Perceived Informatics Competencies among Midwives: A Cross-Sectional Study in the Sunyani Municipality of Ghana .

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Abstract

Background :
In most recent times, data innovation is a vital component of the medical care sector and allows healthcare authorities to possess primary technological expertise to control and use technology to provide care, as well as computer skills. Midwives are expected to provide quality and efficient care to their clients in this rapid advancement in ICT across the globe hence the need to build the knowledge and skills in the application of ICT. The survey sort to determine the informatics competencies among midwives in some randomly selected health care facilities in the Sunyani municipality of Ghana.

Methods:
A quantitative-based cross–sectional study design was used for this inquiry. Using quota sampling method, 300 respondents were recruited from six (6) randomly selected health facilities using the electronic data management system in their operations.

Results:
The study revealed that majority (52%) of the practicing midwives were young adults (31-40 years) with 68% holding diploma in midwifery. It was also found out that majority of the respondents have basic knowledge in computers with and its application across the professional ranks total mean and standard deviation of 4.2, 0.36. It was again found out that there was no significant relationship between informatics competencies across professional ranks and working experience in years of the midwives which can be attributable to the fact that most of the instructions content of midwifery informatics seeks to introduce the trainee midwives to the basics of midwifery informatics.

Conclusion:
It can be concluded that most of the midwives interviewed were in their youthful ages and started practising with diploma. We found out that majority of the midwives have basic knowledge in computers and could apply this knowledge in the performance of basic tasks and also have a fair knowledge and skills in informatics as well. There was no relationship between knowledge and educational level and professional rank.

Recommendation :[a]
It was therefore suggested that the curriculum for midwifery informatics be reviewed to include other advance programs and periodic organization of training programs or workshops for practicing midwives.

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1 Introduction

Health informatics is the integrative inquiry of the setup, improvement, integration, and usage of advanced computerized technologies in the provision, control, as well as organizing of healthcare services. It encompasses a broad array of replicated subspecialties such as medical informatics, consumer health informatics, and public health informatics, bioinformatics, nursing and midwifery informatics (Safdari, 2014). Midwives are anticipated to render protected, skilled, and kind-hearted care in a progressively specialized and computerized milieu. The most important subject recently in the delivery of healthcare services is the utilization of data frameworks in addition to advances that make strides the worth and security of patient care. Midwives must be straightforwardly locked in with data frameworks in addition to innovations due to its significance for practices based on empirical evidence, clinically supporting devices, and the automated medical register (Ball *et al.,* 2011).

In most recent times, data innovation is a vital component of the medical care sector and allows healthcare authorities to possess primary technological expertise to control and use technology to provide care, as well as computer skills (Pordeli, 2017). The American Institute of Medicine (IOM) proposed in early 2000 that electronic solutions are used in medical facilities to improve the quality of hospitalized patients' support and treatment. Previous research relating to impact of bringing into play of medical information advances have consistently shown a relatively enormous beneficial outcomes with regards to the provision of quality health care delivery (Buntin, *et al.,* 2011). By the use of technology and computer systems have been found to have facilitated provision of care and educational tools for nursing lessons (Darvish et al., 2014 &Rouleau *et al.,* 2017).

Furthermore, it has been established that the application of automated data system in the delivery of care help midwives to cutdown time consumed on recording procedures or treatments rendered to the client but rather devote supplementary period providing patients with improved services (Kelley et al., 2011& Chaudhry *et al.*, 2006). Universally, increased patient safety and enhanced performance of nursing practitioners are the advantages of working with automated data management systems in carrying out midwifery responsibilities (Rouleau *et al.,* 2017).

Competencies in computerized processing of data are important for midwifery practitioners as care providers due to the comprehensive incorporation of automated data management system in healthcare (Honey, 2017& Nagle, 2013). In the research led by Yang *et al*., 2014, it discovered that the informatics competencies of nursing managers were at an intermediate level (77.6%).

Choi and De Martinis also uncovered that trainee nurses or midwives have the skills needed in the domain of computer science in a study carried out in 2013. Competencies in midwifery informatics can be well-defined as "possessing passable knowledge, skills and abilities for performing specific tasks in informatics" (Hunter *et al.*, 2013). Three attributes include informatics competencies: elementary programming abilities, familiarity of information processing and computer ingenuity. The know-how and competencies to use a computer and associated technology apply to basic computer skills (Goldhammer *et al.*, 2013).

Awareness of information technology refers to the erudition of using computing know hows to organize data science. Furthermore, the ability to apply instructions, tools and particular methods in the computer industry can be described as competences (Staggers *et al.,* 2002).

Evaluation of nursing IT competencies has been a favourite subject for researchers since the advent of computer and information technology in health care (Darvish *et al.,* 2014). It is therefore required for a broader development, test and testing of communities with high computer expertise in the world.

Technology and Informatics Guiding Educational Reform (the TIGER Activity) is a self-regulating, popular midwifery activity that is basically interested in instructive change in midwifery information science (Ball, *et al.,* 2011). In 2006 the TIGER Activity was initiated in reaction to enhancing information processing competencies among the nursing/midwifery workforce. The TIGER Activity was built around Alliance for Nursing Informatics (ANI), a merging of an additional twenty (20) nursing information science capable social orders including key nursing institutes in the like of the American Nurses Association (ANA), Affiliation of Nurse Executives (AONE), the American Affiliation of Colleges of Nursing (AACN) (TIGER, 2008). The ANI again in-

cluded an extra 170 distinctive agencies that looked at forming information science "nursing's tool by the 21st century" (Ball, *et al.,* 2011, TIGER, 2008, 2010).

Midwifery informatics is a novel syllabus offered in midwifery training colleges and other Ghanaian universities. Midwifery informatics is a difficult subject to teach, especially in terms of the practical component. Midwifery informatics competency is rapidly acknowledged as essential innovative abilities that midwives must acquire to accomplish their obligations (Yoon, *et al.,* 2009 & Buntin, *et al.,* 2011). The absence of practical knowledge would have a significant impact on midwives' ability to provide health care in varied healthcare facilities.

For the past 3 decades, there have been the drive to impress on midwives to secure and construct upon informatics competencies to perform their job ideally (Herbert, 1999 & Stuns *et al.,* 1998). Till date, midwives reliably complain the need to improve on their informatics skills to perform indeed the foremost essential computer capacities, exterior of those required at their work place (Ball *et al.,* 2011; Hwang & Park, 2011 & Thede & Sewell, 2009). Regardless of the call, the incorporation of information science into midwifery educational programs besides improvement of information science competencies among midwives is near to the ground (Virgona, 2013). It's upon this that this study is being conducted to ascertain midwives' informatics competencies in the era of global healthcare expectations. This research was therefore, conducted with the aim of (1) determining the level of knowledge of computers and other electronic devices among midwives, (2) ascertaining the level of flexibility of usage of computers and other electronic devices among midwives, and (3) determining the midwives' skills level in the application of the hospital information management system.

2 Materials and Methods

Study design

A quantitative-based cross–sectional study design was used for this inquiry to elicit statistical inference about the population of interest. The study was conducted in six (6) randomly selected health facilities, three (3) hospitals (1 government owned, 1 CHAG and 1 private), two (2) private clinics and a health centre out of the eighteen (18) health facilities using the Hospital Administration Management System (HAMS). All the one thousand two hundred midwives (1200) working in the municipality were the target population. The sample for this study was estimated by the application of Yamane's formula $n = N/(1 + (N)\ e2\ )$ (Yamane, T.,1967), where n is the sample size, "N" is the population size and "e" is the level of precision, which is usually set at 0.05.

Study participants

Based on the population of registered midwives in the municipality, 330 participants were picked by using quota sampling method for the study giving room for 5% attrition rate. A multistage sampling strategy was used to recruit the participants. The quota sampling system was adopted because each of the selected health care facility had a varied number of midwives hence the need to base our selection participants on the number of midwives in the facility or unit. In each facility/unit, a convenience sampling strategy was used to recruit the participants who met the inclusion criteria and consented to participate in the study. These strategies were adopted to avoid biases and to ensure generalization of the findings from the study.

Inclusion criteria

Registered midwives who have practiced for minimum of one year and practicing at any unit or department within the selected health care facility were considered as the study subjects.

Exclusion criteria

Auxiliary midwives and registered midwives on leave during the period of data collection were not considered.

Study setting

In the municipality, there are thirty-one (31) healthcare facilities comprising of six (6) hospitals, twelve (12) clinics, seven (7) chips compound, three (3) maternity homes and three (3) health centers providing health services to total population of 123,224 (Population and Housing Census, 2010). Out of the thirty-one (31) health care facilities in the municipality, eighteen (18) were using the electronic health management system, on 20th May, 2021 six (6) of these facilities were randomly selected including three (3) hospitals (1 government owned, CHAG and private), two private clinics and a health centre.

Instruments

Structured questionnaire self-developed from a review of literature on previous work on nursing informatics (Kaminski, J., 2011 & TIGER, 2014) were

distributed among the participants in person and electronically via Google Docs Form considering the protocols for Covid 19 disease; this was to help reduce the risk of spreading Covid-19. The questionnaire was composed of five sections: the first section was used to pick demographic characteristics of participants including age, sex, marital status, professional rank, educational level, and work experience; the second and third sections elicited data regarding respondents' knowledge and skills in using computers, whilst the fourth and fifth sections contained questions that picked data regarding the midwives knowledge on informatics and application of such knowledge into practice (using the health information management system). The 73 questionnaire items were rated using a 5-point Likert scale ranging from "strongly agree" to "strongly disagree".

Pilot study

A content validation form was prepared by my supervisors who are experts in informatics and midwifery education and practice. After the content validation form was prepared, a five-member committee was set up to conduct content validation. Each of the four domains of informatics competencies thus computer literacy (computer knowledge and skills), information literacy (information knowledge and skills) was reviewed and assigned a score on each item. Content Validity Index (CVI) to evaluate the validity of the study instrument. This was done on a five-point Likert scale. The content item validity index was computed and arrived at 0.81.

The test-retest method was used to determine the reliability of the instrument after which the instrument was distributed to 30 midwives from another health facility for completion. After one week, the participating midwives were asked to complete the questionnaire once more. Cronbach's alpha was used to determine the reliability of the construct. The computed Cronbach alpha coefficient value was 0.83 which indicated that the construct was reliable devoid of any ambiguity.

Data collection and analysis

The data collection process lasted for about four (4) months, while some of the data were gathered in-person others were collected electronically through the use of google form doc. Data collected from field was coded and entered into the computer for analysis using IBM SPSS software version 20, both descriptive and inferential statistics techniques were employed. Socio-demographic data gathered were described in frequencies, averages and standard deviations. To ascertain respondents' knowledge level in computers and other electronic devices (objective 1) a 5-point Likert scale questions were used, the scale ranged from strongly disagree to strongly agree. Weights were attached to each option as follows; strongly disagree -1, disagree- 2, neutral -3, agree – 4 and strongly agree -5. Also, to ascertain respondents' skill level in computers and application of informatics in carrying out their duties (objectives 2 and 3) a 5-point Likert scale questions were used, the scale ranged from "no difficulty" to "cannot use at all". Weights were attached to each option as follows; cannot use at all-1, don't know- 2, lots of difficulty -3, some difficulty – 4 and no difficulty-5.

Non-parametric method (Kruskal Wallis Test) of analysis was used to determine the differences among the four categories of informatics competencies since the normality test showed a skewed data to the right.

Ethical consideration

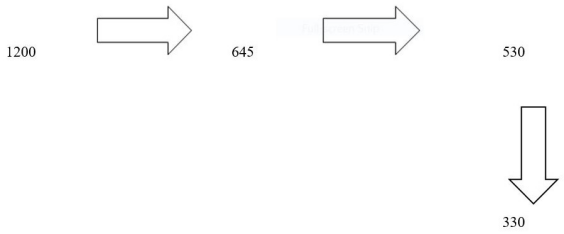
Ethical clearance was sorted from the university ethical clearance committee. An ethical clearance was sought from Ethics Review Committee of University of Port Harcourt, Department of Nursing and Midwifery and the authorities at each health care facilities for the purpose of the research. In order to ensure that the respondent's dignity is respected and confidentiality not compromised, not even once, it was indicated to the respondents that they could withdraw from the research at any time without incurring any negative consequences whatsoever. The identity of all respondents was withheld and remained anonymous. The respondents were assured that the data would be reported as group data and so no reference could be made to any specific person. To ensure that all these were understood by the respondents, a verbal consent was sought before the administration of the questionnaire.

3 RESULTS

After using simple random sampling method to pick the Sunyani municipality among other municipalities in the region, it was found out that the population of midwives within the municipality was 1200, out of which 645 were found to be working within the six (6) healthcare facilities randomly selected for the study. During the time of the study,

it was also revealed that 530 of the population have worked for more than a year and were at post hence were qualify to take part in the survey.

Flow chart showing population, target population, accessible population and sample.



Source: Designed by the authors

Demographic Data of Respondents

Above shows the age distribution of the respondents. It is observed that out of the total 300 respondents, majority (156) were aged between 31 and 40 with a percentage of 52. This is followed by age group of 21 and 30 amounts to 44.3%. It was also observed from the table that only few of the respondents 11 (3.7%) aged above 40. This shows that most of our respondents were young adults or in their youthful stage. From the same table other characteristics of the respondents such as respondents' professional ranks and years of working experience.

Basic Computer Knowledge of Respondents

Table 2 shows the mean scores with their measure of dispersions of all the 300 responses on each item. It was observed that all the means were either close to 4 (agree) or even more than 4. This suggested that the respondents could perform almost all the basic functions of a computer. However, it was also observed that some functions could be performed better than others. For instance, shutting down a computer has the highest average of 4.81 with standard deviation 0.42 indicating that almost all the respondents strongly believe that they could shut down a computer and that was what they can do best. Finally, with a total mean and standard deviation of 4.2 and 0.36 respectively, it could be said that respondents have a strong knowledge in computing and could perform several basic computing tasks.

An inferential statistic was conducted to ascertain whether the knowledge these respondents have is equal or different among their professional rank and working experience.

Kruskal-Wallis H Test for Basic Knowledge in Computer Across Professional Rank

We test the hypothesis that;

$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6$ **(Population means are not significantly different)**

$H_0: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5 \neq \mu_6$ **(Population means are significantly different)**

Figure 1 showed the non-normality Kruskal-Wallis H test of differences in basic computer knowledge across professional rank. It was generally observed from the box plot that knowledge between the ranks were different. It is also evident that Principal Midwifery Officers scored the highest mean rank followed by Senior Midwifery Officers. It is also observed from the same box plot that Senior Staff Midwives scored the least mean rank.

These observations implied that Principal Midwifery Officers had the highest basic computer knowledge while Senior Staff Midwives had the least knowledge. The box plot showed that one respondent belonging to Principal Midwifery Officer was an outlier indicating that his/her knowledge in basic computing deviates from the colleagues.

To ascertain whether or not these differences in basic computer knowledge was statistically significant, the table in the diagram was interpreted. With (Chi square = 10.508, p = 0.062, df = 5) or in other words the probability value (0.062) was greater than our critical value (0.05), we failed to reject the null hypothesis. This implied that although differences existed between the means of the ranks with regards to basic computer knowledge, these differences were not statistically significant.

Respondent's Computer Skills

The second objective was to assess and establish the level of flexibility of usage of computers and other electronic devices among midwives. These levels of flexibility were grouped into five key aspects thus Microsoft word, Excel, PowerPoint, internet and electronic mails. The means and standard deviations were computed and summarized on the table below;

The table above shows the various aspects that made up the overall skill in computing. With a mean of 4.50, and standard deviation 0.913, computer skill in Microsoft word was the highest amongst the respondents followed by skill in electronic mails (4.41 and 0.921), Microsoft Power Point (3.83;1.294) and Microsoft excel being the least (3.74 and 1.245). Others including mouse, peripheral and safe computer usage, manipulating

Table 1. Demographic Data of Respondents

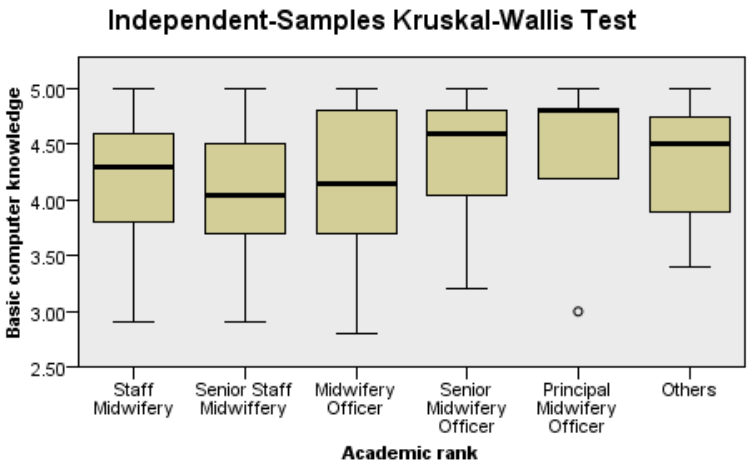
Demographic Variable	Frequency	Percentage (%)
Age distribution 21-30	133	44.3
31-40	156	52.3
41-50	009	3.0
>50	002	0.7
Academic Qualification	204	68.0
Diploma	78	26.0
BSc	15	5.0
Postgraduate	3	1.0
Others		
Professional Rank	132	44.0
Staff Midwife	66	22.0
Senior Staff Midwife	66	22.0
Midwifery Officer Senior	20	6.7
Midwifery Officer Principal	7	2.3
Midwifery Officer	9	3
Others		
Work Experience	105	35.0
0-2	103	4.3
3-7	60	20.0
8-12	21	7.0
13-17	3	1.0
18-22	4	1.3
23-27	2	0.7
28-32	2	0.7
>32		
Total	**300**	**100**

Source: Data from the survey, for illustration purposes only.

Table 2. Table 4.2 Respondents knowledge in computers

COMPUTER LITERACY	MEAN	S. DEVIATION
Identify components of PC	4.42	.667
Set up computer system	4.22	.766
Boot computer	4.63	.669
Shut down computer	4.81	.418
State the function of mother board	3.86	.999
Identify CPU	4.18	.939
Purpose of cooling system	3.71	1.079
State memory types of computers	4.22	.924
State function of memory	3.78	1.109
Less application to run faster	4.16	.931
Total	**4.20**	**0.36**

Source: Data from the survey, for illustration purposes only



Total N	300
Test Statistic	10.508
Degrees of Freedom	5
Asymptotic Sig. (2-sided test)	.062

1. The test statistic is adjusted for ties.
2. Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Figure 1. Figure 4.5 Kruskal-Wallis H test of computer knowledge across professional rank

through windows and solve minor computer problems recorded an average of exactly 4.0 indicating strong skill in manipulating computer. Clearly the respondents showed differences in their skill levels. Therefore, an inferential statistic was conducted to ascertain whether the skill levels of the respondents were equal or different among their working experiences.

Figure 3 shows the summary of non-normality Kruskal-Wallis H test of differences in computer skills across respondents work experience. From the box plot in the diagram, it was observed that respondents' median points or mean ranks in computer skills differ across the number of years in service, respondents who have worked for over 17 years scored the highest mean rank followed by those who have worked between 13 and 17 years. Also, respondents who have worked between 3 and 7 years scored the least mean rank with two outliers. It was also observed that computer skill appears to increase as working experience also increases. Boxplots with outliers depicts that within the same work experience, some respondents possess different computer skill levels while the ones without outlier shows approximately similar skill level.

To determine whether or not these differences in computer skill is statistically significant, with (Chi square = 5.270, p = 0.261, df = 4) or in other words the probability value (0.261) is greater than our critical value (0.05), we fail to reject the null hypothesis and assert with 95% confidence that although

COMPUTER SKILL	MEAN	STANDARD DEVIATION
Skill in Microsoft word	4.50	.913
Skill in Microsoft excel	3.74	1.245
Skill in Microsoft PowerPoint	3.83	1.294
Skill in electronic mail	4.41	0.921
Skill in internet	4.354	1.019
Others (peripheral & safe computer usage etc.)	4.00	1.055

Figure 2. The various aspects that made up the overall skill in computing.

differences exist between the means ranks of respondents' computer skills, these differences are not statistically significant.

Respondents' Skill in Informatics

Respondents' General Skills in Informatics

The final objective was to assess the respondents' skill in informatics. The responses are summarized in the mean table below;

Kruskal-Wallis Test for Skill in Informatics Across Groups

Kruskal-Wallis Test for Skill in Informatics Across Work Experience

We test the hypothesis that;

$H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5$ (Population means are not significantly different)

$H_0 : \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 \neq \mu_5$ (Population means are significantly different)

Figure 4 is a summary of non-normality Kruskal-Wallis H test of differences in respondents' skills in informatics across their working experience. It was evident from the Boxplot in the figure 4.9 that respondents' median points or mean ranks in informatics skills differ across the number of years in service. Respondents with the highest working experience or those who have worked for over 17 years scored the highest mean rank followed by those who have worked between 13 and 17 years. It is also observed that respondents who have worked between 3 and 7 years scored the least mean rank with two extreme values (outliers). Respondents with 13 to 17 years of working experience also showed two extremities in informatics skills with one being very extremely represented by asterisk. That extreme value shows that his/her skill far deviates from his colleagues. It is also observed that informatics skills appear to increase as working experience also increases. All the outliers are found below the lower parts of the whiskers of the Boxplots indicating that those respondents exhibited lower levels of informatics skills as compared to the rest.

To determine whether or not these differences are statistically significant, the table in the diagram is interpreted. With (Chi square = 7.293, p = 0.121, df = 4) or in other words the Chi-square probability value (0.121) is greater than our critical value (0.05), we fail to reject the null hypothesis and assert with 95% confidence that although differences exist between the means ranks of respondents' informatics skills, these differences are not statistically significant.

4 Discussion:

Demographic Information

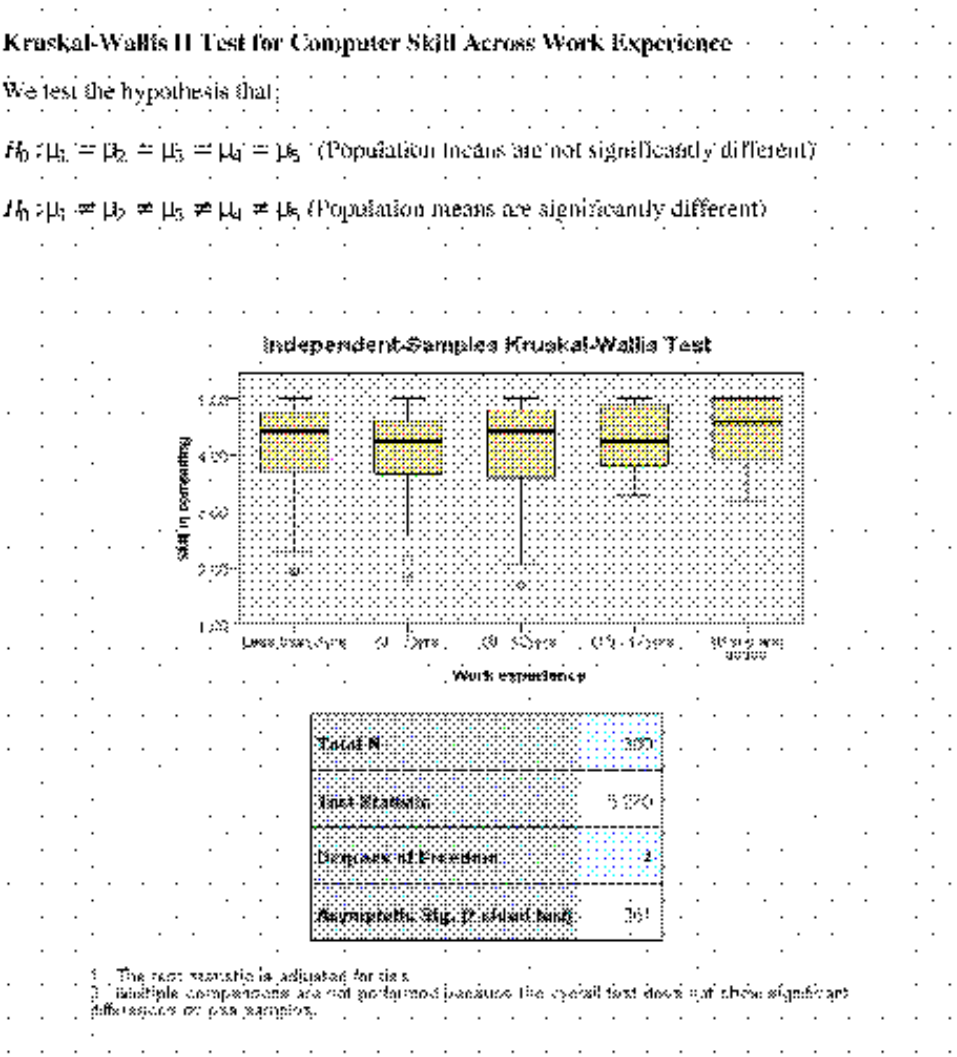


Figure 3. shows the summary of non-normality Kruskal-Wallis H test of differencesin computer skills across respondents work experience.

Table 3. Respondents general skills in informatics

INFORMATICS SKILL	MEAN	S. DEV.
Able to collect data from client	4.46	.908
Ability to use HAMS in the client care or recording data	4.40	.968
Ability to use HAMS to store and retrieve	4.20	1.129
Can use diagnostic code	4.03	.865
Ability to access shared data in HAMS	3.90	1.189
Able to find resources in computer	3.73	1.214
Use HAMS to plan care and intervene	3.98	1.246
Use HAMS to assess and monitor progress of client	3.97	1.240
Use of application programs to implement plan	3.90	1.274
Able to teach and guide other system users with challenges	3.82	1.270
Log in into patients' MIS with an ID	4.30	1.156
Able to search data in patients' MIS	4.18	1.222
Improve integrity and accessibility of information	3.95	1.211
Encourage myself and others to use application program	4.25	1.086
Ability to correct defects	3.85	1.185
Total **4.06**		**1.144**

The data collected with regards to the professional ranks of the midwives and their informatics competencies revealed some similarities. This might help us in generalizing and validating our findings.

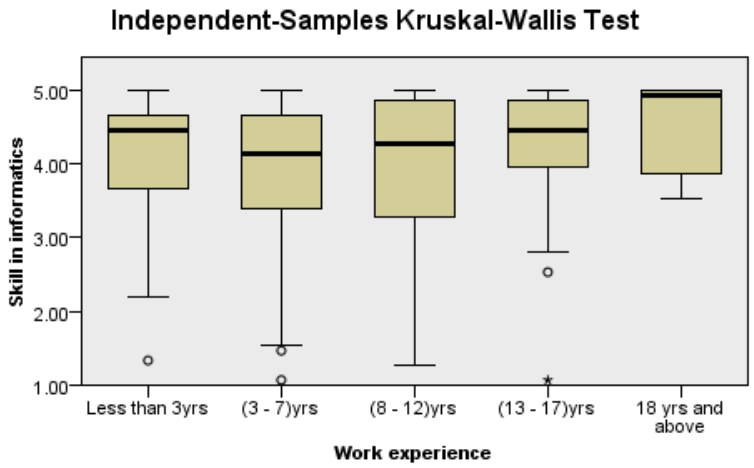
From the demographic data it was observed that majority (156) of the midwives interviewed were aged between 31 and 40 representing 52% of the total respondents interviewed. It was also observed that majority (68%) of the respondents were diploma certificate holders while about 5% from the total 300 respondents were holding a postgraduate degree. This data depicts that the basic entry point for most midwives is diploma, also we can conclude from the above that only a handful of such midwives could rise to the top especially those in the clinical settings. This finding conforms with the findings of studies conducted by other researchers (Olajubu *et al.,* 2014, Pordeli L., 2017 & Godsey J.A., 2015).

It was also found out that majority (132) of the study subjects representing 44% were staff midwives while very few (7) of the midwives were principal midwifery officers. With respect to working experience majority (105) representing 35.0% of the respondents had between 0-2 years working experience. This attests to the fact that, as these professionals rise up the academic and the professional ladder, they move out of the clinical setting to take up other appointments such teaching or other administrative responsibilities which was inconsistent with the findings of an earlier study (Olajubu *et al.,* 2014).

Years of working experience was grouped into 0-2 years as the least and above 32 years as the highest, this study found out that majority (105) of the respondents had between 0-2 years of working experience while 2 out of a total of 300 had over 32years of working experience. This is in conformity with a study conducted by Pordeli L., 2017 which found out that "the mean number of years of informatics nursing experience reported in pre-test was 13-23 months was 61% (n=8), and in post-test group was 2-3 years 50% (n=5). In the pre-test group,71% (n=10) and in post-test group 60% (n=6) had five years or less of informatics nursing experience, 21% percentage (n=3) had more than 10 years of practice experience, and 20% percentage (n=2) had more than 10 years of practice in the post-test group".

Respondents' Knowledge in Computers

Regarding respondent's general knowledge in computers, a 5-point Likert scale questions was employed to ascertain respondents' knowledge in computer hardware and software. Ten (10) items were used to assess the respondent's knowledge on computers. The scale ranges from strongly disagree to strongly agree. Mean score analysis was



Total N	300
Test Statistic	7.293
Degrees of Freedom	4
Asymptotic Sig. (2-sided test)	.121

1. The test statistic is adjusted for ties.
2. Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Figure 4. Figure 4 Kruskal-Wallis H test of differences in informatics across work experiences

run for each of the item and it was found out that at least each of the respondents agreed to have had basic knowledge on computers which contradicts a study conducted by Thede & Sewell in 2009 who stated "aside the innovative technological advances in care, midwives ofttimes lack basic informatics competencies outside of their own worksite". Finally, with a total mean and standard deviation of 4.2 and 0.36 respectively, it can be said that respondents have a strong knowledge in computing and can perform several tasks. An inferential statistic was conducted to ascertain whether the knowledge these respondents have is equal or different among their professional ranks and working experience. Kruskal-Wallis test was employed. It was generally observed that knowledge between the professional ranks were different. It was also evident that Principal Midwifery Officers scored the highest mean rank followed by Senior Midwifery Officers. It was also observed from the study that Senior Staff Midwives scored the least mean rank. These observations implied that Principal Midwifery Officers have the highest basic computer knowledge while Senior Staff Midwives had the least knowledge. It was again found out that one of the respondents belonging to Principal Midwifery Officer was an outlier indicating that his/her knowledge in basic computing deviates from the colleagues.

To ascertain whether or not these differences in basic computer knowledge is statistically significant, a non-parametric statistic was used. With (Chi square = 10.508, p = 0.062, df = 5) or in other words

the probability value (0.062) is greater than our critical value (0.05), we fail to reject the null hypothesis. This implied that although differences exist between the means of the ranks with regards to basic computer knowledge, these differences were not statistically significant. This suggested that though there were differences in the knowledge between the ranks of the midwives, these differences were not significant. These findings can be explained by the findings of a study conducted by McNeil and colleagues, they found out that "informatics syllabi very frequently encompass "accessing electronic resources" (50%), followed by "computer-based patient record" (46%), "ethical use of information systems" (45%), "informatics midwife competencies" (40%), and "informatics definitions" (39%). "Only 37% of the respondents stated teaching informatics content which maintained evidence-based practice". They further stated that advanced programs were found to have even low informatics-based content areas than bachelor's degree courses. This suggests that most informatics curricula usually impart basic knowledge across.

Respondents' skills in computing

The study also sorts to determine the respondents' overall skills in computing. With a mean value of 4.50, and standard deviation 0.913, computer skill in Microsoft word is the highest amongst the midwives interviewed. This was followed by skill in electronic mails (4.41 and 0.921), followed with a mean and standard deviation of 3.83 and 1.294 respectively, Microsoft PowerPoint showed a weaker application skill. The aspect with the weakest application skill was Microsoft excel with mean and standard deviation 3.74 and 1.245 respectively. The use of peripheral and safe computer usage, manipulating through windows and solve minor computer problems recorded an average of exactly 4.0 indicating strong skill in manipulating computer which agrees to other published studies (Hunter *et al.,* 2013 & Hubner *et al.,* 2016).

With this finding there was the need to run an inferential statistic to determine whether there exist significant differences between computer skills across working experience and professional rank which in a way may synchronise with academic background. A summary of non-normality Kruskal-Wallis H test of differences in computer skills across respondents work experience was assessed. From the test run, it was observed that respondents' median points or mean ranks in computer skills differed across the number of years in service. That was to say, respondents who have worked for over 17 years scored the highest mean rank followed by those who have worked between 13 and 17 years. It is also found out that respondents who have worked between 3 and 7 years scored the least mean rank with two outliers. It became obvious that computer skill appears to increase as working experience also increases. The study also revealed that there were outliers that existed within the same work experience, some respondents possessed different computer skill levels while the ones without outlier shows approximately similar skill level.

To determine whether or not these differences in computer skill is statistically significant, with (Chi square = 5.270, p = 0.261, df = 4) or in other words the probability value (0.261) is greater than our critical value (0.05), we failed to reject the null hypothesis and assert with 95% confidence that although differences exist between the means ranks of respondents' computer skills, these differences are not statistically significant. With this we could make an inference that there was no relationship between computer skill and years of working experience, this affirms what a study conducted by Olajubu and co in Nigeria found in 2014.

Respondent's Skill in Informatics

With a total mean and standard deviation of 4.06, 1.14, it was observed that majority of the respondents were skilled in informatics. Inversely, it was found out that the study subjects have mastery in certain areas of informatics which included collecting data from clients (4.46, 0.98), using the HIMS in recording data and client care (4.40, 0.96), and using the HIMS to store and retrieve data (4.20,1.12) respectively.

The study subjects also scored less means and standard deviations with respect to the following aspects of informatics skills: able to find resources in the system for ethical decision making (3.73. 1.21); able to teach and guide other system users with challenges (3.82, 1.27); ability to correct defect while working with the system (3.85, 1.18) respectively. Based on these findings it can be concluded that the participants have a fair skill with respect to informatics which cites with a similar study which have been conducted by other researchers (Hunter et al., 2013, Olajubu *et al.,* 2014 & Hubner *et al.,* 2016).

From the descriptive statistics it was observed that there exist differences in the informatics skill across working experience; respondents' median points or mean ranks in informatics skills differ across the number of years in service. Respondents with the highest working experience or those who have worked for over 17 years scored the highest mean rank followed by those who have worked between 13 and 17 years. It was also observed that respondents who have worked between 3 and 7 years scored the least mean rank with two extreme values (outliers). Respondents with 13 to 17 years of working experience also showed two extremities in informatics skills with one being very extreme represented by asterisk. That extreme value shows that his/her skill far deviates from his/her colleagues. This could be attributed to the respondent's curiosity to know since some of these information can be seen on the internet. It was also observed that informatics skill appears to increase as working experience also increases. All the outliers are found below the lower parts of the whiskers indicating that those respondents exhibited lower levels of informatics skills as compared to the rest.

As indicated clearly above, respondents exhibited differences in informatics skills with respect working experience. To determine whether or not these differences are statistically significant, with (Chi square = 7.293, p = 0.121, df = 4) or in other words the Chi-square probability value (0.121) is greater than our critical value (0.05), we failed to reject the null hypothesis and assert with 95% confidence that although differences exist between the means ranks of respondents' informatics skills, these differences are not statistically significant.

Interpretation of results

The study revealed that midwives in the municipality have basic knowledge in computing such as booting, shutting down computers, responding to mails, to mention just a few. This results however contradicts the findings of a similar study conducted by (Thede & Sewell, 2009).

The study also revealed that the respondents have strong skills in manipulating computers which supports a study by (Hunter et al., 2013 & Hubner *et al.,* 2016).

Finally, it was evident that the midwives interviewed had a fair skill in informatics and this is consistent with the studies of (Hunter et al., 2013, Olajubu et al., 2014 & Hubner *et al.,* 2016).

Generalizability

The study which was conducted in the Sunyani municipality in the bono region of Ghana can be generalized looking at the following parameters:

1. The study looked at a wide range of age group. The study was not limited to midwives trained before the introduction of computers/informatics but also looked at midwives who was trained after the introduction of computers/informatics.

2. The study also considered midwives who have practiced between one (1) year and thirty (30) years of working experience hence the study looked at midwives with different professional ranks ranging from staff midwife to principal midwifery officer.

3. Again, the study didn't look at midwives practicing in specific departments or units but rather midwives practicing at various units in the selected facilities for the study.

4. Despite all these considerations the study also employed the best sampling techniques to recruit respondents for the study which could help the researchers generalize their results. The study employed simple random sampling method to pick the Sunyani municipality as the study site, it also used simple random sampling method to select the six (6) health facilities from the 18 facilities that were using health administration and management system. Finally, we picked the respondents using quota sampling method taking into consideration the size of practicing midwives in the selected facilities.

5 Limitation

The study may have had limitations that could have affected the internal and external validity. The study only looked at perceived competencies of the respondents since the respondents were not exposed to real situation but rather were asked to respond to close ended questions. The study had no funding support from any institution or individual. The study didn't look at the relationship between age and informatics competencies which can be look at in a later survey.

6 Conclusions

It can be concluded that most of the midwives interviewed were in their youthful ages and started practising with diploma. We found out that majority of the midwives have basic knowledge in computers and could apply this knowledge in the performance of basic tasks with the computer such as booting

it, shutting it down, responding to electronic mail and also enter a text using Microsoft word. We also found out that the respondents have a fair knowledge and skills in informatics as well. There was no relationship between knowledge and educational level and professional rank. There is the need to look at the curriculum of nursing informatics since the informatics course content just to expose the students to basic computer knowledge and skills (Elahi, *et al.,* 2018 & Schleyer *et al.,* 2011).

Recommendations

With the pace at which information technology is advancing across all walks of life, there is the need to help improve the informatics competencies among health care practitioners especially midwives so as to help improve data management and the quality of care provided.

It is also imperative to look at informatics syllabi for the trainee midwives. This is because most of these cadre of healthcare workers had their informatics training in their training institutions. Studies have shown that most midwives possess basic knowledge and skills in informatics, and this may limit their adaptability to the use of most of these electronic data management systems (Schleyer *et al.,* 2011 & Hunter *et al.,* 2013).

To help improve the informatics competencies among midwives and other healthcare workers it will be prudent to develop an educational training and professional programs that will help the midwives (Safdari & Azadmanjir, 2014).

Practical demonstrations should also be adopted to assess informatics competencies since the most available tools used are structured questionnaire or checklists which are used to elicit perceived competencies.

Contributions To Knowledge

Nursing and midwifery have for a long time be seen as similar profession but there exist vast differences in the scope of practice. Though there exist enough study on nursing informatics this is the first study looking at informatics competencies among midwives will set the pace for others aspects of midwifery informatics. The study also found out that there exists a gap between the level of education, number of years of working (experience) and informatics competencies.

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Conflict of interest

The authors of this paper declare no conflict of interest.

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