ORIGINAL RESEARCH

Midwives' experience of participating in the Advanced Life Support in Obstetrics® educational program in Rwanda

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ABSTRACT

High maternal and newborn mortality rates remain a global health issue. Ninety-nine percent of maternal deaths occur in low and middle income countries and many could be prevented by having more qualified health providers. In 2013, 62% of maternal deaths took place in Sub-Saharan Africa. The Advanced Life Support in Obstetrics (ALSO®) Educational Program is an internationally recognized continuous professional development course aimed at increasing the knowledge, skills, competence, and confidence of health professionals to manage obstetric emergencies. The purpose of this qualitative descriptive study was to explore midwives' experiences of translating the knowledge and skills acquired from participating in the ALSO® program into their professional practice in Rwanda. A purposive sample of nine midwives participated in one-to-one interviews directed at understanding their experience of implementing their new knowledge and skills into practice. All interviews were audio-recorded and transcribed verbatim. Content analysis was used to illuminate five themes: 1) Improved midwifery practice, 2) Availability of resources, 3) Inter-professional collaboration, 4) Job (dis)satisfaction, and 5) Autonomy for midwifery practice. The findings revealed that although midwives reported increased knowledge, skills and confidence in management of obstetric emergencies, their ability to change practice was often hampered by non-conducive work environments, a shortage of health care providers, and insufficient equipment and materials. These findings can serve to inform ALSO® course module development, midwifery education development, and health human resources policy that can address obstetrical and newborn education needs and health service delivery in Rwanda.

Key Words: Advanced Life Support in Obstetrics®, Maternal mortality, Obstetric emergencies, Midwifery, Developing countries, Continuous professional development

1. INTRODUCTION

Safe pregnancy and childbirth is a human right and a key international goal.[1] However, high maternal mortality rates remain a global health issue.[2] Although globally, the maternal mortality ratio has decreased by 45% between 1990 and 2013, from 380 to 210 deaths per 100,000 live births,[3] it falls short of achieving the target of the Millennium Development Goals (MDG) to reduce the maternal mortality ratio by 75% by 2015. In Rwanda, the maternal mortality ratio decreased from 1,400 to 320 deaths per 100,000 live births between 1990 and 2013. The reduction of premature mortality including maternal mortality in Rwanda, has been associated with many contributing factors such us improvement in the social determinants of health after the genocide

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of 1994, a reduction in poverty, enhanced gender equity and the Government effort to achieve the millennium development goals targets.[4] Particularly declines in maternal mortality are associated with improvements in the contraceptive prevalence rate[5] and increased number of skilled birth attendants.[6] The pace of the reduction of maternal mortality has been accelerated as Rwanda approaches its fifth millennium development goal target.[4] However, it remains high compared to the standard of the UN, which stipulates that maternal mortality ratio is considered to be high if it is equal to or over 300 deaths per 100,000 live births.[3]

The formal education that skilled birth attendants receive primarily emphasizes care provision for the uncomplicated pregnancy,[7] however, the main causes of maternal deaths are related to pregnancy complications or obstetric emergencies.[8] Therefore, it is recommended that all skilled birth attendants learn how to effectively manage complications associated with pregnancy and childbirth.[9] According to WHO, a skilled birth attendant refers to a qualified health professional, such as a midwife, doctor, or nurse.[7] To achieve and maintain competencies in obstetrical practice, current skilled birth attendants need opportunities to engage in continuous professional development (CPD) courses on managing complicated pregnancies and obstetric emergencies in order to further reduce the maternal mortality ratio.[10]

The Advanced Life Support in Obstetrics (ALSO®) course is an evidence-based, multidisciplinary education program that prepares skilled birth attendants to better manage obstetric emergencies. The ALSO® course was developed in 1991 by two medical doctors, James Damos and John Beasley, from the University of Wisconsin in the United States (US). They proposed that the ALSO® education course could bridge knowledge gaps and increase skills among maternal health care providers to improve emergency obstetrical care management.[11] The ALSO® course is based on adult learning theories, emphasizes an inter-professional team approach, and includes hands-on training.[11]

In many high income countries, CPD is highly valued and is mandatory for midwifery and nursing practice.[12, 13] In some low income countries, CPD is based on the needs and the availability of donors who offer financial support to organize and implement CPD.[13] Although the importance of CPD on knowledge, skills, and confidence of birth attendants is evident,[14, 15] little research has been conducted to explore the opportunities and challenges midwives experience when applying the knowledge and skills they gain from CPD into their practice settings.

Previous studies indicate an increase in participants' knowledge, skills, and confidence in managing obstetric emergencies after participating in an ALSO® course.[16, 17] In Rwanda, ALSO® education has been offered to health professionals working in maternity services (midwives, nurses, and physicians) since 2005. Additionally, CPD educational sessions including ALSO®, using a 'train-the-trainer' approach, have recently been conducted by the Maternal, Newborn, and Child Health in Rwanda Project (MNCHR) in the Eastern province of Rwanda. However, little is known about the experience of midwives managing obstetrical emergencies after participating in the ALSO® educational program. Therefore, the aim of this study was to address this gap by exploring midwives' experiences of applying the knowledge and skills they acquired from attending an ALSO® educational course to their professional practice in the Eastern province in Rwanda.

1.1 Statement of purpose

The purpose of this study was to gain an in-depth understanding of midwives' experiences of applying the new knowledge and skills they gained from attending the ALSO® education course into their practice settings.

1.2 Research questions

The research questions were: 1) What are midwives' experiences of transferring into practice new knowledge and skills they gained after completing the ALSO® education course? and 2) What facilitators and barriers impact midwives' abilities to implement new knowledge and skills in their practice settings?

2. METHODS

2.1 Study design

A descriptive qualitative design was used to address the research questions. A qualitative descriptive approach is appropriate when wanting to describe a life experience or event in-depth.[18]

2.2 Setting

The healthcare system in Rwanda is composed of referral hospitals known as tertiary care hospitals, secondary level care or district hospitals, and primary care level which are known as health centers. Women with pregnancy complications and who cannot birth at health centers are transferred to district hospitals for advanced obstetrical management, like caesarean section, blood transfusion and specialized obstetric cares.[19] The health centers work under the supervision of district hospitals.[20] When at the health center, they receive a complicated or an emergency case they inform the district hospital to be prepared in advance, then if the health center has its own ambulance they transfer the client to the hospital. If the health center does not have its own ambulance the

district hospital send an ambulance with a qualified nurse or midwife to accompany the client to the hospital or midwife to carry the client.[20] This study was conducted with midwives employed in district hospitals located in the Eastern Province of Rwanda.[21] The Rwanda Demographic and Health Survey conducted in 2010, showed that the Eastern Province is the region with the highest maternal and under five years of age mortality rates in Rwanda. Between June and December 2013, the MNCHR project, supported by the Canadian International Development Agency, organized and funded the delivery of ALSO® education courses for skilled birth attendants who work in maternity services in the Eastern province of Rwanda.

2.3 Sampling

Purposive sampling[22] was utilized to recruit study participants. Inclusion criteria included practicing midwives who were able to speak and read English or Kinyarwanda, worked in maternity service in the Eastern Province, and had completed an ALSO® course organized and funded by the MNCHR project within the last two years. Midwives who met these criteria, but who were on leave from the district hospital during the period of the study, were excluded.

This study has been approved by the Western University Health Sciences Research Ethics Board and has met Tri-Council and International Ethics Standards. Ethics approval was also obtained from the Rwanda National Ethics Committee (RNEC). Based on the research permit obtained from the Directorate of Science, Technology and Research in the Ministry of Education in Rwanda, the concerned hospital managers provided research permission before initiating the study. The researcher received, from the project manager in Rwanda, a list of all 23 midwives who had completed the ALSO® course offered through the MNCHR project. The list consisted of midwives' names and contact information. The researcher used the list to contact the midwife attendees, provide them with the Letter of Information about the study and if interested, invite them into the study. The researcher attempted to contact all the midwives; however, some were unable to be contacted due to changing phone numbers, email addresses, or moving locations. All midwives contacted accepted the invitation to participate in this study. The final sample size for this study included nine midwives with whom data sufficiency was reached.

2.4 Data collection

The primary data collection method was individual interviews using a demographic questionnaire and a semi-structured interview guide. The interviews were conducted from July 2014 to December 2014. The date, time and location for the interview were chosen by each participant. A reminder telephone message was sent one day before the agreed upon date of the interview. Written consent was signed by each participant immediately before commencing the interview. Given that English and Kinyarwanda are official languages used in Rwanda, all written correspondence was in English and in Kinyarwanda. All participants chose to have their interviews conducted in Kinyarwanda. Interviews took place within 7-18 months of involvement in the ALSO® CPD activity. All interviews were conducted in person by the researcher and were digitally audio-recorded with permission of each participant. The interviews were transcribed verbatim in Kinyarwanda, and then translated to English by the researcher. Individual interviews lasted approximately 60 to 90 minutes. The researcher is fluent in both Kinyarwanda and English. To ensure the translation accuracy, one of the members of the research committee who is also fluent in these two languages read both the transcripts in Kinyarwanda and in English.

2.5 Data analysis

Inductive content analysis[23] was used to analyze the data. The inductive content analysis process is used when there is limited former knowledge about a phenomena,[24] and includes open coding, creating categories, and abstraction to identify themes.[24,25] Data collection and the data analysis occurred concurrently. The data has been analyzed manually.

Initially, each transcript was read through while listening to its audio recording to ensure accuracy. Then, the researcher translated the transcripts to English. One of the members of the research committee read both the transcripts in Kinyarwanda and in English to ensure translation accuracy. Subsequently, the researcher read each transcript in its entirety to get a sense of what the participant said. The researcher then read and re-read each transcript, highlighting key words in the text, and engaged in open coding by highlighting text and writing codes in the margins of the transcripts. The initial codes were collected to develop a coding guide. Other members of the research team used the initial coding guide and coded transcripts independently. Using an iterative process categories were generated by grouping similar codes together.

After open coding of content and initial categorizing, the categories which appeared similar were grouped under higher order categories or themes. Through group discussion by the researchers, consensus was reached on the final themes. The general description of midwives' experience was illustrated through the generated themes. Every theme included direct quotes to link them back to the data. To assure the quality of this study, trustworthiness, namely credibility, dependabil-

ity, transferability and conformability, as proposed by Elo *et al.*[25] were used. The researcher ensured the trustworthiness for the preparation phase, organization phase and reporting phase.[26]

To ensure credibility for the preparation phase, the researcher ensured that the participants were accurately identified for eligibility. In addition, the use of a semi-structured interview guide with open-ended questions enabled the participants to provide rich descriptions of their experience of applying ALSO® knowledge and skills into practice settings.

In the organization phase, to ensure conformability the researcher kept reflective notes to capture her thoughts and feelings throughout the process of analysis. Reflective notes helped to ensure the researcher stayed true to what participants said. To ensure dependability the researcher kept a record of decisions made throughout the research process in the form of an audit trail. To indicate conformability and credibility of findings the researcher ensured that the data represented accurately the information provided by participants. To achieve this, investigator triangulation was used and data analysis was performed by the researcher and by members of the research team. Final categories and themes were discussed and determined by consensus of the researcher and the research team.

Finally, the researcher used representative quotes from the transcribed text to reflect the participants' voice and to show the connection between the data and findings. Transferability was addressed by providing sufficient rich description of the findings that might be transferable to other contexts.

3. FINDINGS

All nine participants had completed a diploma in midwifery, eight were female and one was male, and ranged in age from 27 to 50 years of age. Most participants had more than five years of experience in maternity services, four had between one year and five years of experience, and five had experience ranging between six years and ten years.

Five interrelated themes were identified which illustrated the midwives' experiences of applying their new knowledge and skills into practice: 1) Improved midwifery practice, 2) Availability of resources, 3) Inter-professional collaboration, 4) Job (dis)satisfaction, and 5) Autonomy for midwifery practice.

3.1 Theme one: Improved midwifery practice

Improved midwifery practice was characterized as the midwives' personal observations of reductions in maternal and newborn morbidity and mortality in their practice settings related to a change in how they practiced. This theme includes the sub-themes of increased knowledge, skills and confidence in management of obstetric emergencies, improved maternal and neonatal health, knowledge sharing, and improved interactions between midwives and mothers.

3.1.1 *Sub-theme: Increased knowledge, skills and confidence in management of obstetric emergencies*

Participants described that after attending the ALSO® course, their knowledge, skills and confidence in managing obstetrical emergencies increased. Participants expressed engaging in more independent decision making and taking action in emergent situations. Many discussed feeling more "confident" in performing certain emergency procedures and managing obstetrical complications such as shoulder dystocia or postpartum hemorrhage (PPH) independently.

One midwife stated: *"Before attending ALSO® training, things like shoulder dystocia and PPH whenever they happened, I should be confused and call immediately upon a doctor. Today because of ALSO® training, I am confidently able to make the diagnosis and take care of the client accordingly while I am waiting for the doctor."*

Participants commented that they were now feeling more competent to make a diagnosis, plan, and initiate care within their scope of practice without waiting for a physician's assistance. As one participant remarked about admitting a woman: *"... depending on her condition, it is easy for me to diagnose her problem, thus make a good plan and implement it without waiting for the assistance of the physician, something different from what I did before ALSO®."*

The majority of participants described abandoning previous routine practices, such as episiotomy for a primapara, after involvement in the ALSO® course. Some stated that their beliefs about certain procedures had also changed. "Nowadays, we believe that a mother can deliver without episiotomy nor tear, even though it is her first birth." Participants also stated that routine practices for newborn resuscitation were "eradicated" and they now "know the simple helpful procedures to help the baby breath the first minutes of her/his life."

3.1.2 *Sub-theme: Improved maternal and neonatal health*

All participants expressed that there was "concrete" improvement of maternal and newborn health leading to reduced maternal mortality after implementation of ALSO® courses. The midwives reasoned that the reduction of maternal and newborn mortality was linked to the increased confidence, knowledge and skills of birth attendants for the management of obstetric emergencies as a result of the ALSO® courses. As one participant stated about ALSO® training: *"... even*

if we are not yet achieving 100%, but the improvement is remarkable. These days the maternal and neonatal deaths related to health workers' poor knowledge and skills, is obviously reduced."

3.1.3 *Sub-theme: Knowledge sharing*

Sharing their new knowledge and skills with colleagues was described by some participants. One midwife remarked sharing what she learned from the ALSO® course with others, *"... the few who did not attend the course, we try all our best to train them to act as we have been taught, so that our services may be perfect."*

Although the ALSO® education sessions used a train-the trainer approach, some participants stated that they were not always able to teach their colleagues who did not participate in the ALSO® course. Participants mentioned the shortage of midwives and a heavy workload as the reasons behind the lack of time to train other midwives in their practice settings.

Participants shared experiences of mentoring and teaching students in clinical settings after participating in the ALSO® course. They described using their newly acquired knowledge and skills to explain and role model proper technique for obstetric procedures to students. One midwife remarked how her increased confidence and skills in practicing midwifery influenced her work with students: *"... When students come in their clinical settings, they tell us their objectives, then, based on your competence and confidence, you help them to achieve their learning objectives."*

3.1.4 *Sub-theme: Improved interaction between mothers and midwives*

Participants stated that their interactions with clients improved after taking the ALSO® course and became more women-centered. One participant commented how she has changed the way she used to respond to women in labour:

> We should not care about the cries of a mother who was suffering from the pain related to uterine contractions. We were considering that, like noise, we should even ask the mother to stop shouting in labour ward! Today, we are aware that all mothers do not react to the pain in the same way, hence we try our best to show them the best of those contractions and request them to be patient. It is known that when a mother is in labour, she needs psychological support. When you try to show her that you are her nearest support in whatever happens during labour, she feels reinforced.

Another participant mentioned that, while she does not have sufficient time for individual health education before discharging the mother, she now provides group health education to mothers who are in the same ward.

3.2 Theme two: Availability of resources

This theme involved the challenges hampering the implementation of the knowledge and skills midwives had gained from ALSO® course. Shortage of midwives and physicians, insufficient materials and equipment, lack of regular CPD and in-service education programs, and inexperienced midwives and medical doctors are sub-themes.

3.2.1 *Sub-theme: Shortage of midwives and physicians*

All participants identified the shortage of midwives as the main challenge which hindered the implementation of their newly acquired knowledge and skills into the practice setting. A shortage of midwives complicated the working conditions and negatively impacted the quality of obstetric emergency care. Some participants explained that, to translate into practice the knowledge and skills gained, hospital management needed to support an increased number of practicing midwives. One participant expressed how a shortage of midwives is linked to poor quality of care: *"The great challenge is that we are few in number. You may need a help from a colleague yet he/she is too busy and you find that what you should do for the mother is not done as intended."*

Another challenge expressed by many participants was a lack of obstetrics and gynaecology specialists in the district hospitals. In Rwanda, specialist medical doctors are allocated to work in referral and teaching hospitals. Participants suggested that if the district hospitals had an obstetrician-gynaecologist specialist, who was able to perform a laparotomy or hysterectomy, then some maternal deaths, which are primarily due to the delay in accessing these needed emergency procedures, could be prevented. One participant stated that lack of an obstetrician-gynaecologist in district hospitals impacts their implementation of the new knowledge and skills thus, prevention of maternal deaths, as there are some emergency interventions aimed to save mother's life which are required to be performed by obstetrician- gynaecologist. For example, hysterectomy during severe cases of post-partum hemorrhage. *"Furthermore we don't have any specialist doctor in maternity, I mean in obstetrics and gynaecology, this is another serious problem linked to some avoidable maternal deaths."*

3.2.2 *Sub-theme: Insufficient materials and equipment*

"Shortage of materials" and equipment was mentioned by all participants as contributing to poor obstetric services. The participants suggested that if their respective hospitals employed a proportionate number of midwives to the number of clients that maternity services receive, and supplied maternity services with required materials such as sufficient delivery kits, heat lamp, medications, and so on, the maternal and neonatal mortality would be reduced to the expected

level.

3.2.3 *Sub-theme: Lack of regular CPD or in-service education programs for skilled attendants*

All participants felt, that in addition to what they learned in formal midwifery education programs, CPD or in-service education programs about obstetric emergencies and other related topics needs to be routinely offered in order to effectively manage obstetric emergencies and improve quality of maternity care. One participant expressed the need of ongoing education to ensure all physicians and skilled birth attendants remain *"competent and confident in management of obstetric complications."*

Most participants suggested that, after completing a CPD education course, it would have been useful to have follow-up offered by ALSO instructors, to help them resolve problems encountered during the implementation of the gained knowledge and skills in practice settings. One participant commented on the necessity of supervision by the instructors to determine if trainees practiced what they were taught: *"...If we should be visited by the instructors one day, the concern we have at this hospital of not knowing exactly where to fix the cup of the vacuum on the foetal skull would have been resolved."*

3.3 Theme three: Inter-professional collaboration

The theme, inter-professional collaboration, was characterized by the professional interaction between midwives and physicians. In Rwanda, practicing midwives are encouraged to work in inter-professional teams as some obstetrical complications can arise quite suddenly, and immediate assistance from all team members is critical to effectively manage the complex care required by the mother and her baby. A number of participants commented that "team spirit" and support improved after participating in an ALSO® course and enhanced team collaboration, particularly in managing obstetrical emergencies. As one participant commented:

> Despite the fact that we are few, when it comes to an emergency case in the labour ward, it becomes a concern for everyone; we call upon the people in the post-partum and the doctor. If it arises when the doctor allocated in maternity is performing caesarean, we call upon another from a different service and all personnel are informed to answer by their presence.

However, participants stated that teamwork and collaboration is hampered by the shortage of qualified midwives. As one midwife remarked:

> Normally when we have an emergency case, we call for help, and the colleague come from different services to assist, but sometimes there are only two midwives in maternity ward, as we have three labour rooms you may both be conducting deliveries, in that situation your colleague cannot leave the mother alone, this is really a challenge.

Participants expressed that some hospital regulations sanction physicians' authority which, in turn can limit midwives' autonomy and scope of practice. Many participants described how the power imbalance between physicians and midwives is often disruptive to practice and efforts are needed to strengthen collaboration between the two professions. One midwife stated: *"To reduce maternal deaths that could be avoided some hospital regulations could be revised and the collaboration between midwives and physicians be improved."* Misunderstanding between midwives and some novice physicians working in maternity services about what care is needed was also identified by participants as a challenge to improve maternal health. In describing some physicians one participant stated: *"Sometimes he/she tells you to do something that you find yourself not good to be done based on the experience you have in maternity. If the doctor is not collaborative, you finally fell into misunderstanding, and the mother and her baby become victim."*

Although most participants described limited collaboration between midwives and physicians, two participants from the same hospital, commented on the positive collaboration between midwives and physicians. One midwife announced that midwives and physicians work collaboratively and share knowledge in the best interest of the client. The other midwife described how novice physicians show respect by asking senior midwives to *"teach them some procedures like vaginal examination, monitoring labor, conducting normal delivery and so on."*

3.4 Theme four: Job (dis)satisfaction

Job satisfaction was characterised by the midwives' perceptions, behaviour and attitude towards their work in practice settings. The theme "job (dis)satisfaction" has three sub-themes: joy of achievement, emotional exhaustion, and working conditions.

3.4.1 *Sub-theme: Joy of achievement*

Participants expressed feeling proud and "rejoiced" knowing they had the knowledge, skills, and competencies to save the lives of a mother and her baby. As one midwife stated, *"I really rejoice when I succeeded to resuscitate a baby!"* Another commented that having participated in the course made her "feel proud of my career."

3.4.2 *Sub-theme: Emotional exhaustion*

Emotional exhaustion was characterised by feeling overloaded and experiencing work stress. Participants described

feeling "confused", "sad", "alone", stressed and disliking midwifery altogether. The participants described the emotional exhaustion as the consequence of the shortage of midwives.

3.4.3 *Sub-theme: Working conditions*

The midwives commented that working conditions were not favourable for balanced professional life and quality care. The main factor reported to be associated to poor working conditions was high midwife-client ratios and high work loads. One participant described the emotions associated with having to work in such conditions, *"breaks my heart is that I don't practice as I should do because of the conditions under which we work..."*

3.5 Theme five: Autonomy for midwifery practice

The theme, autonomy for midwifery practice, was characterised by two sub-themes: midwives' empowered feelings to initiate change, and hospital policies and midwifery scope of practice and autonomy.

Sub-theme: Midwives' empowered feelings to initiate change

Participants revealed that, although they faced various challenges in their practice settings, the hospital managers encouraged them to initiate changes that could improve the quality of midwifery care. Many mentioned feeling empowered to make necessary changes to improve obstetric and midwifery practices. One participant stated, *"We feel really empowered by the hospital leaders, and we have already succeeded to change some bad routines based on the knowledge and skills we gained from ALSO® course."* Although the comments about feeling empowered were encouraging many participants pointed out that the chronic shortage of midwives *"handicaps our good initiatives... We agreed on the appropriate ways to improve the care we offer to our clients, but we failed to implement them, because we are very few compared to the number of clients we receive."*

3.6 Sub-theme: Hospital policies and autonomy to practice midwifery

Many participants mentioned that some hospital policies conflicted with midwifery autonomy and scope of practice. For example, participants suggested revising some policies which limit midwives' authority to administer some necessary drugs to manage obstetrical emergencies. One participant stated: *"All medicine that we have been taught that are very necessary in emergency cases should be allowed to be administered by midwives for identified reasonable cases, in order to avoid preventable maternal complications and deaths"*.

4. Discussion

The findings highlight that although midwives indicated having increased knowledge, skills, and confidence in management of obstetric emergencies, their ability to change midwifery practice was often hampered by non-supportive work environments, shortage of qualified health care providers, and insufficient equipment and materials.

Improved midwifery practice was revealed as a major outcome from midwives participating in the ALSO® course. The results suggest that midwives' increased knowledge and skills in the management of obstetric emergencies contributed to the improvement of midwifery practice. Postpartum hemorrhage is the leading cause of maternal death in Rwanda[27] and world-wide.[28] These study findings concur with the results of previous research on similar CPD education programs which reported increased knowledge, skills, and confidence among participants in obstetric emergency management.[28,29] The midwives perceived that maternal deaths decreased after having participated in an ALSO® course. Participants' perceptions of the reduction of maternal deaths might be attributed to their improved ability to prevent and manage PPH, avoidance of performing unnecessary episiotomies, and improved inter-professional team work. These study results are similar with previous results of a study conducted in Tanzania, which showed a significant decrease in episiotomies and a reduction of incidence of PPH after skilled birth attendants' participation in an ALSO® course.[16]

Availability of resources was discussed by the participants to be important to facilitate the application of their newly acquired knowledge and skill into practice. Shortage of skilled birth attendants, particularly midwives, and insufficient materials and equipment were identified by the participants as the main challenges hampering knowledge transfer to midwifery practice. Similar results were demonstrated in a study conducted in Somalia to assess the impact of in-service education programs on emergency obstetric care, where 90% of participants were nurses and midwives The findings showed that lack of drugs, materials and essential equipment, and discouraging policies were barriers which hampered the translation of new knowledge and skills acquired into practice.[29] In the field of maternal and newborn health services, the shortage of skilled birth attendants and limited materials and equipment are critical barriers to availability of quality emergency obstetric care in low and middle resource countries.[30,31] Inadequate implementation of evidence-based interventions to reduce maternal and newborn mortality in limited resource settings is primarily due to lack of resources.[32]

Inter-professional collaboration in the health sector encour-

ages health care professionals from different domains to work together and offers a cohesive solution to the complex needs of clients.[33] This study revealed that inter-professional collaboration especially in the obstetric emergency management is an important skill that all health care providers working in maternity services need to acquire in order to improve the quality of emergency obstetric care thus, reduce maternal and neonatal morbidity and mortality. The results of this study indicated that in hospitals where midwives and physicians respect each other, share knowledge and work in collaborative way, the quality of midwifery care and patient outcomes improved. These study results concur with the results of a qualitative study conducted by Hastie and Fahy in Australia, with ten midwives and nine physicians, to examine the factors affecting inter-professional interactions in maternity units.[34] The findings of that study revealed that both midwives and physicians agreed that good collaborations are associated with outcomes, such as positive patient outcomes and increased job satisfaction.

However, in hospitals where the collaboration between medical doctors and midwives was poor, the quality of emergency obstetric care was hampered by the delay in provision of appropriate obstetric care. Similarly a study aimed to describe the socio-cultural and health service factors associated with maternal death in rural Gambia showed that women reached the health facilities on time to seek emergency obstetric care, but lack of collaboration between physicians and midwives contributed to the disorganized and delayed health care to respond to obstetric emergencies.[35]

Our study findings related to inter-professional collaboration between midwives and physicians concur with previous study results examining the collaboration between midwives, nurses and physicians in maternity services.[36,37] Simpson *et al.*[38] found that nurse-midwives and physicians in maternity services had a common objective of improving maternal and neonatal outcomes; however, they did not always come to an understanding on how to achieve that shared objective.[38] Education programs for health professionals would benefit by focusing on inter-professional collaboration.[39] To improve the quality of maternal healthcare and thus reduce maternal and neonatal morbidity and mortality, the barriers to lack of collaboration between midwives and physicians should be resolved.

Increased knowledge and skills in management of obstetric emergencies contributed to the midwives' job satisfaction. Participants reported feelings of pride being capable of improving mothers' and babies health outcomes in emergency situations. The midwives' satisfaction with the positive outcomes of their work was also reported in a study conducted by Rouleau, Fournier, Philibert, Mbengue and Dumont in Senegal to explore the effects of midwives' job satisfaction on burnout, intention to quit, and profession mobility. Midwives reported satisfaction with the quality of their work and the outcome of obstetric labour and the health of mothers. Midwives' feelings of satisfaction with midwifery work might be linked to the nature of midwifery work, which in normal circumstances when the mother and her baby are healthy most often has positive outcomes.[40]

However, in this study job dissatisfaction was experienced in non-conducive working environments, which acted as a major barrier to the implementation of new knowledge and skills into midwifery practice. Midwives expressed experiencing diminished job satisfaction associated with poor professional collaboration between midwives and physicians, inability to save women's lives due to increased workload, shortage of qualified staff, and insufficient essential materials and equipment. In addition, work related stress as result of job dissatisfaction was evident in the findings. These results are consistent with previous research on nurses' job satisfaction and burnout conducted in some sub-Saharan African countries.[41,42] Non-conducive work environments and job dissatisfaction affect midwives' and nurses' intention to leave the job or their career.[43,44]

The study results suggested that autonomy for midwifery practice is an important factor to change practice and improve the quality of health care. After having participated in CPD, hospital midwives felt empowered to introduce innovation or change aimed to improve the quality of obstetric and neonatal care. Participants in this study affirmed that after involvement in the ALSO® course, despite the challenges hampering the implementation of the new knowledge and skills gained, they have successfully initiated some changes in providing routine obstetric care and neonatal resuscitation. For example, they succeeded in eliminating systematic episiotomy for primipara as part of normative practice. However, some hospital policies, protocols and guidelines, which require midwives to work under the authority of physicians, and a shortage of midwives, hampered their autonomy and limited midwifery scope of practice. For example, participants suggested revising some policies which limit midwives' authority to administer some necessary drugs to manage obstetric emergencies. These findings are consistent with results from an Australian study by Homer *et al.*, which revealed that health facilities' system of maternity care, domination of physicians, invisibility of midwifery in decision making and regulation, were the major barriers for midwives to fully enact their role in maternity services.[43]

Edmondson and Walker found that in caseload midwifery

care, midwives considered autonomy in midwifery practice to be a key factor in constructing the midwifery role.[44] Autonomy in practice was associated with the ability to use the full scope of midwives' skills and knowledge to care for women and newborns and to develop as professionals. In high income countries, the introduction of well-educated, licensed midwives, who work collaboratively with physicians and other health professionals has been shown to be associated with sustainable decrease of maternal and neonatal morbidity and mortality.[45] The policies and institution systems which limit autonomy for midwifery practice and midwifery scope of practice need to be revised for the midwifery profession to continue to play a significant role in implementing effective, sustainable, and affordable quality obstetric care, thus helping to reduce maternal and infant morbidity and mortality. Hospital administration could improve the availability of essential materials, and increase the number of health professionals in maternity services, particularly more obstetric-gynecological specialists and midwives.

4.1 Implications for education, practice, and research

Findings from this study have implications for nursing and midwifery education, practice, and research. Regarding professional education, participants indicated that before participating in the ALSO® education program, they did not have the required knowledge and skills to manage the main causes of maternal deaths. To assist midwives in clinical settings to improve the quality of obstetric care, participants indicated that ongoing professional development is needed, especially for novice midwives, in order to acquire and sustain the competencies required to help reduce maternal and neonatal mortality and ensure quality maternity care.

In collaboration with health care facilities and the National Council of Nursing and Midwifery, schools of nursing and midwifery could organize and offer regular CPD programs and refresher courses aimed to bridge gaps in knowledge and skills among practicing midwives. The study findings also highlighted the need to incorporate the notion of follow-up, inter-professional collaboration and knowledge sharing in the program of CPD offered to midwives to facilitate and encourage them to implement into practice their acquired new knowledge and skills. Therefore, Rwanda National Council of Nursing and Midwifery and schools of nursing and midwifery could develop and revise CPD education program modules for midwives and nurses, incorporating those concepts as highlighted by participants in this study. The findings of this study may increase practising midwives' understanding of the importance of attending regular CPD education programming to acquire the knowledge, skills and confidence necessary in providing quality care, thus improve maternal and newborn health outcomes.

Our study results highlight the need to increase the number of qualified midwives and other health care providers in order to maintain a reasonable workload for midwives. This can lead to improved working conditions, midwives' overall job satisfaction and improved care. Hospital managers could use the study results to stress the magnitude of the shortage of healthcare providers in maternity services, and advocate with health councils to attempt to resolve the issue. To achieve this more effort at the ministry level in education and hiring midwives is required. The findings also emphasize the need to supply the necessary materials and equipment to improve the quality of obstetric care. Therefore, in order for midwives to implement their new knowledge and skills into practice, the hospital managers need to ensure that there are sufficient resources. Midwives, physicians and other health professionals who have the goal and mission to improve the health of mothers and their babies could be encouraged to work in collaborative teams. Strategies to improve inter-professional collaboration in practice settings such as training/ workshops, policies and regulations that promote inter-professional collaboration could be developed in order to effectively manage obstetric emergencies.

This study added value to the knowledge regarding midwives' experience of translating knowledge and skills gained from a CPD education course (ALSO®) into practice. The study findings illuminated the factors which both supported and hampered midwives' abilities to improve delivery of quality care in obstetrics. Therefore, more research is needed to determine sustainable strategies that might eliminate those factors limiting midwives' abilities to improve practice. Further research is needed to address the issue of midwives not being able to work at their full scope of practice, and to determine if the skills and knowledge levels of midwives and other skilled attendants working in maternity services are maintained to the standards of quality care over long term. The settings for this study were some hospitals in Eastern Province in Rwanda, therefore this study could be replicated in other hospitals. Furthermore, the participants were midwives and therefore this study merits replication with other health professionals working in maternity services, who also participate in an ALSO® course.

4.2 Strengths and limitations

To our knowledge this is the first qualitative study conducted in Rwanda about the midwives experiences of knowledge and skills transfer to midwifery practice settings after participation in the ALSO® course. This study has some limitations that deserve mention. Although midwives, nurses and physicians participated in each of the ALSO® course

offerings only the midwives participated in this study. Exploring the experiences of physicians and nurses working with midwives who have participated in the course is warranted. Another limitation is associated with the setting. The Eastern Province has nine hospitals. However participants in this study were from only three hospitals. A future larger study could be more inclusive of participants from each of the settings involved in the CPD offering.

5. Conclusion

These study findings have contributed to advancing the limited amount of research on the translation of new knowledge and skills into clinical practice after CPD education in Rwanda, specifically in the field of midwifery. Midwives in Rwanda who participated in the ALSO® course increased their knowledge, skills and confidence in management of obstetric emergencies in their practice settings. Consequently, midwifery practice and maternal and newborn health outcomes were perceived as being improved. However, the ability for midwives to permanently change midwifery practice was hampered by a shortage of qualified staff, low resources availability, heavy workloads, poor collaboration between midwives and physicians, and non-conducive work environments. To further improve the quality of obstetric care, and thus contribute to further reduction of maternal and neonatal morbidity and mortality in Rwanda, the identified factors hampering midwives' ability to fully transfer their new knowledge and skills to practice and to be able to function at their full scope of midwifery practice to improve the quality of care need to be addressed.

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Conflicts of Interest Disclosure

The author declares that there is no conflict of interest.

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