospital ethical committees where the study took place, with approval reference ADM/E/A/VOL. VII/148178 on October 30th, 2019 and permission was also obtained from the other hospitals. In line with the Belmont report, the researcher strived to do no harm to participants. Consent form was given to the participants to seek written consent, and verbal consent was also taken before data collection. Participants were not being exploited financially and physically.

Data obtained were coded and analyzed using the Statistical Package for Social Sciences version 21.00 statistical software (IBM Corp., Released 2012. IBM SPSS statistics for widows, version 21.0 Armonk, NY, USA: IBM Corp). Variables and research questions were analyzed using frequencies, percentage, mean and standard deviation statistics.

RESULTS

Demographic characteristics of nurses in total from selected hospitals are reported in Table 1: The statistics regarding nurses age 31 (12.4%) were in age group of 18–25 years, 198 (79.2%) were in age group of 26–35 years, 15 (6.0%) were in age group of 36–45 years, 6 (2.4%) were in age group of 46 years and above, means of 30.50 years \pm 6.33 years of all the respondents, we found that 82.0% are female and 18.0% male. As for the religion, 72.0% of the nurses are Christian and only 28.0% are Muslim; this is because this study was done in Christian dominated part of the country. With regard to academic qualifications, the largest percentage of nurses have bachelor degree in nursing or in health education, while only about 0.8% of the nurses had doctorate degree in nursing

Table 1: Demographic characteristics of Nurses in Selected Hospitals, Benin-City, Nigeria (n=250)

Variables	Attributes	Frequency (%)
Age group (years)	18-25	31 (12.40)
	26-35	198 (79.20)
	36-45	15 (6.00)
	46 and above	6 (2.40)
	Mean±SD	30.50±6.33
Gender	Male	45 (18.00)
	Female	205 (82.00)
Religion	Christianity	180 (72.00)
	Islam	70 (28.00)
Academic qualification	RN	5 (2.00)
	RM	3 (1.20)
	RN and RM	40 (16.00)
	BNsc	180 (72.00)
	Msc	20 (8.00)
Ranks	PhD	2 (0.80)
	ADNS	5 (2.00)
	CNO	20 (8.00)
	ACNO	35 (14.00)
	SNO	50 (20.00)
	No 1	60 (24.00)
	No 11	80 (32.00)
Years of experience	Below 5	80 (32.00)
	11-15	110 (44.00)
	16-20	35 (14.00)
	21-25	12 (4.80)
	26-30	8 (3.20)
	31-above	5 (2.00)

practice or doctor of philosophy degree in nursing. Moreover, regarding the rank, more than half of the nurses (56%) in the hospital fall between the rank of nursing officer 11 (NO11) and nursing officer 1 (NO1), while about 44% of the nurses fall into the rank of senior nursing officer (SNO) and above. This is because most nurses travelled abroad seeking for greener pasture before they were promoted to SNO ranks. As for year of experience, the highest percentage (58%) of the nurse had <20 years working experience, while less than half of the nurses (44%) had 20 years and above experience in their respective area of specialization.

Attitude of nurses toward adoption of modern technology is reported in Table 2: It shows an overall positive perception of adoption of modern technology with a means score of 2.23 (1.29).

Barriers toward adoption of modern technology among nurses is reported in Table 3: It shows the followings as barriers: Increases the work load for nurses 2.86 (1.66), high cost of modern instruments and equipment 3.38 (1.96), lack or poor supply of electricity require to power the instruments 3.99 (2.31), complexity of most modern instruments 2.88 (1.67), lack of competent personnel for maintenance of most of the instruments 2.14 (1.24), associated with risk

of injury 2.14 (1.24), and lack of self-confident and fear of unknown 2.80 (1.62). This is because most of them were not taught how to use the new instrument in their various schools of nursing. At the same time, this study disagreed with the fact that modern technology is time consuming 1.04 (0.60), enhances violation of patient privacy 1.86 (1.08) and associated with high degree of error was faulted.

Furthermore, the benefits of modern technology in nursing practice was also reported in Table 4: This study identified the following as benefits of using the modern technology to care for patients: It ease the workflow with mean score of 3.22 (1.87), reduces health care cost 3.34 (1.94), improve data storage 2.51 (1.46), increases accessibility to big data at a time 2.50 (1.45), it improves health coverage 2.14 (1.24), improved public health status 2.14 (1.24) and also improve patient outcome 2.50 (1.45). On the other hand, the finding of this study also disagreed with the fact that modern technology improves communication among nurses 1.31 (0.76) and open up more jobs 1.62 (0.94) because the nurses in the area believe that technology could take over their responsibilities and rendered the nurses jobless.

DISCUSSION

Attitude in a general sense is seen as intensity and direction of the sum total of a person's inclinations, feelings, prejudices or bias, conceived notions, ideas, fears, and other convictions that can either persuade or discourage one from repeating an activity or adopting a new methods. This study shows that nurses have positive perception about adoption of modern technology in nursing practice. This is in agreement with a study carried out in Singapore in 2011 to explore nurses' awareness, knowledge, and attitude toward adoption of modern technology in nursing practice, and found that More than 64% of the nurses expressed a positive attitude toward the use of modern technology.^[25] On the contrary to the findings of this study; A study carried out in Dutch hospitals, on Successful implementation of new technologies in nursing care: A questionnaire survey of nurse-users and found that half of the respondents were confronted with the introduction of a new technology in the last 3 years and only half of these respondent have positive attitude toward the introduction of the modern technology.^[26] We believe that the nurses in this study had positive attitude toward the use of modern technology as result of resent sensitization and campaigning by the government through the health minister to encourage digitalization of health care practices.

Moreover, this study identified the following barriers which discourage nurses from adopting or accepting the new modern technology in the hospitals: High cost of modern instruments and equipment, lack or poor supply of electricity to power the instruments, complexity of most modern instruments, lack of competent personnel for maintenance of most of the instruments, associated with risk of injury, lack of self-confident and fear of unknown. This is in agreement

Table 2: Attitude of Nurses toward Adoption of Modern Technology in Selected Hospitals, Benin-City, Nigeria

Items	SA, n (%)	A, n (%)	D, n (%)	Sd, n (%)	Mean±SD
Technology/innovative training should be included in basic nurse training	120 (48.00)	81 (32.40)	44 (17.60)	5 (2.00)	3.22±1.87
Nurses need to be trained on how to use modern equipment	140 (56.00)	69 (27.60)	30 (12.00)	11 (4.40)	3.34±1.94
Use of these technologies innovation will ease work of documentation by nurses	100 (40.00)	57 (22.80)	35 (14.00)	58 (23.20)	2.51±1.46
Quality of patient care will improve with technologies and innovation	123 (49.20)	33 (13.20)	41 (16.40)	53 (21.20)	2.50±1.45
Use of it by nurses increases nursing professional status	88 (35.20)	46 (18.40)	103 (41.20)	13 (5.20)	2.14±1.24
Technologies application knowledge should be promotion criteria for nurses	50 (20.00)	32 (12.80)	97 (38.80)	71 (28.40)	1.31±0.76
Use of technologies will solve Nurses problem	80 (35.20)	54 (21.60)	61 (24.40)	55 (22.00)	2.14±1.24
Nurses are knowledgeable about new gadgets in the hospital	90 (36.00)	35 (14.00)	81 (32.40)	44 (17.60)	2.00±1.16
Technology should not be purely clinical Nurses are technology innovation oriented	60 (24.00)	41 (32.40)	103 (2.00)	46 (17.60)	1.62±0.94
Do you think majority of gadgets in hospital is time wasting.	45 (18.00)	52 (20.80)	104 (41.60)	49 (19.60)	1.55±0.90
Grand mean score					2.23±1.29

SA: Strongly agree, A: Agree, D: Disagree, Sd: Strongly disagree, SD: Standard deviation

Table 3: Barriers toward Adoption of Modern Technology in Selected Hospitals, Benin-City, Nigeria

Items	SA, n (%)	A, n (%)	Sd, n (%)	D, n (%)	Mean±SD
Technology increases the workload for nurses	98 (39.20)	81 (32.40)	44 (17.60)	27 (10.80)	2.86±1.66
High cost of modern technology	180 (72.00)	31 (12.40)	27 (10.80)	12 (4.80)	3.38±1.96
modern technology is time consuming	8 (3.20)	57 (22.80)	135 (54.00)	50 (20.00)	1.04±0.60
It increases the violation of patient privacy	67 (26.80)	49 (19.60)	61 (24.40)	73 (29.20)	1.86±1.08
Poor supply of electricity	203 (81.20)	46 (18.40)	01 (0.40)	0.0 (0.00)	3.99±2.31
Complexity of most modern technology	100 (40.00)	80 (32.00)	33 (13.20)	37 (14.80)	2.88±1.67
Lack of maintenance personnel	80 (32.00)	54 (21.60)	55 (22.00)	61 (24.40)	2.14±1.24
High degree of error	70 (28.00)	25 (10.00)	106 (42.40)	49 (19.60)	1.52±0.88
High risk of injury	83 (33.20)	51 (20.40)	70 (28.00)	46 (18.40)	2.14±1.24
Lack of self-confident and fear of unknown	106 (42.40)	69 (27.60)	44 (17.60)	31 (12.40)	2.80±1.62

SA: Strongly agree, A: Agree, D: Disagree, Sd: Strongly disagree, SD: Standard deviation

Table 4: Benefits of Modern Technology in Nursing Practices among Selected Hospitals, Benin-City, Nigeria

Items	SA, n (%)	A, n (%)	Sd, n (%)	D, n (%)	Mean±SD
Ease of workflow	120 (48.00)	81 (32.40)	44 (17.60)	5 (2.00)	3.22±1.87
Lower healthcare cost	140 (56.00)	69 (27.60)	30 (12.00)	11 (4.40)	3.34±1.94
Better and Safer data storage	100 (40.00)	57 (22.80)	35 (14.00)	58 (23.20)	2.51±1.46
Improved access to big data	123 (49.20)	33 (13.20)	41 (16.40)	53 (21.20)	2.50±1.45
Improve health coverage	88 (35.20)	46 (18.40)	103 (41.20)	13 (5.20)	2.14±1.24
improve communication among nurses	50 (20.00)	32 (12.80)	97 (38.80)	71 (28.40)	1.31±0.76
Improved public health	80 (35.20)	54 (21.60)	61 (24.40)	55 (22.00)	2.14±1.24
It centralized data point	90 (36.00)	35 (14.00)	81 (32.40)	44 (17.60)	2.00±1.16
It open up more jobs	60 (24.00)	41 (32.40)	103 (2.00)	46 (17.60)	1.62±0.94
It improve patients outcome	104 (41.60)	52 (20.80)	45 (18.00)	49 (19.60)	2.50±1.45

SA: Strongly agree, A: Agree, D: Disagree, Sd: Strongly disagree, SD: Standard deviation

with a study carried out in Canada on the factors that determine the therapists' acceptance of new technologies for rehabilitation – a study using the Unified Theory of Acceptance and Use of Technology (UTAUT) in 2014. A self-administrated paper-based survey was created by adapting scales with high levels of internal consistency in prior research using the UTAUT and found that acceptance and Use of Technology is influenced by the degree of difficulty to use technologies^[27] Other study carried out in Denmark in 2012 on the Barriers

to the Adoption and Use of an Electronic Medication Record was also in agreement with this study. They investigate on the mid- and -lower-level manager's barriers toward adopting the EMR and found the following barriers to EMR being as: Time consuming to use, lack of knowledge, information, and training, and inadequate support of certain work areas.^[28] This is further supported by a study carried out to elicited experiences of acute care providers with the introduction of technology and the study identified barriers and in the

implementation process of the use of modern technology to care for patients.^[29]

Finally, the result of the analysis also shows the benefits of adopting modern technologies in nursing practice as follows: Ease the workflow of nursing practice, reduces health care cost, improve data storage, increases accessibility to big data at a time, improves health care coverage, improved public health status and improve patient outcome. In the other hand, the study also show that modern technology do not improve communication among nurses but reduce job opportunities because technology will take over the responsibility of nurses and rendered them jobless. This is supported by a study that examines the Benefits of Health Information Technology: A Review of the Recent Literature Shows Predominantly Positive Results and found that Health Information Technology brings about quality improvement in health care.^[13]

Other studies revealed that the use of the Intensive Care Information System (ICIS) in patients after cardiothoracic surgery affects nursing activity. Using ICIS reduce the time nurses spent on documentation up to 30%.^[30,31] Another study further explained that with the help of modern technology, it is possible to transform health care and improve patient safety by better leveraging patient information and other nursing care through modern technology to improve the efficiency, accuracy, and effectiveness of health care services.^[4]

Nevertheless, this study was faced with some limitation such as; the research only covered one state out of 36 states in the country. Probably, there is a peculiarity in the state that affected the outcome of the study. Furthermore, the incomplete eradication of extraneous variable like economic hardship in the country, poor supply of electricity to power the modern technology and poor wages among nurses is another major factor. The study will be better if extended to more hospitals in other states of the country.

CONCLUSION

The nurses had positive attitude toward the use of modern technologies, but there are barriers like shortage of nurses, lack of adequate in-service training for staff on how to use the new technology, and poor supply of electricity. It also noted that modern technology in the nursing profession in Nigeria is in its infancy stage, a lot of factors are contributing to slower development such as high cost of the instruments, these may be associated with the way nurses handle modern technology in clinical areas, therefore there is a need to address these problems by the affected stakeholders. The hospital managers should make available these various modern technologies in the hospital, constant supply of electricity to power the technology, seminars and workshop on the uses and benefits of these technologies, and training schools of nursing should include how to use modern technology in their curriculum; this will then improve personal confident and allay fear among nurses when they find themselves in digitalized hospitals.

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Conflicts of interest

There are no conflicts of interest.

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