KNOWLEDGE OF BENEFITS AND CHALLENGES OF TECHNOLOGICAL INNOVATIONS IN HEALTH CARE AMONG HEALTH WORKERS IN IMO STATE SPECIALIST HOSPITAL, OWERRI

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Abstract
Medical and health services face a lot of challenges ranging from ill-equipped facilities and low utilization of modern technologies in the delivery of health services. This study investigated the knowledge of benefits and challenges of technological innovations in healthcare among health workers in Imo State Specialist Hospital Owerri. Four research questions and two null hypotheses guided the study. The study employed cross-sectional research design. A total number of 440 health workers drawn using thepurposive sampling technique participated. Data collection was done using self-structured Knowledge ofBenefits and Challenges of Technological Innovation in Health Care Questionnaire (KBCTIHCQ). Descriptive statistics of frequency and percentagewere used to answer the research questions, while chi-square test was used to test the null hypotheses at .05 alpha level. Results revealed that health workers had average knowledge (49.0%) of benefits and high knowledge (62.7%) of challenges in technological innovation in health care. Years of work experience was significantly associated with knowledge of benefits (χ^2 = 129.770, p = .000≤ .05) and challenges (χ^2 = 119.962, p = .000≤ .05) in technological innovation among health workers.This research proves that good benefits and challenges'knowledge of technological innovation in health care can help improve the quality of health of the people. However,the State government should increase budgetary allocation to health sector for procurement of technological tools, training of health workers, and information technology experts to enhance effective and efficient health care system in Nigeria.

Keywords: Benefits, Challenges, Technology, Innovation, Health workers

Introduction

The use of technology has revolutionized the health industry. Certain technologies can make patients'care easier, more efficient for health workers and improve health care system (Ukaoha&Egbokhare, 2018). The widespread adoption of information technology

(IT) brings many potential benefits to healthcare. At the sametime, problems with information technology can disrupt the delivery of care and increase likelihood of new, often unforeseen errors that affectthe safety and quality of clinical care, and may lead to patient's harm (Kim, Coiera, &Magrabi, 2017). Medical and health services face a lot of challenges and bottle necks ranging from dearth of trained personnel, ill-equipped facilities, and low utilization of modern technologies in delivery of health service (Mandy-Roth, 2021; Moahi, 2009).

Many countries especially from developing economics seem to be exploring better and cheaper alternatives of delivering health services to their citizens with the advent of technology, especially information and communications technology. This has initiated better concepts of delivering health care at affordable rates and with high success rate of targeting and reaching out to more people especially in rural habitation (Adewale, 2014). New technology has the potential of improving Nigeria's health indices; if infrastructural challenges are addressed. Nigeria has a population of more than 200 million people, where majority lives in rural areas with no access to modern facilities(Adewale, 2014). Further, many Nigerians suffer geographical isolation, scarcity of physicians, and lack of health facilities. These challenges can be mitigated through the use of information technology and communication.According to World Health Organization (2007), technology describes standardized physical objects, traditional and designed social means and methods used to treat or care for patients. This presupposes that the use of technology and technological innovation aim at sharing electronic information with patients and health workers for improved health, and reduces medical errors. The use of technology in form of smaller portable devices, such as smart phones, touch screens, tablets, laptops, electronic health records (EHR), personal health records (PHR), telemedicine, clinical decision, mobile home health care and cloud computing contribute to people's health and wellbeing, and undoubtedly transform patient-care efficiency (Chukwudum, 2022; Mandy-Roth, 2021; Mohammed-Rajput NA, 2011).

Technology brings about innovation, described as new, better, more effective waysof solving problems. Innovation is the practical application of ideas that result in different new types of new offerings, such as products, services, processes, and business models, intending to improve or disrupt existing applications or creating new solutions (Tahn, 2023). However, the utmost goal of information technology is to improve the ability to meet public and personal healthcare needs and demands by optimizing the performance of the health care system.

Healthcare primarily deals with the prevention and healing from illness. The term health care system refers to a country's system of health care delivery services for prevention and treatment of diseases. Healthcare systems are now changing due to the dynamic nature of technological and scientific medical practices. Healthcare providers are now swiftly adopting the technology into health care procedures where clinical information is transferred through interactive audio visual media for the purpose of consulting, and sometimes for remote medical procedures or examinations (Dube, 2014). Technological innovations is an important area that might help a country, such as Nigeria, where few qualified health workers attend to overwhelming population that needs health care. This has resulted in mass exodus of health workers to developed countries. Therefore, advancement in technological innovations in health care is needed for effective and

efficient performance of health workers and other numerous benefits accruing from such actions. The existing technology information of Global System Mobile Telecommunications (GSM) has helped in the advancement of technology innovation in healthcare system (Boulanger, Keapney, Ochoa, Tsuei, & Sands, 2001). Technological innovations in health care include cloud computing, genomics, artificial intelligence, internet of things, immersive technology, mobile health (mHealth), 3D printing, blockchain, telemedicine, IVD technology, state-of-the-art-imaging equipment, big data and analytics among others (Chukwudum, 2022; Jennifer-Thompson, 2020; Patient Data in the Age of Technology, 2018).

Studies have shown that in developed and developing countries, technology can promote healthcare efficiency and make it more effective. For instance, in South Africa, sending short messages using mobile phone in providing information about Acquired Immune-Deficiency Syndrome (AIDS) has resulted in a triple increase in the number of contacts to the local information centre (Curisoso, 2010).Similarly, sending short messages about AIDS virus in Uganda has increased the number of visitors for AIDS test as much as 40 per c ent (Rezeih, Mohmoud, & Borzoo, 2013).

Telemedicine as a technological innovation in health care differs from the traditional medical practice where physical presence of patients and health workers becomes less important (Boulanger et al., 2001). Martinez (2004) disclosed that that telemedicine involves two health professionals discussing a case over the telephone or more complex procedure using satellite technology and video-conferencing equipment to conduct real time consultation between medical specialists in two different countries. In Nigeria, the COVID-19 pandemic accelerated the adoption of telemedicine by many governments, health care systems, clinicians, and patients (William-Payne, 2019). In addition, telemedicine aids to assist elderly people remotely, reduces bed space, and conserves clinical supplies. Numerous benefits of technology in healthcare include bridging the gap between healthcare workers and rural communities, availing doctors' timely consultation with specialist without long hours of travel,and attending to people living in isolated communities, avoiding long waiting hours at the clinics in conventional hospitals (Miller & Derse, 2002; William-Payne, 2019).

The benefits of technological innovations are numerous. The benefits of technology in health care include reduced cost of health care, increase efficiently in management of chronic diseases, shorter and few hospital stay and increase in patient satisfaction (Kim et al., 2017;Tanjent, 2006). In addition, in recent years, there have been ground breaking advancements and benefits in health care. For instance; 3-D printing which creates implants and joints used in prosthetics, and creating perfect matching limbs, Robotics for easy surgical operations, tele-health which allows patients receive medical care through digital devices (Boulanger et al., 2001; Hempel, Maggard, & Nguyen, 2016; Jennifer-Thompson, 2020; Mbarika, 2004). For instance, use of artificial intelligence which can be trained to evaluate the risks of patients to medical errors, provides digitalization of health records, greater patient care which automatically alerts the physician to potential health problems, entering data into computerized system which is less time consuming, reduces the risk of errors in patients data, and minimizes the heap of files and reports in medical record rooms using electronic medical records by health workers (Pansu, 2015; William-Payne, 2019).

Health workers are professionals who are providers of health care treatment and advice based on formal training and experience. Contextually, health workers are people who render health care to patients according to their area of specialization in Imo State Specialist Hospital Owerri.Some of the health workers have spent many years in their areas of specialty,which cumulated into years of experience. The number of years of work experience of workers improves effective and efficient delivery of health care service. Mbarika found that years of experience individuals gainin a job influence and increase their knowledge which enhances proficiency and, noted that knowledge gained varies with the number of years of work experience of each person. Health workers in healthcare system may have knowledge of some benefits of technology and innovations in their workplace (Ukaoha&Egbokhare, 2018). Furthermore, Razeih et al.(2013) reported that knowledge of challenges of technological innovation was higher among workers who possess many years of experience than those who have spent few years in their job which has minimal advantage; indicating significant difference that exists among a group of workers based on work experience. Obviously, some challenges to technological development common in healthcare system exist. Nguyen (2016) noted that while it has enriched the lives of many individuals across the globe, it has several challenges that hinder its acceptance, which include inability to provide hardware and software. Often, these tools are costly and require sufficient fund for training for operability. Poor internet availability is a vital infrastructural barrier and a serious challenge to third world countries, such as Nigeria, where unsteady electricity supply and poor internet availability can hinder effective and efficient use of technology in health care practice. This poses a challenge in detection of diseases at early stage. For instance, detection of cancer at early stagecan save man's life instead of late diagnosis. Interactive Health Communication Application can be used for overcoming this challenge.

Skills to manage technology requires skilled personnel for effective operation, and combining skills of health researcher service(HRS) and IT expert is an effective manner to achieve maximum benefits.Other challenges of technological innovations include, lack of patient's privacy, privacy is not protected in the interest of the patient, establishing trust between the health Researcher service (HRS) and IT expert, shortage of professionals, are all challenges of technological innovation use in health care system (Eriolis&Vasilione, 2008; Paul &Kechley, 2021; Rasid & Woodward, 2015).

Despite these challenges, Nigeria being a third world country could not benefit much from technological innovations in health care unlike technologically advanced countries. Nigeria as a nation seems not to have made concerted efforts to improve the health system in Nigeria through adoption of technological innovation to reduce morbidity and mortality rate. This has grossly affected the health of the populace in urban and rural communities. This trend can be prevented when there is political will to address the gap by political leaders. Nevertheless, the problem of this study is, do health workers have knowledge of the benefits and challenges of technological innovations in health care. The researchers therefore set out to assess the knowledge of benefits and challenges of technological innovation in healthcare among health workers in Imo State Specialist Hospital Owerri. The result of this study would draw the attention of the Federal and State governments to appreciate the need to join developed countries in ensuring that technological innovation and advancement is achieved in health sector in Nigeria.

Purpose of the study

The purpose of the study was to investigate knowledge of benefits and challenges of technology innovations in health care among health workers in Imo State Specialist Hospital, Owerri. Specifically, the study determined level of knowledge of:

1. benefits of technological innovations in health care among health workers;
2. challenges of technological innovations in health care among health workers;
3. benefits of technological innovations in health care among health workers based on years of work experience; and
4. challenges of technological innovations in health care among health workers based on years of work experience.

Research questions

Four research questions guided the study

1. What is the level ofknowledge of benefits of technological innovations in health care among health workers?
2. What is the level ofknowledge of challenges of technological innovations in health care among health workers?
3. What is the level ofknowledge of benefits of technological innovations in health care among health workers based on years of work experience?
4. What is the level ofknowledge of challenges of technological innovations in health care among health workers based on years of work experience?

Hypotheses

Two null hypotheses were postulated for the study at 0.05 alpha level.

1. There is no significant association between knowledge of benefits of technological innovations in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri.
2. There is no significant association between knowledge of challenges of technological innovations in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri.

Methods

Research Design: This study adopted the cross-sectional survey research design.Cross-sectional research design according to Cohen, Manion, and Morrrison (2011), is one that produces a snap shot of a population at a particular point in time, where instead of following a group of subjects over a period of time, cross-section of the subjects of varying ages and other socio-demographic factors are sampled and studied at the same time, and data are obtained at one time from groups or at different stages of development.

Area of the Study: The study was conducted in Imo State Specialist Hospital, Owerri.It is situated in Umuguma, Owerri West Local Government Area. It has eight departments.

These are obstetrics and gynaecology, outpatient, surgery, paediatrics, radiology, medical laboratory, pharmacy, and nursing departments. There are lots of complaints due to poor health services rendered to patients who attend/visit the hospital,probably as a result of lack of job satisfaction associated with limited provision of technology innovation in the health facility. In view of these facts, the area was adjudged suitable for the study.

Population of the study: The population of the study comprised 3,122 health workers (Imo State Hospital Management Board, Owerri, 2022). Only health workers who had worked for two years or above were included in the study.

Sample and sampling techniques: The sample size was 440 health workers (medical and paramedical staff) determined using Cohen et al. (2011) standardized table for sample size, confidence levels and confidence intervals for random samples, which states that when a population size is 2,500 or above at 95 per cent confidence level (5% intervals), the sample size should be 333 or above. The purposive sampling technique was used to select 55 health workers who had worked for at least two years from each of the eight departments in Imo State Specialist Hospital, Owerri. This gave a total of 440 health workers.

Instrument for data collection: Aself-structured questionnaire known as Knowledge of Benefits and Challenges of Technological Innovations in Health Care Questionnaire(KBCTIHCQ) was used for data collection. The instrument contained 24 questions divided into three partsA, B, and C.Part A contained one item on demographic characteristics (years of work experience) of the respondents. Section B contained 16 items on benefits of technological innovations in health care. Section C contained seven items on challenges of technological innovations in health care. The questionnaire was validated by three experts.Two of the experts came from the Department of Health Education, and one came from Science Education Department (Measurement & Evaluation unit), all from Alvan Ikoku Federal College of Education, Owerri.The internal consistency (reliability) of KBCTIHCQ was analysed using split half method (Spearman's Brown Coefficient), and a reliability coefficient of 0.81 was obtained, and deemed reliable for use in the study.

Method of data collection: Copies of the questionnaire were administered to 440 health workers who are medical and paramedical staff of the hospital used for the study. Out of the 440questionnaires administered, 420 copies were returned, which gave a return rate of 95.5 per cent.The 420 returned copies were duly filled out and used for analyses.

Method of data analysis: Data analysis was done using frequency and percentage to answer the research questions, while chi-square (χ^2) statistics was used to test the null hypotheses at .05 level of significance.In determining the level of knowledge of the benefits and challenges of technological innovations in health care, Okafor (1997) guideline was used. By these guideline, below 20 per cent was interpreted very low knowledge; 20-39 per cent was interpreted low knowledge; 40-59 per cent was interpreted average/moderate knowledge; 60-79 per cent was interpreted high knowledge, and 80 per cent and above was interpreted very high knowledge.

Results

Table 1: *Socio-demographic Characteristics of the Respondents*

Variables	Number	Percentage
Years of work experience		
2-5 years	90	21.4
6-10years	44	8.3
11-15years	130	31.0
16years and above	156	35.0
Total	420	100

Table 1 shows the percentage distribution of health workers' years of work experience. The vast majority of health workers had 11 + years 286 (66.0%) of work experience. A good number 90 (21.4%) had 2-5 years of work experience.

Table 2: *Health Workers' Knowledge of Benefits of Technological Innovations(n = 420)*

S/n	Items	Knowledge Responses Yes f (%)	No f(%)
	Do you know technological innovation:		
1.	Helps doctors in early diagnosis?	227(66.0)	143(34.0)
2.	Improves healthcare accessibility for patients?	261(62.1)	159(37.9)
3.	Reduces long distance travels for treatment of patients?	259(61.9)	161(37.1)
4.	Allows two health professions have the opportunity to discuss a case using telephone?	220(52.4)	200(47.6)
5.	Avails doctors' timely consultation with specialist without long hours of travels to isolated communities?	181(431)	239(56.9)
6.	Reduces long waiting hours at the clinics in hospitals?	222(52.9)	198(47.1)
7.	Reduces cost of care for patients?	145(34.2)	275(65.5)
8.	Assists in efficient management of chronic diseases?	192(45.7)	228(54.3)
9.	Increases patients' satisfaction through shorter and few hospital stay?	173(41.2)	247(58.8)
10.	Advancement has created implants and joints used in prosthetics?	180(42.9)	240(57.1)
11.	Introduced tele-health which allows patients receive medical care via digital devices?	203(48.3)	217(51.7)
12.	Reduces medical errors in health care?	191(45.5)	229(54.5)
13.	Provides digitalization of health records?	193(46.0)	227(54.0)
14.	Helps to achieve greater patient care which alerts physician to potential problems, such as allergies?	193(46.0)	227(54.0)
15.	Allows use of artificial intelligence for easy surgical operations?	205(48.8)	215(51.2)
16.	Enhances research to help understand the causes of diseases using improved techniques and technologies?	221(52.6)	199(47.4
	Overall percentage	49.0	51.0

Key: Below 20% = Very Low Knowledge (VLK)
20-39% = Low Knowledge (LK)
40-59% = Average Knowledge (AK)
60-79% = High Knowledge (HK)
80% + = Very High Knowledge (VHK)

Table 2shows that overall; health workers had average knowledge (49.0%) of benefits of technological innovations in health care. This implies that health workers in Imo State Specialist Hospital, Owerri had average knowledge that early diagnosis by doctors can improve health care accessibility for patients, reducing distance travels for treatment, use of telephone by health professionals to discuss case study, timely consultations, reduced waiting hours at the clinics by patients, reduces cost of care, enhanceefficient management of chronic diseases, achieving patients' satisfaction, creating implants used in prosthetics, reduces medical errors, provides digitalization of health records, alerts impending danger resulting from medication, use of artificial intelligence for easy surgery, and enhances research in understanding of causes of diseases using technologies are benefits of technological innovation in health care system.

Table 3: *Health Workers' Knowledge of Challenges of Technological Innovations(n = 420)*

S /N	Items	Knowledge Responses	
		Yes f (%)	No f (%)
	Do you know:		
1.	High cost of technological tools poses a big challenge to technological innovation?	275(65.5)	145(34.5)
2.	Poor internet availability is a barrier to technological innovation in health care?	303(72.1)	117(27.9)
3.	Lack of vital infrastructure, such as electricity supply is a barrier to technology in health care?	251(59.8)	169(40.2)
4.	Lack of skilled personnel to enhance operability (IT experts) is a hindrance to technological innovations in healthcare?	252(60.0)	168(40.0)
5.	Patients' privacy is not protected?	267(63.6)	153(36.4)
6.	Unforseen errors can cause death of patients?	266(63.3)	254(36.7)
7.	Lack of fund results to inability to provide hard ware and software used in health care?	232(55.2)	188(44.8)
	Overall percentage	62.7	37.2

Table 3 shows that overall; health workers had high knowledge (62.7%) of challenges of technological innovations in health care. This implies that majority of health workers in Imo State Specialist Hospital, Owerri had high knowledge on high cost of technological tools, poor internet availability; lack of vital infrastructure, such as electricity supply; lack of skilled personnel to enhance operability (IT experts);patient's privacy not protected;unsforseen errors leading to death, and lack of fund results to inability to provide hardwareand software used in health careare challenges of technological innovation in health care.

Table 4: *Health Workers' Knowledge of Benefits of Technological Innovationsin Health Care Based on Years of Work Experience (n = 420)*

S/n	Items	Knowledge Responses Years of work experience			
		2-5 years (n= 90)	**6-10years (n= 44)**	**11-15years (n = 130)**	**16 + years (n = 156)**
	Do you know technological innovation:	22(24.4)	35(79.5)	98(62.8)	122(93.8)
1.	Helps doctors in early diagnosis?	18(20.0)	30(68.2)	89(57.1)	124(95.4)
2.	Improves healthcare accessibility for patients?	19(21.1)	29(65.9)	89(67.1)	122(93.8)
3.	Reduces long distance travels for treatment of patients?	12(13.3)	24(54.5)	78(50.0)	166(81.5)
4.	Allows two health professions have the opportunity to discuss a case using telephone?	7(7.8)	24(54.5)	59(37.8)	91(70.0)
5.	Avails doctors' timely consultation with specialist without long hours of travels isolated communities?	14(15.6)	23(52.3)	74(47.4)	111(85.4)
6.	Reduces long waiting hours at the clinics in hospitals?	4(4.4)	20(45.5)	43(27.6)	78(60.0)
7.	Reduces cost of care for patients?	11(12.2)	24(65.5)	63(40.4)	94(72.3)
8.	Assists in efficient management of chronic diseases	9(10.0)	24(54.5)	57(36.5)	83(63.8)
9.	Increases patients' satisfaction through shorter and few hospital stay?	10(11.1)	16(36.4)	60(38.5)	94(72.3)
10.	Advancement has created implants and joints used in prosthetics?	18(20.0)	16(36.4)	67(42.9)	102(78.5)
11.	Introduced tele-health which allows patients receive medical care via digital devices?	12(13.3)	16(36.4)	64(41.0)	99(76.2)
12.	Reduces medical errors in health care?	11(12.2)	14(31.8)	65(41.7(	103(79.2)
13.	Provides digitalization of health records?	11(12.2)	13(29.5)	57(36.5)	112(86.2)
14.	Helps to achieve greater patient care which alerts physician to potential problems, such as allergies?	16(16.7)	20(45.5)	72(46.2)	98(75.4)
15.	Allows use of artificial intelligence for easy surgical operations?	16(17.8)	21(47.7)	78(50.0)	106(81.5)
16.	Enhances research to help understand the causes of diseases using improved techniques and technologies?	**14.5**	**50.0**	**45.2**	**79.1**
	Overall percentage				

Table 4 shows that overall;health workers with16+ years of work experience had high knowledge of (79.1%) of benefits of technological innovations in health care, than those with 6-10years (50.0%), 11-15years (45.2%), and 2-5 years (14.5%) respectively.

Table 5: *Health Workers' Knowledge of Challenges of Technological Innovationsin Health Care Based on Years of Work Experience (n = 420)*

S/N	Items	Knowledge responses Years of work experience			
		2-5 years (n = 90)	6-10years (N = 44)	11-15years (N = 130)	16 + years (n = 156)
	Do you know:				
1.	High cost of technological tools poses a big challenge to technological innovation?	27(30.0)	32(72.7)	100(64.1)	116(89.4)
2.	Poor internet availability is a barrier to technological innovation in health care?	33(36.7)	31(70.5)	116(74.4)	123(94.6)
3.	Lack of vital infrastructure, such as electricity supply is a barrier to technology in health care?	24(26.7)	25(56.8)	90(57.7)	112(86.2)
4.	Lack of skilled personnel to enhance operability (IT experts) is a hindrance to technological innovations in healthcare?	24(26.7)	24(54.5)	87(55.8)	117(90.6)
5.	Patients' privacy is not protected?	29(32.2)	27(61.4)	88(56.4)	123(94.6)
6.	Unforseen errors can cause death of patients?	41(45.6)	25(56.8)	88(55.1)	114(87.7)
7	Lack of fund results to inability to provide hard ware and software used in health care?	46(51.1)	17(38.6)	69(44.7)	100(76.9)
	Overall percentage	35.6	58.8	58.2	88.5

Table 5 shows that overall;health workers with 16+ years of work experience had very high knowledge of (88.5%) of challenges of technological innovations in health care, than those with 6-10 years (58.8%), 11-15years (58.2%), and 2-5 years (35.6%) respectively.

Table 6: *Chi-Square Test of Knowledge of Benefits of Technological Innovations in HealthCare among Health workers Based on Years of Work Experience*

S/N	Years of Work Experience	N	Knowledge Reponses Yes O(E)	No O (E)	χ^2	Df	p-value
1	2-5 years	90	14(52.1)	76(37.9)	129.770*	3	.000
2	6-10 years	44	33(25.5)	11(65.7)			
3	11-15years	130	17(35.2)	13(54.8)			
4	16 + years	156	29(90.3)	77(65.7)			

Table 6 shows that the hypothesis of no significant association between knowledge of benefits of technological innovations in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri (χ^2 = 129.770, df = 3, p = .000≤ .05) was rejected, thus significant. However, there was a significant association between knowledge of benefits of technological innovations in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri. This implies that years of work experience was associated with knowledge of benefits of technological innovations in health care among health workers in Imo State Specialist Hospital, Owerri.

Table 7*:Chi-Square Test of Knowledge of Challenges of Technological Innovations in HealthCare among Health workers Based on Years of Work Experience*

Years of Work Experience	N	Knowledge Reponses Yes O(E)	No O (E)	χ^2	Df	p-value
2-5 years	90	23(55.9)	67(34.1)			
6-10 years	44	29(27.3)	15(16.7)	119.962*	3	.000
11-15years	130	125(80.8)	5(49.2)			
16+ years	156	84(96.9)	72(59.1)			

Table 7 showsthat the hypothesis of no significant association between knowledge of challenges of technological innovations in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri (χ^2 = 119.962, df = 3, p = .000≤ .05) was rejected, thus significant.However, there was a significant association between knowledge of challenges of technological innovation in health care and years of work experience among health workers in Imo State Specialist Hospital Owerri. This implies that years of work experience was associated with knowledge of challenges of technological innovations in health care among health workers in Imo State Specialist Hospital, Owerri.

Discussion of findings

The findings of the study in table 2 showed that health workers in Imo State Specialist Hospital, Owerri had average knowledge of the benefits of technological innovations in health care. The benefits include helps in early diagnosis, improved healthcare accessible for patients, reduced distant travels for treatment, use of telephone by health profession to discuss patient's case study, timely consultations, reduced cost of care, reduced medical errors, provides digitalization of health recorded, achieve efficient management of chronic diseases, use of Robotics for easy surgical operations, and enhanced research in understanding the causes of disease using technological. The result was expected and not surprising.Studies have consistently shown that the benefits mentioned above, are the benefits of technological innovation which have improved health care delivery in many developed countries.

The findings of this study are consistent with the findings of Kimet al. (2017) who found that the benefits of technological innovations in health care include increase efficiency in management of chronic disease, bridging the gap between the health workers and rural communities, availing the doctors timely consultations with specialist without long hours of travels to isolated communities and avoiding long waiting hours at the clinics.The findings are consistent with the findings of Cocosila, Coursaris, and Yuan (2004) and Razeih et al. (2013) who found that sending short messages about AIDS virus in Uganda increased the number of visitors for AIDS test as much as 40 per cent. In Philistine, the use of IT in reminding patients suffering from pneumonia to use their drugs and 90 per centof them used their drugs based on technology was in line with the study.

The findings of the study in Table 3 showed that health workers in Imo State Specialist Hospital had high knowledge of challenges of technological innovations.The challenges include high cost of technology tools, poor internet availability, lack of steady electricity supply, inadequate number of protection of patient's privacy and unforeseen errors that can cause harm or death to patients. The findings of this study are in tandem

with the assertions of Eriolis and Vasilione (2008) and Rasid and Woodward (2015) that lack of patients' privacy is often not protected in the interest of the patient, and that privacy of patients is a challenge in technological innovations in healthcare. Rasid and Woodward suggested the use of regulation to overcome this challenge, and emphasized the need to ensure that patients have trust on health care system where their personal information is protected. Furthermore, the findings are in agreement with the findings of Nguyen (2016) who found that while technological development in health care has enriched the lives of many individuals across the globe, it has several challenges that hinders its acceptance which include inability to provide hardware and software.

The findings in Table 4 showed that health workers with 2-5years of work experience had very low knowledge of benefits of technological innovations, those with years of work experience, 6-10years and 11-15years had average knowledge respectively, while health workers with 16years and above work experience had high knowledgeon the same issue. The finding in table 6 showed that there was significant difference in the knowledge of benefits of technological innovation among health workers in Imo State Specialist Hospital Owerri based on years of work experience. The finding was expected and not surprising. Studies have indicated that the more the number of years a worker spends in a particular job, the more knowledgeable and more proficient the person becomes. The findings of this study are in line with the assertion of Ukaoha and Egbokhare (2018) who posited that years of experience acquired in a workplace boosts one's knowledge of the activities associated with the assigned duties in a particular job, and the workers gain skills in the process and increases the person's proficiency. Also, the findings of the study are in line with the assertion of Mbarika (2004) that one of the benefits of work experience is increase in one's knowledge in a chosen profession. The more the number of years of work experience, the higher the knowledge of health workers on benefits of technological innovations in healthcare system.

The findings in Table 5 showed that the health workers with 2-5years of work experience had low knowledge of challenges of technological innovations in healthcare, those with 6-10 years and 11-15yearshad average knowledge respectively, while health workers with 16years and above work experience had very high knowledge on the challenges of technological innovations in healthcare. The findings were expected and not surprising, because studies have indicated that year of work experience is a strong determinant of increased knowledge acquired by an individual in a given job. The findings agreedwith the assertion of Mohammed-RajputNA (2011) who asserted that years of work experience of an employee should be emphasized in job recruitment. Mohammed-RajputNA further emphasized that knowledge acquired in a given job, often creates opportunity for the mastery of the job and gaining more information peculiar to the job. Therefore, health workers in Imo State Specialist Hospital who possessed many years of work experience had high knowledge ofthe challenges of technological innovations in health care system. The findings of this study are in line with the findings of Razieh et al. (2013)who reported that knowledge of challenges of technological innovations was higher among those with more years of work experience than those who spent few years on the same job. The findings have implications for ministry of health and the government in organizing sensitization programmes on the innovative health care approaches for health workers in various health facilities.

Conclusion

The findings have shown that health workers in Imo State Specialist Hospital, Owerri, Imo State possessed average knowledge of the benefits and high knowledge of the challenges of technological innovations in health care. Many years of work experience play a big role in acquiring knowledge of benefits and challenges of technological innovations in health care. This is evidenced byhealth workers with fewer years of work experience reporting low knowledge of benefits and challenges of technological innovations in health care.

Recommendations

Based on the findings and conclusions of the study, the following recommendations were made:

1. Government should provide technological tools and infrastructure to ensure that application of technological innovations is instituted at all levels of healthcare delivery system in Imo State.
2. The StateGovernment should increase the budgetary allocation in health sectors to fund the provision of technological tools and technological infrastructure (electricity supply and availability of network) in order to enhance effective and efficient healthcare system in Imo State.
3. The State Ministryof Health in collaboration with the federal and State Government should embark on massive recruitment and training of information technology (IT) experts to enhance the implementation of health technology, telemedicine, and technological innovations in healthcare delivery system.
4. The State Government should implement the National Health Insurance Scheme (NHIS) policy to accommodate all Nigeria citizenry to reduce out-of-pocket health expenditure for the less privileged in the society as to enable them access healthcare using technological innovations.

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