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# Factors Affecting The Learning Implementation Of Midwife In-Service Training In South Sudan

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## Abstract

**Background:** In South Sudan where both maternal mortality rate and infant mortality rate are among the worst in the world, we conducted a qualitative study in the area of midwife in-service training outcomes with an aim to contribute to the in-service training development that fits the local context and serves the needs of midwives in dire environment.

**Methods:** We conducted semi-structured interviews with five graduates of a midwife in-service training program. The interview guide was developed to determine the progress, the facilitators and the bottleneck in the transfer of knowledge from the training program to practicum. The interviews were conducted in Juba, South Sudan, and transcribed verbatim followed by content analysis of data using the Modified-Grounded Theory Approach.

**Results:** The content analysis of data produced 24 concepts, 5 subcategories and 3 categories. Those categories were "Development of motivation for application," "Building up midwife skills," and "Midwife care improvement in the facility." We found that the midwife leaders' skills building processes were influenced by environmental factors such as community members' perception which impedes safe delivery, lack of pregnancy and birth related knowledge among women in the community, and low level of language skills of colleagues. There were also intrinsic factors including having successful experiences, recognition from others, and confidence in new skills.

**Conclusion:** Overall, the study indicated the incorporation of participant-centered learning methodology and strategies to effectively work through environmental issues and midwives' level of self-efficacy will increase successful application of learning.

## Introduction

According to the World Health Organization (WHO), 2004, a skilled birth attendant is defined as "an accredited health professional such as a midwife, doctor or nurse who has been educated and trained to proficiency in the skills needed to manage normal pregnancies, childbirth and the immediate postnatal period, and in identification, management and referral of complications in women and newborns [1]."

Robinson and Wharrad (2001) reported that "...maternal deaths are substantially reduced when a high proportion of births are attended by health professionals, including primary health care workers trained in midwifery skills, with the maintenance of an aseptic environment, the identification of maternal and fetal complications, and the opportunity when necessary to transfer parturient mothers to centers with higher level skills and facilities [2]." In the initiative launched in 2008 by the United Nations Population Fund and International Confederation of Midwives, it was stated that "Up to 90 per cent of maternal deaths can be prevented when midwives and personnel with midwifery skills are authorized and supported by the health system to practice their full set of competencies, including basic emergency obstetric and newborn care [3]." This message underscores the importance of skilled birth attendants.

In South Sudan, the maternal mortality is 2,054 per 100,000 live births (sub-Saharan Africa average is 740 per 100,000) which is the worst in the world [4]. Only 10% of the country's women give birth under the professional care of a medical doctor and nurse/midwife [5]. Most of the childbirths are supported by Traditional Birth Attendants (TBA), village midwives, and community health care workers [5]. Most of them, however, have not had the opportunity to attend an officially established midwifery schools. Due to circumstances, their

technical training ranged from a few weeks to a year and was mainly provided by non-government organizations and donors who had their own curriculum and methods of teaching [6]. Hence the development of skilled birth attendants has become the top priority for human resources development in public health in South Sudan.

With the purpose of contributing to the in-service training development in South Sudan, we analyzed the process of how midwife in-service training participants apply the learned knowledge and skills to pregnant women, people in the community, and other midwives in reciprocal relationships using a qualitative study method. Based on the results of the analysis, we investigated the influencers of learning application.

There exists extensive research on the diverse factors that affect the outcome of continuing professional education for healthcare service professionals in industrialized countries [7-14]. Cervero's study, 1985, identified and defined such factors to be: 1) characteristics of the continuing professional education program, 2) characteristics of the individual professional, 3) characteristics of the proposed behavioral changes; and 4) characteristics of the social system in which the professional operates [15]. Warmuth, 1987, also indicated that characteristics of the individual participant, program factors,

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and the work environment are the factors that influence the use of continuing education for nurses, and that these same factors act as both encouragers and discouragers [16]. In comparison to studies done in industrialized countries, research conducted in developing countries such as Vietnam by Kadoi (2008) identified discouragers as lack of supplies and funds, and “the difficulties of changing long-established habits” of midwife training program participants [17]. Other studies in developing countries reported that the barriers were lack of role or autonomy given to health care training participants, lack of planning, mismatch of training content with participants’ needs, and non-standardized content [17,18].

Bergstrom et al. (2012) analyzed and reported that commitment, informal payment; resources and community involvement were the barriers to knowledge transfer for midwives in Uganda using a qualitative research method [19]. However, qualitative studies on the field of training outcomes remain limited. Warmuth, 1987 has said “Nursing is a humanistic process of helping individuals. It requires judgment. It’s diverse and complex [16].” A qualitative research method, Modified Grounded Theory (M-GTA) is based on the original grounded theory approach proposed by two American sociologists, Strauss and Glaser, in the 1960’s. The grounded theory approach was created as they looked for a research method which enabled them to construct knowledge grounded in the field [20]. It is a qualitative research method which attempts to create an original theory grounded in data. It is said to be effective in the areas of studies that attempt to clarify a process of behavioral or conceptual changes that take place among person to person interactions [21]. M-GTA also enables researchers to create a grounded understanding and a theory of a given social phenomenon especially when the research involves prediction and explanation of human behavior, and when analysis is conducted on a specified area of a given phenomenon with the clear research theme established by the researcher (Kinoshita, 1999).

## Method

### Subjects

Participants were five midwives who had attended a midwife in-service training and were in a position to teach and coach other midwives at a medical facility after the training in South Sudan. To be eligible to participate, midwives had to have (1) co-workers that they led, (2) attended in-service? training which provided training of the trainer (TOT) for midwives, and (3) demonstrated an increase in knowledge and skills at the end of the training.

The sample size was determined by the funding and resource available for the study.

### Study purpose

This study aims to investigate the unique factors which affect the outcome of in-service training in South Sudan by studying the process of building up skills learned in an in-service training program for midwives in leadership positions, and analyzing the factors that facilitate and minimize the application of new knowledge and skills into practice.

### Data collection

A semi-structured interview guide was developed to determine progress in implementation to date, difficulties they were facing in implementation, and the impact of in-service training to their midwife

career. Responses to these questions were freely discussed followed by probing questions in some cases. Individual interviews were conducted between 26 April and 12 May, 2013 in a hotel or a conference room in the ministry of health in Juba to secure confidentiality and to allow an open discussion. Three of the five interviews were conducted directly by the researcher in English. Two interviews were conducted with the support of a Sudanese registered nurse who served as an Arabic interpreter. The interviews were audio recorded with an approval of the interviewees and transcribed verbatim by the researcher. An average time for an interview was 77 minutes.

### Analysis method

M-GTA requires defining an analysis theme as well as an analysis focused person (Bunseki shoten-sha) in order to give the researcher a focal point so the analysis can be as grounded as possible in the data [22]. Thorough readings of the transcripts take place followed by identifying and highlighting key words or sentences (e.g. a line of text, or a paragraph or more) relevant to the established analysis theme and analysis focused person. A key sentence or a concrete example is called a “variation”, which then is transferred into a “work sheet.” Each worksheet has a group of similar variations from transcripts, and is given a “definition” and a “concept name” that encompasses and explains the variations in a sheet [22]. As the data analysis proceeds, more variations are picked up and transferred to worksheets producing more concepts [Supplementary file 1]. If not enough variations are found in the data, the concept is then decided to be absolute. For the analysis not to be arbitrary, along with the similar variations we also look for opposite examples in the data. The results of the search for opposite variations along with analysis perspective are recorded in the theoretical note section. The relationships of the produced concepts are studied individually producing “categories” of multiple related concepts. From the mutual relations of such categories, study results are summarized followed by a composition of a “storyline” (short outline of the results) and a construction of a diagram demonstrating the relationship among the categories, called theoretical framework.

Shown here (Table 1) is a sample worksheet created for a concept named “Acceptance of new knowledge and skills.”

In the earlier stage of the analysis, the theme was to make clear the process of midwife in-service training program participation experience. However, as the analysis progressed, we realized that the focus should be on how in-service training participants transferred and applied knowledge into practice. Thereby the analysis theme was finalized to identify the process of learning application into practice. The analysis focused person was a midwife in a leadership role at the PHCC or hospital in South Sudan who had attended midwife in-service training (Table 2).

Throughout the analysis process, supervision was provided by a group of midwifery professors and graduate students with midwifery and nursing licenses.

### Ethics

This study was conducted with an approval from the ethics committee at the University of the Ryukyus. We also observed and implemented the Declaration of Helsinki (2008 version) by the World Medical Association and Ethical Guidelines for Critical Studies by Ministry, Labour and Welfare of Japan. Consent was obtained from all interviewees to participate in this study.

Concept 4	Acceptance of new knowledge and skills
Definition	Realizing “there is always new knowledge” despite years of experience
Variations	<ul style="list-style-type: none"> <li>Ms. A: The number is going down because of in-serve training for midwives. We still need more in-service training. Because there is always something new knowledge. More training. (Ms. A, pg 11)</li> <li>Increased my knowledge very much. I gained and I want to take more of JICA training. (Ms. B, pg 7)</li> <li>Interviewer: What was the impact of this training to your career as a midwife?</li> <li>Ms. C: This training brought for me a big change because they gave me skills how to go train these midwives. ...</li> <li>According to me, about our training, training brought new skills for us....</li> <li>About resuscitation and how to palpate. Because some of us don’ know. Me, I know but other colleagues, they do not know how to palpate or how to resuscitate. But she gave us good skills. (Ms. C, pg 4 &amp; 7)</li> <li>Ms. D: JICA impact the new way. Now we are doing it the right way. We are not in a good way. We are conducting delivery in a right manner. Resuscitate. *Active birth with those drugs. Mother was bleeding but we give drugs and the bleeding stop. When the child doesn’t want to come, we cut and later on stitch. Interviewer: Impact is quite big? Ms. D: Yes, because now TBA work like midwives. (Ms. C, pg 6) *Active birth = From the context, it is assumed to be “active management of third labor.”</li> <li>Yes, many changes, many changes. Because our people don’t know the oxytocin, even the labor, they don’t know. But after JICA, there is many changes. Many changes now. And the mortality rate is reduced also. (Ms. E, pg 11)</li> </ul>
Theoretical note	During the in-service training, midwives were showered with so many topics and information. Were there any topics that they chose not to remember or apply? → Yes. Topics of Training Cycle Management and importance of breastfeeding were not mentioned at all. It is assumed that these two topics were perceived to be not directly tied with saving lives of mothers and children, which was the most pressing issue midwives faced. They chose and accepted new skills and knowledge that they thought would help them improve critical issues at work.

Table 1. Worksheet sample.

Age	- 40 years old	2
	40 - 50 years old	1
	50 - years old	2
Mean: 45.0		
Marital status	Single	0
	Married	4
	Widow	1
Number of Children	- 3	1
	4-6	2
	7-10	2
Mean: 5.4		
Midwifery education years (type of qualifications)	1 year (Certified)	2
	2.5 years (Enrolled)	1
	3 years (Registered)	2
Experience in midwifery practice	0-10 years	3
	11-30 years	2
Mean: 15.8 years		

Table 2: Worksheet sample.

### Attributes of subjects

Among the five subjects (all women), the mean age was 45.2 years old (range: 38~54 years), qualifications ranged from certified to registered, and the median number of years they had been working as a midwife was 15.8 years (range: 3-30years) (Table 2). One of the five midwives works at a PHCC in Juba. Two work at state hospitals in remote districts. One worked as a midwife at a state hospital at the time of the in-service training, and currently attends a registered midwifery school as a student. One worked as a midwife at a state hospital in a remote area and currently works as a health officer for the same state employed by the state ministry of health. The educational background was diverse ranging from certified midwife with one year of basic training, enrolled midwife with 2.5 years of schooling, to registered nurse-midwife with 3 years of registered nursing schooling and another 3 years of midwifery schooling.

The analysis of in-service training learning process and skill development for midwives in leadership positions in South Sudan generated 3 categories, 5 sub categories and 24 concepts. The following storyline summarizes the flow of the analysis results using concepts expressed in underlined, sub-categories in < >, categories in [ ], and key words or comments in quotation.

### Storyline

Midwives enroll in in-service training with diverse educational backgrounds. The broad spectrum included participants with as little as one year of midwife training while others received several years of nursing, midwifery, and health visitor training, in addition to practical training experiences in daily operations at a medical facility.

Despite their broad background, all had many common experiences in the midwife birthing process. All experienced the prolonged civil war and its affect in losing expectant mothers for reasons such as severe bleeding and facing still birth. These common experiences forged a strong sense of “something has to be done” to save lives of women and children. During the in-service training, this mission to save lives was the foundation that provided acceptance of new skills and knowledge. The in-service training provided learning that changed perceptions from having little or no control over the deaths of mothers and children to identifying, accepting, and practicing the knowledge, abilities and skills that could save the lives of mothers and children. The in-service training introduced change in the mindset of the midwife practitioners and change in the recognized scope of practice. The midwives in-service training produced a shift in the level of understanding of (certain) midwife skills. For example, antenatal care was merely an event that they distributed medicines to treat illness such as malaria or conducted tests as HIV and hemoglobin, etc.; however, participants learned that by adding functions such as palpation and examining baby’s heartbeat, danger signs or complications could be detected so mothers could be referred to a higher medical facility. This practice alone would support the well-

being of mothers and babies. <Learning at in-service training> took place facilitated by these experiences and mission to save lives following [development of motivation for application].

The potential in-service benefits motivated midwives to initiate application of learned knowledge and new skills to pregnant women. Although participants were motivated and enthusiastic, they faced different types of <bottleneck of application> that prevented a smooth transition to actual practice. These barriers included pushback from mothers and families due to customs impeding safe delivery, lack of supplies from outside organizations, and lack of pregnancy related knowledge of women, described by one midwife as “ignorance” of women. Conversely, facilities with ample supplies from outside organizations were able to accelerate the application of learned skills. Examples included resuscitation with Ambu bags (Bag Valve Mask) for newborns and the use of oxytocin for placenta delivery and to stop bleeding after childbirth. The continuation of such applications provided an increase in midwives' success rate. This in turn helped fuel a sustained desire to participate in “more in-service training” to gain access to more “new knowledge.” Successful experiences also provided midwives recognition and respect from family and community members. Contrary to <bottleneck of application>, these factors construct the <accelerators of application>. The strongest accelerator for change was the midwives' realization for the need to improve the current situation. This factor accompanied with new knowledge and a renewed confidence from the in-service training supported 4 out of the 5 midwives to initiate action against existing community traditions and promote a new practice. A primary example was the introduction of the free style delivery at a medical facility. Overcoming the perceived “ignorance” of women was a work in progress for all, but with the common recognition of the dire circumstances and the realization of the need to improve the current situation, midwives continued communicating to women the importance of going to hospitals, birth spacing, and health education at their facilities. As such, <accelerators of application> outweighed <bottleneck of application> and made it possible for midwives to keep applying the learned skills and knowledge in the medical facility and in the community. To note, the aid from outside organizations played both the roles of a bottleneck and accelerator depending upon its availability.

Either by a step by step approach where midwives continued communicating the importance of new care to mothers individually or accelerated adaptation of new skills, midwives kept the application of new skills to pregnant women and were [building up lifesaving skills].

With their newly acquired knowledge and skill set, in addition to providing actual midwife care, the subject midwives were considered the subject matter experts in the skills they were applying. All were expected to supervise and provide training of colleagues on the new skills and knowledge. The communication and knowledge transfer was affected even more so by the low level of colleagues' language skills. It became necessary for midwife leaders at a medical facility to assume tasks that required reading and writing such as record keeping of deliveries and picking up drugs. This adversely impacted the time to train others, placing severe time constraints on teaching the lifesaving skills. Additionally, colleagues' attitudes were a prevailing issue for one midwife who emphasized that “nobody takes work seriously” hence making learning application difficult. One last hindrance identified was their low level of confidence in teaching.

These difficulties in training were pushed through by motivation to continue training comprised of seeing colleagues' positive attitudes in terms of learning new knowledge and skills, experiencing decrease of time constraints once colleagues started to expand their scope of practice after in-service training, having experienced effective TOT methods which did not require reading or writing regimen, and having built confidence in new skills by repeated application of the skills to mothers.

As the <motivation to continue training> outweighed the <difficulties in training>, training of colleagues was conducted successively promoting [midwife care improvement in the facility]. Training of colleagues simultaneously facilitated [building up (their own) lifesaving skills].

### Development of Motivation for Application

As a result of participating in in-service training, midwives developed the motivation to apply learned knowledge and new skills. Driven by the overarching mission to save lives of mothers and children, midwives accepted information that would support them in achieving the mission. By accepting and recognizing the possibility of their practice affecting the lives of mothers and children, they experienced a shift in the level of understanding of midwife skills. One such example was expressed as:

“We are focusing on antenatal. So you must examine the woman properly. So that you know what is the dangers. Because if you don't examine this woman properly, maybe you miss something, and then this woman may be at risk because of negligence. Now I am training these ladies. They are helping me to give health education to mothers. Before we were doing only health education, but we were not doing how to check from head to toe.” (Ms. A, pg.10).

Accurate and sufficient understanding of midwife practices and meaning is still an on-going process for most of the midwives in South Sudan. This is said to be caused by inconsistent levels of knowledge and skill practice provided in basic training, which is held by different NGOs and aid organizations for the duration ranging from a few weeks to a year. Furthermore, because of the illiteracy of most of the TBAs and village midwives, midwife concepts and names of medicines are taught in variety of forms such as songs, pictures, or oral form of questions and answers. Although TBAs and midwives possess techniques acquired from field experiences, they have been offered limited access to basic knowledge of midwifery due to low literacy. For this reason, it is assumed that their understandings of midwifery practices are not consistent.

Among the diverse topics shared during in-service training, midwives mainly recognized and named physical examination, palpation, resuscitation, and oxytocin as skills they remembered and practiced the most. As for resuscitation and the usage of oxytocin, our analysis indicates that midwives had been ready to accept the information as they were experiencing still births and losing mothers to severe bleeding. On antenatal care, the following changes were noted:

Before in-service training: During the 4 visits of antenatal care, the routine was limited to providing medicines such as anti-malaria pills, supplements and conducting HIV tests and so forth. Record keeping was rare and not accurate adding limited value to delivery.

After in-service training: The routine includes palpation, checking baby's heart rate, a physical examination, and calculation of delivery due date. Complications such as breach can be detected at an early stage and referred to higher level of medical care.

This indicates that their understanding of antenatal care has expanded during the in-service training. Ms. B, who demonstrated an effort to change her behavior in the antenatal care practice had 26 years of extensive experience, but had never participated in in-service training. Her normal place of duty was in the maternal ward, but when time permitted, she would visit the antenatal care unit and provide guidance and training for the staff. The other midwife who showed as much behavioral change in antenatal care was Ms. A who worked at a PHCC and had also one year of training as a certified midwife. Both Ms. A and B utilized an aid of English-Arabic interpretation during the program since they did not understand or speak English. Antenatal care was a topic which was reviewed thoroughly utilizing various teaching methods such as role play, simulations, and teaching to learn. Participants also visited a local PHCC and taught a topic to practicing TBAs and village midwives. In the second part of the program, midwives learned a resuscitation technique in the form of a song shared by an instructor from Kenya. Ms. B, who utilized the Arabic interpretation service during the program, recited a phrase from the song "Keep baby warm," and said she was practicing resuscitation using ambubag. Another teaching method that solved the issue of lack of resources was the use of locally available products such as vegetables and piece of cloth to create the different level of hardness of placenta and the placenta itself during the practice of placenta delivery.

### Building up Lifesaving Skills

The application of learned knowledge and new skills to pregnant women was pushed and pulled by opposing factors: <accelerators and bottlenecks of application>. One midwife, who has been playing an active role in advocating the importance of antenatal care and referral to mothers and colleagues, acknowledged that:

"What I'm not doing is labor. The style or the position. Because the mothers here don't accept or agree or don't want to. Only one position. They don't want to change. Even their relatives who accompany the woman don't allow. They say that's wrong; that's not the way. Say those positions are all traditional position. They don't want. Like the TBA position." (Ms. A, pg. 9).

Others also faced the issue of mothers and women's strong preference toward delivery while lying on bed rather than squatting or any other free position in their facility. As a countermeasure to overcome this custom impeding safe delivery, one posted a picture of free style positions in the delivery room to foster awareness among women. The other midwife realized the benefits of free style labor once a mother accepted and tried a style that was comfortable for her, and experienced the smooth delivery of the child and placenta.

Ms. D: In our society, last time we had many positions. We tried but they say they want to lie down. I tried. I tell them any position, no problem. There was one woman I delivered. She said this was a very good position.

Interviewer: Did you have to cut her?

Ms. D: No. We didn't cut the woman. Unless she is taken to a hospital with a gynecologist.

Interviewer: Mother delivered like that, how was it for you?

Ms. D: Good for me. When she lies like this, I hold backward, and just catch the baby. I move the placenta easily. Placenta comes very easily.

Interviewer: Was that the first time you delivered like that?

Ms. D: First time.

Interviewer: Prime gravida?

Ms. D: No, this was the third baby.

Interviewer: Maybe with her first and second, she was laying down?

Ms. D: She was lying down. The third I delivered.

Interviewer: Did you ask her if it was ok?

Ms. D: I asked her, and she said it's ok. She said there is no more pain. I said good; later on you have another child, come and I deliver the child.

(Ms. D, pg. 4)

Midwives were aware of severe bleeding causing mothers to lose their lives. Once they realized there was a means to help with smooth labor, despite the tradition or strong preference, they pushed their way through and took action. Lack of resources from outside organizations was another factor that hindered some application of skills. For instance:

Interviewer: Do you use oxytocin to stop bleeding? In all cases?

Ms. D: No. Only when the mother is bleeding. In 2010 and 2011, not enough drugs. 2012, we have enough drugs. (Ms. D, pg 4)

Ms. D, a nurse-midwife at a state hospital, experienced times when they did not have the drug oxytocin. She indicated that now that oxytocin was supplied, they were able to stop bleeding. She also mentioned that during her first attempt to have a mother deliver in a free style at the hospital, she experienced such a smooth delivery that produced no bleeding and smooth delivery of placenta, she'd like to continue practicing free style delivery. As seen from other cases, resources play as both promoter and hindrance. Another common issue that the midwives referred to was the "ignorance" of women in the area of pregnancy and birth.

"Sometimes they come and babies already died. Still birth. Most of our people are still ignorant. They don't know the importance of the hospital. They stay there like prime gravidas, when they try to deliver at home, they fail. Then they bring the child that died." (Ms. C, pg. 3)

From comments such as these, a combination of grief and frustration toward situations they want to improve but feel are out of their control were made clear. In attempts to change the situation, midwives promoted referrals, family planning, and health education to prevent complications.

Throughout the application attempts, the midwives experienced successful care such as:

"I listened to the baby's heartbeat, and it was beating very fast. Even the mother was at risk. So I said this one cannot wait here, or she'd be dead. .. So they took her to a hospital, they found the doctor who did cesarean section. The baby and the mother were saved. Up to now both the mother and the baby are healthy. Up to now they respect me for what I did because otherwise both of them had died." (Ms. A, pg. 11)

This type of outcome fostered a desire for more knowledge hence in-service training. This concept was named as "more in-service training."

Ms. B: Increased my knowledge very much. I gained and I want to take more of JICA training.

Interviewer: What do you remember the most?

Ms. B: Examination. I remember the positions in a hotel. 2010, positioning. Lying down... So I practiced once with woman lying down like this.

Interviewer: At the hospital?

Ms. B: At the hospital.

Interviewer: One?

Ms. B: One, she accepted. Very rare cases. But most woman like this position, lying down. So the woman tried the position.

Interviewer: Was the delivery ok? Smooth?

Ms. B: No problem. Mother was ok, and baby ok.

Interviewer: The mother didn't need to be cut?

Ms. B: Without it. (Ms. B, pg. 8)

Midwives received positive evaluation from mothers and people in the community for what they had done.

"In our society, last time we had many positions. We tried but they say they want to lie down. I tried. I tell them any position, no problem. There was one woman I delivered. She said this was a very good position." (Ms. D, pg. 4)

This recognition from others and desire for "more in-service training" was produced by previous successful experiences. These 3 concepts were part of the <accelerators of application>. A series of these experiences assisted them in [building up lifesaving skills].

### Midwife Care Improvement in the Facility

As part of their duty, midwives started training colleagues in the learned knowledge and new skills they had been applying themselves.

Ms. E: After JICA training and up to now, we're using it.

Interviewer: Ambu bag and resuscitation?

Ms. E: Yeah.

Interviewer: After JICA training?

Ms. E: After JICA training.

Interviewer: Do all the nurse midwives, do they know how to use the ambu bag, too?

Ms. E: Yes, I give them training. (Ms. E, pg. 4)

In doing so, colleagues' positive attitude in learning a new skill was a powerful <motivation to continue training>.

"They want to know anything. If you invite them, they are ready to come because they want to know more." (Ms. E, pg. 10)

On the contrary to positive attitude, we had one midwife who had a <difficulty in training> due to her colleagues' negative attitude expressed as "Nobody takes work seriously."

"Now people don't take things seriously. Everything is neglected. Nobody takes work seriously. They don't record. In those days they used to." (Ms. E, pg. 1)

Another difficulty was time constraints on teaching the lifesaving skills due to time being spent on tasks others should be doing but are not; limiting midwives from training colleagues. For instance:

Ms. B: I am very busy because there are seven village midwives. They cannot read or do anything. Even if you send them to bring you medication from the refrigerator, they don't know; they cannot read the name. So I am the one coming all over; to bring medication, and do this and do that. So I cannot go to antenatal ward to train the midwives. They don't even know how to weight babies. They are assisting, practically receiving babies in maternity. They cannot take blood pressure. So, I am there alone; I don't count those midwives.

Interviewer: So they can't do the physical assessment?

Ms. B: No, no.

Interviewer: You have to do everything?

Ms. B: I have to do everything. I don't have time to teach! (Ms. E, pg. 6-7)

Ironically, in the case of another midwife, this issue was solved by providing training to other midwives causing a decrease in time constrains.

"Now because I trained others, it reduces my workload. Now these people can help me. Now that I was trained in TOT, I'm training others and they can train also." (Ms. A, pg. 10)

Another <difficulty in training> was the low level of colleagues' language skills.

"Some of the village midwives cannot write. They are skilled and have knowledge but...Even in training, no writing. You have to cram like a song. No reading, no writing." (Ms. A)

"The only thing that's difficult is changing language from English to our language. (Arabic?) Some Arabic." (Ms. D, pg. 6)

However, because of the experience of receiving effective TOT methods during in-service training, midwives gained effective teaching methods that overcame this barrier.

"This training brought for me a big change because they gave me skills how to go train these midwives." (Ms. C, pg. 4)

Effective TOT methods also affected their low level of confidence in teaching.

Interviewer: What was the impact of this training to your career as a midwife?

Ms. A: Very effective, because now I am able to help my people; my colleagues at the hospital. The effectiveness is that you trained us to be TOTs. So now we don't feel shame or we don't feel shy to train others. So that is the benefit of JICA training. (Ms. A, pg.10)

Additionally, confidence in new skills through applying new skills also motivated midwives to continue training in spite of their low level of confidence in teaching.

Ms. D: JICA impact the new way. Now we are doing it the right way. We are not in a good way. We are conducting delivery in a right manner. Resuscitate. \*Active birth with those drugs. Mother was bleeding but we give drugs and the bleeding stop. When the child doesn't want to come, we cut and later on stitch.

Interviewer: Impact is quite big?

Ms. D: Yes, because now TBA work like midwives. (Ms. D, pg. 6)

The above experiences overall made [midwife care improvement in the facility] possible.

"Yes, many changes, many changes. Because our people don't know the oxytocin, even the labor, they don't know. But after JICA, there is many changes. Many changes now. And the mortality rate is reduced also." (Ms. E, pg. 11)

Training of colleagues circulated and helped midwives in [building up lifesaving skills].

1	Diverse educational backgrounds	Years spent on technical training such as nursing, midwifery and health visitor	Enrolled midwifery school in Uganda for 2.8 years (Ms. C)
2	Training experience	Experience of providing guidance and training to colleagues prior to in-service training	After the basic training, I came here. I started making changes. If there's something that's not right, I would correct it; "that shouldn't be like this." During deliver, caring of the mother, even postnatal caring for the mother and how to care for the baby. I started teaching other midwives. (Ms. A)
3	Mission to save lives	Sense of duty beyond professional obligation to help save lives	Interviewer: What makes you want to continue working as a midwife? Ms. C: I want to save the lives of mothers. (Ms. C)
4	Acceptance of new knowledge and skills	Realizing "there is always new knowledge" despite years of experience	Ms. A: The number is going down because of in-serve training for midwives. We still need more in-service training. Because there is always something new knowledge. More training. (Ms. A)
5	Change in recognized scope of practice	Changes in scope of practice before and after in-service training	Now because of this workshop or in-service training, now I know when to refer woman to doctor. I know how to identify risk and time. I know all these things. Discovered lots of things like taking blood pressure. These are all through in-service training. Even know to test HIV at PHCC, and family planning. I know all of these during in-service training not basic one (Ms. A)
6	Shift in the level of understanding of midwife care	Change in the level of understanding and practice of midwife care after being introduced to new information	Ms. A: We are focusing on antenatal. So you must examine the woman properly. So that you know what is the dangers. Because if you don't examine this woman properly, maybe you miss something, and then this woman may be at risk because of negligence. Now I'm training these ladies. They are helping me to give health education to mothers. Interviewer: So this is something you were not doing before JICA training? Ms. A: Before we were doing only health education, but we were not doing how to check from head to toe. (Ms. A)
7	Perception impeding safe delivery	Local practices and people's perception that could get in a way of safe delivery	Ms. A: What I'm not doing is labor. The style or the position. Because the mothers here don't accept or agree or don't want to. Only one position. They don't want to change. (Ms. A)
8	Lack of resources from outside organizations	Resources not available from government and donors	Ms. A: The difficulties or the challenges we have, even after our training, we don't have equipment. Like even taking blood pressure, we have only one machine in Malakia health center. That one machine is spoiled now. We don't have. (Ms. A)
9	"Ignorance" of women	Women's lack of birth-related knowledge	Sometimes they come and babies already died. Still birth. Most of our people are still ignorant. They don't know the importance of the hospital. They stay there like prime gravidas, when they try to deliver at home, they fail. Then they bring the child that died. (Ms. C)
10	Realization for the need to improve current situation	Difficult situations surrounding birth giving midwives reasons to improve practices	Interviewer: Is there anything specific in antenatal care you teach? Ms. A: Just focusing on mothers, advise. Their visits to the clinic. Even if they are supposed to come four visits, but in between if the mother's sick, let her come to see a doctor so she is treated; early treatment. Let her not wait at home even if her appointed date is not yet to come. So this is where we are focusing. (Ms. A)
11	Ample supplies from outside organizations	Having resources such as medical supplies available from government and donors	Ms. E: But now there's many. They brought many to the hospital. Interviewer: Many..? Ms. E: Many oxytocin to the hospital. The government brought it. (Ms. E)
12	Successful experiences	Experiencing improvement of care and better outcome from application of new skills	... we use drugs, oxytocin. After delivery of the baby, they give the drug, then the placenta comes. (Ms. C)
13	"More in-service training"	Development of motivation to attend more in-service training after experiencing improvement in practice	Ms. A: The number is going down because of in-serve training for midwives. We still need more in-service training. Because there is always something new knowledge. More training. (Ms. A)
14	Recognition from others	Evaluation of care provided to mothers	She listened to the baby's heartbeat, and it was beating very fast. Even the mother was at risk. So she said this one cannot wait here, or she'd be dead. ... So they took her to a hospital, they found the doctor who did cesarean section. The baby and the mother were saved. Up to now both the mother and the baby are healthy. Up to now they respect her for what she did because otherwise both of them had died. (Ms. A)
15	Application of learned knowledge and new skills to pregnant women	Skills being introduced and practiced to mothers	Interviewer: How are you applying what you learned in training at work? Ms. A: Focused antenatal care. (Ms. A)

Continue..

16	“Nobody takes work seriously”	Lack of motivation to work or try to provide appropriate care	Now people don't take things seriously. Everything is neglected. Nobody takes work seriously. They don't record. In those days they used to. (Ms. E)
17	Time constrain on teaching the lifesaving skills	Time being spent on tasks others should be doing but are not; limiting midwives	Interviewer: So they can't do the physical assessment? Ms. B: No, no. Interviewer: You have to do everything? Ms. B: I have to do everything. I don't have time to teach! (Ms. B)
18	Low level of colleagues' language skills	Recognized lack of language skills despite their practical skills	Some of the village midwives cannot write. They are skilled and have knowledge but... Even in training, no writing. You have to cram like a song. No reading, no writing. (Ms. A)
19	Low level of confidence in teaching	Feeling shy or shameful to teach others	So now they don't feel shame or they don't feel shy to train others. (Ms. A, pg 10) This training brought for me a big change because they gave me skills how to go train these midwives. (Ms. C)
20	Colleagues' positive attitude	Colleagues' willingness and acceptance of learning new knowledge and skills	They want to know anything. If you invite them, they are ready to come because they want to know more. (Ms. E)
21	Decrease of time constrains	Training colleagues not just empowers the participants but also frees them from workload	Now because I trained others, it reduce my workload. Now these people can help me. Now that I was trained in TOT, I'm training others and they can train also. (Ms. A)
22	Effective TOT methods	TOT experience acting as a promoter when training colleagues	This training brought for me a big change because they gave me skills how to go train these midwives. (Ms. C)
23	Confidence in new skills	Experiencing the expansion of range and level of understanding and practice	Interviewer: Last year, did you have cases where you had to perform resuscitation on babies? Ms. C: Yeah. Interviewer: How many cases? Ms. C: 5. Interviewer: How did it go? Ms. C: They were OK after resuscitation. Interviewer: Did you use the ambu bag? Ms. C: Yes, the ambu bag.
24	Training of colleagues	Experiences in giving training to other midwives	Yes, I trained about antenatal care and how to examine the mother. (Ms. C)

Table 4: Concepts, definitions, and supporting variations.

The following is the theoretical framework. An arrow indicates the direction of influence between factors (Figure 2).

## Discussion

Our study investigated the factors affecting the learning implementation of midwife in-service training in South Sudan. To the best of our knowledge, this study represents the first attempt to document the process of skills building after in-service training among the midwife leaders in South Sudan. We found that the midwife leaders' skills building processes were influenced by environmental factors as well as intrinsic factors. As Kolb's study indicated “learning involves transactions between the person and the environment. (We) need to take into account of environmental and cultural circumstances [23].

## Environmental factors

Perception impeding safe delivery has been identified by the subjects as a bottleneck of application. In Ms. A's case, the adoption of free style delivery at her PHCC was not successful because of the perception of the style being traditional and “wrong” by mothers and family members. As supported by the study of Cantillon and Jones, 1999, “local perceptions of an innovation may affect subsequent behavior change. Factors such as the relative advantage the innovation offers over existing practice, its complexity, and its trialability (degree to which an innovation may be experimented with on a limited basis) are all important considerations [9],” Ms. A's response of not applying free style delivery suggests that clarification on its advantage

is necessary during in-service training for this style to be accepted. Another environmental factor was “ignorance” of women, or lack of pregnancy and birth related knowledge among women, identified as a hindrance to application. Considering limited access to basic education in South Sudan (Net Enrollment Rate for primary school in 2009 was 48% [24]) and low literacy rate (27% country average), midwives who have completed 1 to 9 years of technical training are most likely to have more knowledge in the area of pregnancy and birth than the women in the community. As a midwife service provider, however, an ability to communicate with service receivers is critical in order to assess their needs. By doing so, a midwife can determine effectively the type of care women need, and direct the resources to the areas of demand. For instance, previous studies on low utilization of health facilities by pregnant women show that “the majority of women regard pregnancy and childbirth as normal events and have a low perception of the need for assistance” and that “among all groups – rich, poor, attended deliveries or unattended deliveries – by far the most common reported reason for not having a facility-based delivery was that it was deemed “not necessary” by husband, family member, or “not customary [25].” Since the decision to deliver at home or not go to the health facility is “likely to be influenced by social and cultural beliefs at the household and community levels,” it is recommended that awareness education among not just the mothers but also the fathers and family members needs to take place at antenatal care visits or during home delivery visits. Therefore, midwife in-service training programs should include communication training for midwives to learn how to adjust the content and delivery of their message to fit the needs of the listeners. This recommendation further emphasizes the

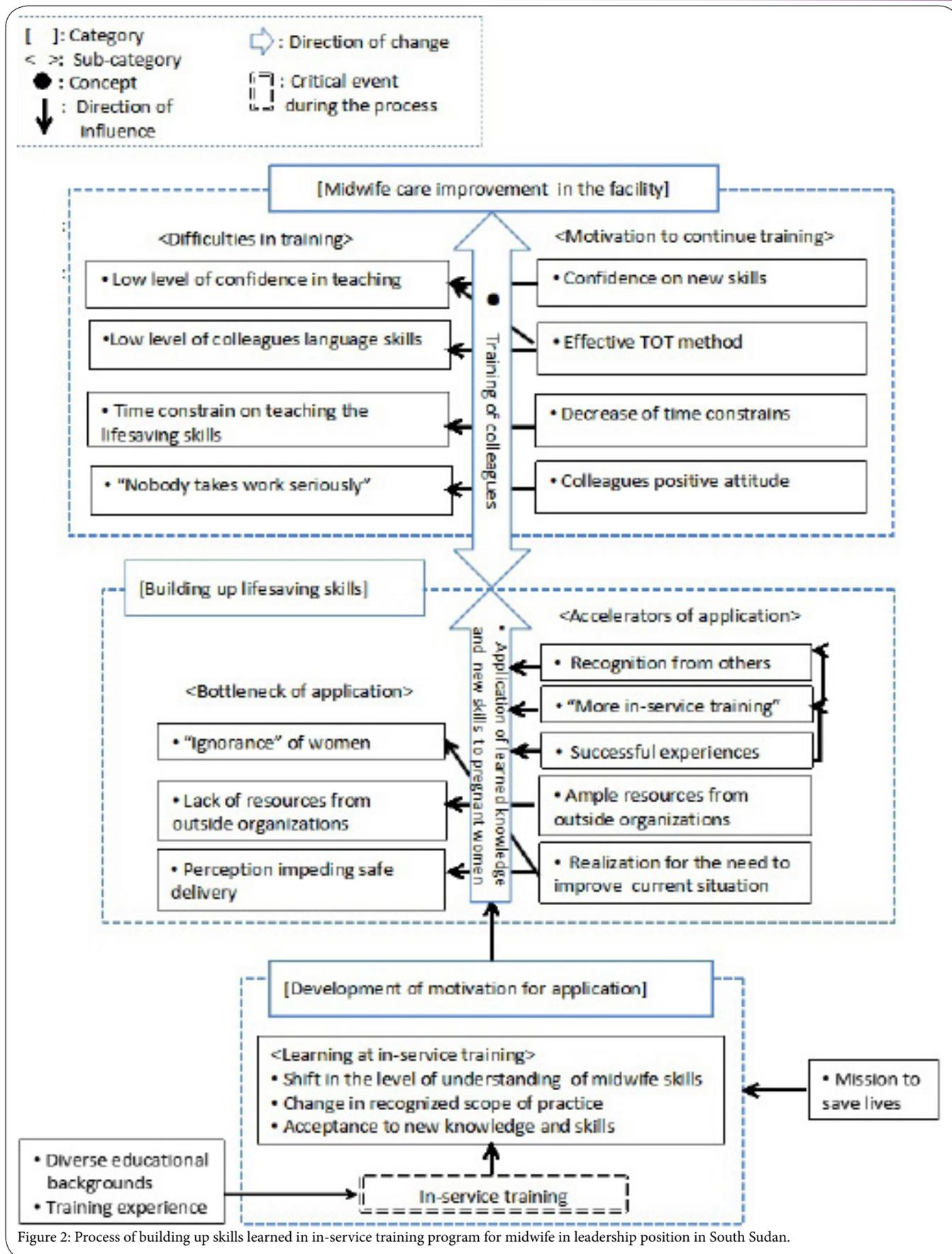


Figure 2: Process of building up skills learned in in-service training program for midwife in leadership position in South Sudan.

importance of on-the job communication training for midwives who are called to deliver at homes. Unlike industrialized countries where gaps in basic education and literacy between service providers and receivers are small, this training intervention seems to be more necessary to fill the noteworthy gap in South Sudan. Along with lack of knowledge of women in the society, colleagues' low level of language skills was pointed out as a barrier to providing training on the job. This included reading and writing skills in Arabic as well as comprehension of English language. South Sudan is promoting basic training to be conducted in English; however, the pregnant women who receive the services at health care facilities speak Arabic in most cases. Also, the majority of the practicing midwives have received the basic training in Arabic. Hence, during this period of transition from Southern Sudan to South Sudan, supplemental material in Arabic seems to be necessary to foster understanding in both midwives themselves and pregnant women to whom the midwives' care is provided. During the TOT training, the usage of hands-on teaching methods such as role plays, simulation, and teach-to-learn seemed to have promoted learning despite the language and low literacy issues. This could imply that adaptation of a participatory learning method was effective in a way that facilitated learning and application even for participants with language barriers and limited understanding of midwife theories. Throughout the TOT training, the participants' activities and practices were observed by a group of supervisors composed of a gynecologist, Ministry of Health personnel, and a midwifery school principle. Impromptu feedback was provided to participants during these observations and also a brief summary was given in a report to the training organizers. Examples of responses were "Ms. X possesses rather high level of knowledge," "Very nervous," "Provided necessary information." To augment this feedback opportunity and to promote deeper learning, laboratory teaching method can be added to the training interventions. Laboratory training method is "an integrated process that begins with here-and-now experience followed by collection of data and observations about the experience. The data are then analyzed and the conclusions of this analysis are fed back to the actors in the experience for their use in the modification of their behavior and choice of new experiences [23]." Per this method, time is secured for the observers to share their "data" whether written notes or verbal responses with the participants so they can receive instant feedback on their performance. Furthermore, this exercise may be able to offer participants an opportunity to immediately reflect on their performance in a safe environment. According to the study by Bandura, "reflection has been a powerful tool for enabling professionals to acknowledge their own positions and review the ethics and efficacy of their practice [26]." Also, "through the process of reflection, students/nurses become aware of themselves, which helps them review and improve clinical skills. They also become more able to communicate with patients and colleagues. Reflection enhances self-directed learning and professional maturity. Nurses who use reflection can be better positioned to provide excellent patient care [27]." As such, implementation of laboratory training method can add benefits to participants' professional development.

### **Intrinsic factors**

Successful experiences, recognition from others, and confidence in new skills were among the encouragers of skill building which intrinsically emerged from midwives. Application of new knowledge and skills ranged from providing guidance during down time to changing the content of care in antenatal visits that affected the entire facility. In spite of the diverse behavioral changes, midwives received

recognition, confidence, and successful experiences by providing care to pregnant women and by giving guidance and training to colleagues. According to Bandura, 1994, the degree of behavioral change is closely tied to the level of perceived self-efficacy [26]. Perceived self-efficacy is defined as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives [26]." Taking this evidence into consideration, the midwife whose behavioral change affected the entire facility is assumed to have had a high level of self-efficacy. Therefore, in order to maximize the in-service training impact, we recommend interventions that improve or at least maintain the level of efficacy among the participants. Bandura indicates in his study that "the most effective way of creating a strong sense of efficacy is through mastery experiences. A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort [26]." Recommended interventions include participatory learning method that allows participants to practice a new skill until mastery, and experiential learning that gives opportunities to overcome realistic setbacks. The image of the instructor is also critical in terms of being a social model. According to "Self-Efficacy" (1994), a way to "create and strengthen self-beliefs of efficacy is through the vicarious experiences provided by social models. If we see the model as someone who possesses more similarity, their influences on us become greater. If people see the models as very different from themselves, their perceived self-efficacy is not much influenced by the models' behavior and the results it produces [26]." This very premise seemed to be achieved when the film was presented during the in-service training to show the brief history of midwives in Okinawa, Japan where the instructor was from. The first few pictures of post-war Okinawan thatched houses represented a similarity to the houses in South Sudan. Additionally, recognition and appreciation from supervisors as well as the community help to increase the level of perceived self-efficacy [28]. If circumstances allow, supervisors of midwife leaders should establish systematic reviews and follow up sessions to provide feedback and positive reinforcement to midwives who have been applying new knowledge and skills learned in in-service training.

### **Conclusion**

This study clarified how midwife in-service training participants build new skills at work after in-service training, and investigated how the encouragers and discouragers of skill building interacted with one another in South Sudan. Our analysis indicated the need to incorporate participant-centered learning methodology and strategies to effectively work through environmental issues to support the practices of midwives in a society that largely lacks access to information and education, and that have established cultural norms that may conflict with midwife knowledge and standards that allow safe child delivery. Furthermore, the need to provide training interventions to strengthen perceived self-efficacy of midwives is strongly recommended.

### **Limitations**

Kinoshita (2003) indicates that although the number of subjects is not a determinant of analysis reliability, it is desirable to obtain data of at least 10 subjects for variety and diversity [21]. For our study, we were only able to interview five subjects due to funding and resource availability as well as safety issues for foreign visitors in South Sudan.

To achieve a higher level of theoretical saturation, further study may be necessary with more subjects in addition to gaining more knowledge and experience in M-GTA research method.

## Competing Interests

The authors declare that they have no competing interests.

## Author contributions

All the authors substantially contributed to the study conception and design as well as the acquisition and interpretation of the data and drafting the manuscript.

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