

Nursing Informatics Competences of Nurse and Midwife Educators in Bayelsa State, Nigeria

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ABSTRACT

Background: Nursing informatics competence refers to possessing the necessary knowledge, skills, and capacity to execute specialized information management activities that could aid nursing/clinical decision-making. This study examined the nursing informatics competencies of nurse and midwife educators in Bayelsa, Nigeria. **Method:** A cross-sectional descriptive design was applied on a convenience sample of 169 consenting nurse-educators (teachers) in the nursing and midwifery programmes in Bayelsa. The standardized Farzandipour's Nursing Informatics Competency Questionnaire (FNICQ) was used for data collection. All collected data were summarized using descriptive statistics and hypotheses were tested with Chi Square test of independence at a 5% level of significance. Data was analyzed with the aid of SPSS 25 software. **Results:** Majority of the respondents had moderately good computer knowledge (87.0%) and informatics skills (81.1%). Attending informatics trainings was significantly associated with poor computer knowledge ($p = 0.030$), but not with years of teaching experience, highest educational qualification, and school type ($p > 0.05$). There was no significant association between informatics skills ($p > 0.05$) and the socio-demographic variables. **Conclusion:** The teachers have moderately good informatics competencies that were not determined by years of teaching experience and educational qualification. Frequent implementation of highly targeted and standardized informatics trainings and drills in universities are highly recommended.

Keywords: Clinical decision-making, Computers, Information management, Midwifery, Nursing informatics.

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I. INTRODUCTION

Competence refers to being highly qualified and possessing the necessary knowledge, skills, and capacity to execute specialized activities, as well as values, attitudes, critical thinking, and decision-making abilities. As a result, nursing informatics competencies entail having the knowledge, skills, and capacities to execute certain informatics activities (Nes et al., 2021). To keep younger generation nurses graduating and licensed, which is one of nursing education's primary aims, much emphasis has been made on evaluating and empowering nursing informatics competencies among nurses and nurse educators (Gadelha et al., 2019). If nursing informatics competencies were to be lacking in nursing programs, this will result in inefficiencies of nursing information technology.

Nursing informatics competencies are made up of three components: basic computer skills, informatics knowledge, and informatics skills. Basic computer skills are the knowledge and competence to use a computer and related technology (Harerimana & Mtshali, 2019). Furthermore, informatics skills may be defined as the capacity to put instructions, tools, and specific informatics procedures into action. Nursing informatics competencies are growing more prevalent in nursing education and healthcare settings worldwide (Raman, 2015).

Given that nurses account for the highest number of health professionals globally, they are projected to be the largest category of informatics users (Kim & HanJong, 2019). As a result, several countries have banded together to ensure that nurses entering education and practice settings have the nursing informatics competencies needed to use information technology in meaningful and effective ways (Kaihlalanen et al., 2021). In nursing education programs, the curriculum expects nurse-educators to frequently focus on the acquisition, teaching, learning, and using of informatics skills. The curriculum is often guided with the Novice to Expert and Cognitive Load theories.

The increasing use of sophisticated patient information management systems and communication technologies in the healthcare industry necessitates nurses possessing core abilities that were previously not seen as essential for strictly clinical practice. The organizational changes required to effectively integrate informatics competencies into nursing practice necessitate tight collaboration between nursing leaders, educators, and informatics specialists (Tolonen & Väri, 2017).

Owing to the more recent introduction of nursing informatics into nursing education in the less technologically advanced nonetheless, it is likely that some nurse educators in the developing countries have not received schooling that includes entry-to-practice informatics competencies, nor have they been provided with institutional opportunities to develop such competencies (Rajalahti et al., 2014). As a result, today's nurse educators may lack the informatics knowledge and advanced competencies required to provide effective strategic and tactical mentoring, adoption, and use of nursing informatics (Forman et al., 2020).

There are calls to investigate informatics abilities important to nurse educators. Till the time of this study, no known peer-reviewed and published empirical study dwelt on this area of inquiry in Nigeria including the setting of the study. Consequently, a study of this nature was justified to address this knowledge gap. The problem statement was articulated using the PEO framework (PEO, acronym for Population, Exposure, and Outcome) as follows: Among nurse and midwife educators (P), in Bayelsa State in Nigeria, what are their informatics competencies?

II. METHODS

Design and sampling: A descriptive analytic approach was applied to this study. The research was carried out at two tertiary institutions in Bayelsa State, Nigeria, that offer nursing and midwifery programmes. The two public tertiary institutions that offer nursing and midwifery programmes include the Niger Delta University and the Bayelsa State College of Nursing and Midwifery Tombia. Bayelsa state lies in Nigeria's south-south, deep within the Niger Delta area. The study population is 253 nursing and midwifery academics from the designated institutions.

A sample size of 169 was determined for the study using the single population proportion formula that is mathematically calculated in line with Charan and Biswas formula. A minimum sample size of 384 was computed. Given that the population is less than 10,000, a finite population sample size correction formula was applied as advocated by Bolarinwa (2020). A corrected sample size of 152 was computed as the minimum sample size required for this study. A 10% non-response rate was added using the non-response formula $n^* = n \div (1-p)$; A final sample size of 169 was used for the study.

The convenience sampling technique was applied in the selection of the consenting respondents across the institutions under study.

Instrument and data collection: The standardized Farzandipour's Nursing Informatics Competency Questionnaire (FNICQ, developed by Farzandipour et al. (2021)) was adopted for this study. It is a structured 39 item self-report questionnaire that comprise four sections (A-C). Section A comprise 6 items which will extract the socio-demographic characteristics of the respondents such as age, sex/gender, highest academic qualification, years of teaching experience, Institution of practice, and attendance to any informatics training/workshop. The socio-demographic variables have categorical responses. Section B comprises 17 items which focuses on basic computer skills. Section C comprise 16 items that assess informatics skill. The sections measuring basic computer skill and informatics skill all have 5 point likert type responses ranging from strongly disagree (score 1), disagree (score 2), undecided (score 3), agree (score 4), to strongly agree (score 5). Content validity was tested using nursing five research experts and the agreement between the experts was 0.93. A test-retest reliability assessment of the questionnaire was done on 20 nurse educators in Rivers State University and an index of 0.89 was obtained.

Data collection was done after obtaining Ethical Approval from the institutional Review Board. Data collection took place between November 2021 and February 2022. The respondents were approached. The purpose of this study was explained to the potential respondents. Signed informed consent was requested and obtained from verbally consenting participants. The structured questionnaire was submitted to the academics to fill in their responses. All administered questionnaire was retrieved within 1 hour of administration. A unique number was coded on each filled and returned questionnaire.

Data analysis: The categorical data from participant's demographic data were summarized using descriptive statistical methods such as frequency and percentage. The basic computer skill and informatics skill scores were summarized using mean, standard deviation, frequency and percentage. Test of association between informatics competency and socio-demographic variables was done using the Chi square statistic at a 5% level of significance and 95% confidence interval. All statistical analysis were done with the aid of Statistical Products and Service Solutions software version 25 (IBM Chicago IL, USA; SPSS version 25).

Ethical consideration: This study adhered strictly to the provisions of the Helsinki Declaration of 1975, as revised in 2013. The study was approved by the University of Port Harcourt Institutional Review Board. Signed informed consent was obtained from participants. Consenting respondents were given all essential information regarding this study and their rights to discontinue with the study at any point without reprisal was explained. All collected data was protected and used for the approved academic purpose.

III. RESULTS

Table 1 showed that the majority of the respondents were aged 50-59 years (27.2%). They were mostly females (91.7%) with Bachelor's degree (24.3%), and 20-29 years academic job experience (29.0%). The practiced predominantly in colleges of nursing/midwifery (61.5%) and had attended no on the job informatics training (91.1%).

Table 2 showed that majority (87.0%) of the respondents had moderate computer knowledge (mean(SD) 3.01(0.34) on a 5-point scale).

Table 3 showed that majority (81.1%) of the respondents had moderate informatics skill (Mean(SD) 2.96(0.36)). Table 4 showed that attending informatics trainings was significantly associated with poor computer knowledge ($p = 0.030$), but not with years of teaching experience, highest educational qualification, and school type ($p > 0.05$).

IV. DISCUSSION

This study found that that majority (87.0%, mean(SD) 3.01(0.34)) of the respondents had moderate computer knowledge. This finding was not surprising based on the premise that with the proliferation of computer devices in many facets of human operations, nurses may have actively and/or passively acquired basic knowledge related to computer use. This finding did not corroborate with the findings of a South Korean study on factors associated with nurses' informatics competency by Hwang and Park (2011) who reported that approximately 58.9% of nurses had below average basic computer knowledge. The dissimilarity in findings could be linked to the nature of the respondents utilized for the study. Where the present study examined nurses practicing in the educational industry (nursing and midwifery educational programmes), the South Korean study focused on educationally prepared nurses who practiced in teaching hospitals as preceptors. This finding supported a study conducted in the USA by Choi and Martinis (2013) that reported that nurses in their MSN and PhD programmes had moderately good basic computer skills (mean 3.39, $Mean < 2.5 = low$, $2.5-3.49 = moderate$, $3.5-5 = high$). The similarity in findings could be linked to the similarity in sample size examined for the study. The American study examined 154 nurses while this study examined 169 nurses. Additionally, nurses in their MSN and PhD programmes are likely to be educators/teachers in basic and undergraduate nursing programmes. This finding also did not support another study in the USA on nursing informatics competencies by Choi and Zucker (2013) that reported that about 96% of Post MSN nurses had above average Basic Computer Knowledge between 2007 and 2010. This finding was not surprising as one would expect that more frequent computer use would come alongside higher educational advancement.

This study found that majority (81.1%) of the respondents had moderate informatics skill (Mean(SD) 2.96(0.36)). This finding was in line with an American study by Choi and Martinis (2013) that reported that nurses in their MSN and PhD programmes had moderately good informatics skills (mean 3.36, $Mean < 2.5 = low$, $2.5-3.49 = moderate$, $3.5-5 = high$). The similarity in findings could be linked to the instrument of data collection. This study and the American study utilized a 5 point-likert type questionnaire. In line with the mentioned, similar results were expected. More so, this finding supported an Iranian study by Khezri and Abdekhoda (2019) that reported that nurses from Tabriz University of Medical Sciences' hospitals have moderately good Informatics skills (score 62.9%). The similarity in findings could be linked to the method of data collection utilized in the study. Both this study and the Iranian study utilized self-report questionnaire. The use of self-report method of data collection tends to minimize the Hawthorne effect that might arise if the respondents were orally interviewed by an interviewer.

This study found that attending informatics trainings was significantly associated with poor computer knowledge ($p = 0.030$), but not years of teaching experience, highest educational qualification, and school type ($p > 0.05$). This finding may suggest that the nurse educators who make an attempt to attend informatics trainings are the ones who already have poor basic computer knowledge. This finding was buttressed by a South Korean study conducted by Chung and Stagers (2014) that reported that engagement in self-directed informatics education were substantially linked with better informatics competences ($p = 0.001$), but not general clinical experience ($p > 0.05$). The similarity in findings could be linked to the idea that use of a 5% level of significance in the test of hypotheses. Both this study and the South Korean study utilized a 5% significance level for the estimation of the probability of association. The use of a 5% level of significance ensures a 95% Confidence of detecting an association if such association really exists. In contrast, this study did not support an Iranian study conducted by Khezri and Abdekhoda (2019) that reported that informatics proficiency was positively

associated to years of job experience ($p = 0.01$). The dissimilarity in findings could be linked to the nature of statistical tools utilized in the study. The Iranian study a more robust correlation statistics (a parametric tool) whereas this study utilized the less robust non-parametric chi square statistics.

Limitation

This study used a self-report questionnaire for this study. Owing to the sensitivity of this topic (information competences) and its relevance in this COVID 19 era, the study may have suffered some degree of Hawthorne effect. It is a phenomenon where respondents in a study modify their actual or intended responses and behavior simply because they are being studied, examined or observed. The Hawthorne effect can impose possible uncertainties and confounders that perhaps impose a fair chance of committing type 1 error. The possible findings of this study must be interpreted with caution if they were to be used for generalization outside this study population.

V. CONCLUSION

In conclusions Educators in nursing and midwifery programmes in Bayelsa Nigeria have moderate computer knowledge and informatics skills. The educators who attended informatics trainings still had poor computer knowledge thus requiring more training. Administrators of nursing and midwifery programmes in Bayelsa should frequently organize highly targeted and relevant informatics trainings for educators with the aim of improving their informatics competencies.

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TABLES

Table 1

Socio-demographic Profile		N = 169	
Variable	f	%	
Age			
20-29	29	17.2	
30-39	24	14.2	
40-49	36	21.3	
50-59	46	27.2	
60-69	34	20.1	
Sex/Gender			
Male	14	8.3	
Female	155	91.7	
Highest academic qualification			
Diploma (RN, RM)	32	18.9	
Higher Diploma (Post Basic Specialties)	31	18.3	
BSN	41	24.3	
MSN	32	18.9	
PhD	33	19.5	
Years of academic job experience			
1-9	40	23.7	
10-19	42	24.9	
20-29	49	29.0	
30-39	38	22.5	
School type			
University	65	38.5	
College	104	61.5	
Attended any Informatics training/workshop			
No	154	91.1	
Yes	15	8.9	

f = frequency, % = percentage

Table 2

Computer Knowledge of teachers of nursing and midwifery programs		N = 169		
Items	Mean	SD	f	%
I know how to perform the following ...				
Switch on and off the computer, printing and use the mouse	2.89	1.36		
Using windows operating system	3.01	1.42		
Resolve computer error reports	2.87	1.42		
Using antivirus software to scan files, folders, and drives	2.95	1.49		
Creating back up files	3.09	1.37		
Operating peripheral devices such as scanners	3.15	1.42		
Using spreadsheet applications such as MS excel	3.02	1.45		
Using external storage devices such as CDs and flash drives	3.21	1.35		
Changing the default printer from the installed printer list	2.97	1.31		
Using word processing software applications	2.77	1.39		
Typing skills	3.18	1.38		
Using PowerPoint software application	3.19	1.45		
Using the internet	2.92	1.38		
Using search engines on the internet	2.98	1.36		
Sending emails and attachments	3.07	1.28		
Using the computer safely	3.04	1.39		
Using computerized self-learning equipment	2.85	1.36		
Summary of results				
Mean computer knowledge	3.01	0.34		
Low computer knowledge			9	5.3
Moderate computer knowledge			147	87.0
High computer knowledge			13	7.7

f = frequency; % =percentage; Mean < 2.5 = low, 2.5-3.49 = moderate, 3.5-5=high

Table 3

Informatics skills of teachers of nursing and midwifery programs		N = 169			
Items	Mean	SD	f	%	
I perform the following Informatics operations...					
Capturing data related to nursing practice	2.99	1.31			
Using informatics system for nursing records	2.95	1.37			
Using informatics system to store, retrieve, and transfer data	2.98	1.53			
Using applications for nursing data coding	2.80	1.41			
Extraction of needed data from larger data sets	3.12	1.32			
Access shared data sets	2.89	1.42			
Influencing attitude of peers towards computer use in nursing	2.96	1.45			
Accessing plans of practice from local drives	2.89	1.42			
Use informatics systems to plan for future practice	2.90	1.39			
Participate in selection, design and implementation of systems	2.82	1.41			
Teaching peers the use of nursing informatics systems	2.82	1.39			
Correcting design defects in an informatics system	3.13	1.39			
Apply informatics to nursing education	3.02	1.41			
Use multimedia files for teaching and learning	3.01	1.42			
Use research database information and downloading articles	3.07	1.40			
Use internet search engines	2.89	1.47			
Summary of results					
Mean informatics skill	2.96	0.36			
Low informatics skill			17	10.1	
Moderate informatics skill			137	81.1	
High informatics skill			15	8.9	

f = frequency; % =percentage; Mean < 2.5 = low, 2.5-3.49 = moderate, 3.5-5=high

Table 4:

Association between socio-demographic variables and computer knowledge N = 169

Variables	Computer Knowledge			df	χ^2	p
	Low	Moderate	High			
Highest academic qualification				8	9.22	0.324
Diploma (RN, RM)	2	24	6			
Higher Diploma (Post Basic Specialties)	1	27	3			
BSN	3	36	2			
MSN	2	29	1			
PhD	1	31	1			
Years of academic job experience				6	10.92	0.091
1-9	3	35	2			
10-19	2	40	0			
20-29	4	40	5			
30-39	-	32	6			
School type				2	4.50	0.105
University	2	61	2			
College	7	86	11			
Attended any Informatics training/workshop				2	7.03	0.030
No	6	136	12			
Yes	3	11	1			

p < 0.05 is significant