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Emergency Labour Outside Hospital

A guide for non-medical assistants in care and management of emergency labour outside hospital

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Thesis abstract

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Very few women among those planning to give birth in hospital will end up having unplanned out-of-hospital birth. Accidental and quick onset of labour outside hospital is an undesirable and unpredictable emergency. It poses increased risks to the mother and baby that could put their health in danger and can even lead to death. Managing the situation aims at delivering a healthy baby while preventing death or complications. Anyone, especially the partner, a family member or neighbour could end up as the assistant caring and supporting a woman in an emergency labour outside hospital. Education and guidance through a clearly written guide are a good means to prepare and train those non-medical assistants and pregnant women to be able to manage successfully emergency labour and delivery outside hospital in the absence of a nurse or midwife. The importance and need for adequate antenatal care visit are emphasized, especially as it affects birth outcomes for the mother and baby. Several evidence-based practices and interventions have been found to be effective and safe in preventing or reducing risks of death, hypothermia, infection and severe maternal bleeding, thereby improving outcomes for the mother and baby.

The aim of the thesis is to develop skills of pregnant women and lay assistants to handle and self-manage emergency labour outside hospital and to improve knowledge and raise awareness about the health risks for the mother and baby. The purpose is to create effective instructions and summarise relevant information as a guide in caring for emergency labour outside hospital to prevent adverse outcomes. The output of the thesis can be used to develop follow-up guidance of women in labour for untrained assistants.

Keywords: out-of-hospital delivery, unplanned delivery, emergency birth, birth complications, neonatal outcomes, maternal outcomes, untrained assistants.

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1 INTRODCUTION

Emergency labour outside hospital is known to have increased adverse maternal and neonatal outcomes (McLelland, Morgans & McKenna 2014, 345). They are risks and possible death to the mother and baby (Nguyen, Lefèvre & Dreyfus 2016, 86). Emergency delivery is an unplanned birth that takes place outside hospital without a midwife and medical care (Javaudin et al 2019, 26). The proportion of out-of-hospital emergency deliveries in Finland and globally is relatively very small, but the number and incidence are rising (Pirneskoski et al 2016, 94). The spouse/partner and another family member or neighbour often end up as the first persons assisting a woman in an unplanned labour outside hospital (McLelland et al, 2018). The incidence of adverse outcomes can be prevented by providing education to pregnant women and those untrained assistants on normal progress of labour and how to give labour support, and the need for antenatal care.

Most Finnish births take place in hospital, but out-of-hospital deliveries (OHDs) have increased over the years. For example, in 2012, 0.2% of approximately 60,000 births in Finland occurred outside hospital, either planned or unplanned (Vuori & Gissler, 2011). Continual closure of smaller delivery hospitals with increasing distance to the central hospitals have led to increase in the number of out-of-hospital deliveries. (Hemminki, Heino & Gissler 2011, 1187)

Birth outside hospital can be planned or unplanned. Planned out of hospital birth are deliveries intended or scheduled at home or at a freestanding birth centre with a pre-organized nurse-midwife or birth attendant (Davies-Tuck 2018, 357). This specific context must be discriminated from unplanned out-of-hospital births. Unplanned out of hospital births are accidental births without midwife and medical care. It usually occurs before arrival at hospital, or before arrival of the pre-organized midwife at a planned homebirth (Avalos-Huizar et al 2010, 418). In this paper, “unplanned” out-of-hospital delivery is same as “emergency” birth outside hospital and the two are used interchangeably.

The subject of this thesis is emergency labour outside hospital. The aim is to develop skills of pregnant women and lay assistants to handle and self-manage unplanned labour outside hospital and improve knowledge about the health risks for

the mother and baby. **The purpose** is to create effective instructions and summarize relevant information as a guide in caring for emergency labour to prevent adverse outcomes. **The output** of the thesis can be used to develop follow-up guidance of women in labour for lay assistants.

2 LABOUR AND DELIVERY INSIDE THE HOSPITAL

2.1 Safety and birth experience

In Finland, delivery in the hospital is the current standard practice and home births are not encouraged. Delivery in the hospital with obstetric facilities is promoted in most countries because of its guaranteed safety for the mother and fetus with reduced incidence of birth complications. Safety is ensured by the presence of professional care and the availability of modern diagnostics for monitoring, supplies and drugs, and medical interventions to assist delivery. (Klemetti & Hakulinen-Viitanen 2013, 45-47). However, giving birth in hospital settings has an increased risk of traumatic birth experience among women due to higher medical interventions. For example, women after operative vaginal delivery have more negative perceptions of their birth experience, themselves and their infants; exhibit poorer parenting behaviours; and may be at higher risk of postpartum mood disturbance compared to women who deliver naturally (Cipolletta 2018, 971).

Pregnant women are usually admitted to hospital when there are signs of labour. It is recommended that admission to the labour ward is delayed until active phase begins. This is because the labour tends to progress faster and requires less interventions than those admitted at the latent phase (Lauzon & Hodnett, 2001).

Normal birth is a physiologic event that involves normal spontaneous labour and vaginal delivery. Spontaneous vaginal delivery at term is the preferred outcome for pregnancy. (Patterson & Winslow 2008, 336.)

2.2 Signs of Labour

Contractions. Most primigravidas and multiparas experience strong and regular contractions before the onset of labour. Braxton-Hicks contractions—the irregular, painless and intermittent uterine contractions that have been occurring throughout pregnancy—may become uncomfortable and felt in the abdomen and groin. These contractions often occur during physical workload and in the evening while resting.

Little by little, the head of the baby engages by pressing down towards the pelvis. Contractions are regular when they are 10 minutes apart for two hours. Bloody discharge, bulging membranes, shortening and opening cervix are also signs of the labour to be starting. (Paananen 2015, 164—203.)

2.3 Stages of labour

Dilatation of the cervix. Dilatation of the cervix starts by regular contractions. The cervix opens on average one centimetre in an hour. The active phase of labour occurs at 4cm on average during progressive dilatation of the cervix with more frequent and high-intensity contractions. The cervix is fully dilated at 10 cm. The emotional and mental support of the midwife is important. Informing the woman in labour and her support person and helping them in decision making are ways of support. The temperature, blood pressure and pulse are monitored in every four hours when arriving to the hospital. Emptying the bladder regularly helps the delivery to proceed. The woman in labour can drink and eat if the condition is well enough. Intravenous (IV) medication is given if needed. Every woman has her own comfortable position in labour. Upright position is in favour for the delivery to proceed. The condition of the fetus can be monitored by cardiotocography (CTG), counting fetal movement and observing the colour of the amniotic fluid. (Paananen 2015, 248—250.)

Pushing stage. Pushing stage starts from the point when the cervix is fully dilated until the delivery of the infant. In the transitional phase the delivering part is too high up to pushing. Early pushing can cause the edge of cervix to swell and it can push in between the head of the baby and the bones of the pelvis. It can slow the process of delivering or even fully prevent it. Therefore, it is observed that the cervix is fully dilated, the head of the fetus is low pressing the perineum, crown joint is straight and the delivering head is seen. After these, the woman is ready to push. The midwife together with the support person can help the woman in labour to find a pushing position. During each contraction the woman in labour should be encouraged to push efficiently and long while holding her breath as 10-13 second lasting sets. Normally the pushing stage should not last longer than two hours in the first delivery or over an hour in the next deliveries. Different positions in pushing and supporting the perineum will prevent the risk of a rupture. (Paananen 2015, 265—270.)

Afterbirth. It takes on average 50 minutes after giving birth for the placenta to deliver. If oxytocin, epidural or high level of pain medication is used, the spontaneous delivery of placenta is not recommended. It increases the risk of a bleeding. The most common ways to help the placenta to deliver is to push when having a contraction. At the same time the midwife can help by holding the umbilical cord and pressing the uterus either on top of the symphysis or fundus. The uterus is pressed empty after the placenta is delivered. The placenta is checked to be whole so that the uterus is known to be fully empty. (Paananen 2015, 275—176).

2.4 Hospital management of delivery

Several medical interventions and procedures, techniques, supplies and medications are used in the hospital to manage, assist and follow up labour and delivery. Management should focus on the goal of delivering a healthy newborn while minimizing discomfort and complications for the mother and baby. To speed up the progress of labour and improve birth outcome, pregnant women at the start of labour are encouraged to walk around and stay in upright position until active stage is arrested at 6 cm dilatation of the cervix (Dresang & Yonke 2015, 208).

Pain management includes nonpharmacologic and pharmacologic methods to ease the discomfort of labour and improve the birthing experience. Nonpharmacologic approaches include acupuncture and acupressure, ambulation, audioanalgesia, aromatherapy, hypnosis, massage, and relaxation techniques; sterile water injections; continuous labour support; and immersion in water (Dresang & Yonke 2015, 202). Continuous labour support is well documented to lower need for analgesia and anaesthesia in so many women in a variety of settings (Anderson & Stone 2013, 47-48). Pharmacologic pain control is often used during labour. They include systemic opioids, nitrous oxide, epidural anaesthesia, and pudendal block. Although epidurals provide better pain relief than systemic opioids, they are associated with a significantly longer second stage of labour; an increased rate of oxytocin augmentation; assisted vaginal delivery; and an increased risk of maternal hypotension, urinary retention, and fever (Dresang & Yonke 2015, 204-205).

FHR is electronically observing and evaluating fetal heart rate to determine the well-being of the fetus during labour. It includes application of monitoring equipment; intermittent auscultation; ongoing monitoring and interpretation of data; initial assessment of the labouring woman and fetus; and ongoing clinical interventions and evaluations of the mother and fetus. The indication for FHR monitoring is based on risk factors (Davidson, London & Ladewig 2012, 574-576). High false-positive rate of fetal heart rate monitoring increases caesarean and operative vaginal deliveries. There is also increased perinatal mortality or the incidence of cerebral palsy (AOCG Committee on Practice Bulletins 2005, 1162). Fetal Electrocardiogram (ECG) measures more accurately fetal heart rate. It is an internal monitoring using fetal scalp electrode. It has the advantage of reducing acidosis and the need for operative vaginal delivery but increases the risk of transmission of infection to fetus (Davidson, London & Ladewig 2012, 577).

Labour support comprises physical care, emotional care and comfort given to the woman in labour to aid normal birth and improve outcomes (Barret & Stark, 2010). Emotional support includes staying with her every time, reassuring her that everything is okay, verbal support and encouragement. Helping to place the woman in different positions comfortable for her and enhancing movements to aid labour and relieve pain, massage and therapeutic touch, guidance on when and how to push, helping her maintain empty bladder etc are parts of the physical care (Payant et al, 2008).

In hospital birth settings, continuous labour support is observed to be underused and considered less important. Physical and emotional care to the labouring woman is largely substituted with the use of technology. Substituting human support with technology to the normal birth process has led to higher rates of medical interventions with increased risks to the mother and baby (Hayes, 2010).

Several randomized controlled trials and systematic reviews have consistently presented compelling evidence of the benefits of continuous labour support for childbearing women in a variety of settings. Outcome benefits are consistent and significant. Women that had continuous labour support had shorter labour, fewer caesarean birth, less need for analgesia and anaesthesia, reduced use of oxytocin in labour, greater maternal satisfaction with childbirth experience, and enhanced

coping skills during the experience. Babies born to women with continuous labour support had higher Apgar scores. It was concluded that continuous labour support is a no-risk intervention that substantially improves outcomes and should be provided for all women throughout labour (Hodnett et al.,2011).

3 LABOUR AND DELIVERY OUTSIDE HOSPITAL

3.1 Attending emergency birth by paramedics

In Finland and other developed countries, emergency medical service unit or paramedics receive calls and dispatch unit relating to attending to emergency childbirth outside hospital. The situation can happen that delivery takes place before the paramedics had arrived, when the unit is on scene or in the ambulance on the way to hospital. For out-of-hospital births occurring before paramedics' arrival, the most likely birth attendant or assistant for most of the women is the partner/husband, followed by another family member and neighbor or friend, and sometimes a police officer is the first respondent. It is of concern that some proportions of the women birthed alone. {(McLelland et al, 2018); (Pirneskoski et al 2016, 96)}. Emergency birth outside hospital can take place at home, in the store, in an ambulance, in a car on the way to hospital and sometimes at the entrance of a hospital.

3.2 Referral to hospital treatment

In the event of preterm labour, high-risk delivery such as breech presentations, multiple births, meconium staining, prolapsed umbilical cord or excessive maternal bleeding, it is important that the woman and her newborn are referred to a health facility equipped for and capable of handling a complicated emergency. Prevent delay and ensure that referral is timely to prevent death and disability. Discuss decision with the woman, partner/spouse and relatives, and quickly organize transport and financial aid. Call and communicate with the persons responsible to receive the referral to facilitate procedures and prevent unnecessary waiting. Emergency medical service (paramedics) ambulance is a good place to contact to facilitate transport and to provide first aid treatment to prevent further deterioration of the condition. (Galvez Tan et al, 2006)

3.3 Need for antenatal care

It is recorded that pregnant women with inadequate antenatal care visits have more neonatal complications when out of hospital birth occurs. (Ovaskainen et al, 2015) Out-of-hospital deliveries (OHDs) have been found mostly among women with higher number of previous births (multiparous), smoking during pregnancy, short duration of labour, single-mother status, living longer distances from the delivery unit and fewer antenatal care visits. Women who delivered out of hospital are usually found to be older and less educated compared to those delivered in hospital. (Ovaskainen et al 2015, 12).

Antenatal care provides opportunity to detect early the pre-existing or newly developed medical conditions pregnant women may be suffering and to initiate prompt treatment and management. High-risk pregnancies such as those complicated with preeclampsia, diabetes mellitus, heart disease etc have increased risk of death. Interventions during antenatal care visits can prevent the occurrence of death and adverse effects from pregnancy and birth related complications (Galvez Tan et al 2006, 20-23).

Education program is a very important aspect of antenatal care. It prepares expectant mothers for childbirth. Pregnant women are taught how to recognize early the onset of labour and the importance of timely admission to health facility to reduce the incidence of unplanned out-of-hospital delivery. Antenatal classes provide information about clean and safe delivery and self-managing birth in any circumstance. Information about pain relief, obstetric complications and procedures, breastfeeding, normal newborn care and postpartum adjustment is shared. Studies have shown that prepared childbirth education programs can have a beneficial effect on performance in labour and delivery (Davidson, London & Ladewig 2012, 284-285).

4 METHOD OF THE RESEARCH

4.1 Aim and purpose

The aim of the thesis is to develop skills of pregnant women and lay assistants to handle and self-manage emergency labour outside hospital and to improve knowledge and raise awareness about the health risks for the mother and baby. The purpose is to create effective instructions and summarize relevant information as a guide in caring for emergency labour outside hospital to prevent adverse outcomes. The output of the thesis can be used to develop follow-up guidance of women in labour for lay assistants.

4.2 Research questions

To achieve the aim and purpose of the thesis, the researcher formulated research questions that are related to the research topic. Those questions include:

- What are the risks for the mother and baby during emergency delivery outside hospital?
- How to prevent those risks during emergency delivery outside hospital.

4.3 Literature review

This study was done by conducting an extensive literature review. A literature review is a survey of scholarly sources on a specific topic. It provides an overview of current knowledge, allowing you to identify relevant themes, methods, and gaps in the existing research. A good literature review doesn't just summarize sources – it analyses, synthesizes, and critically evaluates to give a clear picture of the state of knowledge on the subject (www.scribbr.com).

The literature review in this study involved collecting, evaluating and analyzing publications (journal articles, clinical trials, textbooks, guidelines) that are related to the

research topic. Useful information was obtained by searching and exploring several databases using a list of changing keywords. Some of those keywords are “out of hospital delivery”, “unplanned delivery”, “neonatal outcomes”, “maternal outcomes”, “birth complications”, “emergency birth” etc. And some of the databases searched include CINAHL, PubMed, Cochrane Systematic Review, Google scholar.

Finding evidence-based answers to the research questions helped the researcher to fulfil the aim and purpose of this thesis. It followed in-depth search, analysis and comparisons of relevant research results/recommendations. In the end, a set of knowledge was synthesized that formed the contents of the guide for managing emergency delivery outside hospital.

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5 RESEARCH RESULTS

5.1 Major risks during emergency delivery outside hospital.

Unplanned OHDs have increased adverse outcomes for both mother and baby. (McLelland, Morgans & McKenna 2014, 345). **Infants** born accidentally out of hospital have more often been of low birth weight, preterm and small for gestational age. Unplanned OHD babies have higher rates of admission to the neonatal intensive care unit due to increased risk of neonatal complications such as hypothermia, hypoglycemia, polycythemia, jaundice, infection and convulsions (Hadar et al 2005, 832). **Mothers** have poorer outcomes following out of hospital deliveries due to perineal tears and retained placenta increasing the risk of post-partum hemorrhage. Lack of active management of 3rd stage of labour during unplanned births heightens the possibility of uterine bleeding. Mothers lacking antenatal care delivered out of hospital babies with more neonatal morbidities. (McLelland, Morgans & McKenna 2014, 345).

Risk of death. Emergency delivery complications can present with danger signs to be recognized and monitored that mean an increased risk of death. They represent worsening conditions of the mother or baby that require immediate attention to prevent occurrence of death. The woman may have severe breathing difficulty, unconscious, convulsing, severe vaginal bleeding, severe abdominal pain, looking very ill, severe headache with visual disturbance, fever, severe vomiting. For the baby, there could be small or exaggerated heart beats (for example, decelerating heartbeats below 100 beats per minute in prolapsed umbilical cord showing cord compression with reduced blood flow), the skin might be pale or bluish and not breathing even after tactile stimulation, convulsion and of very small size. High-risk pregnancy with co-existing medical conditions also presents with greater complications during labour that can potentially lead to death outside hospital. Lack of first aid treatment and delay in reaching and receiving facility-based emergency obstetric care for pregnancy and birth related complications contribute greatly to occurrence of death. {(Javaudin et al, 2019); (Chavane et al, 2018);(Galvez Tan et al, 2006)}

Hypothermia is the most common complication suffered by all babies born accidentally outside hospital regardless of gestation. It threatens their survival and well-being (Renesme et al 2013, 175). Neonatal hypothermia is having a core body temperature below 36.5 degree Celsius as defined by World Health Organization (Vilinsky-Redmond & Sheridan 2014, 396). The study below showed “hypothermia” as the most common neonatal morbidity among unplanned out-of-hospital delivered babies:

A study by Scott and Esen in 2005 reported on 14 cases of unplanned out of hospital deliveries which occurred over a three-year period in Ireland. The incidence was 0.31%. All the women were booked and multi-parous. 11 (79%) of 14 deliveries occurred between the hours of 20.00 and 0800, suggesting some difficulty in getting to the hospital or a reluctance to attend the hospital during these hours. Family members were responsible for the deliveries in 7 (50%) of cases, and there was no maternal or fetal mortality. Morbidity in the babies was mainly hypothermia which occurred in 7 (50%) of the babies, 2 of whom (14%) required admission to the special care baby unit while 2 (14%) of the mothers suffered second degree perineal tears. They concluded that women and their partners should be educated about contingency planning regarding how to respond in situations of unplanned out of hospital deliveries, to minimize maternal and neonatal morbidity.

Infection or sepsis is the leading cause of death among neonates and infants under the age of 5. Neonatal sepsis is the presence of symptoms of sepsis in the neonatal period combined with bacteriological isolation of an infectious agents from blood or cerebrospinal fluid. It can be hospital acquired or coming from outside hospital like in home birth. Data on community-acquired neonatal sepsis in developing countries are limited. Neonatal infection endangers the survival and neurodevelopment of infants admitted to the neonatal intensive care unit. Half of neonatal deaths occur in home births and births outside hospital setting. Neonatal infection outside of hospital can be acquired from the maternal genital tract, the delivery environment, equipment used or from poor attendant handling. Unhygienic and unsafe birthing practices, unclean delivery environment and absence of skilled birth attendant increase the risk of neonatal sepsis in emergency delivery outside hospital. Other risk factors for neonatal sepsis include maternal bleeding, early rupture of membranes,

prolonged labor, prematurity and small for gestational age. {(Waters et al 2011, 154-155.); (Miller, Morgan & Vyankandondera 2013, 10-15)}.

Postpartum hemorrhage (PPH) is excessive bleeding of the mother after delivery. It is one of the most frightening and life-threatening maternal complications that nurse-midwife encounter. It is the leading cause of death and morbidities among women giving birth. Such morbidities include fatigue, orthostatic hypotension, anemia, disseminated intravascular coagulation, renal failure, acute respiratory failure and infection (Driessen et al, 2011). The classic definition of PPH is a blood loss greater than 500 cc for a vaginal birth and greater than 1000 cc for a caesarean birth. (Rajan & Wing, 2010). Following out of hospital delivery, mothers have increased risk of postpartum hemorrhage due to perineal tears and retained placenta (McLelland, Morgans & McKenna, 2014). Another study by Hardar et al (2005) showed that unplanned out-of-hospital deliveries resulted in higher rate of postpartum hemorrhage with elevated manual lysis of retained placenta and membranes. Several literatures have shown that uterine atony (insufficient uterine contractions) and perineal laceration are the cause of PPH. And retained placenta is among the triggers of uterine atony. (Anderson & Stone 2013, 244)

5.2 Interventions to prevent risks during emergency delivery outside hospital

Assisting an emergency birth outside hospital. The risks of the adverse outcomes of the out-of-hospital births can be avoided with the knowledge of what to do. The partner or a family member or neighbor or anyone could end up as the assistant attending an emergency birth outside the hospital. This task requires providing support throughout labour and guiding the infant safely as it delivers. When this sudden labour starts the assistant determines first if the baby is about to be born and quickly prepares for delivery by getting a clean place to treat the mother and the baby. The assistant helps to position the woman in side-lying until baby's head starts coming and then helps the woman to lie on her back with knees bent and legs separated. The assistant stays calm and reassures the woman that everything is okay. One hand is placed gently over the emerging head of the fetus to prevent too quick delivery. The woman is encouraged not to push too early as the

baby's head emerges so that birth can go naturally and slowly. Taking slow deep breaths through her mouth will help the woman overcome the urge to push too early (Davidson, London & Ladewig, 2012).

If the umbilical cord is around the child's neck, the assistant helps it over the child's head, but only when it follows easily. He/she does not pull it by force. If an umbilical cord is loose but however cannot be lifted over the child's head, the assistant slides the umbilical cord over the shoulders when the head is coming out. Within few minutes of head emerging, the anterior shoulder is delivered by gently pushing the head down. The baby's head is then gently lifted to deliver the posterior shoulder. The rest of the baby will come out easily and quickly. The newborn is slippery, so he/she will be ready to catch him firmly. Secretions are wiped off his face and body with a clean towel and breathing is checked. The baby is placed on the mother's chest to prevent him getting cold and wrapped/covered with a clean dry linen. The mother and baby are immediately transported to the hospital for follow-up care. Clamping and cutting the cord need not be done immediately; the physician or nurse-midwife can handle this at the nearest hospital (McGill 2005, 31).

Monitoring and response to prevent death. During the delivery the monitoring and preventing the risk of death is the major thing to do. Early recognition and quick assessment of danger signs is very important. Then if there is any indication for referral, give first aid treatment to the woman and her baby while contacting ambulance or organizing quick transport to the hospital. First aid treatment helps to save life and stabilize the patient before ambulance arrives. Check every 30 minutes fetal heartbeat, mother's breathing, count pulse, blood pressure. Assess baby's status after delivery by checking for breathing and skin colour.

If she has severe difficulty breathing, try to clear the airway and dislodge obstructions. Help the woman to find the best position for breathing; urgently contact the ambulance or quickly organize transport to the nearest hospital. For unconscious woman, keep her on her back, arms at the side; tilt her head backwards (unless trauma is suspected); lift her chin to open airways; inspect her mouth for foreign body, remove if found; clear secretions from throat (Galvez Tan et al, 2006).

Failure of the baby to start breathing after drying and wiping him, rub his back or flick his soles. If the respiration is still absent or inadequate, start mouth-to-mouth and nose resuscitation while stopping ambulance or quickly transporting to hospital. {(Galvez Tan et al, 2006) ;(Javaudin et al, 2019) ;(Chavane et al, 2018)}

Methods to prevent hypothermia. They are used to keep the baby warm as a barrier to heat loss. They improve the core body temperature of the baby thereby reducing the risk of hypothermia. Thoroughly dry the baby with clean cloth to avoid being cold; wrap the baby in a dry clothing and cover his head with a cap if possible; leave baby on the mother's chest in skin-to-skin contact after birth; and put baby to mother's breasts. Skin-to-skin contact with the mother is a highly recommended approach because it has several other benefits. It can promote early initiation of breastfeeding and to prolong its duration; improves the heart rate and oxygen saturation levels of the baby; and allows earlier brain maturity in premature infants in comparison with premature infants who had no skin-to-skin contact. {(Vilinsky-Redmond & Sheridan 2014, 398) ;(McCall et al, 2018)}.

Methods to prevent infection is very important because the baby will be born with a weak immune system that is susceptible to infections (Simon, Hollander & McMichael, 2015). Antenatal classes educate expectant mothers on the importance of cleanliness and aseptic during labour. Observing such practices lowers the risk of infection. If you are near a sink wash your hands if there is time. If you are in a car and have access to a water bottle, use it to rinse your hands if possible. Alcohol-based hand sanitizer can be used if it can be reached. Maintain cleanliness of labour and birthing area and clean up spills. Put clean cloth under the buttocks to collect blood. Clean her perineum with a clean cloth after delivery {(Waters et al 2011, 155-156); (Wood & Jones 2015, 46-47)}.

Method to prevent/control postpartum bleeding. Studies have shown that active management of the third stage of labour (AMTSL) reduces the risk of postpartum bleeding (Begley et al, 2011). Currently, uterine massage is included in the World Health Organization's definition of AMTSL. In the event of postpartum bleeding during emergency delivery outside hospital, massaging the uterus immediately after placental delivery has shown to reduce blood loss and the need for uterotonic drug. (Hofmeyr et al, 2010). When postpartum bleeding persists after placenta is delivered

with insufficient uterine contractions, ACOG (2006) recommends uterine massage at the fundus as an emergency measure to expel blood and clots and control bleeding.

6 CONCLUSIONS

Among all the women planning to give birth in hospital environment, very few will eventually end up having an unplanned out-of-hospital birth. Emergency out-of-hospital birth is expected to happen to women neglecting onset of labour and in case of quick labour, multiparity, or when being at a long distance from a hospital or having a psychological or language difficulties. Even though researchers from a number of western countries have argued that emergency births outside hospital is quite safe with few complications for women who had enough antenatal care, research results show they consistently present greater risks to the mother and baby that could put their health in danger or even cause death (Erlandsson, Lustig & Lindgren 2015, 226).

Accidental and quick onset of labour outside hospital is an undesirable and unpredictable emergency that requires quick, informed and organized response that aims at delivering a healthy newborn while preventing death or complications for the mother and baby. It is therefore advisable and lifesaving to prepare for such an unforeseen situation and this could be achieved through education and guidance. Education provided to expectant mothers and non-medical assistants about normal progress of labour and giving continuous labour support are essential skills needed in handling and self-managing labour and delivery outside hospital. This knowledge and skills become handy in assisting the labour process to go less painful and less stressful and that it is not prolonged. Promoting antenatal care among pregnant women and their partners is an integral part of the education and it has been found to lower the risks associated with unplanned out-of-hospital births.

Several evidence-based practices and interventions have been found to be effective and safe in preventing or reducing risks of death, hypothermia, infection and severe maternal bleeding, thereby improving outcomes for the mother and baby. Monitoring of vital functions, quick recognition of emergency signs, first-aid treatment and prompt referral for facility-based emergency care help prevent occurrence of death. Skin-to-skin contact and blanket/cap covering are methods to prevent hypothermia in babies born accidentally outside hospital. Observing hand hygiene and maintaining cleanliness of mother/assistants plus sterilization of the delivery environment are good measures to prevent transmission of infection. Another important potential way

to prevent neonatal sepsis is to train and provide adequate numbers of skilled birth attendants in the community. Encouraging exclusive breastfeeding immediately after birth is an important measure of reducing the infection rate {(Waters et al 2011, 155-156); (Wood & Jones 2015, 46-47)}. Fundal massage following placental delivery has been an effective emergency measure to prevent or reduce severe maternal blood loss. Continuous labour support through emotional support, physical care and comfort has shown to improve labouring woman's feeling of control and confidence, reduces fears and anxiety and contributes greatly to her satisfaction with childbirth experience.

7 RECOMMENDATION

The output of this thesis recommends that women and lay assistants (partners, family members) should be provided with a clearly written guidance on how to follow and handle emergency labour outside hospital in the form of a guide (fliers, posters) for easy reference. The guide will contain concise, easy-to-read and step-by-step practical instructions on preparation for birth and needed equipment, appropriate supportive care given at each stage of labour, what and how to observe and follow the woman and baby and the required skills, and what should be done in case of emergency. Creating such guide for untrained assistants with practical information on supporting childbirth serves as a precautionary measure in preventing death and complications in the absence of a nurse or midwife.

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APPENDIX

APPENDIX. Research articles used for the literature review

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Author(s)	Article	Publication	Result
Chavane L A, Bailey P, Loquiha O et al. 2018.	Maternal death and delays in accessing emergency obstetric care in Mozambique.	BMC Pregnancy Childbirth.	The delays in reaching and receiving appropriate facility-based care for women facing pregnancy related complications in Mozambique contribute significantly to maternal mortality. Securing referral linkages and health facility readiness for rapid and correct patient management are needed to reduce the impact of these delays within the health system.
Driessen M, Bouvier-Colle M, Dupont C et al. 2011.	Postpartum hemorrhage resulting from uterine atony after vaginal delivery: factors associated with severity.	Obstetrics and Gynecology.	Aspects of labor, delivery, and their management; delay in initial care; and place of delivery are independent risk factors for severe blood loss in women with postpartum hemorrhage caused by atony.
Hofmeyr G, Abdel-Aleem H, & Abdel-Aleem M. 2010.	Uterine massage for preventing postpartum hemorrhage.	Cochrane Database of Systematic Reviews.	The present review adds support to the 2004 joint statement of the International Confederation of Midwives and the International Federation of Gynecologists and Obstetricians on the management of the third stage of labor, that uterine massage after delivery of the placenta is advised to prevent PPH. However, due to the limitations of the one trial reviewed, trials with sufficient numbers to estimate the effects of sustained uterine massage with great precision, both with and in the absence of uterotonics, are needed.

Javaudin F, Hamel V, Legrand A. et al. 2019.	Unplanned out-of-hospital birth and risk factors of adverse perinatal outcome: findings from a prospective cohort.	Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine.	Our study assessed for the first-time risk factors for adverse perinatal outcome in a large and multicenter cohort of unplanned out-of-hospital births. We must improve temperature management in the out-of-hospital field and future trials are required to investigate strategies to optimize newborns management in the prehospital area.
McCall E, Alderdice F, Halliday H et al. 2018.	Interventions to prevent hypothermia at birth in preterm and/or low birth weight infants.	Cochrane Database of Systematic Reviews.	Evidence of moderate quality shows that use of plastic wraps or bags compared with routine care led to higher temperatures on admission to NICUs with less hypothermia, particularly for extremely preterm infants. Thermal mattresses and SSC also reduced hypothermia risk when compared with routine care, but findings are based on two or fewer small studies. Caution must be taken to avoid iatrogenic hyperthermia, particularly when multiple interventions are used simultaneously. Limited evidence suggests benefit and no evidence of harm for most short-term morbidity outcomes known to be associated with hypothermia, including major brain injury, bronchopulmonary dysplasia, retinopathy of prematurity, necrotizing enterocolitis, and nosocomial infection. Many observational studies have shown increased mortality among preterm hypothermic infants compared with those who maintain normothermia, yet evidence is insufficient to suggest that these interventions reduce risk of in-hospital mortality across all comparison groups. Hypothermia may be a marker for illness and poorer outcomes by association rather than by causality. Limitations of this review include small numbers of identified studies;

			small sample sizes; and variations in methods and definitions used for hypothermia, hyperthermia, normothermia, routine care, and morbidity, along with lack of power to detect effects on morbidity and mortality across most comparison groups. Future studies should: be adequately powered to detect rarer outcomes; apply standardized morbidity definitions; focus on longer-term outcomes, particularly neurodevelopmental outcome.
Miller AE, Morgan C, & Vyankandondera J. 2013.	Causes of puerperal and neonatal sepsis in resource-constrained settings and advocacy for an integrated community-based postnatal approach.	International journal of gynecology and obstetrics.	Management tools for community-based care of mothers with puerperal sepsis-including early detection, initiation of broad-spectrum antibiotic treatment, and timely referral-should be added to those currently in use for neonatal sepsis. Further research is required to address acceptability, feasibility, and impact of community-based presumptive treatment.
Waters D, Jawad I, Ahmad A et al. 2011.	Aetiology of community-acquired neonatal sepsis in low- and middle-income countries.	Journal of Global Health.	Data on community-acquired neonatal sepsis in developing countries are limited. Future research should focus on areas of high disease burden with relative paucity of data. Research into maternal and neonatal vaccination strategies and improved diagnostics is also needed. All of this could contribute to the formulation of community-based care packages, the implementation of which has significant potential to lower overall neonatal mortality and hence advance progress towards the attainment of Millennium Development Goal 4.