



Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>

## Strategies for Strengthening the Adoption and Utilization of Health Informatics among Nurse in Niger State, Nigeria

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### Abstract

This research is to explore the strategies for strengthening the adoption and utilization of health informatics among nurses in Niger State. The study has five research questions with five corresponding objectives. These are; to assess nurses' awareness regarding health informatics systems to improve their service output, to assess nurses' perceptions regarding the adoption and use of health informatics, to improve their service delivery and patient outcomes, to assess the pattern of utilization of health informatics resources among nurses, to determine the influence of age, gender, marital status, educational status on utilization of health informatics resource, and to assess the barriers and drivers to promote the adoption and utilization of health informatics resources among nurses in Niger State. A review of related literature was done as well as the use of communication channel theory. The study adopts a triangulation of the quantitative and qualitative research methods. The sample size of 320 was considered using Taro Yamane's formula. The multi-stage sampling technique was used involving fishbowl, random, purposive and convenience. The structured questionnaire was used to collect quantitative data, and a key informant interview was used for qualitative data among the nine LGA sampled. The quantitative data analysis was done using Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics were used to analyse the result of 233 duly returned and completed questionnaires. The study found among others that nurses were aware of the health informatics system, however, the adoption and usage were reported to be relatively very low. It was also found that health informatics in the area were not adopted because of the negligence of the health managers and drivers. The study recommends among others that drivers of health management must embrace the health informatics system and also ensure their adaptability because it is regarded as a resource of convenience and acceptable health informatics system.

**Keywords:** Strategies for strengthening, adoption and utilization, health informatics, Nurses

### Introduction

In the current scenario, with a large amount of unstructured data, health informatics is gaining traction, allowing healthcare units to leverage and make meaningful insights for doctors and decision-makers with relevant information to strengthen operations and predict the future view of treatments via information systems communication. Healthcare informatics bridges the gap between healthcare and information engineering. It uses patient information and deals with managing the healthcare process. Healthcare informatics comprises multiple allies such as



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computer, information, social, behavioural, management sciences etc (McDonald, & Tierney (2018).

Health informatics has become an inevitable part of modern healthcare. Due to the volumes of health data being generated, it is inevitable to deploy computers to manage the patient data to offer a better healthcare processes. Now, around the world, massive amounts of data are being collected, adopted and utilised for better patient diagnosis and treatment, improving public health systems and assisting government agencies in designing and implementing public health policies, instilling confidence in future generations who want to utilise better public health systems (Sood, & McNeil, 2017).

It is an objective reality that the world is changing with the development of technology and communication; meanwhile changes in policies, economics, demographic and socio-environmental variables, influence healthcare delivery systems. In support of the utilisation of health informatics technology, scholars such as Garde, Harrison, & Hovenga (2015), Watcharasriroj, & Tang, (2014), Hassan (2016), flora (2013), Too-chukwu, Achadu & Asogwu (2021), Chaudhry, Wang, Wu, Maglione, Mojica, & Roth, (2016) have agreed that the introduction of information technology has accompanied with different health informatics strategies adopted and utilised by healthcare workers specifically the nurses to enhance accurate, efficient, effective and managerial data concerning the patients for appropriate action and decision. They opine that, if this health informatics are appropriately utilised, they can enhance effective health care delivery.

Today, the use of information technology becomes a routine activity for many organizations including the health sector (Kaushal, Shojania, Bates, 2015; Honey, & Procter, 2017). The term informatics means the use of computerized information systems to answer questions, solve problems and make decisions (Kaushal, Shojania, Bates, 2015). Based on the results of past studies when informatics is use in nursing tasks and procedures such as financial, clinical, and other administrative transactions, it can help reduce costs and the time required to complete the process (Honey, & Procter, 2017). Therefore, one of the areas where informatics can be used is the nursing field. Different definitions of nursing informatics are presented. One of these is “the use of information technology concerning any practice within the nursing area and is indicated by nurses such as patients care, management, education and research (Ball, & Ja, 2016). computer and HIS can use for collecting, storing, processing and modifying related data in the field of nursing care and can facilitate the provision of nursing services, resource management and nursing care (Ball, & Ja, 2016; Garde, Harrison, & Hovenga, 2015). Nowadays, the application of informatics in nursing is in expanding (Garde, Harrison, & Hovenga, 2015); Watcharasriroj, & Tang, 2014). Some Studies such as Ball, & Ja, (2016), Garde, Harrison, & Hovenga, (2015), Honey, & Procter (2017), Watcharasriroj, & Tang, (2014) indicate that nurses use informatics in all their activities, and evidence suggests that with the development of the use of information technology, even by the client and could help to increase their participation in the care process.

Nurses and other health workers have been working in the field of informatics near four decades. The term nursing informatics has been considered a specialization in nursing resources since 1984 (Guenther & Peters, 2016; Chaudhry, Wang, Wu, Maglione, Mojica, Roth 2016). Many aspects such as data recovery, ethics, patient care, decision support systems, human-computer interaction, information systems, imaging informatics, computer science, information science, security, electronic patient records, intelligent systems, e-learning and telenursing have been



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adopted and utilised to the field of health informatics. Hana (2017) alluded that nurses adopt health informatics through the application of IT as the nursing duties including education, management & practice. Integration of information science, computer science and nursing science to support nursing practice and knowledge management was the definition offered in 1989 by Graves and Corcoran (Kaushal, Shojania, & Bates, 2016).

The Electronic Health Record (EHR) has been the ultimate goal of the informatics industry from its beginning. In the United States today, only 5% of physicians have access to a true HER (Mennemeyer, Menachemi, Rahrurkar & Ford, 2016). Researchers have worked on the development of this for almost 50 years (Honey, Procter, 2017; Mennemeyer, Meacham, Rahrurkar & Ford, 2016). Over the years “it” has been given many names. It has been called the Automated Medical Record (AMR), the Computerised Patient Record (CPR), the Computer-based Medical Record (CMR), the Electronic Medical Record (EMR), the electronic health care record (EHCR), the electronic patient record (EPR), the personal medical record information (PMRI) and others (Mennemeyer, Menachemi, Rahrurkar & Ford, 2016; Waneka, Spetz, 2018).

In recent years, the healthcare industry has seen rapid growth in medical and healthcare data, which can be used to improve facilities and public health care utilisation and implementation by modern healthcare units using the novel treatment and diagnosis methodologies, which gives citizens confidence in using the best public healthcare services available and aids governments in developing better healthcare policies (Moody, Slocumb, Berg, & Jackson, 2015). Computerized systems for analysis and diagnosis were first adopted by health professionals. More recent technology is making it easier for people to make better decisions (Moody, Slocumb, Berg, & Jackson, 2015). The major purpose of Health Informatics is to increase our understanding of medicine and medical practice by using real-world medical data. In the subject of healthcare, health informatics is a blend of information science and computer science (Sadoughi, Kimiafar, Ahmadi, & Shakeri, 2015).

A study by Allen, (2020) clearly stated that nursing staff utilized health informatics to identify patients who are at higher risk for serious conditions and take preventive steps early. At all levels of education, health informatics can be a pivot in transforming our resources for business education which could result in much-awaited technological changes in our nation .services in academic institutions and has permeated all aspects of life, breaking down barriers to communication and information accessible worldwide.

It has been observed by Hassan (2016) that clarifying and determining the status and finding defects and possible barriers can provide the basis for redesigning and improving the quality of care management and providing nursing services. Similarly, Ouma and Herseman, (2019) opine that the utilization of e-health tools in developing countries is posed with challenges which need to be addressed. These barriers include lack of computer equipment, lack of computer skills, and cost of computers and so on. These have contributed to the unreliability, inaccessibility and lack of sustainability of health informatics infrastructures. However, little has been done on the pattern, and relationship between socio-demographic characteristics of nurses and the utilisation of health informatics resource, barriers, as well as drivers to promote the adoption and utilisation of health informatics resource in Niger state, Nigeria. It is against these identified gaps that this study is time to fill the lacuna for accurate documentation and effective policy-making and implementation for better health outcomes.



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**1.3 Aim and Objectives**

The general aim and objective of this research work are to explore the strategies for strengthening the adoption and utilization of health informatics among nurses in Niger State, Nigeria. Specifically, the study intends to:

1. Assess nurses’ awareness regarding health informatics system to improve their service output and patient outcomes
2. Assess nurses’ perceptions regarding the adoption and use of health informatics to improve their service delivery and patient outcomes.

The following research questions intend to guide the study:

1. To what extent do nurses' awareness of the use of the health informatics systems improves health care service delivery in Niger state, Nigeria?
2. To what extent do nurses’ perceptions of health informatics affect the adoption and utilisation of health informatics to improve nurses' health care service delivery in Niger state, Nigeria?

**Hypothesis**

1. There is no significant relationship between nurses’ level of knowledge and utilization of health informatics among nurses in Niger state, Nigeria.

**Methodology**

The study was a triangulation of the quantitative and qualitative research methods. This study employed both quantitative and qualitative approaches to investigate the strategies for strengthening the adoption and utilisation of health informatics among nurses in Niger state, Nigeria. The sample size for this study was derived from the entire population of nurses in Niger state (1, 599, Ministry of Health and Hospital Management Board, Minna, 2022). However, the sample size was 320 nurses. This was derived using Taro Yamane’s formula for the determination of a sample size. The choice of Taro Yamane’s formula is informed by its suitability in the determination of samples from a heterogeneous and finite population (Okwandu, 2004). This was computed as follows:

Formula: 
$$n = \frac{N}{1 + N(e)^2}$$

Where: n= sample size sought  
 e = level of significance (0.05)

N = population size

Therefore: 
$$n = \frac{1,599}{1 + 1,599 (0.05)^2}$$

$$n = \frac{1,599}{1 + 1,599 (0.0025)}$$

$$n = \frac{1,599}{4.9975}$$





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n = 320 Approx.

The study covers all 25 Local Government Areas (LGAs) in Niger State .

**Stage 1:** In the first stage, the population was divided into smaller sampling units, that is, three geographical regions (Zone A, Zone B and Zone C). Simple random sampling (SRS) and simple balloting was used to select 3 local government areas from each zone, making the sample size of 9 local governments. The second stag involved a simple random sampling (SRS) by employing simple balloting to select the wards from each selected local government area. The nurses of these health facilities in each selected ward will be randomly selected to provide relevant information for the study. A semi-structured self-designed questionnaire was developed. The Four-point Likert Scale method of the response of: Strongly Agree (SA), Agree (A), Disagree (D), Strongly and Disagree (SD) was used to collect responses where necessary with the responses weighted as 4, 3, 2 and 1 respectively. The instrument was designed with each section seeking answers to each research question. The data for the study was collected by the researcher with the aid of six research assistants. Three major criteria were considered when selecting the research assistants. They are: currently studying as a postgraduate student; have a degree in health-related discipline; know research methods. The questionnaires were distributed with the aid of the research assistants and are collected immediately.

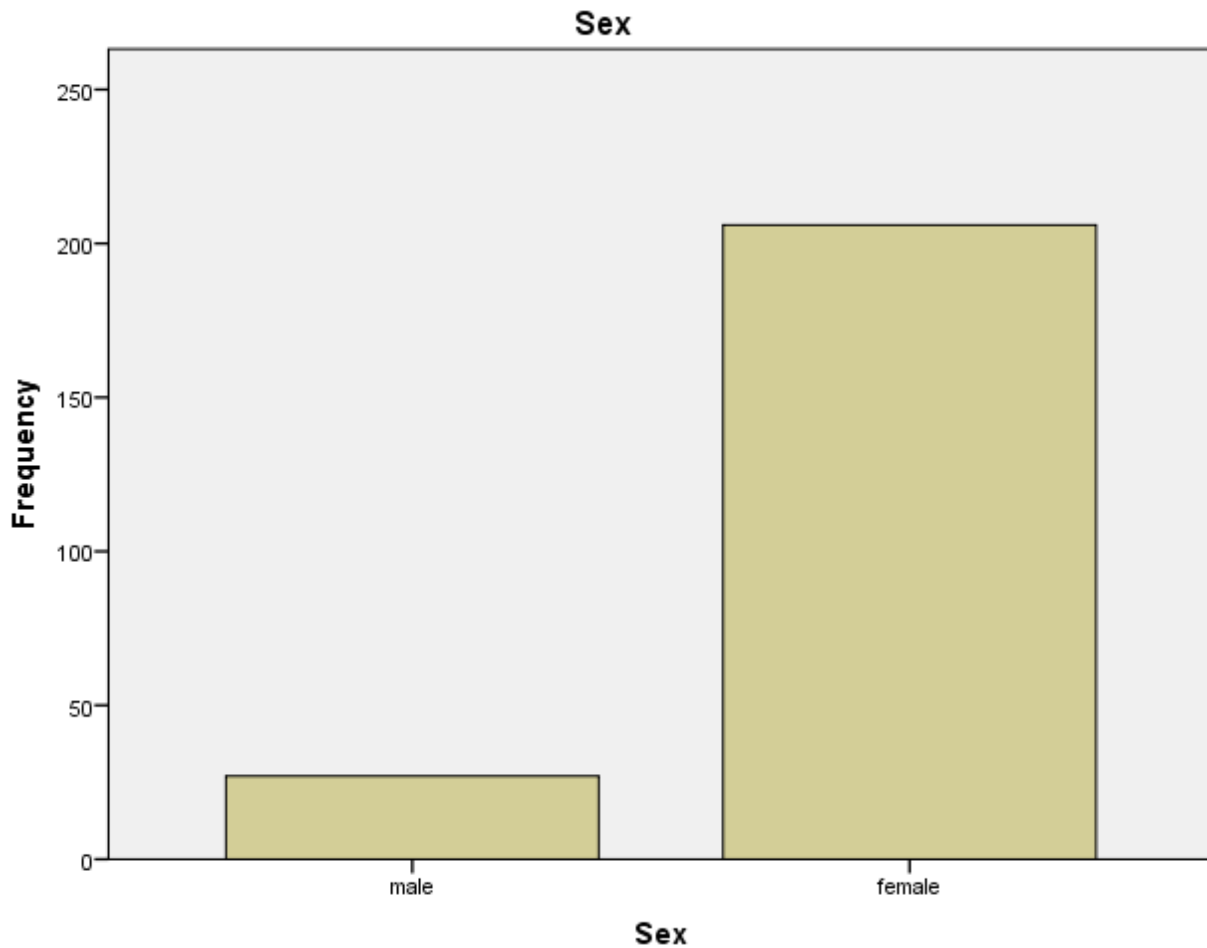
The quantitative data analysis was done using Statistical Package for Social Sciences (SPSS) for Windows. Descriptive and inferential statistics was used: Categorical variables from the questionnaire were identified after sorting, diagrams, Crosstabs, and Chi-Square goodness of fit.

## Result

### Sex distribution of the respondents



Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>

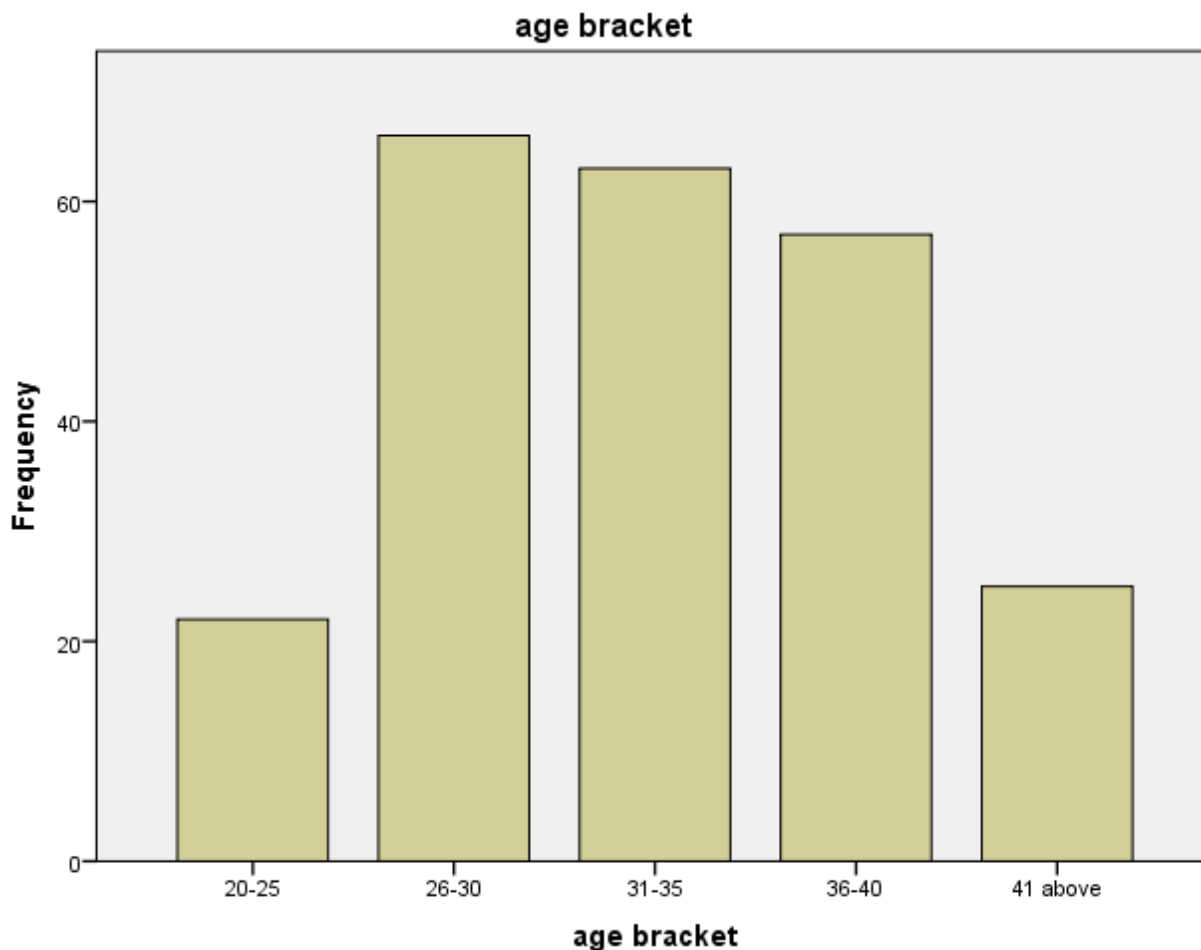


The chart shows the sex distribution of the respondents. It shows that 11.6% (27) are male, and 88.4% (206) were female. This clearly indicates that all the sex categories are well presented in the study.

**4.2.2: Age distribution of the respondents**



Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>



The chart presents the age distribution of the respondents that participated in the study. The chart indicates that 9.4% (22) belong to the age range of 20-25, 28.3% (66) were within the age range of 26-30, 27.0% (63) belong to the age range of 31-35, 24.5% (57) were within the age range of 36-40 and 20.7% (25) were within the age range of 41 and above.

**Table 4.3: Respondents responses on the awareness regarding health informatics system**

Items	Frequency	
	N=233	Percent
<b>%=100</b>		
I am aware of the health informatics system and its relevance in the healthcare management		
SD	9	3.9
D	13	5.6
A	137	58.8
SA	74	31.8



Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>

I know spreadsheet (Microsoft Excel)		
SD	91	39.1
D	100	42.9
A	31	13.3
SA	11	4.7
I am aware of the Data base management (Microsoft Access)but I don't know how to use it		
SD	25	10.7
D	40	17.2
A	134	57.5
SA	34	14.6
I know of internet search and but I don't make use of it in the course of delivering my service here		
SD	9	3.9
D	49	21.0
A	117	50.2
SA	58	24.9
I am aware of Electronic mailing to communicate with other health workers and but we don't use it here		
SD	33	14.2
D	50	21.5
A	110	47.2
SA	40	17.2
I am aware of computer files management (e.g. saves, delete, copy, edit, paste, merge, find etc.) and I know how to use them		
SD	47	20.2
D	102	43.8
A	60	25.8
SA	24	10.3
I can Set up computer system and install software		
SD	78	33.5
D	126	54.1
A	28	12.0
SA	1	0.4

**Source: fieldwork, 2022**

Data on Respondents responses on the awareness regarding health informatics system shows that the majority of the respondents 58.8% (137) agreed, 31.8% (74) strongly agreed, 5.6% (13) disagreed and 3.9% (9) strongly disagreed that they are aware of the health informatics system and its relevance in the health care management. The table revealed that 13.3% (31) agreed, 4.7% (11) strongly agreed, the majority 42.9% (100) disagreed and 39.1% (91) strongly disagreed that they knew a spread sheet (Microsoft Excel). The table also shows that the majority of the respondents 57.5% (134) agreed, 14.6% (44) strongly agreed, 17.2% (40) disagreed and 10.7% (25) strongly disagreed that they were aware of the database management (Microsoft Access) but did not know





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how to use it. Furthermore, the table indicates that the majority of the respondent 50.2% (117) agreed that they knew of internet search but did not make use of it in the course of delivering my service here, 24.9% (58) strongly agreed, 21.0% (49) disagreed and 3.9% (9) strongly disagreed. The table provides that the majority 47.2% (110) agreed, 17.2% (40) strongly agreed, 21.5% (50) disagreed and 14.2% (33) strongly disagreed that they were aware of electronic mailing to communicate with other health workers and but did not use it their respective hospitals. The row data show that 25.8% (60) agreed, 10.3% (24) strongly agreed, the majority 43.8% (102) disagreed and 20.2% (47) strongly disagreed that they were aware of computer files management (e.g. saves, delete, copy, edit, paste, merge, find etc.) and did not know how to use them. The table adds that 12.0% (28) agreed, 0.4% (1) strongly agreed, the majority 54.1% (126) disagreed and 33.5% (78) strongly disagreed that they can set up the computer systems and install the software.

The qualitative data was collected via KII to complement the quantitative data. A female nurse who was 32 years old in an interview in Bida holds that:

Yes, I am aware of the use of health informatics systems. I worked in I private hospital in Abuja before being employed here. There, the hospital management introduced the use of health informatics system and it was very efficient and effective in keeping patients’ records and communicating with other co-workers, but here such are unfounded ( 23 Sept 2022).

**Table 4.3: Respondents' responses regarding the adoption and use of health information to improve service delivery**

Items	Frequency N=233	Valid Percent %=100
<b>I have a positive attitude towards Information cation technology</b>		
SD	6	2.6
D	29	12.4
A	144	61.8
SA	54	23.2
<b>Have used a computer for more than three years and this improves service delivery</b>		
SD	81	34.8
D	88	37.8
A	46	19.7
SA	18	7.7
<b>Have used the Internet and this improves service delivery</b>		
SD	89	38.2
D	91	39.1
A	34	14.6
SA	19	8.2



Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>

**Never used a computer because it has no benefits here**

SD	104	44.6
D	118	50.6
A	4	1.7
SA	7	3.0

**Never used the Internet for service delivery here**

SD	12	5.2
D	38	16.3
A	72	30.9
SA	111	47.6

**I Possess a laptop computer and it aids me in delivery an effective services**

SD	80	34.3
D	110	47.2
A	26	11.2
SA	17	7.3

**Have used social media to chat with my co-workers and this improve my services delivery here**

SD	59	25.3
D	105	45.1
A	68	29.2
SA	1	0.4

**Source: fieldwork, 2022**

The data in respect to adoption and use of health informatics to improve service delivery shows that majority of the respondents 61.8% (144) agree that they have positive attitude towards health informatics, 23.2% (54) strongly agreed, 12.4% (29) and 2.6% (6) strongly disagreed. Also, 37.8% (88) disagreed, 34.8% (81) strongly disagreed, 19.7% (46) agreed and 7.7% (18) strongly agreed that they have used computers for more than three years and this improve their service delivery. In addition, the table indicates that 39.1% (91) disagreed, 38.2% (89) strongly disagreed, 14.6% (34) agreed and 8.2% (19) strongly agrees that they have used the internet and this improves their respective service delivery. The table adds that the majority of the respondents 50.6% (118) disagreed, 44.6% (104) strongly disagreed, 1.7% (4) agreed and 3.0% (7) strongly agreed that they never used a computer because it has no benefit in their respective hospital. The data indicates that the majority of the respondents 47.2% (110) disagreed, 34.3% (80) strongly disagreed, 11.2% (26) agreed and 7.3% (17) strongly agreed that Possessing a laptop computer and its aids them in delivering effective services. The table further indicates that majority of the respondents 45.1% (105) disagreed, 25.5% (104) strongly disagreed, 29.2% (68) agreed and 0.4% (4) strongly agreed that they had used social media to chat with their co-workers and this improve their services delivery in their respective hospital. The table seeks to know the general perception of health informatics among the respondents. The table revealed that the majority of the respondents 44.6% (104) agreed that the health informatics system was very effective in service delivery but it was not been used in their hospitals, 31.3% (73) strongly agreed, 16.3% (38) disagreed and 7.7% (18) strongly disagreed.



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In an interview, a 34 years old female nurse in Kontagora said:

I know that the health informatics system is useful but we don't adopt and use it here because there is no such room created by the hospital management. We are still using paper to record patients' information.

**Test of Hypothesis**

H1: There is no significant relationship between nurses' level of knowledge and utilization of health informatics among nurses in Niger state, Nigeria.

Value	value	Df	Asymp. Sig (2 sided)	Exact sig(2 sided)	Exact Sig ( 1 sided)
Pearson Chi-Square	27.137	9	.001		
Continuity correction	26.342	9	.001		
Likelihood Ratio	23.543	9	.005		
Linear-by-Linear Association	2.266	1	.132		
Fisher's exact test				.000	.000
N of Valid Cases	233				

The table presents the test of the hypothesis using the Pearson Chi-square statistical test. As shown in the table, the null hypothesis which states that there is no significant relationship between nurses' level of knowledge and utilization of health informatics among nurses in Niger state, Nigeria is rejected and the alternative affirmed. This implies that nurses' level of knowledge has a statistically significant influence on the use of health informatics among nurses in Niger state. This is because the  $X^2 = 27.137$ ;  $P = .000 < 0.05$ ;  $df = 9$ . This implies that nurses' level of knowledge of health informatics has a significant influence on the utilisation of health informatics in Niger state.

**Discussion of the findings**

This section deals with the discussion of findings emanating from the quantitative and qualitative data collected and presented. This is discussed based on the research objectives and questions.

**Finding awareness regarding health informatics system in Niger State, Nigeria**

Table 4.2 contains items 5-11 and provides answers to research question one on the awareness regarding informatics systems among nurses. The study revealed that majority of the nurses were aware of the informatics system but they did not utilise them in their respective hospitals. This is evident in the table that the majority of the nurses agreed that they were aware of database management, internet search, and electronic mailing computer files management but they do not utilise them while carrying out their designated functions. Also, it entails that awareness of health informatics was high but utilisation was relatively low. These findings tally with Agin, Melisachew, Lemma & Solomon (2016) who study on the knowledge, attitude and utilization of information communication technologies (ICTs) in an Ethiopian medical teaching hospital. The study indicated that students and health care providers have low knowledge levels and poor utilization status of ICT for academic purposes and service delivery needs.

**Finding on adoption and use of health informatics in Niger State, Nigeria**

Table 4.3 contain items 12-18 to elicit information on the adoption and use of health informatics system to improve service delivery. The study revealed that nurses in the study area did not adopt and utilise health informatics systems in service delivery even though they have a positive attitude



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towards health informatics systems. It was revealed that the hospital management did not adopt the health informatics system and that was why the majority of the nurses disagree and strongly disagreed with having a computer system, and laptop because it has no benefit in their respective workplace. The majority of the nurses also disagreed with using social media to chat with co-workers on service delivery. The finding tallies with Again, Flora (2013) also carried out a study on computer usage among nurses in rural healthcare facilities in South Africa: obstacles and challenges.

### Conclusion

In the present situation of nurse shortages, the use of computers is all the more important as it maximizes the time nurses spend on patient care and minimizes the time spent on tasks that do not require professional nursing expertise. Across the world, particularly in developed countries, computers have become an integral part of clinical activities allowing for more effective information storage and retrieval; for example, computers are used to create and store nurses' notes and discharge forms. For educational purposes, computers allow for self-paced learning. In research, Internet access enables faster literature searches and databases widen the scope of enquiry. In nursing administration, computers are used to keep track of supplies received and disbursed, to communicate, receive and send information about discharges and transfers, to monitor patients and to receive laboratory test results. Computers could also be used to fast-track the dissemination of health information such as clinical guidelines, intervention protocols and policies.

### Recommendations

Based on the findings of the study, the following recommendations are made:

1. For this reason, drivers of health management must embrace the health informatics system and also ensure its adaptability because it is regarded as a resource of convenience and acceptable health informatics system.
2. In the information age, the inability to effectively use computers may be an obstacle for nurses in performing their day-to-day activities effectively. However, if issues of access to support, resources and organizational culture are confronted, this may make computer use at all levels of the nursing profession more prolific.
3. At the rate technology is currently transforming healthcare delivery worldwide; nurses need to be computer literate. To achieve this, nurses need the right computer training and, most importantly, an organizational culture with a positive attitude toward the use of computers.

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Strategies for Strengthening ..... (Umoru, E. H & Gwarzo, A. A<sup>1</sup> 2024) DOI:<https://10.59479/jiaheri.v1i1.73>

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