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Competency of the BScN students in application of midwifery theory into practice during their clinical placement at selected Teaching and Referral Hospitals in Kenya.

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Abstract
Aim: *To investigate competency of the BScN students in application of midwifery theory into practice during their clinical placement at selected Teaching and Referral Hospitals in Kenya.*
Background: Studies done locally and globally have shown that there are gaps between knowledge taught and practice denoting inadequate skills by BScN Nurses. The Midwifery knowledge and skills are applicable in all programs with BscN expected to express higher degree of competencies. Minimizing the gaps would enhance prevention of maternal mortality by all Nurse/Midwives. The BScN in the clinical experience need instructors/mentors who are role models, knowledgeable and skillfully prepared in order to assist the BScN in reducing the gap existing in theory and practice.
Methodology: *This was an analytical cross-sectional study utilizing both qualitative and quantitative approaches conducted among nursing instructors, mentors, third- and fourth-yearBScN students during midwifery clinical practice in both Kenyatta National Hospital (KNH) and Moi Teaching and Referral Hospital (MTRH). A systematic random sampling technique was employed to select 307 midwifery students on clinical placement at the study areas. Purposive sampling technique was used to select nine mentors into the study. A pre-tested semi-structured self-administered questionnaire was used for quantitative data collection. A qualitative observations and field notes taking was done with details of what was observed. The respondents were interviewed and results recorded. The descriptive and inferential statistics was generated and reported appropriately. Chi-square test was used to determine associations between midwifery theory and clinical practice among BScN students and intervention of danger signs, obstetric emergencies. Cross tabulation was done to find association between independent and dependent variables Unadjusted odds ratio (OR), p-values (p) as well as 95% confidence intervals (CI) was reported. A P-value of < 0.05 was regarded as statistically significant. Qualitative data was analyzed using thematic analysis using NVivo 11.*
Results: *The findings revealed that 51.5% (158) of the respondents were female. The average age was 23(SD±1.5) years with more than half, 51.5% (171) were aged less than 23 years. Almost all of the respondents,99% (304) had attended skills training.Most of the respondents, 84% (258) were able to correctly differentiate primary and secondary PPH, 86% (264) knew immediate PPH intervention, 94.5% (290) had knowledge on the causes of PPH, 83.5%(256) of the respondents adequately explained the management of PPH with placenta insitu while 92.2%(283) had adequate knowledge on management of PPH with placenta expelled. The overall competency was 69.7%.Knowledge of recommended ANC visits (OR =11.36, 95%CI:2.4 – 53.66, p<0.001), knowledge of danger signs during pregnancy (OR =2.74, 95%CI:1.2 – 6.25, p =0.021), knowledge of definition of PPH (OR =2.54, 95%CI:1.23 -6.45, p =0.021) and knowledge of difference between primary and secondary PPH (OR =1.94, 95%CI: 1.03 – 3.63, p = 0.043) were significantly associated with having adequate competency among students on clinical placement. Among midwifery key practices, those who had adequate demonstration on examination of placenta (OR =2.1, 95%CI:1.59 -7.49, p =0.014) and adequatedemonstration on repair of episiotomy (OR =1.74, 95%CI:1.04 – 2.90, p = 0.044) were associated with increased competency among study respondents.*
Conclusion and recommendations: *The results have showed a major gap between theory and clinical practice among midwifery students. Thus, there is need for integration of a robust multidisciplinary approach among students, mentors and institutions to create linkage between theory and clinical practice.*
Keywords: *Competency, clinical practice, clinical competency, theory to practice, maternal mortality*

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I. Background

Globally nursing is recognized as a practice-based profession and effective clinical mentor is a major component of nursing education (Etim, 2016). Song and McCreary (2020) found BScN nurses had deficiencies in communication, working together, critical thinking and expertise yet these skills are critical for nurses in managing patients. Therefore, such deficiencies increase delays in decision making.in the area of practice. Filippi (2010), noted that the causes of MMR occur during antenatal and postnatal period with hemorrhage being the most leading cause of MM. Globally, close to 900 women lose their lives from maternal related causes daily (WHO, 2012). These deaths occur in the clinical area where Nurse/Midwives practice. A study done by Neal-Boylan, (2010) indicated thatBScN lacked clinical skills required for patient care probably because this cadre of nurses are trained to take up administration positions which are very few and competitive. Such positions are few and therefore BScN nurses find themselves in clinical practice where practical skills are needed. Globally nursing is recognized as a practice-based profession and effective clinical instruction is a major component of nursing education (Alando 2016). Employers in Kenya recruit diploma nurses who have practical skills referred to as "hand on" skills (Neal-Boylan, 2010. Studies done have shown gaps in university education in Kenya where 51% of graduates were found lacking job market skills (Wolff et al., 2010). Brown and Crookes, 2016, noted 2000 BScN nurses had been licensed to practice in Kenya but the ministry of health was reluctant to employ them. Same study showed County government recruitment of BScN nurses was minimal. Improving maternal health is one of the thirteen targets for the SDG-3 on health 2015.SDGs include direct emphasis on reducing MM moving beyond survival. With the aim of reaching a global MMR of less than 70 deaths per 100 000 live births by 2030 Adequate monitoring of mortality and morbidity related to pregnancy is essential in identifying high risk groups, interpreting trends and coming up with better interventions. The BScN training incorporates the use of simulated patient's skills on history taking, clinical reasoning, physical assessment, communication and interviewing. These approaches used in the program allow BScN students to increase their confidence, competences as well as clinical capability in timely recognition, management and referral of the acutely sick women of which they are lacking. Hence it is essential to understand the level of competency of midwifery students in clinical placement to understand their efficiency in practice in relation to theory in learning environment.

II. Methods

Study design and target population

This was an analytical cross-sectional study conducted to investigate the competency of midwifery students and understand the underlying association. The study was conducted among midwifery students, nursing instructors and mentors placed on clinical rotation at Kenyatta National Hospital and Moi Teaching and Referral hospital which are leading teaching and training hospitals in Kenya.

The target study population was 3rd and 4th years BScN (Direct Entry) students, mentors/clinical instructors who were in the KNH and MTRH midwifery departments at the time of the study. The two referral hospitals, KNH and MTRH were selected to cover both Eastern and Western regions among others and the two were taken as a national representation. The Focus group discussion were key informants 8-12 who are nursing managers, instructors/ mentors from the midwifery departments. Interview were conducted from prenatal clinic and postnatal departments of KNH and MTRH and the key informants allocated to those departments at the time of the study.

Sample size and sampling

Sample size of the students who took part in the research were calculated by use of Fischer's formula where 307 students were enrolled into the study. Systematic sampling technique was used to sample midwifery students in the study area while purposive sampling technique was used to sample nursing instructors and mentors.

Validity and reliability of study tools

The tools were pretested with 2 qualified nurse midwives from Thika level five hospital who are not designated mentors by institution, and 28 4th years nursing students in teaching practice. This assisted in modifying the tool to give research assistants chance to observe on how they collected data prior to the real study. Pretesting helped in checking the validity of the questionnaire, the extent to which the scores from a measure represent the variable they are intended. Validity established using a panel of experts.

Instrument validity refers to how accurately a method measures what is intended to measure. The validity avoids ambiguity to ensure that all respondents understand the questions and respond in accuracy. All variables as contained in the study objectives were adequately covered by the instruments by actually using them to guide

the design of the instruments. The accuracy of the instrument enabled the researcher to make final modifications.

Data assurance

There was tight control and monitoring by the principal investigator of the research during the actual data collection to guarantee value of information.

The research assistants were trained on filling out the questionnaires correctly to enhance accuracy and validity. At the end of each day, the principal investigator checked the questionnaires oversight and likely mistakes entered to make sure that all questions were tackled evidently and properly documented.

Data management and analysis

The data was organized, screened and checked for completeness. It was then coded and entered into the computer, and cross checked with the original data for accuracy. The descriptive and inferential statistics was generated and reported appropriately. Specifically, data was descriptively analyzed into proportions and summarized in frequency tables. Chi-square test was used to determine associations between midwifery theory and clinical practice among BScN students and intervention of danger signs, obstetric emergencies. Student t-tests was used to analyze associations between current midwifery theory into practice against identifying causes of maternal mortality and management of causes. Cross tabulation was done to find association between independent and dependent variables. Statistical significance was assessed using chi-square test for categorical data. Unadjusted odds ratio (OR), p-values (p) as well as 95% confidence intervals (CI) was reported. A P-value of < 0.05 was regarded as statistically significant thus assisting in the development of the innovative midwifery practice training model for Bachelor of Science in nursing students during clinical placement in identification and management of maternal mortality causes at KNH and MTRH. Quantitative data was analyzed using SPPSS Scientists software Version 28 whereas; inferential analysis using Chi-square tests was done to establish relationship between midwifery application of theory to practice and student preparedness in managing the causes of MM during practice**.**

Qualitative data was analyzed using NVivo program version 11 where themes and sub- themes that constitute narrative based on research objectives was be summarized in graphs and matrices. The results were shared with the stake holders of the selected referral and teaching hospital, and Ministry of Health. Ethical approval was obtained from MKU ethics committee, KNH-UoN ethics review committee and IREC Review committee. Permission was also obtained from NACOSTI.

III. Results

4.1 Demographic characteristics of the study respondents

The findings revealed that 51.5% (158) of the respondents were female. The average age was 23(SD±1.5) years with more than half, 51.5% (171) were aged less than 23 years. Almost all of the respondents,99% (n =304) had attended skills training as shown in Table 1.

Table 1: Demographic characteristics of the study participants

	Frequency	**Percent**
Gender		
Male	149	48.5
Female	158	51.5
Age (Mean	23+1.5	
<23 years	171	55.7
>=23 years	136	44.3
Year of study		
3	95	30.9
4	212	69.1
Attended skills training		
Yes	304	99.0
No	3	1.0

The level of competence of the BScN students in application of midwifery theory into practice during their clinical placement at selected Teaching and Referral Hospitals in Kenya.

The findings established that 71.3% (219) affirmed that there is presence of enough clinical supervisors although 28.7% (n =88) stated that there are no enough clinical supervisors in placement facilities as shown in Figure 1.

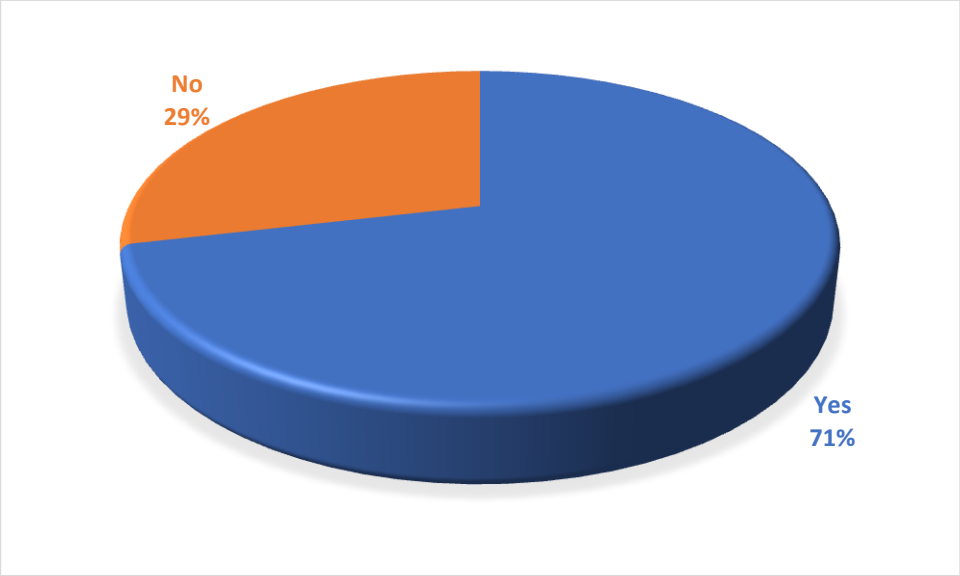

Figure 1: Presence of enough clinical supervisors

Knowledge on ANC visits among respondents

Majority of the respondents, 96.4% (n =296) had adequate knowledge on the recommended minimum ANC visits for any pregnant woman, 92.2% (n =283) of the respondents had adequate knowledge on danger signs associated with pregnancy. The findings further indicated that, 95.1% (n =292) had adequate knowledge on the nature of history taken during first ANC visit during pregnancy as shown in Table 2.

Table 2: Knowledge on ANC visits among respondents

	Frequency	Percent
Recommended ANC visits		
≥4 visits	296	96.4
<4 visits	11	3.6
Danger signs associated with pregnancy		
Adequate	283	92.2
Inadequate	24	7.8
History taken during first visit during pregnancy		
Adequate	292	95.1
Inadequate	15	4.9

Definition of PPH among BScN nursing students on Clinical placement

The respondents were asked to define PPH, 53.1% (n =163) correctly defined PPH by identifying the exact blood levels for both vaginal delivery and CS delivery, 25.7% (n =79) partially defined PPH while 21.2% (n =65) incorrectly defined PPH as shown in Figure 2.

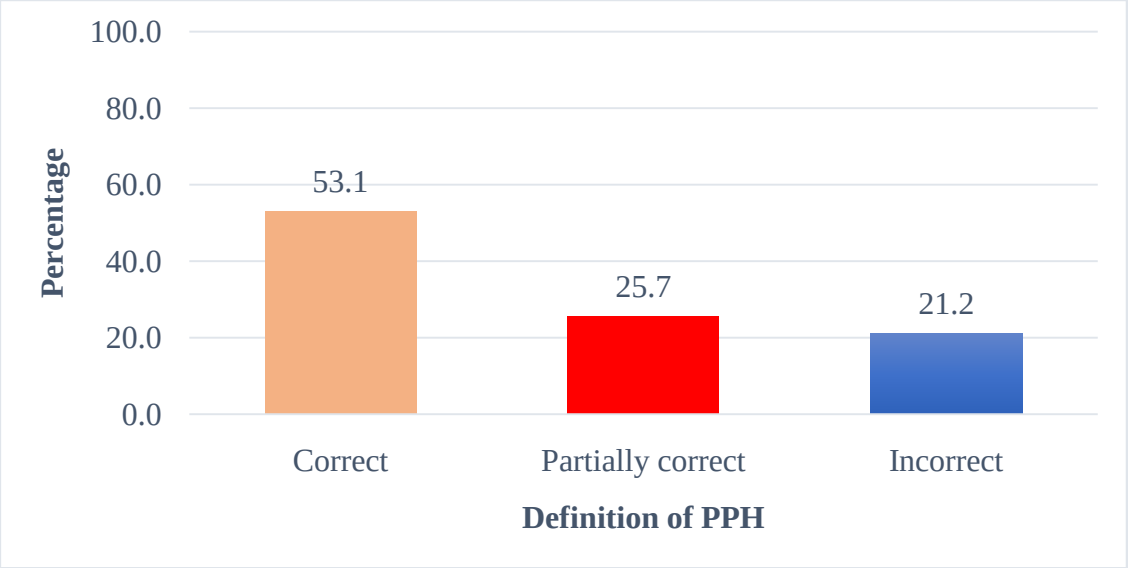

Figure 2: Definition of PPH

Association between knowledge and competency among students on clinical placement

The findings revealed that knowledge of recommended ANC visits (OR =11.36, 95%CI:2.4 – 53.66, p<0.001), knowledge of danger signs during pregnancy (OR =2.74, 95%CI:1.2 – 6.25, p =0.021), knowledge of definition of PPH (OR =2.54, 95%CI:1.23 -6.45, p =0.021) and knowledge of difference between primary and secondary PPH (OR =1.94, 95%CI: 1.03 – 3.63, p = 0.043) were significantly associated with having adequate competency among students on clinical placement as shown in Table 3.

Table 3 : Association between knowledge and competency among students on clinical placement

	Adequate	**Inadequate**	**OR(95%CI)**	**P-value**
Recommended ANC Visits				
>=4 visits	212(99.1)	84(90.3)	11.36(2.4 - 53.66)	p<0.001
<4 visits	2(0.9)	9(9.7)	Ref	
Danger signs during pregnancy				
Adequate	202(94.4)	80(86)	2.74(1.2 -6.25)	0.021
Inadequate	12(5.6)	13(14)	Ref	
Definition of PPH				
Correct	128(59.8)	35(37.6)	2.54(1.23 - 6.45)	0.003
Partially correct	49(22.9)	30(32.3)	0.43(0.22 - 3.41)	0.213
Incorrect	37(17.3)	28(30.1)	Ref	
Knowledge of difference between primary and secondary PPH				
Correct	186(86.9)	72(77.4)	1.94(1.03 - 3.63)	0.043
Incorrect	28(13.1)	21(22.6)	Ref	
Attended skills training				
Yes	213(99.5)	91(97.8)	4.68(0.42 - 21.41)	0.219
No	1(0.5)	2(2.2)	Ref	
Enough clinical supervisors				
Yes	161(75.2)	65(69.9)	1.31(0.76 - 2.25)	0.328
No	53(24.8)	28(30.1)	Ref	

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Demonstration of major procedures in midwifery

The respondents were asked about the adequacy in demonstration of major midwifery procedures; 65.1% (n =200) of the respondents had adequate vaginal examination before delivery, 51.5% (n =158) had adequate physical examination of a pregnant women, 5.5% (n =17) had adequate examination of a placenta,69.7% (n =214) had adequate demonstration on manual removal of the placenta. Further, 68.7% (n =211) had adequate demonstrationon repair of episiotomy, 58.6% (n =180) had adequate demonstrations on repair of perineal tear, 40.7% (n =125) had adequate demonstration on systemic physical examination of a woman post-delivery as shown in Figure 4.

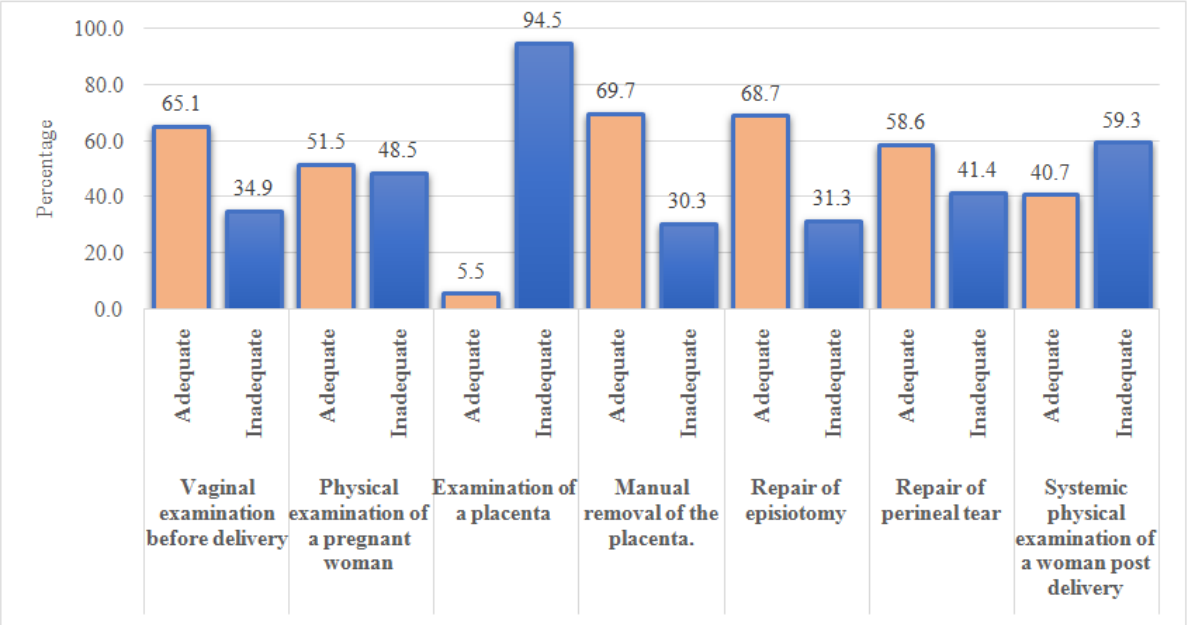

Figure 4: Demonstration of major procedures in midwifery

Findings from qualitative analysis on gaps in midwifery practice

The findings from the focus group discussion which identified three main subthemes in assessing gaps in knowledge among BScN students on clinical placement. These included limited time for clinical exposure, non-committal attitude to clinical practice and lack of supervision.

Limited time for clinical exposure

Majority of the participants stated that there is limited time allocated to the students for clinical exposure which limits their ability to effectively integrate theory into practice:

"*The students do not have enough time for clinical exposure. They need clinical instructors, follow up and guidance. They need engagement in ward rounds with their clinical instructors."* FGD11.

"*There is a deficiency of knowledge and competencies in managing these cases and may be due to a lack of enough exposure to clinicals. Students may need more time in their practical's. Other areas may be better learnt in practical's than in class*." FGD15.

"*They are limited in knowledge and skill of handling obstetric emergencies because of the short duration of clinical rotation. they should revise the number of hours they need to achieve before they qualify*." FGD21.

Non-committal attitude to clinical practice

Some of the participants stated that students had non-committal attitude towards clinical practice and were putting in less effort to improve their efficiency in practice:

"*The students have formed non-committal attitudes towards clinical procedures*." FGD11.

"*The learner should appreciate that he/she will have to be a team player and be eager to apply their theory knowledge to practical through our student mentor in the ward*." FGD14

"*The gaps are lack of adequate practice during their rotation in school and also having mentors during their rotations in school*." FGD21.

Lack of supervision

Most of the participants also affirmed that lack of supervision and mentorship among BScN students on clinical placement both in clinical practice and practical learning. Majority cited that students are less supervised which impact negatively on their competency in clinical practice:

"*There is no periodic assessment of course content, students lack proper supervisor and follow up*." FGD12.

"*Knowledge in handling obstetrical emergencies, duration of clinical rotation to be improved, lack of proper orientation due to personal and workloads*." FGD23.

Association between midwifery key practices and competency among students on clinical placement

The findings revealed that adequate demonstration on examination of placenta (OR =2.1, 95%CI:1.59 -7.49, p =0.014) and demonstration on repair of episiotomy (OR =1.74, 95%CI:1.04 – 2.90, p = 0.044) were associated with increased competency among study respondents as shown in Table 4.

Table 4: Association between midwifery key practices and competency among students on clinical placement

	Adequate	Inadequate	OR(95%CI)	P-value
Vaginal examination before delivery				
Adequate	138(64.5)	62(66.7)	0.91(0.54 - 1.52)	0.705
Inadequate	76(35.5)	31(33.3)	Ref	
Physical examination of a pregnant woman				
Adequate	114(53.3)	44(47.3)	1.27(0.78 - 2.07)	0.385
Inadequate	100(46.7)	49(52.7)	Ref	
Systemic examination of woman post delivery				
Adequate	94(43.9)	31(33.3)	1.57(0.94 - 2.61)	0.053
Inadequate	120(56.1)	62(66.7)	Ref	
Examination of placenta				
Adequate	14(6.5)	3(3.2)	2.1(1.59 - 7.49)	0.014
Inadequate	200(93.5)	90(96.8)	Ref	
Demonstration of manual removal of placenta				
Adequate	147(68.7)	67(72)	0.85(0.50 - 1.46)	0.591
Inadequate	67(31.3)	26(28)	Ref	
Demonstration on repair of episiotomy				
Adequate	155(72.4)	56(60.2)	1.74(1.04 - 2.90)	0.044
Inadequate	59(27.6)	37(39.8)	Ref	

The level of competence of the BScN students in application of midwifery theory into practice during their clinical placement

Most of the respondents, 84% (n =258) were able to correctly differentiate primary and secondary PPH, 86% (n =264) knew immediate PPH intervention, 94.5% (n =290) had knowledge on the causes of PPH, 83.5% (n =256) of the respondents adequately explained the management of PPH with placenta insitu while 92.2% (n =283) had adequate knowledge on management of PPH with placenta expelled as shown in Figure 2.

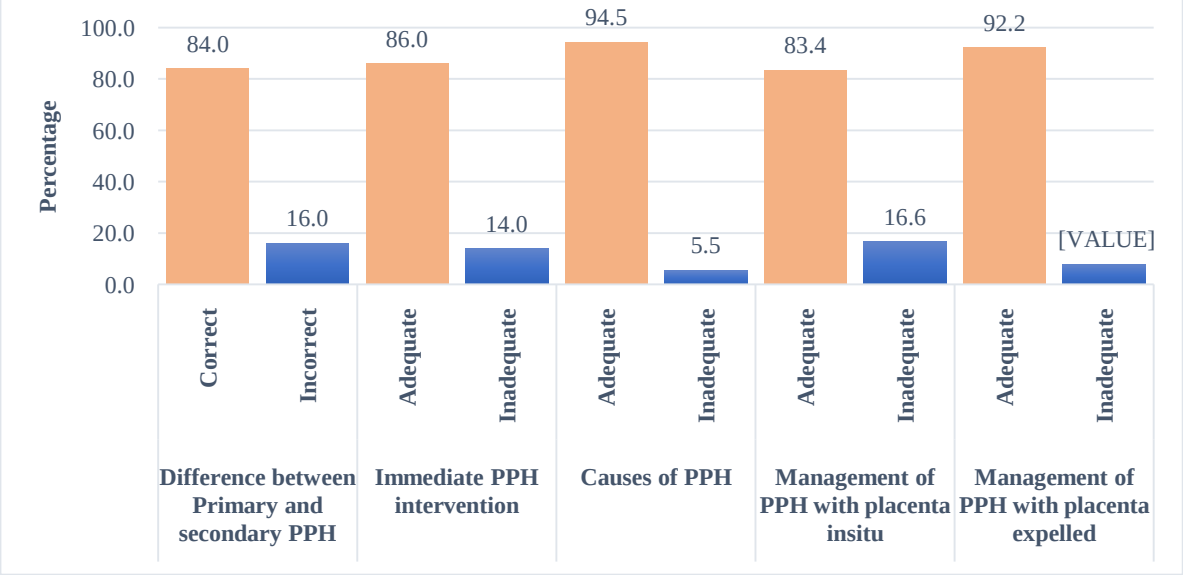

Figure 2:Competency on PPH, causes and management among respondents

Findings from Qualitative findings on competency

The findings from the FGD identified that majority of participants stated that many of the nursing students on clinical rotation are not competent enough to perform most of the tasks required of them.

"*I think that inadequate management of patients presenting at the facility is the major problem*." FGD12.

"*Some of the nursing students I interact with during rotation are unable to link what they learn in class to what they practice*." FGD14.

"*I believe that the competency of nursing students is moderate which warrants better approaches that can help improve the status quo and improve maternal health*." FGD23.

IV. Discussion

The current study revealed that respondents had adequate knowledge on ANC related processes such as recommended ANC visits (96.4 percent), danger signs in pregnancy (92.2 percent) and history taken during the first ANC visit (95.1 percent). These findings are consistent with a correlational study done in Lesotho which revealed that majority of the midwifery students had good knowledge on patient management (Muzeya & Julie,

2020). These practices in ANC are fundamental theoretical concepts which midwifery students are expected to know prior to their clinical placement. About 50% of the midwifery education is focused on clinical education, which has a great importance in shaping the professional skills of the students (Malakooti et al., 2018). However, the findings have showed that there is around five percent of respondents who had inadequate knowledge on antenatal care components.

Slightly more than half of the respondents, 53.1 percent were able to correctly define PPH where they provided full information on volume for both primary and secondary PPH. The findings also revealed that 69.7 percent of the respondents were competent in diagnosis and management of PPH. Almost half of the midwifery students on clinical placement in current study were not competent in diagnosis of PPH and management. The low competency of respondents on PPH explain the high mortality (34 percent) associated with PPH in Kenya. Lack of proper training of midwifery students create gaps in clinical practice especially in situation where they are unsupervised in their clinical practice or graduate without effective competency assessment. These findings are however higher compared to a study done in Tanzania which revealed that 55.2% of the midwifery nurses had inadequate knowledge on PPH prevention and management, 61.6% of the respondents in their study also had inadequate skills in PPH management (Angelina et al., 2019). A study conducted in Ethiopia revealed that only 19.2 percent of midwifery students were clinically competent (Hailu et al., 2021). Our findings were lower than those from a study conducted in Nigeria, which revealed that 80% of the respondents had high knowledge on management of PPH (Asibong et al., 2018). A possible reason for the variation in knowledge and skills described above may be due to different teaching methods used in low resource settings, where students receive large amounts of didactic teaching focused on lectures, assignments and examinations.

Demonstrations form a fundamental part of midwifery training as envisaged in the teaching curriculum. The curriculum presents the basis within which key procedures are done. These procedures involve vaginal examination, examination of a pregnant woman, examination of placenta, manual removal of placenta, repair of episiotomy, repair of perineal tear and systemic physical examination of a woman post-delivery. The findings from our present study showed that, 65.1% of the respondents had adequate vaginal examination demonstration. This shows that 34.9% of the students did not have adequate demonstration on vaginal examination. Physical examination of a pregnant woman was adequate 51.5% while physical examination of a woman post-delivery was adequate in 40.7%. The likelihood of a student who did not have enough vaginal examination being competent in clinical care. Similar findings are echoed by Malakooti et al., (2018) who found that only 21.3 percent of midwifery students had skills for physical examination of a pregnant woman.

Further analysis from the present study only 5.5 percent of the respondents had adequate demonstration on examination of placenta, 68.7 percent had adequate demonstration on repair of episiotomy and 58.6% had adequate demonstrations on repair of perineal tear. These findings show the underlying gaps in teaching as observed by students. Demonstration of key procedures is a major part of learning that every midwifery student is expected to undertake to improve their competency. Demonstration is one of the common teaching methods in midwifery although its utilization and efficiency among learners have not been fully evaluated. A study conducted in Zambia revealed that 32% of the respondents had adequate demonstration (Bweupe et al., 2018). It is essential to ensure that midwifery students who undergo clinical placement meet a minimum threshold regarding the number of demonstrations made to improve their competency in clinical practice. Wolff et al. (2010) established that the present curriculum among BScN students is good although there are gaps in clinical instructions and supervision. This explain the existing gap in meeting the minimum requirement for demonstration of key midwifery procedures. Newton et al (2010) affirmed that planned practice consists of key aspects which include awareness and repetition of competencies. Demonstrative practice becomes essential tool in growing professional proficiency.

V. Conclusion and recommendations

The present study has established varied gaps between theoretical and clinical application. One of the key gaps that have been identified include inadequate assessment of knowledge of learners prior to clinical placement. Demonstrations undertaken within learning environment with instructors are not monitored effectively to ensure that all learners seeking clinical assessment have minimum requirements based on the major procedures in midwifery. Clinical placement settings have not employed effective policies and programs that focus on the needs and wellbeing of all students in clinical placement. Learners on clinical placement are still learning and their competency especially in applying theory to practice needs to be supervised. Therefore, integration of a multidisciplinary approach and linking clinical practice and learning outcomes directly would be critical in bridging the current gap. Preceptors and mentors within clinical placement should have an understanding on learning goals expected at the end of clinical placement as well as assess knowledge level among midwifery students to achieve higher level of success.

Conflict of interest: There is none to declare

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