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## Nurses information literacy skills on the use of electronic information resources for healthcare services delivery in federal medical centers in North-East, Nigeria

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### Abstract

This study examined the information literacy skills on the use of e-resources by nurses for healthcare service delivery. The study adopted a quantitative research methodology using cross-sectional survey design. The population of the study consisted of all the 521 clinical nurses working in the Federal Medical Centers in north-east, Nigeria. A structured questionnaire was used to collect data which was analysed using descriptive and inferential statistics. The findings of the descriptive statistics revealed that nurses possess skills to construct strategies for locating information (mean=2.95) and ability to distinguish potential information sources (mean=2.89) and the major sources through which Nurses access e-resources was search engines (mean=3.41) and smart phones (mean=3.19). The findings also revealed that the major types of e-resources used were Medline Biomedical and Health Resources (mean=2.75) and Nursing Reference Center Plus (mean=2.55), and the major influence of e-resources on health services include Learning new ways of measuring and monitoring patients' vital signs (mean=2.82) and Providing health education in preventing the spread of diseases using empirical findings (mean=2.66). The major problems in accessing and utilizing e-resources include lack of knowledge of availability of resources, poor internet connectivity (mean=4.00), inadequate facilities for using e-resources (mean=3.37) and inability to evaluate information sources (mean=3.37). The inferential statistics found that there is a positive relationship ( $r(350) = .378, n=352, P=.000$ , i.e. less than 0.05) in the first hypothesis with a weak correlation and also a positive relationship ( $r(350) = .601, n=352, P=.000$ , i.e. less than 0.05) in the second hypothesis with a very strong correlation and therefore reject both null hypotheses because there is sufficient evidence of significant correlation between the variables. The study recommends that the libraries in the federal medical centers be equipped with robust internet connectivity in addition to stable/uninterrupted power supply.

**Keywords:** E-resources, nurses, healthcare services, information literacy skills, online database

### Introduction

The revolutionary changes in information and communication technologies changed the way information is stored, retrieved and disseminated. Hence it is the responsibility of information professionals to satisfy clinical information needs so they are timely and accurate in nature. The concept of health is no longer limited to the absence of disease, today it encompasses the physical, mental and social wellbeing of each individual. Significant changes have emerged in healthcare knowledge and the need for clinical information at the point of care have evolved.

The availability of clinical information on the web has changed the ways of accessing information in recent years. Information needs and use by nurses for clinical practice has a paradigm shift in recent years, and the focus is now more on the access to and use of information that is embedded in electronic formats. Consequently, Efe (2013) <sup>[4]</sup> opined that in this information age where digital information and knowledge dominates professionals' expectations and information sources vary from the past, it is pertinent that these changes or development affects healthcare services delivery across the world.

Electronic information resources containing Health Resources for nurses' information needs include the Medline Database containing full text biomedical and health journals, PubMed Databases is a services of the National Library of Medicine which provide access to Medline Data citations. Other resources include CINAHAL Plus covering literature related to nursing

and allied health, EMBASE-ExcerptaMedica Database for international research on drugs and disease coverage. Cochrane library is an independent medical evidence on which to base clinical treatment decisions and POPLINE Database featuring scholarly and non-scholarly literature related to family planning, population and reproduction are important health resources related to nursing research (WHO, 2004) <sup>[16]</sup>.

According to Lansley (2013) <sup>[5]</sup>, e-resources are relevant to nursing research in enhancing effective healthcare service delivery in hospital because they contain information such as Nursing Reference Center Plus which is a master nursing best practices with premier source that answers questions quickly. Others include Global Infectious Disease and Epidemiology Network (GIDEON) providing evidence based resources for diagnosis, teaching and treatment among others.

Health information is crucial to every medical personnel in providing healthcare services to their patients. Medical personnel need current, relevant and reliable information in order to discharge their duties. Healthcare delivery is the provision of healthcare services to individual or community by health workers in order to improve the health status of the people. Therefore, the role of health personnel also contributes to the economic devolvement of every nation. Medical personnel need various information sources in order to obtain relevant information resources to satisfy their information needs and discharge their clinical duties, because information is a tool for both clinical and professional development in nursing profession.

It is against this background and inadequate supported evidence that this research become imperative to investigate the literacy skills, availability, relevance and level of utilization of e-resources by nurses in enhancing effective healthcare service delivery in federal medical centers in north-east, Nigeria and also to explore the relationships between the electronic resources and enhancing effective healthcare service delivery.

### Problem statement

Nursing is one of the allied fields of medical research and nurses play a very significant role in the provision of healthcare service, and also in extending healthcare services to the community. They are also the backbone to the maintenance of the hospitals in general while playing significant roles in assisting medical doctors in performing duties. Hence, any new development in the medical field has a direct effect on the nursing profession in general and the nurses in particular.

Observations and available literature {Oduwole & Idowu (2012) <sup>[9]</sup> and Aina (2014)} <sup>[2]</sup> have indicated that, various professional groups including nurses find it difficult to utilize and harness the vast information imbedded in the electronic world. Most of the nurses lack information literacy skills and computer skills to search for information online, as a result, they cannot find the information they needed for healthcare delivery. This statement is supported by Momoh, Oni & Oshinebo (2015) <sup>[8]</sup> who found that most nurses still find it difficult to find current and relevant information resources online to help them when managing their patients.

In view of the aforementioned, this research intends to conduct a survey in order to determine the information literacy skills possessed by the nurses to use e-resources for

effective healthcare service delivery in the Federal Medical Centers in North-East Nigeria.

### Objectives

1. To investigate the level of Information Literacy Skill of Nurses on the use of e-resources for effective healthcare service delivery in the federal medical centers in north-east, Nigeria;
2. To identify the sources of e-resources used by nurses in federal medical centers under study;
3. To identify the type of e-resources used by nurses for effective healthcare service delivery in federal medical centers under study;
4. To examine the influence of e-resources on enhancing effective healthcare services delivery in the federal medical centers under study;
5. To determine the common problems encountered when using e-resources by Nurses in the federal medical centers under study;

### Hypotheses of the study

- H<sub>01</sub>: There is no statistically significant relationship between the type of e-resources available and the level of utilization of the resources by Nurses for effective healthcare services delivery.
- H<sub>02</sub>: There is no statistically significant relationship between the level of utilization and the influence of e-resources on effective healthcare service delivery by nurses.

### Literature review

Information Technology has changed the behaviour of information seekers in all occupations, and nursing occupation is no exception. From newspaper publishing to research journals, more and more information is being published both in print and electronic format. Information related to health problems, health assessment, diseases, treatment of patients, and other health disciplines is in the health information domain. Nursing professionals need to keep abreast with the latest developments in their concerned fields.

Information resources can be in print or electronic resources such as e-books, e-journals, internet, databases that are used by individuals to find relevant information with regards to their daily activities. According to Miller, Stimely, Matheny, Pope, McAtee & Miller, (2014) <sup>[7]</sup>, the ability of nurses to use an Electronic Health Record effectively is critical to patient safety, decreased facility expenditures for training, and reduced healthcare costs. To use EHRs effectively, nurses must have the right electronic information seeking behaviour and the required knowledge and skills. Electronic information seeking behaviour is the searching of the desired information in electronic sources, which can be both online and offline.

Consequently, Singh & Mahapatra (2017) <sup>[13]</sup> opined that improved technology has helped to increase access to information manifold. Compared to their teachers and older clinical nurses, nurses are now more proficient in making use of e-resources. But the study by Arvind & Maheswarappa (2014) <sup>[3]</sup> found that 97% of nurses used Community health centers as their main information sources followed by 95% used doctors while 81% used libraries and neighbours. However, 93% of nurses sourced health information from printed sources like posters, magazines

and newspapers, 40% used neighbours 55% used family members while 45% used relatives and friends. The above findings have shown that nurses do not use electronic outlets to sources information for healthcare services delivery as none of the literature reviewed has indicated any of the nurses using e-resources as their main sources of information, hence this study intends to fill the gap in these reviewed studies.

With the increase in number of publications in nursing profession and the introduction of the internet, many new electronic information sources are now available to nurses. The availability of internet has provided opportunity to the most current and reliable information sources. In view of this, Olajide & Otunla (2015) [10] found that 28% of nurses used internet as their information sources followed by 22% who used journals while 21% used books as their information source, 32.1% used other health professionals like doctors and 29.3% used nursing colleagues, 28.6% used health/medical libraries, only 11.4% used electronic data bases. This corroborates the findings of McCulley & Jones (2014) [6] who found that student nurses did not know that librarians could help them. Most of the studies revealed that majority of the nurses used their professional colleagues as their main source, this showed that very few of the nurses use internet and electronic databases.

Similarly, Ahmed & Al-Reyaee (2017) [1] found that only 8% of the nurses used online databases more than six (6) times a week, 84% of them used them from one to five times a week, and 8% indicated usage of less frequently than once a week. On the other hand, only 4% of clinical nurses used databases more than six (6) times a week, 32% used them used them one to five times a week, and 64% did not perform searches even on a weekly basis. The usage figures clearly reflected the different access to databases and the previous training for each group. Additional comparisons of factors that influenced database searching by nursing students and clinical nurses found that insufficient time for electronic database searching was a deterrent indicated by 28% of the nursing students, compared to 76% of clinical nurses.

From the discussion above, it is identified that majority of nurses use their professional colleagues as their sources of information for healthcare delivery. Thus, other types of information resources such as medical textbooks, journals and internet are not commonly utilized by the nurses. The review also showed that only few nurses use internet and e-resources to obtain information for healthcare delivery. It is against this background that the study investigates the information literacy skills of nurses and the nature of e-

resources used by nurses for effective healthcare service delivery in Federal Medical Centers in North-East, Nigeria.

**Methodology**

The study was conducted in all the five (5) Federal Medical Centers in North-East, Nigeria which are Azare, Gombe, Jalingo, Nguru, and Yola. The population of the study comprises of all the clinical nurses working in the five (5) Federal Medical Centers in North East, Nigeria as at the time of the preliminary survey, which was five hundred and twenty-one (521). The whole population of the study was used to generate the data for the study, where a cross-sectional survey method was used with structured questionnaire administered to collect data from the respondents.

The data collected was subjected to both descriptive and inferential statistics. The descriptive statistics that was used to examine the nature and use of e-resources among members of the study population were frequency counts, means and percentages. Pearson’s Product Moment Correlation (PPMC) was used to show the relationship between the independent variable (types and utilization of e-resources by nurses) and the dependent variables (effective healthcare services delivery).

**Findings**

**Table 1:** Response rate

Questionnaire	Frequency	Percentage (%)
Administered	521	100%
Returned	352	67.6%
Not returned	169	32.4%

Table 1 above shows the response rate of the nurses, where a total of five hundred and twenty-one (521) copies of the questionnaire were administered to the nurses in the five (5) Federal Medical Centers in North-East, Nigeria, and three hundred and fifty-two (352/67.6%) were returned and found useful for the study. One hundred and sixty-nine (169/32.4%) were not returned. The rate of return was due to the fact that researchers took time out to administer the questionnaire personally to the respondents.

**Research objective one:** To investigate the level of information literacy skill of nurses on the utilization of e-resources for effective healthcare service delivery in the federal medical centers under study

**Table 2:** Information literacy skills of nurses

Item	Very high	High	Low	Not applicable	Mean	Decision
Ability to formulate questions based on my information needs	65 (18.5%)	136 (38.6%)	110 (31.2%)	41 (11.6%)	2.64	Accepted
Ability to distinguish potential information resources	136 (38.6%)	83 (23.6%)	90 (25.6%)	43 (12.2%)	2.89	Accepted
Ability to construct strategies for locating information	151 (42.9%)	87 (24.7%)	60 (17.0%)	54 (15.3%)	2.95	Accepted
Ability to evaluate information obtained from different sources.	85 (24.1%)	115 (32.7%)	87 (24.7%)	65 (18.5%)	2.63	Accepted
Ability to use information in critical thinking and problem solving	93 (26.4%)	66 (18.8%)	78 (22.2%)	115 (32.7%)	2.39	Rejected
Overall mean					2.71	Significant

Table 2 represent the information literacy skills of the respondents, where the analysis showed that nurses in federal medical centers in north east, Nigeria possessed significant level of information literacy skills (overall mean=2.71) for accessing e-resources for effective healthcare service delivery. The table showed that the ability to formulate questions

based on information needs (mean=2.64), Ability to distinguish potential information resources (mean=2.89), ability to construct strategies for locating information (mean=2.95) and ability to evaluate information obtained from different sources (mean=2.63) are accepted as the level of information literacy skills of the respondents. While the analysis also revealed that ability to use



information in critical thinking and problem solving (mean=2.39) was rejected as the level of information literacy skills of the respondents. The implication of the above result is that, majority of the nurses in federal medical centers in north east, Nigeria possess significant level of

information literacy skill.

**Research objective two:** To identify the sources of e-resources used by nurses in federal medical centers in north-east, Nigeria

**Table 3:** Sources of e-resources for nurses

Source of e-resources	Very high	High	Low	Not applicable	Mean	Decision
Data files	35 (9.9%)	45 (12.8%)	71 (20.2%)	201 (57.1%)	1.76	Rejected
Institutional Repositories	35 (9.9%)	32 (9.1%)	26 (7.4%)	259 (73.6%)	1.55	Rejected
Online database	151 (42.9%)	99 (28.1%)	102 (29.0%)	0 (0.0%)	3.14	Accepted
Search engines	206 (58.5%)	85 (24.1%)	61 (17.3%)	0 (0.0%)	3.41	Accepted
Smart phones	151 (42.9%)	119 (33.8%)	79 (22.4%)	3 (0.9%)	3.19	Accepted
Total					2.61	Significant

The result on table 3 above showed that respondents accessed e-resources from different sources which depended mainly on availability. Over 291(82.6%) (Very High and High) of the respondents indicated that the sources through which they accessed e-resources the most is search engines (mean=3.41), 270(76.7%) (Very High and High) access e-resources through their smart phones (mean=3.19) while 250(71%) (Very High and High) access e-resources through online database (mean=3.14). Only 80(22.7%) of the respondents had accessed e-resources through data files (mean=1.76) and 67(19%) access e-resources through

institutional repositories (mean=1.55).

The analysis further revealed that the overall mean was significant (mean=2.61) which shows that nurses use different sources of e-resources towards effective healthcare service delivery in federal medical centers in north east, Nigeria.

**Research objective three:** To identify the type of e-resources used by nurses for healthcare service delivery in federal medical centers in north east, Nigeria

**Table 4:** Medical e-resources used

E-resource	Very high	High	Low	Not used	Mean	Decision
Medline Biomedical and Health resources	121 (34.5%)	83 (23.6%)	87 (24.7%)	61 (17.3%)	2.75	Accepted
PUBMED and ExcerptaMedica Database (EMBASE)	39 (11.1%)	44 (12.5%)	72 (20.5%)	197 (56.0%)	1.79	Rejected
CINAHL Plus and COCHRANE Library	30 (8.5%)	74 (21.0%)	90 (25.6%)	158 (44.9%)	1.93	Rejected
HINARI, POPLINE and TOXNET	56 (15.9%)	36 (10.2%)	82 (23.3%)	178 (50.6%)	1.91	Rejected
LILACS and TRIP Pro	48 (13.6%)	84 (23.9%)	38 (10.8%)	182 (51.7%)	1.99	Rejected
Global Infectious Disease and Epidemiology Network (GIDEON)	109 (31.0%)	53 (15.1%)	85 (24.1%)	105 (29.8%)	2.50	Accepted
Nursing Reference Center Plus	100 (28.4%)	90 (25.6%)	67 (19.0%)	95 (27.0%)	2.55	Accepted
Overall Mean					2.20	Not significant

Table 4 above represent the analysis of the different types of medical e-resources used by nurses. The table reveals that Medline Biomedical and Health resources (mean=2.75), Global Infectious Disease and Epidemiology Network (GIDEON) (mean=2.50) and Nursing Reference Center Plus (mean=2.55) with their mean marks above 2.50 benchmark are accepted as the only types of medical e-resources used by nurses in federal medical centers in north east, Nigeria. PUBMED and ExcerptaMedica Database (EMBASE) (mean=1.79) have over 197(56.0%) of the total respondents rated not used while CINAHL Plus and COCHRANE Library (mean=1.93), HINARI, POPLINE and TOXNET (mean=1.91) and LILACS and TRIP Pro (mean=1.99) are

rejected by the respondents as not part of the types of medical e-resources used by them.

The table further revealed that the overall mean is not significant with a mean mark below 2.50 benchmark (mean=2.20) due to the respondents rejecting most of the medical e-resources. This may be due to a lack of awareness about the availability of these resources or their preference to using professional colleagues than other sources of information, including e-resources.

**Research objective four:** To examine the influence of e-resources on enhancing effective healthcare services delivery in the federal medical centers under study

**Table 5:** E-resources for healthcare services delivery by nurses

Influence	Very high	High	Low	Not applicable	Mean	Decision
Provision of current nursing information to patients on contemporary diseases	78 (22.2%)	89 (25.3%)	25 (7.1%)	160 (45.5%)	2.24	Rejected
Providing health education in preventing the spread of diseases using empirical findings	165 (46.9%)	35 (9.9%)	20 (5.7%)	132 (37.5%)	2.66	Accepted
Applying new trends of patients examination based on findings from empirical studies	61 (19.3%)	30 (8.5%)	160 (45.5%)	101 (28.7%)	2.15	Rejected
Modern ways of admitting and discharging patients with prior notice electronically	129 (36.6%)	25 (7.1%)	132 (37.5%)	66 (18.8%)	2.62	Accepted
Learning new ways of measuring and monitoring patients' vital signs using e-resources	182 (51.7%)	31 (8.8%)	32 (9.1)	107 (30.4%)	2.82	Accepted
Promoting health status of patients through enlightenment campaigns	94 (26.7)	82 (23.3%)	113 (32.1%)	63 (17.9%)	2.59	Accepted
Overall mean					2.51	Significant

Table 5 represent the level of influence of e-resources on enhancing healthcare service delivery in federal medical centers in north east, Nigeria. The table revealed that the influence of e-resources is significant (mean=2.51) as e-resources have positive effect for effective healthcare service delivery.

The analysis indicated that majority 200 (56.8%) of the respondents rated that e-resources enhances the provision of health education in preventing the spread of contagious diseases using empirical findings (mean=2.66), modern ways of admitting and discharging patients with prior notice electronically (mean=2.62), learning new ways of measuring and monitoring patients' vital signs using e-resources (mean=2.82) and promoting health status of patients through media enlightenment campaigns

(mean=2.59) are accepted as the level of enhancing effective healthcare service delivery as a result of utilization of e-resources by the nurses under study.

The analysis further showed that the provision of current nursing information to patients on contemporary diseases (mean=2.24) and applying new trends of patients' examination based on findings from empirical studies (mean=2.15) are rejected and not among the influences of e-resources on enhancing effective healthcare service delivery in federal medical centers in north east, Nigeria.

**Research Objective Five:** To determine the common problems encountered when using e-resources by nurses in the Federal Medical Centers under study

**Table 6:** Common problems encountered when using e-resources

Item	Very high	High	Low	Not applicable	Mean	Decision
Inability to seek and obtain information	167 (47.4%)	80 (22.7%)	105 (29.8%)	0 (0.0%)	3.18	Accepted
Lack of requisite computer use skills	115 (32.7%)	130 (36.9%)	46 (13.1%)	61 (17.3%)	2.85	Accepted
Knowledge of availability of resources	352 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4.0	Accepted
Unstable power supply	10 (2.8%)	342 (97.2%)	0 (0.0%)	0 (0.0%)	3.03	Accepted
Poor internet connectivity	0 (0.0%)	352 (100.0%)	0 (0.0%)	0 (0.0%)	3.0	Accepted
Inadequate facilities for using e-resources	166 (47.2%)	150 (42.6%)	36 (10.2%)	0 (0.0%)	3.37	Accepted
Inability to evaluate information sources	166 (47.2%)	150 (42.6%)	36 (10.2%)	0 (0.0%)	3.37	Accepted
Overall mean					3.11	Highly significant

Respondents were asked about common problems limiting access to, and use of e-resources by the nurses under study. The table revealed the overall mean of the problems as highly significant (mean=3.11) as the respondents faces numerous problems while accessing and using e-resources through accepting all the items indicated on table 6 above.

The findings showed that all the respondents rated lack of knowledge of availability of resources (mean=4.0) very high as it affects their accessibility and utilization of the resources. Poor internet connectivity (mean=3.00), inability to seek and obtain information (mean=3.18), lack of requisite computer use skills (mean=2.85), unstable power supply (mean=3.03), inadequate facilities for using e-

resources and inability to evaluate information sources (mean=3.37) among others as the major problems nurses encountered while accessing and using e-resources by nurses in enhancing effective healthcare service delivery in federal medical centers in north east, Nigeria.

**Inferential statistics analysis**

**Hypotheses**

H<sub>01</sub>: There is no statistically significant relationship between the sources of e-resources for nurses and the level of utilization of the resources by nurses for healthcare services delivery.

**Table 7:** Correlation analysis of sources and level of utilization of e-resources

Correlations			
		Utilization of e-resources	Source of e-resources
Sources of e-resources for Nurses	Pearson Correlation	1	.378**
	Sig. (2-tailed)		.000
	N	352	352
Level of utilization of e-resources by nurses	Pearson Correlation	.378**	1
	Sig. (2-tailed)	.000	
	N	352	352

\*\*Correlation is significant at the 0.01 level (2-tailed)

Table 7 represent the Pearson's Product Moment Correlation (PPMC) of the first hypothesis of the study on the different sources of e-resources and the level of utilization by the nurses under study. The analysis revealed that the correlation coefficient is significant at the 0.01 level (2-tailed) and the relationship is positive ( $r(350) = .378$ ,  $n=352$ ,  $P=.000$ , i.e. less than 0.05). This analysis revealed a weak correlation that is only 37% of the different sources of e-resources influences utilization of the resources, while over 63% are being influenced by other factors.

If the P value significant level is less than 0.05 ( $p < .05$ ) the Null Hypothesis of the study will be rejected while if the P

value significant level is greater than 0.05 ( $p > .05$ ) the Null Hypothesis of the study will be retained. Therefore, according to this analysis, the H<sub>0</sub> is rejected ( $p < 0.05$  i.e. Sig = 0.001), because there is sufficient evidence of significant correlation between the different sources of e-resources and the level of utilization of the resources by the nurses in federal medical centers in north east, Nigeria.

H<sub>02</sub>: There is no statistically significant relationship between the level of utilization of e-resources and the influence of e-resources on healthcare service delivery by nurses in federal medical centers in north east, Nigeria.

**Table 8:** Correlation analysis of level of utilization and influence

Correlations			
		Utilization of e-resources	Influence of e-resources
Level of utilization of e-resources by nurses	Pearson Correlation	1	.601**
	Sig. (2-tailed)		.000
	N	352	352
Influence of e-resources on healthcare service delivery	Pearson Correlation	.601**	1
	Sig. (2-tailed)	.000	
	N	352	352

\*\*Correlation is significant at the 0.01 level (2-tailed).

Table 8 represents the Pearson’s Product Moment Correlation (PPMC) of the second hypothesis of the study on the level of utilization of e-resources and influence of the resources on healthcare service delivery by the nurses under study. The analysis revealed that the correlation coefficient is significant at 0.01 level (2-tailed) and the relationship is positive ( $r(350) = .601, n=352, P=.000$ , i.e. less than 0.05) that is high increase in the level of utilization of e-resources will increase the level of enhancement of healthcare service delivery. Healthcare service delivery is influenced by more than 60% through utilization of e-resources while the remaining 40% is influenced by other factors.

If the P value significant level is less than 0.05 ( $p<.05$ ) the Null Hypothesis of the study will be rejected while if the P value significant level is greater than 0.05 ( $p>.05$ ) the Null Hypothesis of the study will be retained. Therefore, according to this analysis, the  $H_0$  is rejected ( $p<0.05$  i.e. Sig = 0.001), because there is sufficient evidence of significant correlation between the different types of e-resources and the level of utilization of the resources by the nurses in federal medical centers in north east, Nigeria.

**Discussion of major findings**

The methodology employed in this study was the cross-sectional survey design, where the study first ran a descriptive statistics analysis to obtain percentages and mean counts before running an inferential analysis using Pearson Product Moment Correlation (PPMC) to show the relationship among the variables of the study.

**Information literacy skills of nurses on the use of e-resources**

The study found out that nurses possessed significant level of information literacy skills (overall mean=2.71) for accessing e-resources for healthcare service delivery. The ability to formulate questions based on information needs (mean=2.64), ability to distinguish potential information resources (mean=2.89), ability to evaluate information obtained from different sources (mean=2.63) and ability to synthesize and build on existing knowledge (mean=2.72) are found to be the level of information literacy skills of the respondents. The implication of the above result is that, majority of the nurses in federal medical centers in north east, Nigeria possess significant level of information literacy skill. This is line with the result of the study by Toyo (2017) which found that more than half of the nurses have average information literacy skills.

**Sources of e-resources for nurses**

The descriptive analysis shows that the sources for accessing e-resources was significant (mean=2.61) which shows that nurses use different sources of e-resources for research in nursing towards effective healthcare service

delivery in federal medical centers in north east, Nigeria. The study found out that the major mode of accessibility of e-resources by the nurses under study is through search engines (mean=3.41), 270 (76.7%) of the nurses’ access e-resources through their smart phones (mean=3.19) while 250 (71%) access e-resources through online database (mean=3.14). Only 80 (22.7%) of the respondents’ access e-resources through data files (mean=1.76) and 67 (19%) access e-resources through institutional repositories (mean=1.55). This finding is in line with the findings of Song and Buba (2017) [14] which also identified that professionals accessed e-resources through their mobile phones.

**Level of utilization of different types of e-resources by nurses**

The study found out that the level of utilization of e-resources by the nurses is not significant (mean=2.20) due to the respondents rejecting most of the different types of medical e-resources. This may be due to a lack of awareness about the resources and problems identified by the study or their preference to using professional colleagues than e-resources.

The different types of medical e-resources used by nurses include Medline Biomedical and Health resources (mean=2.75), Global Infectious Disease and Epidemiology Network (GIDEON) (mean=2.50) and Nursing Reference Center Plus (mean=2.55) while PUBMED and ExcerptaMedica Database (EMBASE) (mean=1.79), CINAHL Plus and COCHRANE Library (mean=1.93), HINARI, POPLINE and TOXNET (mean=1.91) and LILACS and TRIP Pro (mean=1.99) are rejected by the respondents as not part of the types of medical e-resources used by them. The findings indicated in general that the nurses do not make use of the various medical e-resources available. This corroborates the study by Ahmed and Al-Reyae (2017) [1] who found that only 8% of the nurses used online databases more than six (6) times a week, 84% of them used them from one to five times a week, and 8% indicated usage of less frequently than once a week.

**Influences of using e-resources by nurses**

The study found out that use of e-resources influences the use of advanced information resources in federal medical centers in north east, Nigeria (mean=2.51) with a positive effect on healthcare service delivery. The study found out that e-resources enhances the provision of health education in preventing the spread of contagious diseases using empirical findings (mean=2.66), modern ways of admitting and discharging patients with prior notice electronically (mean=2.62) and promoting health status of patients through enlightenment campaigns (mean=2.59) are accepted as ways of enhancing healthcare service delivery as a result of

utilization of e-resources by nurses in the federal medical centers. This is in contrast with the study by Arvind & Maheswarappa (2014) [3] found that 97% of nurses used Community health centers as their main information sources followed by 95% used doctors while 81% used libraries and neighbours and that nurses do not use electronic outlets to sources information for healthcare services delivery.

### Problems encountered when accessing and using e-resources

The problems encountered by nurses while accessing and using e-resources as found by the study is highly significant (mean=3.11) as the respondents faces numerous problems while accessing and using e-resources. The major problems found by the study include lack of knowledge of availability of resources (mean=4.0), poor internet connectivity (mean=3.00), unstable power supply (mean=3.03), inadequate facilities for using e-resources and inability to evaluate information sources (mean=3.37) are the major problems nurses encountered while accessing and using e-resources for enhancing healthcare service delivery in federal medical centers in north east, Nigeria. This finding corroborates the findings by Omoike (2013) [11] that among the various factors that militate against effective utilization of e-resources are poor electricity supply and poor Internet connectivity.

### Inferential statistics findings

The study rejects both null hypotheses which implies that there are statistically significant relationships between the different sources of e-resources for nurses, level of utilization and the influences of the resources on enhancing healthcare service delivery in federal medical centers in north east, Nigeria. Even though the relationship between the sources and level of utilization of the resources is weak due to low mean level of utilization of the resources (mean=2.20) as a result of the problems associated with utilization as identified by the study such as lack of knowledge of availability of resources (mean=4.0) and poor internet connectivity (mean=3.00) but the relationships are still significant.

### Implication

Current study results have significant implications for both nursing education programs and employers. First, if nursing education programs are not providing future nurses with the information literacy skills necessary to use e-resources effectively, employers must be prepared to provide not only on-the-job training for critical skills but also must have the infrastructure to educate the nurses about the availability of the resources. The infrastructure should consist of a robust collection of medical e-resources and also likely consist of professionals who have been trained in information handling and in the particular e-resources used by the Hospitals.

### Conclusions and Recommendations

This study concludes that e-resources is necessary for nurses, mainly because they provide better, faster and easier access to information than print media in enhancing healthcare services delivery in their hospitals. The study also concluded that nurses possess skills in formulating questions based on information needs and ability to evaluate information obtained from different sources to enhance the provision of health education in preventing the spread of

contagious diseases using empirical findings from electronic resources. It was also concluded by the study that nurses in federal medical centers in north east, Nigeria access e-resources through search engines, smart phones and online database from Medline Biomedical and Health resources, Global Infectious Disease and Epidemiology Network (GIDEON) and Nursing Reference Center Plus. Finally, the study concluded that the problems affecting the use of e-resources include lack of knowledge of availability of resources, poor internet connectivity, unstable power supply, inadequate facilities for using e-resources and inability to evaluate information sources. The study also concludes that there are positive and strong correlations between all the independent variables of the study and the dependent variable (healthcare service delivery) in federal medical centers in north east, Nigeria.

Base on the findings of the study, the following recommendations were proffered:

1. The hospital management should equip and maintain in the hospital libraries, adequate and relevant e-resources for the benefits of all their health workers and even patient relatives.
2. The federal medical centers should enhance Internet connectivity, infrastructures and access points at strategic locations in the hospitals.
3. The federal medical centers need to subscribe to relevant databases and make them readily available to the nurses for them to keep abreast of the new and trending issues pertaining healthcare delivery.

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