Research

Midwives' Knowledge, Attitude and Use of Health Management Information System in Obstetrics and Gyneacology Departments in Teaching Hospitals in Abia State

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Abstract

Background: Effective use of Health Management Information Systems (HMIS) is an imperative in delivering midwifery services. This study assessed the knowledge, attitude, and use of HMIS among midwives in obstetrics and gynaecology departments in two teaching hospitals in Abia State.

Methods: This cross-sectional study involved the administration of structured questionnaires to 161 respondents. Knowledge and attitude towards HMIS were computed from the summated scores of a multi-dimensional structured questionnaire and categorized as good (>70%), fair (50-69.9%) and poor (<50%). Descriptive and inferential statistics were conducted using the Statistical Package for the Social Sciences, Version 25. Ordinal logistics regression was used to determine factors associated with the knowledge and attitude of midwives toward HMIS. The odds ratio, 95% confidence intervals and the p-value were reported with p-value <0.05 considered significant.

Results: More respondents were female (88.8%), had good knowledge (41.8%) and positive attitudes (46.4%) towards HMIS. Midwives aged <25 years showed significantly poorer attitudes towards HMIS compared to those ≥40 years (OR=0.44; 95%CI:0.24, 0.81), p < 0.0001). Same was observed for those with years of experience between 11 – 15 years compared to those ≥15 years (OR = 0.44; 95%CI:0.27, 0.73; p=0.001).

Conclusion: Less than half of the midwives reported good level of knowledge and positive attitude towards using HIMS. The influence of age and years of experience on midwives' attitude should be explored in interventions to improve the use of HMIS in teaching hospitals.

Keywords: Knowledge, attitude, health management information system, HMIS, midwives, teaching hospital, Abia State.

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Introduction

Health Management Information Systems (HMIS) are broad system that captures, stores, manages or transmits information related to patient or the health organizations[1]. Health information management is recognised as one of six building blocks for the strengthening of health systems globally[2]. While the paper-based or manually operated HMIS are still in common use in Nigeria, the electronic HMIS, are comprehensive, integrated information software designed to manage all aspects of a hospital's operations, including medical, administrative, financial, and legal issues and the corresponding processing of services[3,4]. It facilitates immediate access to the complete information of any patients in any place or time for the purpose of planning, management, and decision-making during facility-based health care delivery. While the use of electronic HMIS facilitates fast and easy access to the patients' health information, the lack of a comprehensiveness or coherent HMIS may cause miscommunication, repeated tests, increased costs and most disconcertingly, errors in patient care[5]. Essentially, decisions premised on complete and accurate facts, lead

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to greater efficiency, improved performance and ultimately to higher administrative efficiency in hospitals' processes[6].

Midwives are skilled, knowledgeable, and compassionate providers of care for childbearing women across the continuum from pre-pregnancy, pregnancy, birth, postpartum and the early weeks of life[7]. This category of frontline health workers plays vital roles in improving maternal and child health indices. Available evidence demonstrates a positive correlation between the density and quality of midwives on the one hand and improved quality of care, sustained reductions in maternal and newborn mortality on the other hand[8].

Being one of six pillars of an effective health system[2], the National health policy identifies HMIS as an important part of the Nigerian health system. The National Health Management Information System (NHMIS) was developed for effective and efficient management of the Nigerian health system[9]. The HMIS in any department of a hospital is often integrated into the broader hospital's HMIS. For this obstetrics department, this enables storage and retrieval of useful information for effective care during pregnancy, delivery, postnatal period, including the care of the newborn [5,7].

The need to assess and improve the knowledge, attitude, and use of HMIS among midwives stems from the fact that as frontline health workers, they are involved with handling childbearing women, newborn infants, and families across the continuum of care - pre-pregnancy, pregnancy, birth, postpartum and the early weeks of life. Research and interventions in this area will contribute to the improvement of maternal health services and to the achievement of the sustainable development goal 3.

The need to reduce maternal and infant morbidity and mortality have been a major driver for many global, regional, and national strategic interventions in healthcare. Effective HMIS in hospital settings provide useful clinical information on patients receiving care in health facilities as well as disaggregated data on maternal and infant wellbeing in developing countries with suboptimal civil registration systems as well as demonstrated low capacity for periodic largescale survey of health indices[10].Despite the global decline in maternal mortality, 99% of the estimated 303,000 pregnancy-related mortalities are still preventable maternal and occur in low- and middle-income regions. Sub-Saharan Africa account for 66% of these deaths with Nigeria being a major contributor[11].

While outcome measures like maternal mortality ratio are important to inform decisions in healthcare, understanding the processes leading to these outcomes will provide useful clues for programmatic actions. HMIS existing as manual or electronic repository of patients' information that can be retrieved and processed to improve decision-making in-patient care, is accepted by patients and healthcare providers,[3] and also a key requirement for clinical governance in healthcare[12].

Assessing the knowledge, attitude, and utilization of the HMIS by midwives who play critical roles in maternal and newborn health, will determine gaps that could inform focused interventions for creation and diffusion of competencies related to midwives' use of HMIS and improvement of maternofetal outcomes. Available evidence suggests there exist a direct relationship between improved maternofetal outcomes and good knowledge and use of HMIS among midwives[13,14,15]. Earlier studies on HMIS were focused on the perspective of HMIS usefulness among frontline health workers[16,17], patients[3], or its efficiency[16,17,18]. There is still a paucity of data on the knowledge, attitude, and the use of HMIS among midwives in obstetrics and gynecological departments of teaching hospitals in Nigeria. Based on the assumption that midwives with adequate knowledge and positive disposition to the use of available HMIS, will likely be more motivated to implement the overall health plan of their patients, this study assessed the level of knowledge, attitude, priorities, and factors influencing use of HMIS by midwives in obstetrics and gynaecology units of selected teaching hospitals in Abia State.

Methodology
Research Design
A descriptive cross-sectional design was utilized for this study.

Study Area
This research was carried out in Abia State created on the 27th of August 1991 and located in the south-eastern region of Nigeria. The State has several primary healthcare centers, general hospitals, and specialist hospitals that provide healthcare services to the residents of the state. Some of the notable healthcare facilities in the state include the Abia State University Teaching Hospital, Abia State Specialist and Diagnostic Center, and the Federal Medical Center, Umuahia.

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Study population

The population of this study comprised of all the midwives in the teaching hospitals in Abia State, Nigeria. This is comprised of the Abia State University Teaching Hospital and the Living Word Teaching Hospital. Midwives receive a minimum of three years post-secondary training in accredited institutions and are registered to practice by the Nursing and Midwifery Council of Nigeria (NMCN). In the teaching hospital, they work with the obstetricians to provide antenatal, intrapartum, and postnatal care. There are one hundred eighty-seven (187) midwives in the Abia State University Teaching Hospital and eight three (83) in the Living Word Teaching Hospital making a total of 270 midwives.

Sampling methodology

The sample size of this study was ascertained using the conventional finite population sample sampled size formula known as the Taro Yamane[19] sample size determination formula expressed as: $n = N/(1 + N(\varepsilon)^2)$. Where, n = Sample size, N = Population under study, ε = Margin of error (0.05 at 95% confidence interval)[20]. An adjustment was made for the finite population of 270 midwives in both institutions which resulted in a sample size of 161. The calculated sample size was proportionately allocated to the two teaching hospitals giving 110 and 51 allocated to the Abia State University Teaching Hospital and Living Word Teaching Hospital respectively. Consecutive midwives in the department of obstetrics and gynaecology who met the eligibility criteria and gave consent to participate in this study were recruited into the study.

Data Collection

The data collection period lasted between November 2022 to December 2022. The researcher first administered the consent form to the respondents after the aim and objectives of the study has been explained to them. The respondents who gave consents were handed the questionnaires and given some time to complete and submit them to the researcher.

The structured self-administered questionnaire was developed following a review of the literature and comprised of five sections. The first was used to capture the socio-demographic characteristics of the study participants. The second section comprised of 10 questions with dichotomous response (yes =1, or no = 0) used to obtain information on knowledge of midwives on HMIS. The third section comprised 7 items on 4-point scale (strongly agree = 4, agree = 3, disagree = 2 and strongly disagree = 1) used to obtain information on attitude of midwives to HMIS. The fourth section comprised 5 items on 4-point scale (strongly agree = 4, agree = 3, disagree = 2 and strongly disagree = 1) used to capture aspect of the HMIS that the midwives consider important to them and the final section comprised of 11 items on 4-point scale (strongly agree = 4, agree = 3, disagree = 2 and strongly disagree = 1) which assessed perceived factors influencing the use of HMIS in the hospital. The questionnaire was subjected to face and content validation by experts. The reliability of the questionnaire was assessed using the Cronbach's alpha coefficient for internal consistency.

Data Analysis

Both descriptive statistics (mean, percentage) and inferential statistics (ordinal logistics regression) were conducted using the Statistical Package for the Social Sciences (SPSS) version 25. The descriptive analysis was performed to describe the frequency and percentage of study participants' socio-demographic characteristics as well as the frequency of the categorical responses to the dependent variables. The knowledge and attitude scores were transformed into percentages and then recategorized as poor (<50%), fair (50 – 74.9%) and good ≥75%). Negatively worded items were reversed before transformation of the attitude score using the formula $T_s = (R_s - S_{min}/S_{max} - S_{min}) \times 100$. Where T_s is the transformed score, R_s was the raw score, S_{min} is the minimum scale score and S_{max} was the maximum scale score. The skewed distribution of the knowledge and attitude scores necessitated the reconversion to categorical rating and application of the ordinal logistics regression from the generalized linear model. The mean rating of the scores on priorities and factors influencing use of HMIS were obtained and ranking performed. Results were presented in tables and odds ratios as point estimates alongside its 95% confidence intervals and the p-value were reported from the inferential analysis. P-value ≤0.05 were considered statistically significant.

Ethical Considerations

Ethical clearance for the study was obtained from the Ethics Committee of the University of Port Harcourt. Permission to conduct the study was also obtained from the heads of the Obstetrics & Gynaecology Units of the Hospitals and then the participants after explaining the purpose of the study and confirming their willingness to

participate in the study. The respondents were also informed that their participation will not affect their job and they were free to choose not to participate or stop their participation at any stage if they are so desire.

Results

From the questionnaire administered and returned by the respondents. It was observed that out of the one hundred and sixty-two (162) questionaries administered to the respondents, one hundred and fifty-seven were returned, and one hundred and fifty-three (153) were correctly and completely filled giving questionnaire return rate is 94.40%. and response rate of 95%. The internal consistency reliability of the entire scale measured by the Cronbach's alpha was 0.86 while for the subscales were 0.23 (knowledge), 0.66 (attitude), 0.69 (importance) and 0.72 for factors influencing use of HMIS.

The background characteristics of the respondents presented in Table 1 showed that majority were female (88.8%), aged 25 – 39 years (62.1%) and had between 11 and 15 years of working experience as nurses/midwives (41.2%). The exploratory data analysis on the dependent variables shown in Figure 1 reveals that both the level of knowledge and attitude of the midwives towards HMIS were not Normally distributed variable. The knowledge (skewness = -0.43, SE = 0.196) and attitude (skewness = -0.38, SE = 0.196) scores of midwives to HMIS showed skewed distributions with the Shapiro-Wilk Test of Normality statistics being 0.947 (p-value = 0.000) for knowledge scores and 0.948 (p-value = 0.000) for attitude scores. From Table 2, out of ten knowledge-based items considered, respondents showed greater knowledge on reading and accessing information on patients' files (77.1%) and ability to update patient information on hospital's computer (77.1%) than they did with editing patient information (32.7%), using medical billing software (33.3%) and identifying patient records (33.3%). Consistently high proportion of the respondents' knowledge was on file-based when compared to computer-based HMIS.

Table 3 presents summary descriptive statistics and ranking of attitude, priorities and factors influencing midwives' use of HMIS. They were more positively disposed to using HMIS to capture patients' information and least disposed to using the HMIS conduct of routine duties and improve the efficiency of the work process. This reflected in their priorities for the HMIS but the strongest perceived factor affecting use of HMIS was the level of computer literacy among midwives.

The distribution of respondents across the categorization of their knowledge and attitudes into poor, fair and good shown in Table 4 reveals equal number of respondents with good knowledge and fair knowledge of HMIS (n = 64) while the greater number had good attitude to HMIS (n = 71). Only 16.3% and 15.7% of the respondents were categorized as having poor knowledge and attitude towards HMIS in midwifery practice respectively.

Although younger respondents reported greater odds of having better knowledge on HMIS than those aged 41 years and above, these differences were not statistically significant. Inversely, those aged less than 25 years showed significantly poorer attitude (OR = 0.44, 95%CI: 0.24, 0.81; p = 0.008) towards HMIS compared with those aged 40 years and above. Respondents with 11-15 years of experiences also demonstrated significantly poorer attitude to HMIS (OR = 0.44, 95%CI: 0.27, 0.73, p = 0.001) compared to those with years of experience above 15 years (Table 5).

Table 1 Socio-demographic characteristics of the respondents

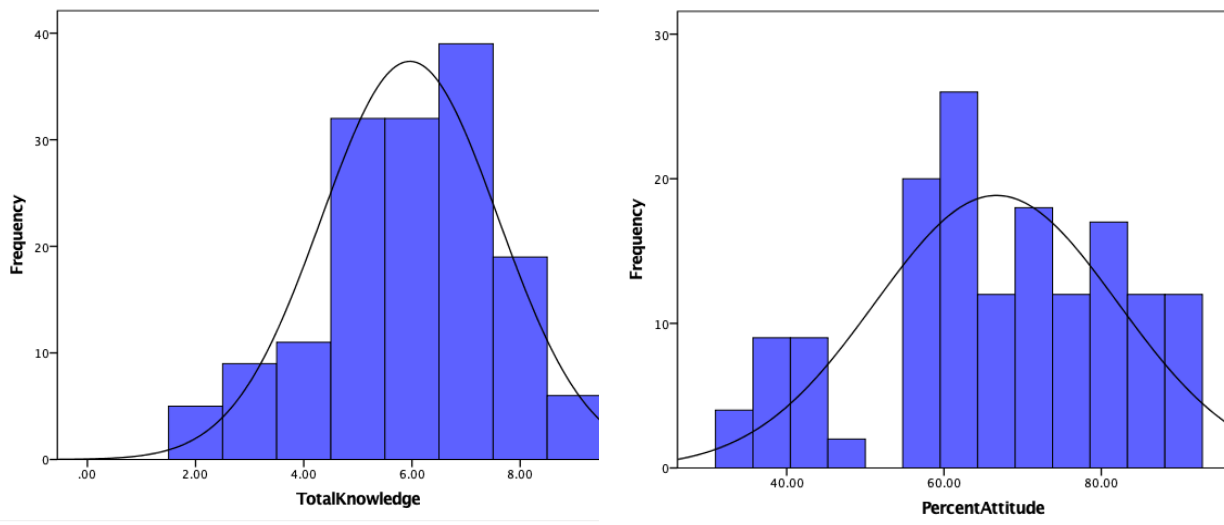| Demographic factor	Groups	Number	Percentage
Gender	Male	18	11.2
	Female	134	88.8
Years of Experience	0-5	16	10.5
	6-10	33	21.6
	11-15	63	41.2
	16 and above	41	26.8
Age	0-<25	34	22.2
	26- 39	95	62.1
	≥40	24	15.7

Figure 2. Exploratory analysis of midwives' knowledge and attitude scores

Table 2. item-level analysis of midwives' knowledge of HMIS

Knowledge of HMIS	Yes (%)
Identify and sort patients' files in the ward	100 (65.4)
Read information contain in patients' files in the ward	118 (77.1)
Record information contain in patients' files in the ward	109 (71.2)
Identifying patients record in the hospital's computer	51 (33.3)
Record patients' information on the hospital's computer	103 (67.3)
Edit patients' information on the hospital's computer	50 (32.7)
Update patients' information in the hospital's online record	118 (77.1)
Browse diagnostics and treatment procedure from hospital online record	109 (71.2)
Use the medical billing software in the hospital	51 (33.3)
Use the emergency care applications in the hospital	103 (67.3)

Table 3. Attitude, preferences and factors influencing midwives' use of HMIS

Items	Response – Frequency (%)				Mean
Attitude towards HMIS	SA	A	D	SD	Score (rank)
Capture of patients & related information	52(34.0)	77(50.3)	16(10.5)	8(5.2)	3.13 (1)
Overall handling of patients' information	48(31.4)	73(47.7)	32(20.9)	0(0.0)	3.10 (2)
Editing patients' & related information	41(26.8)	72(47.1)	40(26.1)	0(0.0)	3.01 (3)
Managing patients' & related information	49(32.0)	72(47.1)	16(10.5)	16(10.5)	3.01 (3)
Storing patients'& related information	25(16.3)	104(68.0)	16(10.5)	8(5.2)	2.95 (4)
Conducting daily midwife' duties	40(26.1)	65(42.5)	40(26.1)	8(5.2)	2.90 (5)
Efficiency of work processes	41(26.8)	72(47.1)	24(15.7)	16(10.5)	2.90 (5)
Aspects of HMIS considered important					
Capture patients' & related information	52(34.0)	77(50.3)	16(10.5)	8(5.2)	3.13 (1)
Store patients' & related information	41(26.8)	72(47.1)	40(26.1)	0(0.0)	3.01 (2)
Flexibility for edit and updates	25(16.3)	104(68.0)	16(10.5)	8(5.2)	2.95 (3)
Diagnostics, prescription, and treatment functions	40(26.1)	65(42.5)	40(26.1)	8(5.2)	2.90 (4)

	SA	A	D	SD	Mean (Rank)
Flexible to update diagnostic, prescription & treatment procedures	41(26.8)	72(47.1)	24(15.7)	16(10.5)	2.90 (4)
Factors influencing HMIS use					
Computer literacy among midwives	76(49.7)	61(39.9)	16(10.5)	0(0.0)	3.39 (1)
Redundant patient information	76(49.7)	53(34.6)	16(10.5)	8(5.2)	3.29 (2)
Coherence of stored records	61(39.9)	69(45.1)	8(5.2)	15(9.8)	3.15 (3)
Handling of patient-related information	52(34.0)	77(50.3)	16(10.5)	8(5.2)	3.13 (4)
Combining paper and electronic records	52(34.0)	77(50.3)	16(10.5)	8(5.2)	3.13 (4)
Interest of Midwives on use of HMIS	48(31.4)	73(47.7)	32(20.9)	0(0.0)	3.10 (5)
Lack of administrative political will	41(26.8)	72(47.1)	40(26.1)	0(0.0)	3.01 (6)
Power supply to main HMIS	25(16.3)	104(68.0)	16(10.5)	8(5.2)	2.95 (7)
Promptness in accessing information	44(28.8)	70(45.8)	23(15.0)	16(10.5)	2.93 (8)
Cost of HMIS installation & maintenance	40(26.1)	65(42.5)	40(26.1)	8(5.2)	2.90 (9)
Training of Midwives on use of HMIS	41(26.8)	72(47.1)	24(15.7)	16(10.5)	2.90 (9)

Note, SA is Strongly agreed, A is agreed, D is disagreed, and SD is strongly disagreed.

Table 4. Categorical grading of the knowledge and attitude of midwives on HMIS

Dependent variable	Category	Frequency	Percentage
Level of Knowledge	Poor	25	16.3
	Fair	64	41.8
	Good	64	41.8
Level of Attitude	Poor	24	15.7
	Fair	58	37.9
	Good	71	46.4
Total		153	100.0

Table 5. Factors associated with knowledge and attitude of HMIS from ordinal logistics regression.

Variables	Category	Knowledge of HMIS		Attitude towards HMIS	
		AOR (95%CI)	p-value	AOR (95%CI)	p-value
Gender	Male	0.80(0.53, 1.21)	0.289	1.10(0.73, 1.66)	0.652
	Female	-	-	-	-
Age in years	< 25	1.25(0.71, 2.20)	0.447	0.44(0.24, 0.81)	0.008
	26 – 39	1.37(0.71, 2.61)	0.343	0.63(0.32, 1.24)	0.182
	≥40	-	-	-	-
Years of experience	0 – 5	1.20(0.62, 2.35)	0.586	1.08(0.54, 2.16)	0.829
	6 – 10	0.75(0.42, 1.34)	0.338	0.69(0.38, 1.25)	0.225
	11 – 15	0.81(0.51, 1.29)	0.374	0.44(0.27, 0.73)	0.001
	Above 15	-	-	-	-

AOR: Adjusted odds ratio; CI: Confidence interval

Discussions

The study which assessed the knowledge, attitude, priorities, and factors influencing the use of HMIS among midwives in teaching hospitals, observed that most of the midwives were female who have practiced midwifery for over a decade, but study found less than half having good knowledge and attitude towards HMIS. The finding from the study showed almost 90% of the midwives being female. This is not unusual in different climes but can be accentuated in highly cultural and religious settings like in Nigeria. Interestingly, all the

clients seeking midwifery services in obstetrics and gynecology departments of teaching hospitals are female. The preference of these clients for female midwives[21] coupled with the cultural and religious connotations of sexuality and reproductive health issues may be the driving force of midwifery being a female dominated profession.

The distribution of the knowledge and attitude scores were negatively skewed with the preponderance of respondents reporting high knowledge and attitude scores is a salutary observation because an optimal level

of knowledge and positive disposition towards the HMIS is a prerequisite for quality patient care. This corroborates findings from an earlier study among health providers in Geita District of Tanzania that reported 71% had good knowledge and 90% had positive attitude towards HMIS.[22] Interestingly, the midwives in this study, reported higher level of knowledge on undertaking various functions on paper or electronic-based HMIS except identifying records of specific patient on the electronic HMIS and using the billing software of the hospital. Where quality is not enshrined in the management of patient data in the electronic HMIS, there might be difficulties in identification of the records of specific patients because of missing data.[23]

Like earlier reports,[22,24] more of the midwives reported greater positive attitudes towards the use of the HMIS for handling patients' health records than the effect that using the HMIS will have on their routine duty and work efficiency. This pattern was also reflected in the association between respondents' background characteristics and attitude towards HMIS. Younger workers less than 25 years were significantly less enthusiastic about the use of HMIS than older subject above the age of 40 years. While it is surprising to find a contrast of the expected pattern between digital natives and digital immigrants.[25] it is likely that their aversion to the use of the HMIS by younger midwives may be due to the higher workload and requirement for documentation experienced by younger midwives. Similar allusion could hold sway for midwives with less than 15 years of experience on the job, reporting significantly poorer attitude towards the use of the HMIS than those who have had more than 15 years of experience.

In terms of accessing and utilizing the hospital's computer system, a third of healthcare professionals were able to identify and access patients' records on the hospital's computer. This skill enables healthcare professionals to access electronic patient records, which can enhance efficiency and accuracy in managing patient data. The findings in this study are consistent with earlier finding of improved workflow and patient satisfaction with use of electronic HMIS[3,26]

From the research findings of two-thirds of midwives being able to record patients' information on the hospital's computer, indicating their proficiency in utilizing electronic systems for data entry. This capability streamlines the documentation process and reduces the

chances of errors associated with manual record-keeping. The adoption of Electronic HMIS in advancing effective and efficient records keeping in teaching hospitals is consistent with previous finding[27]. Another special interest is the finding that two-thirds of midwives reported being able to use emergency care applications in the hospital. The ability to utilize emergency care applications can support timely decision-making and improve patient outcomes.

Almost half of the midwives reported positive attitudes towards HMIS. Although much lower that the report from Geita District of Tanzania where 90%b of health providers had positive attitude towards the use of HMIS[22], it would be interesting to further explore reasons for the dismal gap in future studies. A useful clue is the fact that the highest-ranked perceived factor influencing the use of HMIS from this study is the level of digital literacy among the midwives. Essentially, the perceived challenges related to documentation practices, coherence of stored records, and handling of patient-related information are all indicative of formidable but not insurmountable obstacles around digital literacy and job pressure. Furthermore, option of integrating paper and electronic records, level of administrative support, power supply, access to internet bandwidth, cost of maintaining, and need for continuous training of midwives were critical influences on HMIS adoption that hospitals' managers need to tackle.

It is pertinent to institutionalise continuous training of midwives including technology-based training aimed at enhancing their digital literacy. A previous report suggests that health providers with previous training had at least three times more odds of using HMIS[28]. Addressing administrative and political barriers, providing reliable power supply, and offering comprehensive training can encourage midwives to embrace and utilize HMIS more effectively.

Implications of the findings

Health Management Information System (HMIS) as a building block of any health system, plays a crucial role in healthcare delivery in terms of managing patient data and supporting decision making during the care process. Adequate knowledge and a positive disposition towards paper based or electronic HMIS among healthcare professionals is essential for effective utilization of the system. The positive disposition of midwives towards the HMIS, presents an opportunity for the management of the teaching hospitals to enhance the use of electronic

HMIS for effective delivery of care to pregnant women in support for the global quest to achieve the sustainable development goal 3. The challenges such as resource limitation, poor training, inadequate staff in this setting and developing countries[3, 29] are formidable but not insurmountable with positive disposition of the midwives. Policy and decision makers need to take this cue in developing strategies for strengthening HMIS in midwifery practices. While acknowledging that digital literacy among frontline health workers including midwives is a sine qua non, the need to provide critical digital infrastructure, support systems (power and internet bandwidth), and access to training opportunities for frontline human resource for health on the use of digital technology for HMIS cannot be over-emphasised. Government, through the ministry of health and management of the teaching hospitals, should also design effective HMIS systems based on the extant National Policy on HMIS that can sustainably be implemented in all teaching hospitals while working towards integration of HMIS infrastructure across hospitals.

Strengths and limitations of the study

The study derived it strengths from the use of a robust multidimensional instrument with acceptable level of internal consistency reliability to assess HMIS adoption among midwives in teaching hospitals in this setting, however, the low internal consistency reliability of the knowledge construct of this multidimensional scale requires caution in use of the findings on midwives' knowledge of HMIS from this study. Another weakness of the study was the non-stratification of the data along proprietorship of these teaching hospitals. This would have strengthened the recommendations from the findings of this study. The study did not also uncover the structural elements within these institutions that are critical in the assessment of the level of readiness and maturity of the hospital for the deployment of electronic HMIS beyond the knowledge, attitude and use of the HMIS among the midwives. While the limited sample size affected the nature of analysis that could be deducted in the study, the cross-sectional design limit the authors from making causal inferences based on rhe results of the data analysis.

Conclusions

A moderate proportion of midwives in the selected teaching hospitals in Abia state had good level of knowledge and positive attitude of the midwives on the use of health management information system This moderate proportions should be exploited in planning for a widescale implementations of HMIS for midwifery services in teaching hospitals.

Declarations

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