oxygen heart rate giving the newborn time to adapt wait isbar most important
stress placenta transfusion the sound of silence tone communication
non-breathing the sound of silence reactions heart rate guidelines
intact cord act oxygen asphyxia-table train anxiety in the midwives happiness
worry interior delivery room anxiety in the midwives
scenario information call-for-help care show emotions
early cord clamping response prevent resuscitation quick response the mother's voice
critical eye time frame focus relief heart rate comfort
follow guideline prevent damage safety the most precious being close calm breathing movements
knowledge same progress keep mothers hands take care mother
explain anxiety in the parent expert only those that are needed parents time safety focus
warmness assessments support co-operation reactions anxiety at the doctor explain
collaboration role-understanding observations
quick response practical training evaluate
terrifying same feeling collaborate
save a life fill the pulmonary circulation preparation teamwork know who does what
ventilation mobile equipment call-for-help Apgar quick interventions follow guideline
working together stimulate control act documenting expert automatic resuscitation
acute training delegate help Apgar score after 1 minute oxygen
unreal the dream of life quickly on working together
liberating cry from the baby colour cooperation avoid heat-loss
bluish-white baby quiet poor tone quick
the sound of silence horror avoid damage support nature ventilate simulation
neo-puff time frame expected poor condition acute neo-beat
bed-side resuscitation lack of oxygen critical
heat cannot be for real
breathing movements
non-breathing

Linda Wike Ljungblad

Preparing midwifery students for newborn resuscitation

Stimulate-ventilate-collaborate

Dissertation for the degree of Ph.D
Person-centred Health Care

Faculty of Health and Social Sciences

University of
South-Eastern Norway

Linda Wike Ljungblad

Preparing midwifery students for newborn resuscitation

Stimulate–ventilate–collaborate

A PhD dissertation in
Person-centred Health Care

Dedication

To all midwives and midwifery students worldwide.

For your important daily work to provide sufficient newborn resuscitation. Your essential work identifying the need for and initiating newborn resuscitation matters.

Preface

In my journey becoming a researcher, my clinical background has impacted my choices. Looking back, it was logical for me to choose the topic of newborn resuscitation with a focus on midwifery. Before becoming a midwife, I was a neonatal nurse, and it felt like most newborn babies needed resuscitation after delivery. After becoming a midwife, my perspective on the need for resuscitation changed completely. Through hours of valuable discussions as a PhD candidate over the last years, I have gained knowledge that has helped make me the researcher I am today.

Predicting unforeseen events like nonbreathing newborns is not always possible. The unforeseen will thus always create new challenges and possibilities for me as a person, a researcher, and a midwife. While we can prepare for unforeseen events to some extent, it is impossible to be totally prepared for all everyday situations. As in the Norwegian poem below, some situations will arise like unforeseen events, and these situations must be managed (in this case by a midwife):

har du noen gang balansert på en knivsegg
mellom liv og død
mellom det som går av seg selv og det som stopper opp
og nå er alle råd dyre og hva skal jeg gjøre nå
inne på ei fødestue
bak i en ambulanse, oppi et fly
over en dårlig telefonlinje
hvorsomhelst
jeg må må må ta det riktige valget
og så tar du det riktige valget
og så går det faktisk bra
kunsten
å forholde seg rolig når alt annet spinner seg opp i orkan styrke
cocktailen av adrenalin og ansvar
det er ikke så koselig
men det er fantastisk

Excerpt from the Midwifery poem by Trygve Skaug (Skaug, T. 2020). Reprinted with permission.

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Lastly, my deepest thanks to my husband Ulf, and our children Filip and Erik. Your support and understanding during stressful times, as well as building me a greenhouse and letting me write there for endless hours, are greatly appreciated. Thanks for reminding me of what is most important in life when I was too busy to see it myself. I could never have completed this work without your support. You mean everything to me.

Linda Wike Ljungblad,

Bakkenteigen, May 24th 2023

Abstract

Background: Between 4 and 10% of all newborn babies need support to start breathing immediately after birth. Midwives are the professionals who attend most deliveries in Norway. Hence, they are the ones who most frequently *identify the need for* and *initiate* newborn resuscitation within a short time interval, globally referred to as "the golden minute". However, recent studies have identified challenges when it comes to adhering to guidelines related to "the golden minute", such as difficulty completing all tasks within the allocated timeframe. Despite the existence of several training programmes in newborn resuscitation, few studies focus exclusively on how midwifery students in particular can best prepare for newborn resuscitation. Such a course should incorporate the experiences of midwives in relevant clinical practice.

Aim: The overall aim of this study was to explore midwives' experiences in newborn resuscitation and develop a newborn resuscitation course tailored for midwifery students.

Methods: Three qualitative studies with explorative design were conducted, each addressing a specific aim and presented in its own paper. The data was collected between August 2018 and October 2020. Midwives and midwifery students from across Norway were included as participants. Study 1 consisted of in-depth interviews of 16 midwives from across Norway, who answered one open-ended question about their experiences performing newborn resuscitation. A phenomenological hermeneutical approach was chosen for the analysis. In study 2, semi-structured interviews were conducted with 16 midwives about their experiences and suggestions for the content and structure of a course in newborn resuscitation for midwifery students. Systematic text condensation was chosen as a method for analysing the data. In study 3, co-creation in workshops was chosen to develop a newborn resuscitation course tailored to midwifery students. In total, eight midwives and twelve midwifery students participated in four workshops. Data were analysed using a framework method.

Findings: This thesis found midwives' role in newborn resuscitation to be complex, involving multiple challenges simultaneously within a short time interval. Midwives shared ideas for content and structure for a course in newborn resuscitation for midwifery students based on

their experiences and developed a course in co-creation with midwifery students. This course is proposed to be used in a lifelong learning process in which continuous competencies can be reassumed in clinical practice as a continuum throughout a midwife's career. Various innovative methods are presented to meet midwifery students' individual learning needs. The importance of a safe learning environment where emotional reactions are acknowledged and valued is emphasised. Preparedness related to a midwifery focus is carefully considered for midwifery students to identify the need for and initiate required assessments in newborn resuscitation within a short time interval. The findings are presented in the form of a model for preparing midwifery students for newborn resuscitation.

Conclusion: The findings guided the further development of the proposed newborn resuscitation course. The course outlines how to achieve essential midwifery competencies in newborn resuscitation through suggested learning outcomes and learning activities. A midwifery focus is emphasised. This thesis proposes that preparing midwifery students for newborn resuscitation in their clinical practice entails a lifelong learning process that begins with midwifery education in a safe culture where emotional reactions are acknowledged.

Keywords: clinical practice; education; co-creation; competence; golden minute; lifelong learning; midwifery; midwifery student; newborn resuscitation; preparedness; simulation training; the unforeseen; qualitative research.

Sammendrag

Bakgrunn: Mellom 4 og 10 % av alle nyfødte barn trenger noen form for hjelp for å begynne å puste umiddelbart etter fødselen. Jordmødre er de fagpersonene som er med på de fleste fødsler i Norge. Derfor er det de som oftest *identifiserer behovet for* og *initierer* gjenopplivning av nyfødte barn i løpet av et kort tidsintervall, som globalt kalles "the golden minute". Nyere studier har imidlertid pekt på utfordringer med retningslinjer knyttet til «the golden minute», som for eksempel med å fullføre alle oppgaver innenfor det foreslåtte tidsintervallet. Til tross for at flere opplæringsprogrammer innen gjenoppliving av nyfødte har eksistert i flere tiår, fokuserer få studier utelukkende på jordmorstudenter og hvordan de best forbereder seg. Et slikt kurs bør inkludere jordmødres erfaringer i relevant klinisk praksis.

Formål: Hovedmålet med denne studien var å utforske jordmødres erfaringer med gjenoppliving av nyfødte barn og utvikle et kurs i gjenoppliving av nyfødte skreddersydd for jordmorstudenter.

Metode: Tre kvalitative studier med eksplorativt design ble utført, hver med et spesifikt mål som er presentert i hver sin artikkel. Dataene ble samlet inn mellom august 2018 og oktober 2020. Jordmødre og jordmorstudenter fra hele Norge ble inkludert som deltakere. Studie 1 besto av dybdeintervjuer av seksten jordmødre fra hele Norge, som svarte på ett åpent spørsmål om deres erfaringer med gjenoppliving av nyfødte. En fenomenologisk hermeneutisk tilnærming ble valgt for å analysere datamaterialet. I studie 2 ble det gjennomført semistrukturerte intervjuer med seksten jordmødre om deres erfaringer og forslag til innhold og struktur i et kurs i gjenopplivning av nyfødte for jordmorstudenter. Systematisk tekst kondensering ble valgt som metode for å analysere datamaterialet. I studie 3 ble samskaping i workshops valgt for å utvikle et kurs i gjenoppliving av nyfødte skreddersydd til jordmorstudenter. Totalt deltok åtte jordmødre og tolv jordmorstudenter fordelt på fire workshops. Data ble analysert ved hjelp av «framework method».

Hovedfunn: Jordmødres rolle i gjenopplivning av nyfødte ble beskrevet som kompleks, fordi den gir flere utfordringer samtidig innenfor et kort tidsintervall. Jordmødre delte ideer til innhold og struktur for et kurs i gjenopplivning av nyfødte basert på erfaringer, og utviklet videre et kurs i samskaping med jordmorstudenter. Dette kurset er foreslått å brukes i en livslang læringsprosess der kompetanser kontinuerlig kan gjenopptas i klinisk praksis som et kontinuum gjennom jordmors karriere. Ulike innovative metoder presenteres for å møte jordmorstudenters individuelle læringsbehov. Det legges vekt på å skape et trygt læringsmiljø der emosjonelle reaksjoner blir anerkjent og verdsatt. Beredskap er viktig for at jordmorstudenter skal kunne identifisere og iverksette nødvendige tiltak ved gjenoppliving av nyfødte innenfor et kort tidsintervall. Derfor er funnene fra denne avhandlingens presentert som en modell for å forberede jordmorstudenter på gjenopplivning av nyfødte barn.

Konklusjon: Avhandlingens funn guidet videreutviklingen av det foreslåtte kurset i gjenoppliving av nyfødte barn. Kurset skisserer hvordan viktige kompetanser for å gjenopplive nyfødte kan læres gjennom foreslåtte læringsutbytter og læringsaktiviteter. Et jordmorfokus er vektlagt. Denne avhandlingen foreslår at det å forberede jordmorstudenter på gjenopplivning av nyfødte i deres kliniske praksis starter i jordmorutdanningen i en trygg kultur som anerkjenner emosjonelle reaksjoner i en livslang læringsprosess.

Nøkkelord: det uforutsette; gjenoppliving av nyfødte; golden minute; jordmorfag; jordmorstudent; klinisk praksis; kompetanse; kvalitativ forskning; livslang læring; preparedness; samskaping; simuleringstrening; utdanning

List of papers

Paper 1

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B. (2020). Balancing Life and Death During the Golden Minute - Midwives' Experiences of Performing Newborn Resuscitation. *Journal of Multidisciplinary Healthcare*, *13*, 943-952. https://doi.org/10.2147/jmdh.S268959

Paper 2

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B. (2021). An exploration of midwives' perceptions of newborn resuscitation programmes for midwifery students. *Midwifery*, *100*, 103021. https://doi.org/10.1016/j.midw.2021.103021

Paper 3

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B. (2022). "Keep It Simple"-Co-Creation of a Tailored Newborn Resuscitation Course for Midwifery Students. *Advances in medical education and practice*, *13*, 81-93. https://doi.org/10.2147/AMEP.S346991

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Abbreviations

AAP	American Academy for Pediatrics
AI	Artificial intelligence
DU	"Det Uforutsette"
ERC	European Resuscitation Council
HBB	Helping Babies Breathe
ICM	International Confederation of Midwives
NRP	The Newborn Resuscitation Programme
NRR	Norsk resuscitatasjonsråd
PARIHS	The Promoting Action on Research Implementation in Health Services
UN	The unforeseen
VR	Virtual Reality
WHO	World Health Organization

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1 Introduction

UNICEF recently published a report stating that over 5,000 babies were stillborn daily in 2021, totalling 1.9 million stillbirths (UNICEF, 2022). The World Health Organization (WHO) describes stillbirth as a baby born without signs of life after 28 weeks of pregnancy (World Health Organization, 2023b). Many of these deaths might be prevented with the correct help. Stillbirth rates are important indicators of the quality of pregnancy and childbirth care (UNICEF, 2022), which corresponds directly to the quality of how midwives are trained in midwifery education. The United Nations' sustainable development goal 3 aims to reduce preventable deaths by 2030 (United Nations, 2023a). Midwives identify non-breathing newborn babies at maternity wards around the world every day. To prevent newborn deaths, immediate assessment and resuscitation can contribute to reduce the number of deaths (Lee et al., 2011). Between 4 and 10% of all newborn babies need support to start breathing immediately after delivery (Skåre et al., 2015; Vali et al., 2015), while less than 1% need advanced resuscitation (Wall et al., 2010).

Newborn resuscitation is defined as all interventions needed immediately after delivery to support newborn babies' transition to extrauterine life (American Academy of Pediatrics and American Heart Association, 2011; Morton & Brodsky, 2016). A number of rapid changes occur at this time, such as the aeration of the lungs, which are filled with fluid during pregnancy and expand at birth for the first time (Hooper et al., 2019). The delivery of oxygen to the developing brain and heart is optimized by the direction of flow of the intrauterine circulation, which changes after delivery (Morton & Brodsky, 2016). Hence, ensuring effective ventilation is the most prioritised initiative for treating newborn babies in the first minutes of resuscitation (Foglia & te Pas, 2018).

Midwives systematically assess all newborn babies' vital functions using the Apgar score after 1, 5 and 10 minutes of extrauterine life (Apgar, 1953). However, even before the first Apgar score is recorded, babies are assessed about the need for resuscitation. If resuscitation is necessary, an intact umbilical cord continues to supply the baby with oxygen-rich blood from the placenta during resuscitation; therefore, it is recommended to wait at least 3 minutes before clamping the cord (Andersson & Mercer, 2021).

No published literature has been identified about how long to allow the complex transition to last; however, both international and national guidelines specify that the onset of ventilation or breathing should take place within the first 60 seconds of a newborn baby's life (Madar et al., 2021; Norsk resuscitasjonsråd, 2021). Time is critical when a newborn baby does not immediately start breathing spontaneously, and interventions must be initiated within the so-called "golden minute" – a term used worldwide to refer to the first 60 seconds of a newborn baby's life (Steele, 2013).

Since midwives are the professionals who attend most deliveries and assess newborn babies, their role in newborn resuscitation is pivotal, as they must handle multiple tasks simultaneously. Following the guidelines, midwives must first identify the situation as abnormal and then initiate adequate assessments within a short interval. However, assessment and further treatment are based on correct identification. In midwifery practice, "the golden minute" can be considered a clinical term and seen as a window of opportunity since it is a timeframe in which tasks must be accomplished. When a midwife identifies a non-breathing newborn baby, other professions come into play in response to the midwife's perception of the need for intervention. However, midwives do not operate alone but rather act like an orchestra director, identifying what needs to be done and designating who will do it. Other professionals (like paediatricians, neonatal nurses, and anesthesiologists) appear after being called to an already identified situation. Accordingly, the midwife's role differs from other professionals in that they are they one responsible for identifying the need for resuscitation.

The "Utstein formula of survival" (Figure 1) offers a conceptual framework for improving survival worldwide (Global Resuscitation Alliance, 2021). It identifies three key elements to survival: medical science, educational efficiency and local implementation. Although this framework has been discussed and continuously improved since 2003, resuscitation researchers have called for more persuasive data to improve global survival (Søreide et al., 2013).

Figure 1

Utstein formula of survival. Reprinted with permission

The Utstein Formula of Survival

Medical Science X Educational Efficiency X Local Implementation = Survival

Quality - CPR Simulation and Role Playing

Low Dose High Frequency Training

Rapid Dispatch

Dispatcher CPR

Cardiac Arrest Registries

Case Reviews and Feedback
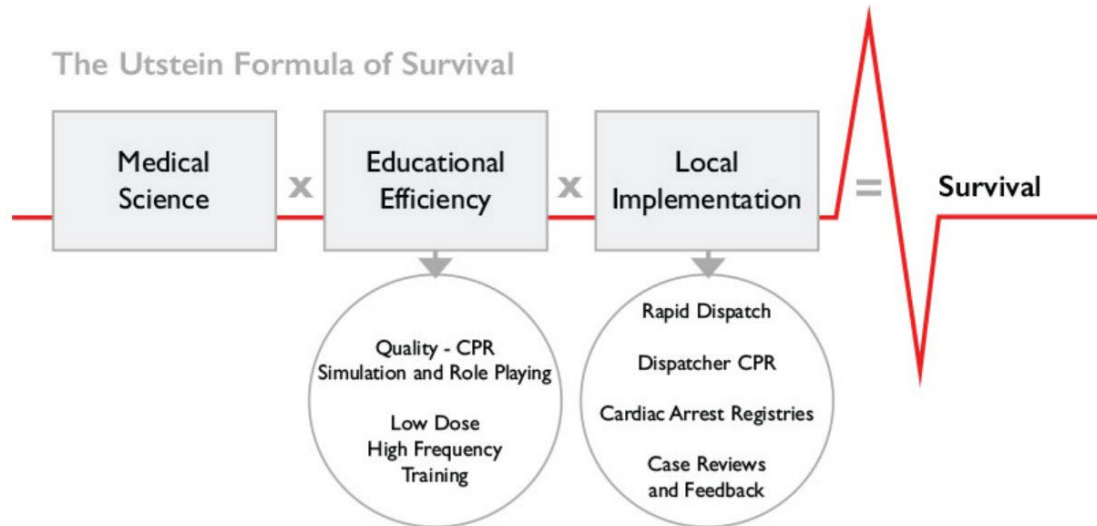
This thesis contributes data related to the second element of the formula, namely educational efficiency. Even though the mission is incomplete, a global approach corresponds to the educational efficiency of preparing students for newborn resuscitation using simulation training and debriefing (Halamek, 2016).

In addition to above having presented a clinical justification for why this thesis is necessary, a qualitative focus is proposed to address the challenges associated with timely initiation of newborn resuscitation (Vadla et al., 2022). Furthermore, there have been calls for a standardised, evidence-based training programme in newborn resuscitation for midwives (Williams et al., 2020). Another study also highlighted the need to use simulation programmes over time to strengthen knowledge and confidence (Carolan-Olah et al., 2018).

Hence, the clinical need to save newborn lives and practitioners' need for good quality teaching and training led to the twofold aim of this thesis: to explore midwives' experiences in newborn resuscitation and develop a newborn resuscitation course tailored for midwifery students.

2   Background

2.1 Addressing the need for midwifery competencies

The World Health Organization argues that midwives educated to international standards could prevent over 80% of stillbirths and maternal and neonatal deaths (World Health Organization, 2019). Newborn resuscitation is included in midwifery education worldwide as a required competence. Educating midwives to international standards enables them to provide care, including newborn resuscitation, across a broader range of settings (Homer et al., 2014; Renfrew et al., 2014). WHO has called for action to strengthen midwifery education, including training programmes, by developing academic standards (Nove et al., 2021; World Health Organization, 2021). The quality of the training provided in midwifery education often does not sufficiently prepare midwifery students to meet the challenges they will face in maternity wards (World Health Organization, 2021). Accordingly, it is necessary for universities to develop appropriate training programmes to teach midwifery competencies.

According to the International Confederation of Midwives (ICM), a minimum set of knowledge, skills and professional behaviours are required when entering midwifery practice (International Confederation of Midwives, 2019). Essential competencies are divided into four categories: 1) general competencies, 2) pre-pregnancy and antenatal care, 3) care during labour and birth and 4) ongoing care of women and newborns. Category 3C, "provide care of the newborn immediately after birth", corresponds directly to the overall aim of this thesis. In the quest to apply international standards to midwives globally, challenges to establishing and maintaining high-quality midwifery education remain (McKellar et al., 2022). Infants who unexpectedly need resuscitation are at risk of receiving inadequate ventilation if providers are not properly educated (Skåre et al., 2016). Recently a global report from WHO furthermore recommended high-quality education and training of midwives as one of the key areas for investment in midwives at all levels of the society (World Health Organization, 2023a). Hence, it has been suggested that the "provision and maintenance of high-quality education and practice require shared responsibility between education providers and health care services" (McKellar et al., 2022).

2.2 Norwegian midwifery education – history and current situation

Midwifery education was first established in Norway in 1818 and has been continuously improving since. Beginning in 1952, applicants were required to be qualified nurses when applying for midwifery education, and in 1977 midwifery education became part of university college education. New legislation in 2005 made midwifery education into a two-year full-time programme, including 50% clinical practice in hospitals and municipalities *(Utdannings- og forskningsdepartementet, 2005).* In response to the Bologna Process, a standard degree structure was implemented in European higher education (Davies, 2008). In 2012, the first Master in Midwifery programme in Norway was introduced with 120 ECTS credits (Dahl et al., 2019), providing the possibility of continuing an academic career. Today there are six midwifery education programmes in Norway located throughout the country, all at a master's degree level, consisting of two years of full-time study equally divided between theory and clinical practice. In addition, simulation training has been integrated into all curricula to prepare students for practice and help them gain and maintain skills and competencies needed for infrequent acute obstetric emergencies like newborn resuscitation.

Midwifery students' clinical practice takes place in Norwegian hospitals, which are differentiated into three levels: university hospitals, maternity clinics and midwifery-led units. In the latter units, midwives are solely responsible for healthy women in labour and their newborn babies. They have the legal authority to be responsible for normal births and to support healthy mothers and babies during healthy pregnancy and childbirth without any involvement from obstetricians. Midwives also follow up pregnant women in the municipalities and attend home deliveries. Thus, they must have the necessary competencies to differentiate normality from pathology and call for help when needed. Moreover, they must be able to make decisions quickly, which requires both knowledge and experience (Skåre et al., 2015). Recently a global report from WHO furthermore recommended high-quality education and training of midwives as one of the key areas for investment in midwives at all levels of the society (World Health Organization, 2023a). Hence, it has been suggested that the responsibility to provide and maintain high-quality midwifery education and practice should be shared between educational institutions and clinical practice (McKellar et al., 2022).

2.3 Methods to gain competence in newborn resuscitation

Historically, theoretical knowledge was acquired in the midwifery education programme while practical hands-on training was acquired in clinical practice at hospitals. The importance of setting educational objectives to gain competence in newborn resuscitation was described as early as 1999 (Fanaroff, 1999), and is commonly recognized in Norwegian midwifery education today. Although educational objectives are still used in the acquisition of theoretical knowledge in midwifery education, various forms of simulation training have been offered for decades to prepare for newborn resuscitation in clinical practice (Fanaroff, 1999; Halamek et al., 2000). However, best practices to prepare for newborn resuscitation are still lacking (Ades & Lee, 2016), and despite efforts to prepare midwives, newborn resuscitation is still an issue that calls for action on a global level (Halamek, 2016).

Simulation training has been reported as beneficial and a key to successful newborn resuscitation since it allows students to learn from their mistakes and train with no risk to patients (Cooper et al., 2012; Ennen & Satin, 2010; Mileder et al., 2014). There are three levels of fidelity in simulation training. Low-fidelity simulation builds knowledge, mid-fidelity simulation builds competence, and high-fidelity simulation builds performance and action (Wolters Kluwer, 2023). The basic but essential skills midwives need to perform newborn resuscitation require continuous practice, which can be achieved through short and frequent simulation training (Enweronu-Laryea & Robertson, 2017; Haynes et al., 2021). Competence in newborn resuscitation is reported to be as challenging to master in high-income countries as in low-income ones (Thallinger et al., 2015). Although simulation training is widely used in midwifery education, a lack of realism will always be an issue since some situations are impossible to simulate (McKenna et al., 2011).

There are several possibilities related to the choice of manikins in simulation training. The "traditional" newborn baby is frequently used worldwide to practice the ventilation skills. However, new devices for training have recently been introduced. NeoNatalie™ Live is a high-fidelity simulation device recommended for low-dose high-frequency skills training and self-assessment (Laerdal Global Health, 2023; Vadla et al., 2022). Another device that can be used to practice newborn ventilation skills is Monivent®Neo Training, which helps measure ventilation accuracy,

giving instant feedback in training situations. Monivent®Neo100 is a clinical version of the device for use in real-life resuscitations (Monivent, 2023).

Although research on midwifery students' simulation training in newborn resuscitation is limited, a variety of simulation courses exist. Helping Babies Breathe (HBB) is a simulation-based educational programme that has been implemented in over 80 low-resource countries worldwide and strives to increase birth attendants' skills and knowledge (American Academy of Paediatrics, 2021). This programme further aims to reduce perinatal mortality at a low cost (Morris et al., 2020). HBB 2nd Edition was introduced in 2016 to provide further educational advice, implementation strategies and quality improvements (American Academy of Paediatrics, 2021). Another example is the American Academy for Pediatrics' (AAP) Neonatal Resuscitation Program (NRP), designed for medical professionals, which has been in use since 1987 (Sawyer et al., 2017) and has recently been updated as "state-of-the-art training" in newborn resuscitation (Halamek & Weiner, 2022).

Three studies describing midwifery students' experiences with simulation training for newborn resuscitation reported improvements in students' knowledge, confidence and skills (Bull & Sweet, 2015; Carolan-Olah et al., 2016; Carolan-Olah et al., 2018). Additionally, students gained an understanding of their role in simulation training, which impacted their learning (Catling et al., 2016; Stoodley et al., 2020). Even though midwifery students felt more prepared after simulation training, their anxiety levels remained static (Bull & Sweet, 2015). Another example of simulation training, is a real-time simulation where midwifery students were interrupted in a classroom setting by an obstetric emergency, which helped them gain knowledge and skills for their clinical practice (Deegan & Terry, 2013).

The benefits of simulation training include reduced stress levels and better focus on learning needs when the training is designed for small groups with everyone participating (Carolan-Olah et al., 2016). It is recommended that midwifery students receive more simulation training in newborn resuscitation to enhance their competence (Forster & Donovan, 2016). Debriefing gives students time to reflect on their communication and situational awareness skills, and repeating simulation training over a longer period of time can also improve readiness for newborn resuscitation (Carolan-Olah et al., 2016; Carolan-Olah et al., 2018). The importance of understanding the midwife's role in newborn resuscitation has been emphasised (Carolan-Olah et al., 2016). Likewise, the importance

of understanding when it is necessary to call for help and of the possibility of tailoring simulation training to each student's needs have also been highlighted (Carolan-Olah et al., 2018).

2.4 Guidelines for newborn resuscitation

Norwegian midwives and midwifery students follow the national guidelines presented in Figure 2 (Norsk resuscitasjonsråd, 2021). According to latter guidelines, the first actions that should be performed within a short time interval after identifying the need for resuscitation are *stimulation* and *ventilation*, which differs from adult resuscitation. Effective ventilation is particularly important and considered the most critical step and cornerstone of newborn resuscitation (Foglia & te Pas, 2018), followed by heart rate, a clinical indicator (Bjorland et al., 2020). The effectiveness of ventilation must be assessed visually by seeing the chest raise being confirmed by an increase in heartrate. Mask leakage is often a challenge, and repositioning is therefore frequently needed.

The Norwegian Resuscitation Council provides national guidelines (Figure 2) for all professions performing newborn resuscitation in hospitals. These guidelines are regularly updated and were recently published in 2021 (Norsk resuscitasjonsråd, 2021).

Figure 2

Norwegian guidelines in newborn resuscitation. Reprinted with permission.

Stabilisering og resuscitering av nyfødte

Sjekk utstyr - fordel oppgaver - tilkall hjelp ved behov

Fødsel til termin?
Barnet gråter eller puster? → Ja
God tonus?
Sen avnavling

Observer barnet hos mor
Tørk barnet
Hold frie luftveier
Hold barnet varmt

Nei

1

Sikre frie luftveier

Hold barnet varmt. Tørk og stimuler
Sjekk hjertefrekvens og respirasjon
(Bruk maks 10 sek)

Barnet puster ikke/gisper eller hjertefrekvens <100/min

2

Start ventilasjon

Rundt 30 innblåsinger/min. Kontroller brystbevegelser
SpO_2 høyre hånd, ev. EKG

Gestasjonsalder ≥32 uker
Trykk 30/5 cm H_2O, FiO_2 21%
Premature <32 uker
Trykk 25/5 cm H_2O, FiO_2 30%

Ventilasjon i 60 sek
Hjertefrekvens fortsatt <100/min

60 sek

3

Sjekk luftveier og ventilasjon

Frie luftveier? Maskelekkasje?
Vurder: Økt inspirasjonstrykk, intubasjon
Fortsett effektiv ventilasjon i 30 - 60 sek

Hjertefrekvens <60/min og ikke stigende

Hjertefrekvens >60/min

Koordinerte
90 kompresjoner
30 ventilasjoner
120 per min

Start HLR 3:1
Gi 100% oksygen
Vurder intubasjon

Fortsett ventilasjon til barnet puster adekvat
Vurder gradvis opptrapping av oksygen
etter klinikk/SpO_2 - verdier

Revurder hjertefrekvens hvert 30. - 60. sek

Fortsett HLR til hjertefrekvens >60/min
Vurder: Venøs tilgang, adrenalin, volumbehandling
(pneumothorax?)

ANBEFALT OKSYGENTILFØRSEL OG MÅLOMRÅDE FOR PREDUKTAL SpO_2

Juster oksygentilførsel ut fra anbefalt SpO_2

2 min	65 - 70%
5 min	80 - 85%
10 min	85 - 95%

Etter resuscitering
Unngå hypertermi,
slå eventuelt av varme.
Vurder terapeutisk hypotermi

MEDIKAMENTER

Adrenalin 0,1 mg/ml
(katastrofeadrenalin)
Anbefalt dose IV
0,01-0,03 mg/kg

Dose milliliter (ml) etter GA (uker)
IV
GA ≥35: 0,5 ml
GA 27-34: 0,25 ml
GA 23-26: 0,1 ml (sjelden aktuelt)

Anbefalt dose intratrakealt
0,05-0,1 mg/kg

Intratrakealt
GA ≥32: 2 ml, GA <32: 1 ml

Adrenalindosen kan gjentas hvert 3. min

Volum Isoton væske eller blod i dose 10 - 20 ml/kg i.v.
Glukose 100 mg/ml i dose 2,5 ml/kg i.v.
Nalokson 0,4 mg/ml i dose 0,25 ml/kg i.m.

Nasjonal modifikasjon av ERC Algoritmer 2021

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NORSK RESUSCITASJONSRÅD

The Norwegian guidelines are informed by international consensus and European guidelines for newborn resuscitation (European Resuscitation Council, 2021; Madar et al., 2021; Wyckoff et al., 2020). The 5 top messages (Figure 3) in the recent update from European Resuscitation Council 2021 are 1) delayed cord clamping, 2) effective thermal care, 3) assess breathing and heart rate, 4) simple steps to support breathing, and 5) chest compressions only once effective ventilation is established (European Resuscitation Council, 2021).

Figure 3

Top 5 messages from the European Resuscitation Council 2021. Reprinted with permission
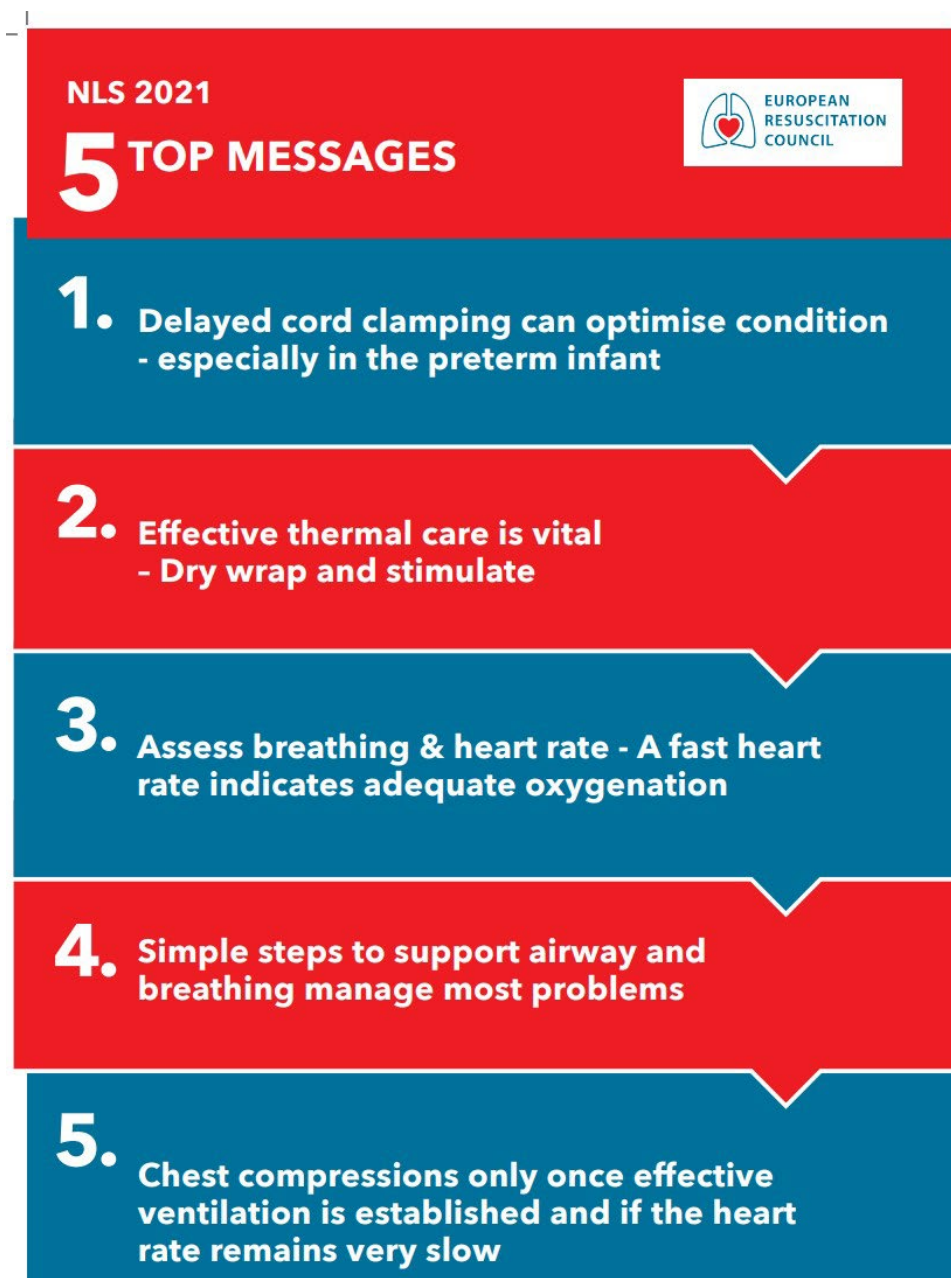
2.5 Midwives' experiences with newborn resuscitation in clinical practice

Newborn resuscitation frequently occurs like "lightning from a clear blue sky" and cannot always be predicted, according to participants. Nevertheless, midwifery students need to prepare for these unforeseen events. Today, midwives still face challenges in preparing for newborn resuscitation similar to those Fanaroff identified decades ago (Fanaroff, 1999). However, descriptions of midwives' experiences with newborn resuscitation may provide insight into how midwifery students best can prepare for such unforeseen events.

Midwives have referred to lack of knowledge and skills, equipment constraints, and poor communication among team members as factors that hinder their ability to perform newborn resuscitation (Alhassan et al., 2019; Kassab et al., 2016; Khriesat et al., 2017). Still, more than half of midwives from a low-risk unit were found to have imperfect resuscitation skills in a simulation context (Rovamo et al., 2013). These examples illustrate the need to improve skills in newborn resuscitation. Using knowledge and experiences from midwives to develop a newborn resuscitation course for midwifery students allows the course to be tailored to their specific needs.

Identifying the constraints and challenges midwives face during newborn resuscitation is crucial when tailoring a newborn resuscitation course for midwifery students. Drawing on their own midwifery education and experience, midwives can recommend elements to be included in such a course.

2.6 Overall aim

The overall aim of this PhD project was to explore midwives' experiences in newborn resuscitation and develop a newborn resuscitation course tailored for midwifery students.

To this end, the following three studies were conducted:

1. An exploration of midwives' experiences of performing newborn resuscitation on maternity wards.
2. An exploration of midwives' perceptions about what constitutes necessary content and methods of instruction in a newborn resuscitation program tailored for midwifery students.
3. The development of a tailored newborn resuscitation course for midwifery students.

3 Theoretical perspectives

This chapter will introduce the two underpinning theoretical perspectives: pedagogy for the unforeseen and didactic perspective of preparedness. These perspectives helped me understand and interpret the findings of this thesis and provided insight into how to prepare midwifery students for newborn resuscitation.

3.1 The unforeseen

Since newborn resuscitation is often an unexpected event, theoretical and pedagogical perspectives related to the unforeseen (Torgersen, 2015) have been a valuable inspiration. The unforeseen is the English translation of the Norwegian "det uforutsette", and research on the unforeseen is often referred to as DU-research in Norwegian (abbreviation of "det uforutsette"). In this thesis, the English abbreviation UN will be used. The following definition of the unforeseen is used:

"a relatively unknown event or situation that occurs relatively unexpectedly and with relatively low probability or predictability to the individual, group or community that experiences and manages the event" (Torgersen, 2015, p. 318).

Throughout this thesis, the phrases *relatively* unknown and *relatively* unexpectedly are understood in relation to newborn resuscitation since the need for newborn resuscitation is neither "totally unknown" nor " totally known" but rather a "known unknown" (Torgersen, 2018, p. 28).

Pedagogy for the unforeseen contributes to preparing for unforeseen events, preventing unwanted events, addressing and managing these situations better if they occur, and facilitating productive learning and development using simulated training methods (Torgersen, 2015, pp. 6, 330). This approach is based on decades of research around the question, "Is it possible to plan, learn and train [for] something that is not yet known?" Moreover, this perspective is often found in emergency management and other professions not related to healthcare (Herberg & Torgersen, 2021; Sørensen et al., 2022). It is known that some babies may be born not breathing, although it may appear unexpected to midwives. Thus, Torgersen et al.'s (2015) "pedagogy of the unforeseen" offers a useful perspective on the findings of this thesis.

Torgersen et al. (2015) use terms like knowledge, learning outcomes, self-efficacy, social support, creativity, judgement, concurrent learning, formation, improvisation, learning assessment and cooperation when describing the pedagogy of the unforeseen and planning simulation training to prepare for unforeseen events. They emphasise the importance of a culture of psychological safety where one learns from one's mistakes rather than seeking scapegoats.

There are five different directions for research on the unforeseen (UN): 1) the phenomenon and nature of UN, 2) UN in pedagogy and training, 3) UN in research, 4) UN in preparedness contexts and 5) UN in innovation and lifelong learning. Openness to innovation, creativity, and "thinking outside the box" is a common denominator. In this thesis, UN offers a theoretical and pedagogical approach to grasp reality related to situations where things that should not happen happen anyway despite preparedness, training, and existing procedures and reactions for "all" possible events (Torgersen, 2015). The approach further illustrates how to learn from previous experiences as concurrent learning and identify signs of escalation to be better prepared the next time a similar event occurs (Torgersen, 2015, p. 50).

One specific term in the unforeseen refers to events that occur like "lightning from a clear blue sky" at unforeseen intervals, namely UN-0, which I apply to unexpected newborn resuscitation. This interval lasts from when an event occurs until enough information has been gathered to understand what happened and stabilize the situation (Torgersen, 2015, p. 50). This interval corresponds to what midwives experience in clinical practice during "the golden minute" when they must identify the need for and initiate newborn resuscitation (Steele, 2013). This thesis includes studies that underline the value of capturing complex details during these brief time intervals, a practice that is also related to "holding the space" when dealing with the unforeseen (Torgersen, 2015, p. 224), which emphasises remaining open to learning from unforeseen events as they are happening.

Context is an essential element of the unforeseen and is likewise crucial throughout this thesis. Accordingly, this thesis benefits from the theoretical perspective of the unforeseen, which explores how events could have been avoided and what should have been done when they happened. In this thesis there is an emphasis on debriefing as essential for everyone attending newborn resuscitation within "the golden minute" or during UN-0 intervals.

3.2 Preparedness

Supplementing the perspective of the unforeseen, a didactic perspective of preparedness originating from a nursing perspective will be introduced (Friberg, 2002). The Latin word for preparedness is *praeparatio*, which refers to a state of readiness. The verb to prepare may be used in various conjugations (Merriam-Webster, 2023):

Prepare (verb)	To make ready beforehand for some purpose, use, or activity
Prepared (adjective)	Subjected to a special process or treatment
Preparation	The action or process of making something ready for use
Preparing	To work out the details of: plan in advance
Preparedness	The quality or state of being prepared

Friberg (2002) presents four main themes describing the didactics of preparedness: 1) characteristics of pedagogical encounters, 2) content of pedagogical encounters, 3) space and conditions for pedagogical encounters, and 4) nurses' pedagogical preparedness. While all these themes relate to the findings, pedagogical preparedness will mainly be the focus in this thesis.

Since midwifery and newborn resuscitation by nature involve unforeseen events, it can be useful to think about them in terms of didactic preparedness (Friberg, 2002). The perspective of didactic preparedness encompasses formative and planned learning and training processes relevant to midwifery students preparing for newborn resuscitation.

In contrast to formative and planned learning (Friberg, 2002), informal and spontaneous education is another way to acquire competencies, according to Friberg et al. (2007). The perspective of unplanned education is valuable to this thesis because the unforeseen events that arise during newborn resuscitation are unavoidable in midwives' clinical practice. Unplanned education has pedagogical dimensions (Friberg et al., 2007), which this thesis address through midwives' reflections on the complexity and contextual challenges of preparing for newborn resuscitation. Friberg et al. (2007) suggest that a co-created pedagogical climate is crucial for learning. The pedagogical climate of midwifery education programmes supports the development of preparedness amongst midwifery students. Preparedness can be understood as a cognitive, emotional, and existential state and is an equally important goal when teaching patients and students (Friberg et al., 2007).

From the perspective of didactic preparedness, pedagogical encounters lead to a greater understanding of the importance of the pedagogical climate, particularly in terms of formative and planned learning for midwifery students preparing for newborn resuscitation (Friberg, 2002; Friberg et al., 2007).

3.3 The theoretical perspectives of the unforeseen and preparedness related to this thesis

Neither of these theoretical perspectives was incorporated into the planning of the three studies, though the relevance of preparing for the unforeseen became evident while writing up this thesis. From the perspectives of both pedagogy for the unforeseen and didactic preparedness, various forms of simulation training seems to be appropriate as method to become prepared for newborn resuscitation. Moreover, both perspectives also support spontaneous and concurrent learning in addition to planned education.

4 Scientific approach

This chapter will elaborate on the qualitative research approach, ethical issues, person-centredness and co-creation.

4.1 Qualitative research approach

Three qualitative studies are included in this thesis. According to Creswell and Poth (2018), there are four philosophical assumptions underlying qualitative research: ontology, epistemology, axiology, and methodology. Also, my former experience as a clinical midwife calls for critical reflection on my journey from clinical practitioner to researcher.

Throughout the individual interviews and workshops, my *ontological* position is related to the nature of reality and therefore was my perspective that meetings during interviews and workshops were shaped by socially constructed relationships (Creswell & Poth, 2018, p. 20). The experiences that participants shared in these meetings illustrated their expert competence, which did not exist in a vacuum but rather was constructed for a specific purpose within a social and cultural context.

As such, my knowledge as a researcher is also a product of my cooperation with midwives and midwifery students during the interviews and workshops and at all levels of the creative process throughout the thesis. This *epistemological* position (Creswell & Poth, 2018, p. 21) assumes that participants contributed with their expertise in cooperation on how to achieve a focus on midwifery when preparing midwifery students for newborn resuscitation.

In terms of *axiology*, I am aware that my values and positions have influenced this thesis (Creswell & Poth, 2018, p. 21). I have been interested in the topic of newborn resuscitation for over two decades, although my perspective has changed during the years of this PhD journey. Initially, my considerations were related to being a clinical midwife, then I brought my experiences and values to become a researcher.

Regarding *methodology*, I used different methods to answer the overall aim of this thesis (Creswell & Poth, 2018, p. 21). To address each study's specific aims and guide the analysis, three qualitative methods were chosen: Lindseth and Nordberg (2004), Malterud (2012) and Gale et al. (2013). There were differences between these three qualitative methods in terms of their overarching

philosophical and theoretical orientation, but all contributed to answering the overaim of the study to which they were applied. As an example from paper 1, between art and science, phenomenological hermeneutic method helped formulate a naive understanding through our artistic skills, analyze structures through our scientific skills, and come to a comprehensive understanding through our critical skills (Lindseth & Norberg, 2021). However, all three methods can be categorised under the heading of interpretive framework (Creswell & Poth, 2018, pp. 22-24).

Thorne (2009) requests bringing new knowledge back into the clinical field. Therefore, I let participants' voices guide my methodological choices to address the overall aim of the thesis. Accordingly, and in line with person-centred approach, co-creation in workshops was applied to study 3. The term co-creation is not used to denote a theoretical perspective but rather a practical method of exploring and describing the discussions from the workshop.

Moreover, co-creation involves building knowledge from other people's experiences. In this thesis, user involvement refers to participants' attendance in individual interviews and workshops. The degree of user involvement increased from study 1 to study 3 due to my gradual acquisition of experience during the research process. Therefore, I distinguish between user involvement and co-creation by the level of participation: for example, studies 1 and 2 had a lower degree of user involvement (individual interviews). In contrast, study 3 followed the directions the participants' discussions took in the workshops (co-creation). During the work on this thesis, I continuously learned and came to see things in a new light as my understanding increased.

Acknowledging participants as experts is fundamental in co-creation and person-centred research (McCormack, Van Dulmen, et al., 2017). Midwives were acknowledged as experts throughout the three studies because of their clinical competence. Also, midwifery students were acknowledged as experts in identifying their need for knowledge and appropriate learning methods. It was a natural choice to acknowledge midwives as experts possessing competence from their clinical experience and midwifery students as experts at being midwifery students.

4.2 Ethical issues

The study was conducted in accordance with the Declaration of Helsinki: Ethical Principles for Medical Research in Human Subjects (World Medical Association, 2013). The Regional Committee

for Medical and Health Research Ethics (REC) considered the study to be outside the scope of the Health Research Act (2018/975, appendix 1). Approval to conduct the studies was given by the Norwegian Centre for Research Data (NSD) in 2018 and prolonged in 2022 (60726, appendix 2, 11). The approval had to be reconsidered by NSD in 2020 when the data collection method for study 3 changed from physical to digital workshops due to Covid-19 pandemic restrictions (150366, appendix 7, 11).

To ensure participants' anonymity, lists of names and associated codes were kept separately in a locked drawer. Data about the participants were stored on a secure server at the university, only accessible by the PhD candidate.

While ethical approval to conduct this study was not required, we continuously discussed ethical challenges and issues within the supervisory team throughout the research process (Kvale et al., 2009).

Before all interviews and workshops, participants were given information about the study in writing and orally, including assurances of anonymity and confidentiality and an explanation of how quotations would be used (appendix 5, 10). When papers were published, their names were replaced with a number. The information included details about my prior experience with and interest in newborn resuscitation. Participants were informed about the possibility of withdrawing from the study at any time until the analysis was started without giving a reason.

Additionally, they were encouraged to contact me for a follow-up discussion if they experienced any adverse emotional reactions during or after the interviews or workshops. Because of my experience as a clinical midwife, I was also attentive to any emotional reactions from the midwives during the interviews. I was prepared to stop the interview, offer a new appointment, or delete the recording if the participant requested it.

4.3 Person-centredness

Over the last decades, there has been an increasing focus on person-centredness in healthcare, policy, government and health organisations (World Health Organization, 2015). Various definitions and concepts of person-centredness exists (Dewing & McCormack, 2017) and there are a number

of related concepts, such as woman-centred care (Berg et al., 2012; Fontein-Kuipers et al., 2018; Leap, 2009; Lundgren & Dahl, 2022), family-centred care (Dahl & Prinds, 2022), patient-centred and people-centred health services (World Health Organization, 2015). Even if person-centredness is believed to benefit service users, health professionals, and the health system as a whole, WHO points to a lack of consensus regarding person-centredness, including overlap within concepts like "empowerment" and "participation" (World Health Organization, 2020, p. 19).

As a PhD candidate in the PhD programme in person-centred health care (University of South-Eastern Norway, 2022), I adopt person-centred principles in this thesis (Jacobs et al., 2017, p. 52). Person-centredness implies respect, reciprocity, mutuality, and self-determination and is related to the main principle of person-centred research: connectivity. Connectivity refers to how one connects with oneself, other people, and various contexts throughout the research process (Jacobs et al., 2017, p. 52). In this thesis, connectivity is related to the idea that one does not do research *about* others but rather *with* them as human beings, which is demonstrated by involving participants and taking their perspectives into account when choosing methods. The main principle of connectivity draws on the following related principles: 1) attentiveness and dialogue, 2) empowerment and participation and 3) critical reflexity.

1) *Attentiveness* refers to seeing oneself in different contexts throughout the research process, from data collection to presenting the findings (Jacobs et al., 2017, p. 53). It requires awareness to listen, see and interpret the surrounding context. *Dialogue* is based on respect and mutual attention, which requires openness and transparency throughout the research process (Jacobs et al., 2017).

2) Person-centred research aims to *empower* individuals by developing their self-awareness and self-esteem, as well as through capacity building and action (Jacobs et al., 2017, p. 53). As part of the person-centred approach underpinning this thesis, I aimed to provide tools for all participants to empower themselves (Leap, 2009) in the three studies and respect their autonomy by including their expert competence when co-creating the newborn resuscitation course. As part of this process, *participation* involves having a voice in decisions and actions that matter and working in partnerships (Jacobs et al., 2017, p. 54). Varying degrees of participation are illustrated in the three included studies; the intention was to

support and address the essential values of person-centredness by asking "what matters to you?"

3) *Critical reflexivity* is required to understand how power relationships are fostered and maintained, who benefits from them, and how they are perpetuated by gender, ethnicity, social class, and age (Jacobs et al., 2017, p. 54). However, as a researcher, I aim to adopt a self-critical reflexive attitude regarding my own experiences, background, and assumptions throughout my research process.

Co-creation and person-centredness are closely related in terms of how they acknowledge experts' expertise and seek to maintain connectivity and respect (McCormack, Van Dulmen, et al., 2017, pp. 209-218). The values of person-centeredness underpin this thesis, as evidenced by certain methodological choices.

4.3.1 Co-creation in this thesis

Co-creation occurs when members of different teams exchange valuable experiences among themselves and between each other (Hemberg & Bergdahl, 2019; Kilde et al., 2016; McCormack, McCance, et al., 2017). In this thesis, co-creation refers to the degree to which participants were included in the development of the newborn resuscitation course. Participants were included in creating data in collaboration, and workshops served as a data collection method to tailor the development of the newborn resuscitation course for midwifery students. Furthermore, co-creation refers to this process but also to a related concept from pedagogy for the unforeseen, namely "samhandling", which can be defined as "interaction", "joint action", "teamwork", "cooperation", "collaboration", "joint forces with", "co-production", or "coordination" (Torgersen, 2018, p. 40). Lastly, co-creation is in line with the United Nations' sustainable development goal 17 regarding the commitment to partnership and cooperation (United Nations, 2023b).

5 Design, material, and methods

This chapter describes the design, material and methods of the three papers included in this thesis.

Each study refers to a published paper. An overview of included studies is presented in Table 1.

Table 1

Overview of included studies

	Title of the paper	Aim	Data collection	Data analysis
1	Balancing life and death during the golden minute – Midwives' experiences of performing newborn resuscitation	To explore midwives' experiences in performing newborn resuscitation on maternity wards	Individual in-depth-interviews with 16 midwives	Phenomeno-logical hermeneutical method
2	An exploration of midwives' perceptions of newborn resuscitation programmes for midwifery students	To explore midwives' perceptions about what constitutes necessary content and methods of instruction in a newborn resuscitation programme tailored for midwifery students	Individual semi-structured interviews with 16 midwives	Systematic text condensation
3	"Keep It simple"—Co-creation of a tailored newborn resuscitation course for midwifery students	To develop a tailored newborn resuscitation course for midwifery students	Four workshops with 12 midwifery students and 8 midwives; in total 20 participants	Framework method

5.1 Study 1

Study 1 explores midwives' experiences of performing newborn resuscitation in maternity wards. Individual in-depth interviews were analysed using a phenomenological hermeneutical method (Lindseth & Norberg, 2004).

5.1.1 Recruitment, participants, and data collection

In August 2018, an invitation to participate in this study was posted on a Norwegian midwifery forum on Facebook consisting of 2,300 midwives (appendix 3). Initially, two midwives responded to the invitation. A month after conducting two interviews, an update was posted in the same forum, which led to two more midwives responding (appendix 4). As no more participants came forward, new recruitment methods were investigated. The snowball method was adopted by asking the included midwives to pass along information to colleagues via word of mouth and flyers (Creswell & Poth, 2018), which resulted in positive responses from midwives. Using this method, the PhD candidate received 19 emails from midwives willing to participate in the study. They received a reply expressing appreciation for their willingness to participate. This reply also included written information with details of the study and a consent form to be signed before the interview; they were told they would be contacted if they were included (appendix 5).

A convenience sample of midwives fulfilled the following inclusion criteria: midwives who had performed newborn resuscitation in Norwegian maternity wards (Patton, 2005).

The included participants were all female, spoke a Scandinavian language, and were 32-61 years old. They represented the northern, southern, eastern, and western regions of Norway and had performed newborn resuscitation in small midwifery-led maternity wards, maternity clinics, and university hospitals, where there were anywhere between 50 and 7,000 births annually. Their work experience ranged from 1 to 35 years (mean 14), including experience performing newborn resuscitation from 26 different maternity wards worldwide. However, international experience was not explicitly reflected in the inclusion criteria, interviews, or analysis. Fourteen of the included midwives had graduated from Norwegian university colleges or universities; two had graduated from programmes in other Nordic countries. Most of them had completed

postgraduate education and courses nationally and internationally. The included participants are presented in Table 2, adapted from paper 1.

Table 2

Description of included participants

Participant	Age	Years of midwifery practice	Level of maternity ward midwife currently works at	Number of births per year for the current workplace	Number of births per year at wards midwife has previously worked at
1	40	12	Univ hospital	7000	-
2	38	2	Midw-led unit	400	2000
3	50	14	Maternity clinic	1400	6000
4	35	5	Univ hospital	2750	7000
5	37	1	Maternity clinic	2000	6300, 650
6	36	2	Univ hospital	6000	450
7	56	25	Univ hospital	6000	1000, 500
8	56	26	Univ hospital	6000	2000, 500
9	32	5	Univ hospital	6000	5000, 1500
10	52	28	Maternity clinic	1600	6000, 2000, 350, 150, 50
11	40	7	Maternity clinic	3000	-
12	40	5	Maternity clinic	3000	-
13	61	35	Maternity clinic	3000	7000, 2000, 800, 500
14	56	32	Maternity clinic	450	2000
15	44	15	Maternity clinic	2200	2000,1500, 800, 600, 500
16	42	15	Maternity clinic	2000	4000, 60

Univ=university, midw=midwifery

Two pilot interviews were conducted with midwifery colleagues before starting the data collection. They were not included in the study, but their input led to adjustments of the interview technique and guide.

Individual in-depth interviews in the number of 16 were conducted from August 2018 to January 2019 at various locations chosen by the participants. After 16 interviews, data collection was stopped due to the occurrence of repetitive themes and the appearance of minimal new data in the interviews. This decision was taken in collaboration with the supervisory team.

The data were collected to address the aims of studies 1 and 2; hence, the interviews had two parts. The first part was an in-depth interview, while the second part had a semi-structured approach (appendix 6). All participants were informed both orally and in writing that we were collecting data for two studies. They were encouraged to describe their experiences of performing newborn resuscitation freely and were interrupted with follow-up questions only when clarification or further elaboration was needed. The following open-ended question was asked to address the aim of study

1: Could you please tell me about a situation when you experienced a non-breathing newborn baby immediately after delivery?

All interviews were audio-recorded and lasted between 38 and 82 minutes (mean 60). The first part of the study 1 interview lasted 22–49 minutes (mean 32). All interviews were transcribed verbatim by the PhD candidate. The total transcribed text was 214 pages and addressed the aims of studies 1 and 2.

Field notes were written for each interview to ensure proper recording of contextual factors during and after the interviews. Key issues were noted for each participant along with topics to be further elaborated during the interview. Moreover, notes about participants' interests and ideas were taken during the interview and were made to distinguish each interview and to indicate which midwife said what.

5.1.2 Analysis

When analysing the data, Lindseth and Norberg's phenomenological hermeneutical approach was used to explore midwives' lived experiences (Lindseth & Norberg, 2004). This phenomenological hermeneutical method is inspired by the phenomenology of Husserl and the hermeneutics of Ricoeur and was originally developed to understand nurses' and physicians' moral and ethical thinking expressed in interview texts.

The analysis process was conducted in close collaboration with the supervisory team until agreement was reached on the final findings, which are presented in the published paper (Ljungblad et al., 2020, p. 946).

The *first step* in the analysis was conducting a *naïve reading,* reading the texts several times with an open mind to grasp the meaning as a whole (Lindseth & Norberg, 2004, p. 149). In this stage of analysis, there was a shift from a natural attitude to a phenomenological attitude, presented as the summary of naïve understanding, formulated in a phenomenological language below:

Most participants experienced newborn resuscitation as one of the most frightening situations a midwife can experience. They described feeling an enormous and simultaneous responsibility for the mother and newborn when performing newborn resuscitation and noted their experiences of a life-and-death-perspective in such situations. They talked about being courageous enough, feeling uncertain, scrutinizing themselves and being critical of their skills. They described physical symptoms from the stress that such situations could cause and experienced that they swung between feeling like experts during normal births and novices when performing newborn resuscitation. They feared they would be found to be insufficiently competent or would be blamed or scapegoated.

In the *second step* of the analysis, the methodological interpretation occurs through *structural analysis* (Lindseth & Norberg, 2004, p. 149). This method emphasises viewing the text objectively and using everyday language to describe meaning units during the structural analysis. The text of the interview transcripts was divided into meaning units consisting of parts of sentences, whole sentences, or paragraphs. Initially, meaning units were decontextualized from the text as a whole, and the text parts were considered independently from their context. The meaning units were discussed to identify themes that emerged as a thread of meaning throughout the text. The themes that emerged were given preliminary names: *being confirmed, being professional, being responsible* and *being stressed.* Reflections on the meaning units in relation to the naïve understanding were discussed before the meaning units were condensed into sub-themes and themes. The themes were reflected on in relation to the naïve understanding and the research question until the naïve understanding was validated. Discussions of a variety of themes and sub-themes were proposed before agreeing on the final themes. An example of the structural analysis is presented in Table 3.

Table 3

An example of the structural analysis

Meaning unit	Condensation	Sub-theme	Theme
"I felt like the blood drained from my body . . . a huge adrenaline rush . . . like being on the top of a mountain on the verge of falling down …" (3)	She felt a lot of stress and that the blood left her body. She had a strong adrenaline kick and felt that she was on a mountaintop on the verge of falling down.	Experiencing stress	Feeling stress and battling the seconds
"It felt like I was waiting for help for 3 hours … but it was only 4 minutes … it was more than enough … and it felt like 3 hours … do they never come?" (12)	She felt as if she was waiting for help for an entire shift, while in reality, the time that elapsed was 4 minutes… it was difficult to accurately state how long waiting for help, but she noted that many tasks were performed while waiting.	Managing stress	

In the *third and final step* of the analysis, a *comprehensive understanding* was formulated *(interpreted whole)*. The themes and sub-themes were summarised as a newly interpreted whole in relation to the research question and contextual factors (Lindseth & Norberg, 2004). Participants often used metaphors to describe details, some of which are quoted as examples to illustrate the findings. In the process of analysis, field notes were used to recall details from each interview. When summarising the sub-themes and themes, the pre-understanding, naïve reading, structural analysis, values, person-centred research, and previous relevant research were taken into consideration (McCormack, Van Dulmen, et al., 2017). In this step, remaining open-minded when listening to participants' stories was important.

5.2 Study 2

Study 2 explores midwives' perceptions of what constitutes necessary content and methods of instruction in a newborn resuscitation programme tailored for midwifery students. Semi-structured interviews were conducted, and the data were analysed using systematic text condensation (STC) (Malterud, 2012).

As previously mentioned, the data for studies 1 and 2 were collected in the two-part interviews. Study 2, which corresponds to paper 2, is based on the data from the last part of these interviews. To clarify and distinguish the different approaches to collecting data for studies 1 to study 2, detailed information about the interview including the interview guide is presented in appendix 6. The interviews were designed to offer midwives an opportunity to describe their own experiences first before discussing the content and structure involved in teaching newborn resuscitation to midwifery students. To save time, participants were asked to participate in one interview instead of two.

5.2.1 Data collection

In the two-part interview, when participants had answered the open-ended question addressing the aim of study 1, they were asked questions that addressed the aim of study 2. Study 2 used a semi-structured interview guide (Malterud, 2017, p. 133), presented in Table 4.

Table 4

Semi-structured interview guide

1	Do you feel prepared for newborn resuscitation?
2	How can midwifery students prepare themselves for newborn resuscitation?
3	What should an educational programme in newborn resuscitation include?
4	Can you please relate your experience in newborn resuscitation to knowledge, skills, communication and teamwork in simulation training?
5	Do you have other comments or want to share experiences that have not been discussed during this interview?

The focus was to gain information about what instructional content midwives considered necessary for midwifery students to learn newborn resuscitation. The interview guide consisted of five questions. Additionally, follow-up questions were asked when elaboration was needed. The interviews lasted from 15 to 43 minutes (mean 26). All interviews were audio-recorded and transcribed verbatim by the PhD candidate.

5.2.2 Analysis

The data were analysed using systematic text condensation (STC), a four-step strategy for thematic cross-case analysis (Malterud, 2012). The thematic cross-case analysis involved exploring case similarities and differences to support empirical generalisability and theoretical predictions. This method was chosen to systematise experiences and ideas about content and methods for a newborn resuscitation programme for midwifery students. Moreover, midwives' experiences were recognized as a valid source of knowledge. STC is a descriptive, explorative helpful method for analysing different types of qualitative data (Malterud, 2017). It consists of the following four steps: 1) total impression – from chaos to themes; 2) identifying and sorting meaning units – from themes to codes; 3) condensation – from code to meaning; 4) synthesizing – from condensation to descriptions and concepts (Malterud, 2012).

In the *first step*, from chaos to themes, the supervisory team and PhD candidate read the material to get an overall impression of the data. The following nine preliminary themes were identified: *skills practice, theoretical knowledge, pedagogical tools, reflection, teamwork, learning from experience, being prepared, documentation, optimal cord-clamping,* and *structure.* During this step, the data was approached with an open mind.

In the *second step*, from themes to codes, the transcripts from all interviews were read line by line to identify meaning units associated with the research question. The meaning units were classified and labelled and then organised according to meaning units into preliminary code groups named "craft knowledge", "content", and "structure". The process was iterative and flexible, and a hands-on approach was used: i.e. related meaning units were sorted into differently coloured envelopes.

S*tep three* involved going from code to meaning. At this step, meaning units within the code groups established in the second step were systematically abstracted. A decontextualized selection of meaning units across participants was achieved at this stage by sorting them as thematic code groups. In reviewing the subgroup's meaning units, we reduced the content into a condensate - an artificial quotation preserving as much as possible the terminology used by the participants. The focus was on one sub-group at a time when reducing the meaning units into condensates. Staying close to the participants' voices was essential when writing the condensate. Thus, as Malterud (2012) suggested, a first-person perspective represented every participant who provided

information about this topic. The following condensate is an example of the first-person perspective from the sub-group "safe culture":

I believe that to become a clinical expert, I need to have a strong motivation, a certain desire to become skilled, gain knowledge, and dare to talk about this topic. It is about processing the situation by talking through critical situations and following up with debriefing for as long as it is needed. Society expects that all deliveries in Norway will have a healthy outcome, and the law is always overshadowing me if I make a mistake. This expectation makes me feel guilty, even if I provide my very best midwifery care. That is why midwifery care is like a craft or like art. Some acute situations are impossible to prepare myself for. It is not easy to be prepared, but it is important for colleagues to have a joint knowledge base to be able to discuss afterwards and in a preventive manner. To become skilled, I need to practice a lot and trust myself that I do it well, and it has to be meaningful to me. I must have psychological support from my colleagues to continue practising as a midwife. In addition, I should never question myself if I dare to call for help. There should be a supportive culture in the ward. It is like a communication culture that should be 100% clear. Midwifery students need to feel skilled in performing newborn resuscitation in maternity wards.

During this process of abstracting empirical data, quotations that could illustrate the sub-groups were identified, and the headings of the code groups were adjusted accordingly.

In the *fourth step*, the analysis proceeded from *condensation to description and concepts*. The data was reconceptualized. The content of the condensates within the code groups was synthesized, and a description addressing the aim was developed. The participants' experiences were re-narrated in the third-person. From this analytical distance, the researchers' responsibility for interpretation became clear. The following is a quote as an example of the analytical text in stage four of the analysis:

*Simplified guidelines should be available for midwifery students. The current guidelines have too much text on the poster. It is not described as user-friendly. One midwife has the motto "keep it simple", which is useful when facilitating practical training. Midwives are the professionals at almost every delivery responsible for assessing every newborn baby within the 'golden minute'. In this part of the guidelines a limited number of tasks can be done. They need to have control of airways, ventilation, call for help and communication. Nevertheless, later in this guidelines, when help has arrived, midwives often have other tasks. Midwives play an important role in the first minutes [after birth], and therefore the focus when learning the guidelines should be on the most important part: **ventilation**. Simplified guidelines could also be printed in a pocket format to make it more available.*

As the text was refined and condensed, headings were adjusted several times until they reflected the findings presented in the analytical text. Lastly, the findings were interpreted using a person-centred nursing framework and in light of previous research (McCormack, McCance, et al., 2017).

5.3 Study 3

This study uses an explorative approach to develop a tailored newborn resuscitation course for midwifery students. The study was designed by applying the PARISH framework (Rycroft-Malone, 2004) to build a foundation for further implementation. Data were collected from workshops and analysed using a framework method (Gale et al., 2013).

5.3.1 Recruitment and participants

A two-step process was undertaken to recruit a convenience sample of midwives and midwifery students to participate in the workshops (Patton, 2005). The inclusion criterion was engagement to contribute to developing a newborn resuscitation course for midwifery students. Midwifery students' contributions were highly appreciated in this co-creation because the course was tailored to their needs. The two steps of the recruitment process are described separately below.

5.3.1.1 Midwives

The recruitment process started with sending all included midwives from studies 1 and 2 a personal e-mail inviting them to participate in study 3 (appendix 8). Study 1 participants had already been informed that they would later be invited to participate in a workshop to develop a newborn resuscitation course for midwifery students. Eight of the 16 midwives responded positively to participating in study 3; therefore, they received written information by e-mail about the study, including a consent form.

5.3.1.2 Midwifery students

Midwifery students were recruited through social media, snowball recruitment, and invitations posted on the digital platform at their educational institution (appendix 9). This recruitment strategy was chosen to ensure the inclusion of a broad variety of students from the Norwegian midwifery education programmes and various parts of Norway and, thus different perspectives. An invitation to participate in the study was also posted on a midwifery forum on Facebook consisting of 2,300 midwives and midwifery students, which is the same forum used for the initial recruitment for studies 1 and 2. The invitation was posted on 10 September 2020.

Additionally, midwives employed in midwifery education programmes across Norway were asked to pass information about the study to the midwifery students on their digital platform, Canvas, a form of snowball recruitment (Creswell & Poth, 2018). These midwives were encouraged to use the text posted on Facebook to inform their students. When including students from all but one midwifery education programme, a reminder was posted on the same Facebook forum in the hope of including participants from all programmes. Altogether, twelve midwifery students, representing five out of six midwifery education programmes in Norway, decided to participate in one workshop of their choice. Before confirming their participation, they received written information about the study and a consent form by e-mail (appendix 10). Table 5 describes the characteristics of the workshop participants.

Table 5

Characteristics of the workshops participants

Workshop	Participants (total)	Registered midwives	Years of midwifery practice	Midwifery students 1st year	Midwifery students 2nd year
1	3	3	Midwife 1: 3 years Midwife 2: 14 years Midwife 3: 37 years	-	-
2	5	5	Midwife 1: 7 years Midwife 2: 16 years Midwife 3: 20 years Midwife 4: 28 years Midwife 5: 30 years	-	-
3	4	-	-	-	4
4	8	-	-	6	2

5.3.2 Data collection

Four workshops were conducted on the digital platform Zoom from May to October 2020. All participants had received information about the study before logging on to participate in their chosen workshop, and this information was also repeated orally before the workshops started. They were offered a daytime or an evening workshop and were allowed to choose the time that suited them best. The workshops were conducted in separate groups, with midwifery students together in two workshops and experienced midwives in the other two workshops. Before consenting, participants were informed that all workshops would be arranged on Zoom's digital platform and that audio recordings would be made using Zoom technology and another recorder. They were also informed that logging in to the Zoom link they had received by e-mail would indicate consent. This information was repeated before the recording started. NSD approved this recording method due to Covid-19 restrictions (appendix 11).

All workshops started by briefly introducing myself as a PhD candidate and sharing my experiences from newborn resuscitation when working as a clinical midwife and then gave all participants time to introduce themselves. Extra effort was put into making every participant comfortable before starting the workshops. It was explicitly stated that all ideas and experiences were equally important, and participants were acknowledged as experts with unique experiences (Dulmen et al., 2017, pp. 209-218). Additionally, it was made clear that no reflections could ever be wrong during

these workshops; all contributions were welcomed as part of a joint reflection and discussion. Before each workshop, participants were offered assistance with practical issues related to using a digital platform. Workshops lasted from 70 to 111 minutes (mean 88 minutes), for a total of 351 minutes.

The PhD candidate facilitated all workshops to ensure all voices were heard in all stages of this study. For each topic discussed, notes were taken on the ideas participants contributed spontaneous with and participants who did not talk spontaneously were asked if they would like to add anything to the discussion. The goal when conducting the workshops was to create a safe, respectful atmosphere for participants to speak freely and share their ideas in the discussion. Since I was present in and facilitated each workshop as a PhD candidate, I contributed to the production of data to some extent. I strived for genuine co-creation where all participants were equal, and further attempted to facilitate the workshops using creative tools when suggesting themes to discuss instead of giving topics from my own experiences. If participants asked about the relevance of what they had said or if it was "correct", I pulled out some keywords from my notes about their discussions as a reply to encourage further discussion. Inspiration from creative tools was used to help participants remember. Four creative tools – a video clip, a picture frame, a word cloud and a poem – were used to get the participants to remember what they felt during the resuscitations they described in as much detail as possible so their emotions could be included in the course and to inspire fruitful discussions. For example, the poem presented in the preface includes cognitive and emotional perspectives, which might have triggered some participants to recall their experiences. The creative tools are shown in Figure 4.

Figure 4

Creative tools applied to facilitate the workshops
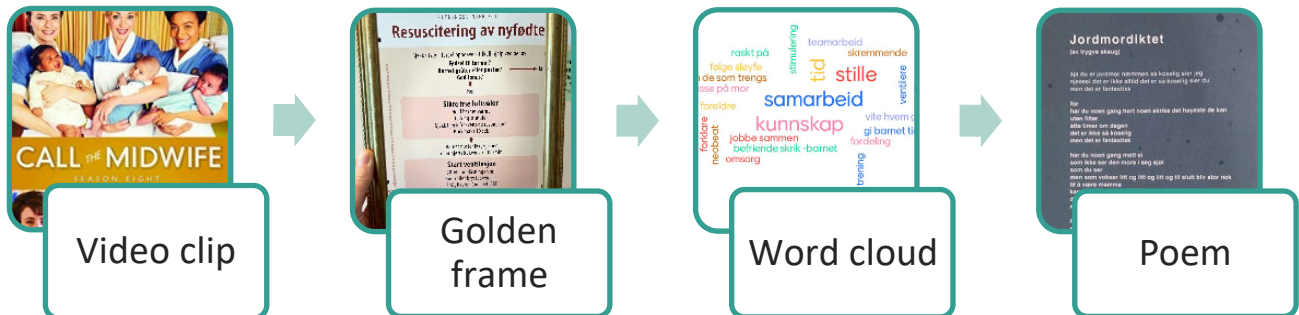
- A **video clip** from the BBC production *Call the Midwife* showed a midwife struggling to help a newborn baby take its first breath. The video, which illustrates what 60 seconds of newborn resuscitation feels like for midwives and shows how complex newborn resuscitations can be, serves as an introduction to the topic to prepare for further discussions.

- An empty **golden frame** was used to visualise the importance of "the golden minute" in newborn resuscitation. The frame was held up in front of the Norwegian national guidelines to illustrate the importance of the first 60 seconds after birth when midwives are often solely responsible for the mother and her newborn baby.

- A **word cloud** was created digitally in each workshop containing characteristics of participants associated with newborn resuscitation. This was created directly after watching the video clip, with each participant relating their experiences from newborn resuscitation to the word cloud.

- A **poem** about midwives' challenges performing newborn resuscitation was read to stimulate further discussion and facilitate reflection on other perspectives of newborn resuscitation without describing personal experiences.

5.3.3 Analysis

The analysis was guided by a framework method (Gale et al., 2013) consisting of seven stages (Table 6). Multidisciplinary health care research has broadly used this method for its clear description of the stages of the process.

Table 6

Overview of the framework method

Stage	Stepwise process of analysis
1	Transcription
2	Familiarisation with the interview data
3	Coding
4	Developing a working analytical framework
5	Applying the analytical framework
6	Charting data into the framework matrix
7	Interpreting the data

Three underpinning elements grounded our study for further implementation. "Evidence, context, and facilitation" are related to the principles of implementation science in the PARIHS framework (Rycroft-Malone, 2004). The decision to use this framework was made in collaboration with the supervisory team in preparation for further implementation of the findings. The supervisory team and I used co-creation throughout this study, similar to how it was used in the workshops.

Transcription was *stage 1* in the analysis. Recordings of the workshops were transcribed verbatim by the PhD candidate. The transcripts totalled 143 pages with large margins for later coding and notes, as suggested in this framework method.

In *stage 2*, I re-listened to all workshop recordings and re-read the transcriptions to familiarize myself with the data. All supervisors received a copy of the written transcripts. This systematic familiarization process emphasised contextual and reflective notes as vital stages of the interpretation process.

After that, in *stage 3,* the three key elements of the PARIHS framework were applied when starting the coding (Rycroft-Malone, 2004). Pen, paper and Post-it notes were used in this deductive process to mark different codes. The following photo illustrates this process. All transcripts were read line

by line and then labelled with codes in the data material. The labels refer to incidents, values, emotions, and the variety of participants' experiences and ideas. The coding aimed to organise the data to be compared with the whole data. Independent coding was conducted to ensure that all perspectives were presented and no one perspective dominated the others.

In *stage 4*, the supervisory team compared the labels and agreed on preliminary codes. These codes were applied to the transcripts but could still be adjusted. The analytical framework was created by grouping the codes into categories using a tree diagram. The process was iterative. *Evidence, context,* and *facilitation* were prominent at this stage of the analysis, as illustrated in the photo below. In this stage, we realized that using *evidence, context,* and *facilitation* could prevent us from creating new codes, so we were open to discovering new ones, illustrated by the non-organised Post-its in Figure 5.

Figure 5

Photography from the analysis process

Next, in *stage 5*, we applied the analytical framework by marking the transcripts with our preliminary categories and codes. Each code was used as an index for easy identification in the transcripts to be structured and organized for further analysis using the analytical framework. The method suggests using CAQDAS (computer-assisted qualitative data analysis software) to speed up the analysis. However, pens and coloured Post-it notes were easier to use, provided better visualisation and were preferred as a hands-on method.

Then, in *stage 6*, the voluminous data were summarized and charted into the matrix, which was created using a flip-over worksheet. Charting includes summing up the data categories from all transcripts. One of the challenges encountered at this stage was how to reduce the data while keeping the participants' original meanings.

During the final stage in this analysis, *stage 7*, the initial notes made directly after each workshop were considered since they contained information about context, particular interests, early observations, and interpretations. In these notes, the codes were differentiated and nuanced to avoid overlap. This stage took longer than anticipated due to the rich data material. Therefore, we went beyond participants' descriptions and looked in more detail at how a tailored newborn resuscitation course for midwifery students could be presented.

The themes that emerged from the analysis were *practice guidance, technical skills, non-technical skills,* and *innovative methods*. Each theme comprises six or seven sub-themes with direct suggestions for learning, practising and maintaining newborn resuscitation skills. Additionally, the themes relate to midwifery students' need to be supported in their clinical practice and the importance of a safe culture after becoming midwives. These themes were key to the co-creation of the newborn resuscitation course.

Participants decided which direction themes should take in this co-creation and after reaching an agreement on the newborn resuscitation course's contents, a model was created based on their creative ideas and workshop discussions. This model was sent by e-mail to all participants for comments and adjustments before agreeing on the final design of the model.

The findings for study 3 are presented as a model of a lifelong learning process consisting of practical guidance, technical skills, non-technical skills and innovative methods to prepare midwives to perform newborn resuscitation illustrated through an eternity symbol.

5.3.4   PARIHS framework for further implementation

Study 3 is based on the PARIHS framework (Rycroft-Malone, 2004), a well-known validated framework to promote the implementation of evidence into practice. The core constructs (evidence, context and facilitation) are consistent with person-centredness and the research values that underpin this thesis (McCormack & McCance, 2017). Clinical practice guidelines cannot be implemented unless an implementation process is in place, which is often difficult and time-consuming (Søreide et al., 2013). To address a call for an increased focus on implementation in medical science (Dainty et al., 2013), plans have been made for further research on how to implement the newborn resuscitation course in future studies. However, due to the limited PhD period, there was not enough time to implement and evaluate the course as originally planned.

6 Methodological and ethical considerations

In this chapter, methodological and ethical considerations will be elaborated on and discussed.

6.1 Methodological considerations

According to Lincoln and Guba (1985), trustworthiness consists of *credibility*, *dependability*, *confirmability*, and *transferability.* Trustworthiness is crucial to assessing methodological quality and values, as well as how closely the findings of each study align with the aims.

6.1.1 Credibility

Credibility refers to the degree to which one can trust the "truth" of the findings in qualitative research (Lincoln & Guba, 1985). As a result of the data collection and data analysis, credibility is demonstrated as other people recognize the experiences described in the included studies (Sandelowski, 1986). Therefore, the following perspectives regarding credibility will be elaborated: prolonged engagement, peer-debriefing and member-checking.

Prolonged engagement

Prolonged engagement, which refers to spending sufficient time in the field, is necessary to study the phenomenon in question (Lincoln & Guba, 1985) and can be considered a strength and a limitation of my thesis. Prolonged engagement ensures the credibility of the included qualitative studies (Lincoln & Guba, 1985). As a limitation, I am aware that I might have been blinded from seeing other perspectives due to my existing engagement with newborn resuscitation as a neonatal nurse and midwife for over two decades. On the other hand, Lincoln and Guba (1985) emphasise the importance of spending time in the field to understand different perspectives on the phenomenon under study and contextual factors for ensuring credibility. Another example of my prolonged engagement is my employment as a part-time lecturer in the Master in Midwifery programme at the University of South-Eastern Norway since 2017. This job might have impacted my thesis and choices as I planned and conducted simulation training in midwifery education throughout these years. My knowledge on the subject naturally impacted me as a researcher and my interpretation of the data. My supervisory team's critical, outsider perspectives have been valuable in this matter.

Peer debriefing

Lincoln and Guba (1985) suggest that having other researchers involved in the research process to evaluate whether the collected data support the findings promotes trustworthiness. To this end, I was able to use my supervisory team, which consisted of one midwife and two nurses with different perspectives on newborn resuscitation. All of them were professors at two different universities in Norway and the United Kingdom. One of them had performed newborn resuscitation, and two had not. Working with this team helped minimize my preconceptions or blind spots during the three separate analysis processes. Our different competencies and perspectives were helpful and supported all processes. We had several discussions before agreeing on methods to address the aim of each study, and the team was regularly used for critical discussions throughout the three studies, strengthening each study's credibility. In addition, this team had limitations in that one of the co-supervisors resigned and the other changed university while I was writing up the thesis. However, a new mentor with competence in both pedagogy and midwifery was appointed. Her contributions strengthened the connection between this thesis and education, pedagogy, and didactics.

Member checking

Because member checking is the most crucial method for establishing credibility, according to Lincoln and Guba (1985), I used it systematically in the individual interviews and workshops to ensure I understood the informants correctly. Therefore, to check my understanding, I asked questions like: what do you mean by that? Or can you please elaborate more on that? (Lindseth & Norberg, 2021). At the end of all individual interviews, participants were given the opportunity to summarize what they had described. They were also allowed to elaborate further and given as much time as needed to think before speaking (Creswell & Poth, 2018). When I opened the floor up for summarisation, most midwives focused in detail on what they found most essential. They elaborated in-depth and used new words to describe their experience differently from how they had discussed it earlier in the interviews, giving me new and more precise insight into their experiences. In the workshops in study 3, I facilitated participants in each group in summarising what they had discussed, which led to new discussions and a more thorough elaboration of already discussed topics.

One limitation related to member checking was that participants were not given the possibility to read the findings or selected quotations from studies 1 and 2. The consent for using their quotes anonymously was given before the interviews were conducted. In study 3, however, participants were invited to comment on the final presentation of the eternity symbol as a finding and propose adjustments.

6.1.2 Dependability

The importance of dependability to the research study lies in ensuring that the study's findings are consistent and repeatable to ensure that if other researchers analyse the data, they will reach similar interpretations and conclusions (1985). I will explain my use of an inquiry audit to ensure a critical outsider's perspective to assess included studies (Lincoln & Guba, 1985).

Inquiry audit

A technique to establish dependability is to benefit from an outside researcher conducting an inquiry audit on the research study, also known as an external audit. A researcher outside of the data collection and data analysis process examines the data collection, the data analysis, and the findings of the research study in order to conduct an inquiry audit to ensure and determine that all interpretations and conclusions are supported by the data collected in order to ensure that the findings are accurate (Lincoln & Guba, 1985). Cresswell and Poth (2018) underscore the importance of other researchers being able to read and follow one's analysis, which was the role of one of my co-supervisors. On the other hand, with higher levels of abstraction and interpretation, it is challenging to demonstrate dependability, credibility and authenticity (Graneheim et al., 2017). Hence, systematic processes whereby a team of researchers constantly and iteratively questioned the findings and could stop, rethink, and critically scrutinize the findings were essential to ensure confirmability in the three included studies. To maintain this perspective, my main supervisor and I worked closely together while benefiting from the co-supervisors' helicopter perspective to evaluate the accuracy of the findings (Lincoln & Guba, 1985). I gained valuable insight from this technique, which enabled me to take a broader view of the findings and articulate them better.

6.1.3 Confirmability

Confirmability refers to the degree to which a study's findings are shaped primarily by the respondents and not by the researcher's own bias, motivation or interests (Lincoln & Guba, 1985). I will further elaborate on my audit trail and reflexivity regarding my thesis.

Audit trail

According to Lincoln and Guba (1985), memos can provide an overview of the research process from the conception and development of research to the reporting of findings. Throughout the research project, I wrote memos in a Word document; they included a clear description of my research trail and decisions related to study design and data collection. These memos constitute an audit trail that enhances confirmability (Lincoln & Guba, 1985). I did not write daily but made brief notes when new challenges arose, or decisions were taken. These notes included methodological notes, ideas that were never used, and suggestions for theoretical perspectives. I kept a separate and more detailed log during the analysis phase of each study. I used these notes to guide the description of my audit trail and to further ensure my thesis's trustworthiness.

Another matter in which I sought to be transparent in my audit trail is my relationship with the participants. Being close to their voices, acknowledging their contributions, and following their creative requests inspired me throughout the process. Each workshop was facilitated to ensure everyone was heard and allowed to speak when they had ideas. As a facilitator, I did not suggest themes for the workshops but remained available in the background to follow up on participants' themes.

Reflexivity

As a neonatal nurse and midwife, I have extensive experience performing newborn resuscitation, which influenced my choice of topic and the values underpinning the three studies. When working clinically at the hospital, I believed that the best way to learn newborn resuscitation was to attend and observe as many resuscitations as possible to gain experience and competence. This view might have influenced how questions were asked, and findings were presented. My perspective changed when I began understanding the importance of midwifery students learning multiple skills when preparing for newborn resuscitation.

"Going native" and conducting research in my own field (Creswell & Poth, 2018, p. 57) created some challenges I needed to reflect on. As a researcher collecting qualitative data, I am subjective rather than objective when addressing the overall aim of my thesis. My question is, therefore, not *if* but rather *how* my own values and my personal and professional background influence my work as a researcher (Jacobs et al., 2017, p. 54). When analysing the data, I knew that my preconceptions influenced my choices throughout the research process, the questions I asked, and my interpretations of the data. An example is the semi-structured interview guide consisting of 5 questions in study 2. Although I am aware of my preconceptions, I cannot free myself from conceptual blinders. The extent to which this influenced the process remains unknown.

Sally Thorne (2009) advocates for bringing knowledge back to practice (Thorne, 2009), and I was close to the field and the empirical data. However, the closeness of the researcher-subject relationship can threaten the data's subjectivity and contribute important person-centred values (Jacobs et al., 2017). I mentioned this concern in my log several times. Some participants who wanted to participate were familiar to me from my prior clinical experience, but it was important not to exclude their valuable contributions. We had several discussions with the supervisory team about how to meet these challenges. Some midwives had been colleagues, while others I knew from various midwifery gatherings, meaning we were familiar to different degrees. Alternating between my role as a researcher and my position as a former colleague was challenging (Creswell & Poth, 2018, p. 54). Sometimes I felt that we reached a common understanding too quickly, and I moved on from specific topics too soon instead of allowing more time for reflection. When reflecting on this matter retrospectively, I think one of my supervisors should have conducted these interviews to avoid any conflict of interest caused by these dual roles. My main supervisor was neutral and could have taken on the interviewer role. However, I aimed to maintain my professional role as a researcher and no midwives were asked directly to participate in any of the three studies.

6.1.4 Transferability

Transferability refers to the ability to apply findings to new contexts and participants (Graneheim et al., 2017; Lincoln & Guba, 1985). Transferability, which this chapter will elaborate on, is often described and facilitated by the use of thick descriptions.

For studies 1 and 2, details about a wide variety of clinical experiences were collected from a convenience sample of midwives. In retrospect, it would have been possible to collect a strategic sample. Nevertheless, I am not sure that strategic sampling would have led to other perspectives being included, as our sample included sufficiently broad and thorough perspectives to address each study's aims. Midwives were included from all areas of Norway, various levels of maternity wards, and most midwifery education programmes to ensure a broad sample.

One of the challenges when collecting qualitative data is determining the appropriate sample size (Sandelowski, 1995). Adequate sample size in qualitative research should be neither too small nor too large (Sandelowski, 1995). After having conducted 16 interviews addressing the aim of studies 1 and 2, we agreed to stop the data collection due to repetitive themes and the appearance of minimal new data in the interviews. Even though we identified repetitive themes, we can never know that no new perspectives would have appeared if we had conducted additional interviews.

Conducting 16 in-depth interviews in study 1 resulted in detailed and thick descriptions. However, I am aware that one interview lasted only 22 minutes, a short time for an in-depth interview. This particular interview was short due to the participant's health condition, although she shared meaningful experiences and contributed with rich data to address the aim. Thick description refers to describing a phenomenon so that it can be further evaluated based on the conclusions made about it; such descriptions support transferability (Lincoln & Guba, 1985). A strength of my approach was that I took time to describe that we were not in a hurry, that participants could think about their experiences, and that I would ask them only one question about how they experienced performing newborn resuscitation.

6.2 Ethical considerations

This chapter will elaborate on ethical considerations regarding the risk of being identified, the inclusion of midwifery students as participants, and offering the possibility for debriefing.

The risk of being identified

In all studies, choosing quotations that incorporate the participant's experiences into the published papers while ensuring anonymity presents an ethical challenge (Creswell & Poth, 2018, p. 56). Snowball recruitment implies a risk of being identified because stakeholders who help with recruitment might recognize descriptions of events from their own maternity wards. Hence, the quotes chosen for the published papers were carefully discussed with my supervisory team and translated from Norwegian to English. All participants were assigned a number, which was used instead of their names to quote them in the published papers to minimize the risk of their being identified.

Midwifery students as participants

Participating in a study as a student can be considered a vulnerable situation. As a lecturer in a midwifery programme, it was essential for me to address how I would respect students' privacy. Privacy concerns also relate to the values of person-centred research, namely the possibility of imbalanced power relations due to students' participation in the study (Jacobs et al., 2017). However, I did not evaluate or supervise the participants during their education, nor did they receive any benefits from participating in study 3. Participation was based exclusively on the willingness and personal engagement with the topic.

Offering the possibility for debriefing

Due to the risk that midwives might react negatively to discussing their experiences of performing newborn resuscitation, I offered debriefing if needed. I also specified my availability in writing on the information sheet. In retrospect, I can see that it might have been better to offer a debriefing with another person not to mix up my different roles in the research process. On the other hand, no one contacted me for debriefing despite several participants sharing traumatizing experiences from their careers as midwives.

7 Findings

In this chapter, each study will be presented separately first, followed by a summary of the findings.

7.1 Paper 1

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B.

Balancing life and death during the golden minute – midwives' experiences of performing newborn resuscitation.

Journal of Multidisciplinary Healthcare, 2020; Vol. 13 Pages 943-952.

Four themes emerged from the analysis. Midwives described their emotions when performing newborn resuscitation using words like anxious, sick, panic, chaos, incapable, numb, cold and clammy. They even reported crying and vomiting and emphasised that newborn resuscitation is one of the most frightening situations a midwife will ever experience. Some used the adrenaline to focus on the correct course of action, while others felt like the blood had left their body, described as *"being on the top of a mountain on the verge of falling down".* A critical matter was their feeling of waiting too long before adequate help arrived. After "the golden minute" in which they performed newborn resuscitation, they were vulnerable, needed support, and felt scrutinised and scapegoated by their colleagues. Some midwives even talked about colleagues who quit their jobs as midwives after traumatic resuscitations. Being responsible for the mother and newborn baby simultaneously while being professional in all challenging situations, appeared to be a huge burden. Hence, they were clear about collaborating with good colleagues as a key to successful resuscitation. Midwives requested increased knowledge and help to focus on the correct actions to be fully prepared for newborn resuscitation.

7.2 Paper 2

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B.

An exploration of midwives' perceptions of newborn resuscitation programmes for midwifery students.

Midwifery 2021 Vol. 100 Pages 103021.

Midwives attend most deliveries in Norway and are aware of their importance during the first minute of a newborn's life to identify if resuscitation is needed. Midwives described their challenges to following existing guidelines when performing newborn resuscitation due to its complexity and amount of text on the poster. They requested a simplified guide tailored for the midwifery profession to help them perform the correct actions at the right time. "Keep it simple" was suggested as a motto, and a simplified print pocket version was considered ideal. To develop the skills needed to perform newborn resuscitation, they suggested methods like e-learning, videos, and illustrations in combination with open dialogues in small reflection groups. Learning in their own way and at their own pace was also crucial to the participants, and they claimed that reading 100 books cannot provide a complete understanding of the skills. They requested more regular hands-on-training to achieve this competence. As a finding, practising newborn resuscitation regularly was crucial to act automatically, when necessary, without waiting for help to start ventilating. Moreover, clear communication and leadership were necessary to get an overview of the resuscitation situation. The ability to fail and try again in a safe and supportive environment was emphasised as vital. However, a midwife or midwifery student should never work alone; they should always work in teams. Becoming clinically competent in newborn resuscitation, which can be achieved through practising and reflecting on critical situations in debriefing, was described to require strong motivation.

7.3 Paper 3

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B.

"Keep It Simple"-Co-Creation of a Tailored Newborn Resuscitation Course for Midwifery Students.

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The four main themes from the analysis were practice guidance, technical skills, non-technical skills, and innovative methods. Each of these themes contained six to seven sub-themes describing more precisely participants' needs when learning and maintaining the skills necessary for performing newborn resuscitation.

The themes were adapted into a newborn resuscitation course for midwifery students based on participants' discussions and co-creation in workshops. All midwives and midwifery students emphasised the importance of focusing on the correct assessments to keep it simple enough to perform newborn resuscitation. They claimed existing guidelines were too complex to follow and called for a simplified guide or a recipe like an ABC. In contrast to other professions, midwives have multiple tasks simultaneously and a different role in newborn resuscitation, as midwives are responsible for identifying newborns in need of resuscitation and initiating it. As a finding, participants recommended lifelong learning to be prepared for newborn resuscitation. A prerequisite for developing this midwifery newborn resuscitation course was identifying the main themes from the analysis. At the end of this process, participants agreed on an eternity symbol containing four essential words: learn, practice, reflect, and improve. Finally, they indicated that learning to perform newborn resuscitation in low-dose, frequent training is important for both midwives and midwifery students.

7.4 Summary of findings

Based on the findings of the three included studies, a model for preparing midwifery students for newborn resuscitation was developed. The summary of findings (Figure 6) illustrates five themes and one overall theme. "**Preparing midwifery students for newborn resuscitation**" was identified as the overall theme. The order in which the themes are presented is not random; it was carefully selected to build a model to underpin a lifelong learning process preparing midwifery students for newborn resuscitation.

Figure 6

Summary of findings
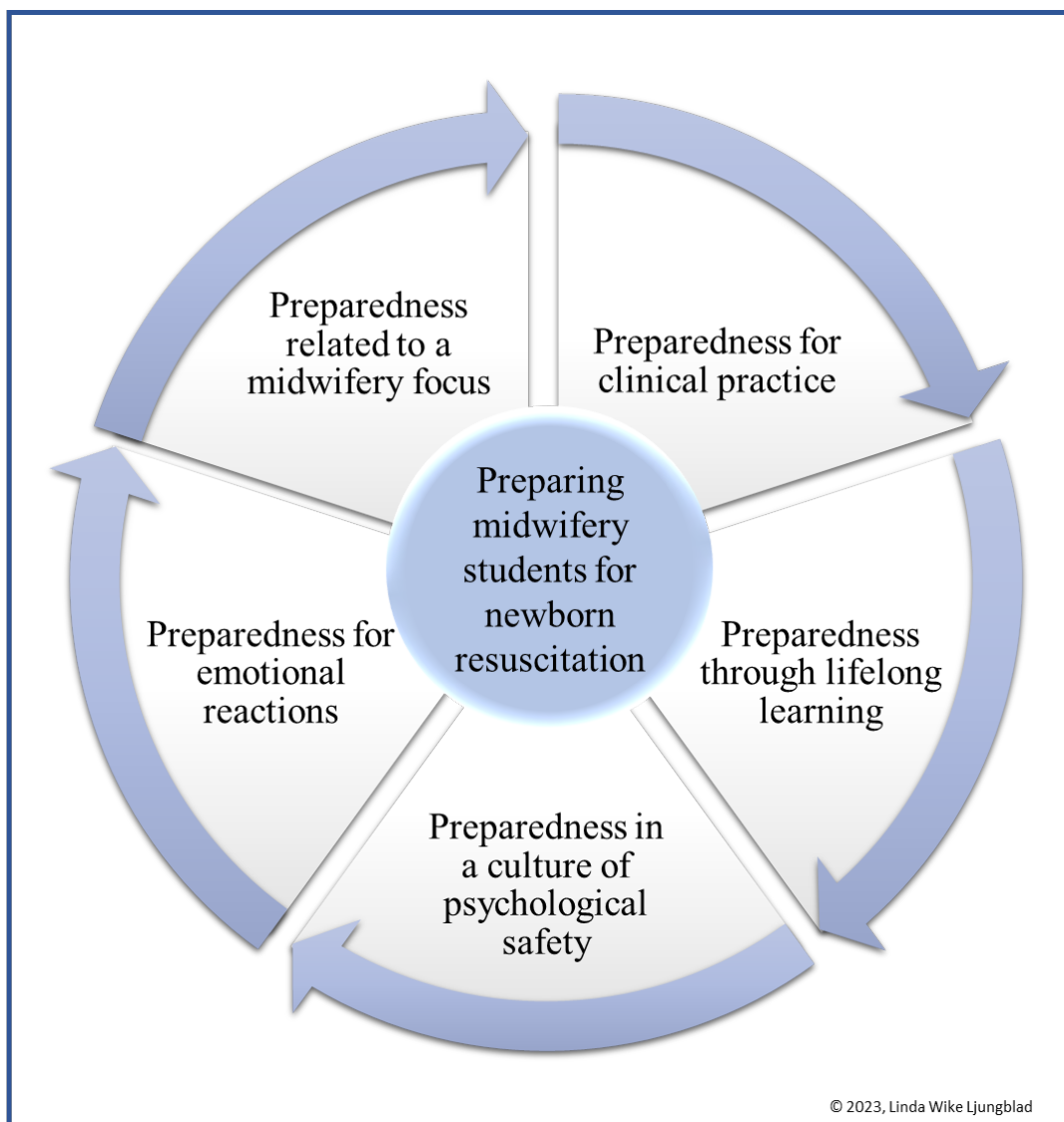
The summary of findings (Figure 6) starts on the top right with the first theme, "**preparedness for clinical practice**", and progresses clockwise. This starting point was chosen because midwifery education aims to prepare students to become clinical midwives. Participants emphasised the need for a greater focus on contextual factors, various learning methods, and increased training frequency, highlighting that the competencies needed for newborn resuscitation cannot be acquired simply by reading books. Technical and non-technical skills were cited as fundamental competencies in newborn resuscitation. Various innovative methods were suggested to individualise each midwifery student's learning needs. The next theme in the model addresses participants' requests for lifelong learning that starts with midwifery education but continues throughout a midwife's career. The theme **"preparedness through lifelong learning"** indicates that attending one single course is not sufficient to acquire the competence necessary to perform newborn resuscitation; according to the findings of this thesis, skills need to be reviewed and updated frequently using low-dose high-frequent training. Participants mentioned that a culture of psychological safety was of the utmost importance to be able to manage newborn resuscitation. Hence, the third theme in the model is "**preparedness in a culture of psychological safety**". Included midwives also described their emotional reactions related to newborn resuscitation. Therefore, the fourth theme presented in the model is "**preparedness for emotional reactions**", emphasised as an important area to acknowledge and value. Last but not least, participants requested a simplified midwifery focus to help them better manage the complexity of newborn resuscitation within a short time interval. The final theme is thus "**preparedness related to a midwifery focus**".

To summarise, the model (Figure 6) illustrates the findings of this thesis. It was constructed based on the findings of the three studies and proposes essential elements to prepare midwifery students for newborn resuscitation.

8 Discussion of findings

The summary of findings (Figure 6) illustrates how to prepare midwifery students for newborn resuscitation. Becoming competent in newborn resuscitation requires high-quality correct competence, which implies flexibility in learning methods (Friberg, 2002; Friberg et al., 2007; Torgersen, 2015). This is consistent with the notion that learning occurs throughout life (Torgersen, 2015, p. 106) as the result of both formal and informal teaching (Friberg et al., 2007).

A newborn resuscitation course for midwifery students was developed based on the model (Figure 6). Elements included in this course will be unfolded, elaborated, and discussed in relation to the summary of findings and other published studies. In proposing this course, this thesis may contribute to improve educational efficiency, which is considered necessary to achieve the ultimate goal of newborn resuscitation, namely survival (Søreide et al., 2013).

Firstly, this discussion needs to clarify the change in terminology from study 2, which refers to a newborn resuscitation programme, to study 3, which refers to a tailored course. After study 2 was published, it became clear that the word programme was understood differently in English than in Norwegian. Preparation for newborn resuscitation was not meant to be a whole programme but a minor part of midwifery education. Neither was the course intended to confer any ECTS. Instead, the idea was to create a course in newborn resuscitation that would meet the international level requirements for essential midwifery competencies (International Confederation of Midwives, 2019) and address the learning outcomes suggested at the national level (Kunnskapsdepartementet, 2023; Utdannings- og forskningsdepartementet, 2005).

8.1 Preparedness for clinical practice

Although there are still unanswered questions regarding how to best train for clinical practice (Ades & Lee, 2016), simulation-based training was proposed decades ago as an attempt to bridge the gap between textbooks and real-life situations (Halamek et al., 2000). The findings of this thesis draw on this suggestion, offering a model (Figure 6) for preparing for newborn resuscitation tailored to midwifery students.

Participants reported that they did not have sufficient skills in newborn resuscitation, which is also a problem for midwives on an international level (Alhassan et al., 2019; Kassab et al., 2016; Khriesat et al., 2017). They mentioned that simulation training in both technical- and non-technical skills was helpful for acquiring the competence necessary for newborn resuscitation. Participants were also attentive to practising optimal cord clamping during newborn resuscitation, which aligns with the principle of intact cord resuscitation, which has been found to result in higher Apgar scores and better recovery after resuscitation (Andersson et al., 2019). Midwives must decide when to clamp the umbilical cord when a newborn is unexpectedly born non-vigorous after assessing that the baby needs resuscitation (Isacson et al., 2022). The recommendation from WHO from 2014 is to clamp the cord no earlier than 1 minute after birth (World Health Organization, 2014), but recent research suggests waiting at least 3 minutes before clamping the cord (Andersson & Mercer, 2021; Winkler et al., 2022). The latter suggestion of delayed cord clamping practice challenges existing resuscitation guidelines. Evidence for proposed revisions to guidelines for optimal cord clamping (Ekelöf et al., 2022) suggests that the umbilical cord should be kept intact during resuscitation (Fulton et al., 2016; Sæther et al., 2020). This discussion is in line with the recent update of the ERC's top 5 messages to include delayed cord clamping (European Resuscitation Council, 2021; Madar et al., 2021).

While participants did not question how simulation training was organised, they did comment on the frequency which with they received it. The competencies gained through simulation training were described as "fresh". Participants preferred low-dose high-frequency training to prepare for newborn resuscitation as they felt that once-a-year training was too infrequent. Without further practice or refresher training, skills were not maintained when reassessed weeks to months after initial training (Tabangin et al., 2018). One study demonstrated that newborn resuscitation skills were retained 6 months after training (Ashish et al., 2017), while another reported decreased skills 4–6 months after simulation training (Arlington et al., 2017). According to Vadla et al. (2022), frequent training can help practitioners maintain skills and transfer them more effectively to clinical practice. Similarly, an RCT study from a Norwegian setting supports the claim that low-dose high-frequency simulation training improves and maintains newborn ventilation skills (Haynes et al., 2021). Paper 2 reported a request for more training, at least every third month, while workshop discussions included how to train briefly and often enough to keep the skills fresh. In line with these

findings, this thesis identified low-dose high-frequency training as a possible solution to bridge the gap between education and practice.

Moreover, low-dose high-frequency training is included in the "Utstein formula of survival" as key to achieving educational efficiency (Global Resuscitation Alliance, 2021). According to this formula, the next element involved in predicting survival rates is implementation. Therefore, implementing this model of educational efficiency (Figure 6) would address the third element of the Utstein formula (Figure 1) and serve as a contribution to survival (Global Resuscitation Alliance, 2021).

A different way to prepare for clinical practice and reduce performance gaps in newborn resuscitation that remain even after frequent training and simulations is to make every resuscitation an opportunity for learning (Bettinger et al., 2021). Participants emphasised that reflection was a way to prepare for newborn resuscitation. Alternative approaches to reflecting on midwifery care have been requested since it is not possible to simulate all situations (McKenna et al., 2011). Hence, taking Bettinger et al.'s (2021) suggestion to consider every resuscitation a learning experience, I propose that midwifery students audio-record a brief reflection after each newborn resuscitation they attend to be shared with other midwifery students in small groups for feedback, reflections and discussion. This method might allow students to engage more in their own learning (Knowles et al., 2020).

Participants in study 3 also emphasised the importance of tailoring learning to each student's needs and suggested well-known methods like mentorship, supervision, coaching and clinical lecturers, as well as innovative ones like podcasts, videos, photos, e-learning, virtual reality (VR), case scenarios, reflection, and workshops. Supporting the use of innovative methods, a study suggested using the mantra "air air air" when preparing midwives for newborn resuscitation (Becker, Wu, et al., 2022). Taking each individual's learning needs seriously is also a key component of person-centredness (McCormack, Van Dulmen, et al., 2017), which is acknowledged in this thesis by addressing participants' requests for *individual* learning needs in the newborn resuscitation course *tailored* to midwifery students. This is in line with Bettinger et al. (2021), suggesting frequent simulation practice, real-time guidance, and debriefing as strategies for improving the translation of learning into practice.

Newborn resuscitation courses similar to the one presented in this thesis have been used for decades. One example is a simulation-based educational programme from Helping Babies Breathe that aligns with the findings (Figure 6) and aims to increase skills and prepare for newborn resuscitation, although from a resource-limited setting (American Academy of Paediatrics, 2021). Another example is a course for medical professionals focusing on cognitive, technical and behavioural skills in newborn resuscitation through simulation and clinical care (Halamek & Weiner, 2022; Sawyer et al., 2017). Although it does not have a midwifery focus, the latter course simultaneously combines simulation training and clinical practice. Since midwifery education in Norway consists of 50% practice in hospitals and municipalities, this course can serve as inspiration when planning the future implementation of the course proposed herein, helping bridge the gap between midwifery education and clinical practice.

Studies have shown that midwifery students' preparedness and role understanding improved with frequent training over time and training in small groups along with their confidence, knowledge, and skills in newborn resuscitation (Carolan-Olah et al., 2016; Carolan-Olah et al., 2018; Catling et al., 2016). Another study found that midwifery students felt well-prepared for clinical practice after participating in a simulation workshop (Catling et al., 2016). Although these studies are from Australia, the included participants suggested using small groups of no more than six people, similar to the participants in our studies. Small groups have also been suggested for the best learning experience in digital online courses (Haugland et al., 2022). Online teaching might be an option for midwifery students to learn the theory of newborn resuscitation.

Newborn resuscitation is one of the most frequent emergencies in midwifery, and an innovative virtual reality (VR) approach has been reported to have enormous educational potential as a risk-free training method (Williams et al., 2018). VR technology has been tailored to help students gain knowledge and skills for clinical practice in combination with learning activities to achieve learning outcomes (Aasekjær et al., 2023). Although conclusions about the usefulness of this technology were based on the study of anatomy, transferring it to preparation for newborn resuscitation would be interesting as participants were open to new and innovative learning methods.

A review reported that simulation training improved midwifery skills and suggested that simulation be included as an essential part of the midwifery curriculum, although it should not replace clinical

practice (Cooper et al., 2012). Simulation training is already part of the curriculum in all midwifery programmes in Norway (Kunnskapsdepartementet, 2023; Utdannings- og forskningsdepartementet, 2005) as it allows students to develop essential competencies that are difficult to acquire exclusively in their clinical practice (Vermeulen et al., 2017).

Using an assessment instrument as a learning tool has been found to increase awareness of non-technical skills among anaesthesia nursing students and might also be helpful for skills training in newborn resuscitation for midwifery students (Flynn et al., 2022). "NeoNatalie™ Live" is a high-fidelity training device designed for low-dose high-frequency skills practice with self-assessment (Laerdal Global Health, 2023; Vadla et al., 2022). The demonstrated importance of self-assessment is in line with the requests of participants in our studies for increased simulation training in midwifery education to better prepare for clinical practice. Another device used to practice newborn ventilation skills is Monivent®Neo100, which measures the accuracy of ventilation and provides immediate feedback (Monivent, 2023).

Simulation training is also a cost-effective way to prepare for newborn resuscitation (Mbinda & Moshi, 2022). However, simulation training alone is not enough to change midwives' performance in clinical practice. Collaboration among midwives leads to collective self-efficacy in newborn resuscitation (Becker, Becker, et al., 2022). There will always be new ways to prepare for clinical practice; this thesis demonstrates that these new methods can be implemented through low-dose high-frequency training.

8.2 Preparedness through lifelong learning

According to participants in this study, mastering the competencies necessary to perform newborn resuscitation requires a lifelong learning process. However, every student learns differently. The studies showed that individualised learning for each student was crucial, beginning during midwifery education and continuing throughout a midwife's career.

The European Resuscitation Council (ERC) provided educational material along with its new guidelines in 2021 (European Resuscitation Council, 2021), which guided the 2021 update of the Norwegian guidelines for newborn resuscitation (Norsk resuscitasjonsråd, 2021). The top 5 messages in this educational material (Figure 3), in particular, "simple steps to support breathing"

(European Resuscitation Council, 2021), correspond to the model preparing midwifery students for newborn resuscitation presented in Figure 6. Similar to the top 5 messages of the ERC's material, the model developed in this thesis (Figure 6) proposes a simplified midwifery focus. It is noteworthy that the participants in our studies requested the same simplified guidance to newborn resuscitation that the top experts highlighted in the ERC guidelines (European Resuscitation Council, 2021; Figure 3). Both the model in Figure 6 and the ERC's material refers to a lifelong learning process, which suggests that educational efficiency is as important throughout a midwife's career as it is during midwifery education to achieve the goal of survival (Søreide et al., 2013).

The model (Figure 6) proposed in this thesis was developed to address the overall aim of preparing midwifery students for newborn resuscitation and is based on the three included studies. Although it is tailored to midwifery students' needs, the model allows for individual learning through innovative methods. A similar model for teaching the unforeseen shows parallel ways to prepare for unforeseen events, including scenarios, simulations and skills training (Torgersen, 2015, p. 330). This model consists of three main pedagogical components – "familiarity, notification and escalation" – and includes planning, conducting and evaluation to improve learning (Torgersen, 2015, p. 331). Contrary to Figure 6, the model from Torgersen et al. (2015) is complex and based on the pedagogy of the unforeseen; therefore, it naturally takes time to fully understand its potential. On the other hand, Figure 6 presents a less complex yet helpful model tailored to the needs of midwifery students to prepare them for newborn resuscitation.

Identifying, interpreting, and assessing early signals in unforeseen situations might make it possible to prevent problems *before* they occur (Torgersen, 2015, p. 323). These early signals are key in Torgersen et al.'s (2015) description of learning outcomes and when planning simulation training to prepare for unforeseen events. To become competent in newborn resuscitation, midwifery students need to know what competencies and learning outcomes they are expected to achieve; this information is suggested to be provided in Norwegian regulatory guidelines (Kunnskapsdepartementet, 2023; Regjeringen, 2005). There are also international standards of essential midwifery competencies (International Confederation of Midwives, 2019).

Regarding learning outcomes, the empirical material highlighted the competencies that must be mastered when performing newborn resuscitation. Although they were not asked to describe

learning outcomes directly, participants reflected on and described their clinical experiences regarding midwifery competencies for newborn resuscitation. Their ideas about what competencies are essential to care for newborn babies were in line with international recommendations (International Confederation of Midwives, 2019). However, their ideas differed in terms of their specificity, and they emphasised the importance of contextual factors. The competencies suggested in existing international and national guidelines (International Confederation of Midwives, 2019; Utdannings- og forskningsdepartementet, 2005) are in line with participants' descriptions of competencies midwifery students are expected to acquire during their midwifery education. A proposal of a revised version of learning outcomes for midwifery students preparing for newborn resuscitation based on their input is presented in Table 7. Different levels of competence are described corresponding to different midwifery degree levels. As the current Norwegian regulations for midwifery education date from 2005, a public hearing was held to collect feedback for revisions, and upgraded learning outcomes in midwifery education have been proposed (Kunnskapsdepartementet, 2023). Although the document has not been finalized, the proposed competencies are at an "advanced" level corresponding to the master's level midwifery education offered in Norway. Proposed learning outcomes from the empirical material are indicated in italics in Table 7, while suggested midwifery competencies from ICM (International Confederation of Midwives, 2019) are marked with *, competencies from the national curriculum and regulations for midwifery education (Utdannings- og forskningsdepartementet, 2005) are marked with ¤, and suggested revised proposals for Norwegian midwifery education (Kunnskapsdepartementet, 2023) are marked with #.

Table 7

Learning outcomes for midwifery students in newborn resuscitation

Knowledge
- Normal transition to an extra-uterine environment *   - Scoring systems to assess newborn status *   - Signs indicating need for immediate actions to assist transition *   - Appearance and behaviour of healthy newborn infants *   - The newborn baby's physiology and pathology ¤   - Care and assessment of newborn babies ¤   - Advanced knowledge of anatomy, physiology and psychology related to pregnancy, delivery and post-partum of unborn/newborn babies #

- Advanced knowledge of the most common pathological diagnoses of unborn/newborn babies during pregnancy, delivery and post-partum #
- *Understanding of the burden of responsibility related to newborn resuscitation*
- *Understanding of how to act professionally at all times*

Skills

- Use standardised methods to assess newborn condition in the first minutes of life (Apgar or other); refer if needed *
- Interventions to establish breathing and circulation *
- Assess, observe and provide care for newborn babies, including pre-and post-mature babies, small for gestational age, and sick newborns ¤
- Can analyse and use relevant methods to observe, assess, consider and independently initiate and document measurements within midwifery #
- Can analyse and use digital medical-technical tools #
- Can use relevant lifesaving methods, including newborn resuscitation #
- *Initiate actions to establish breathing according to national guidelines*
- *Ability to act and focus correctly during "the golden minute"*
- *Support the natural transition and ensure optimal cord clamping*
- *Demonstrate practical and theoretical skills in simulation training*
- *Communicate clearly, being aware of situational awareness and tacit knowledge*
- *Contribute to creating a safe culture by empathic presence*
- *Reflect on emotional reactions in debriefing*
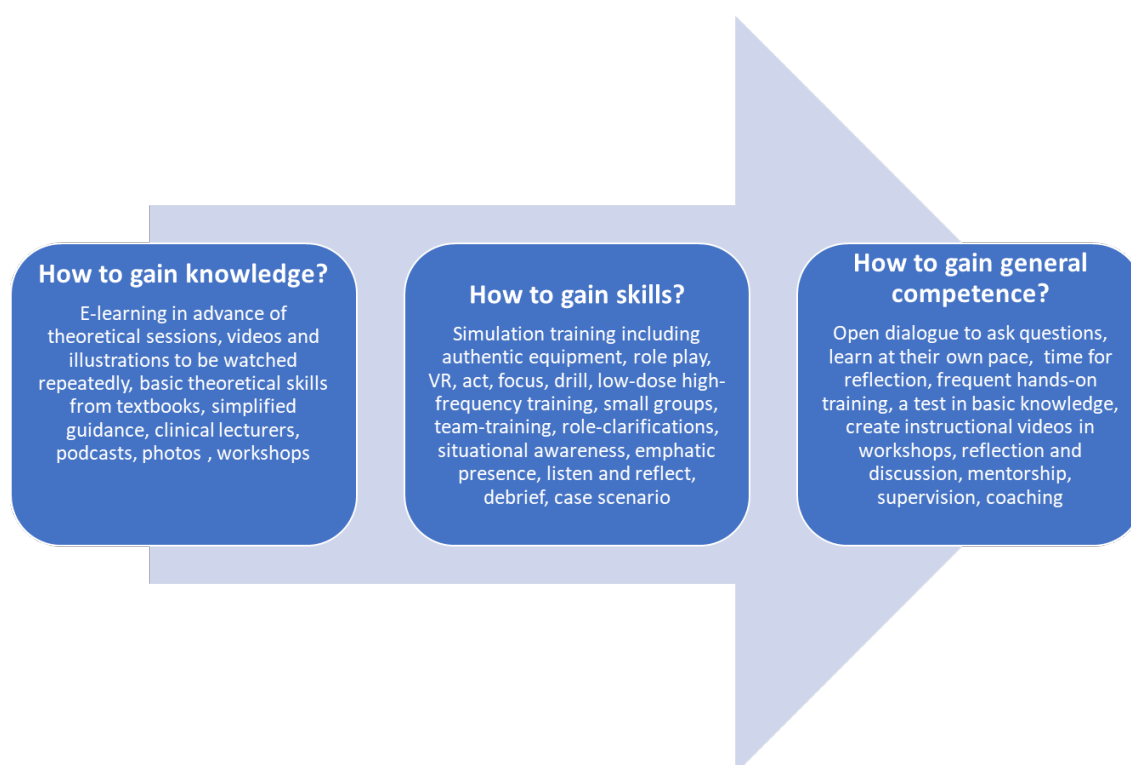- *Handle stress, even when feeling vulnerable*

General competency

- Institute actions to establish and support breathing and oxygenation, refer for continuing treatment as needed *
- Gaining competence in newborn resuscitation ¤
- Can apply knowledge and skills for an independent responsibility for follow-up of the newborn baby #
- *Develop an individual strategy for low-dose high-frequency training as a weekly training*
- *Understand the importance of correct assessments within a short time interval in the first minute of a newborn baby's life*
- *Focus on the midwifery competencies in national guidelines*
- *Be able to acknowledge mentorship, supervision and coaching*
- *Use innovative methods like podcasts, videos, photos, e-learning, virtual reality (VR), and scenarios for lifelong learning*
- *Be willing to engage in reflection and discussion to develop knowledge*

The learning outcomes described in Table 7 should be achieved upon graduation from midwifery education. However, methods and tools must be implemented for students to achieve learning outcomes. Figure 7 outlines proposed learning activities based on participants' suggestions for

achieving the competencies and learning outcomes listed in Table 7. These activities are meant to support midwifery students in choosing their individual methods when preparing for newborn resuscitation *before* participating in simulation training. *Acquisition* of knowledge can therefore be achieved through individual preparation, while *participation* can be achieved through engagement, reflection and discussion, which is essential when meeting in small groups for training (Sfard, 1998).

Figure 7

Learning activities from the empirical material

How to gain knowledge?
E-learning in advance of theoretical sessions, videos and illustrations to be watched repeatedly, basic theoretical skills from textbooks, simplified guidance, clinical lecturers, podcasts, photos , workshops

How to gain skills?
Simulation training including authentic equipment, role play, VR, act, focus, drill, low-dose high-frequency training, small groups, team-training, role-clarifications, situational awareness, emphatic presence, listen and reflect, debrief, case scenario

How to gain general competence?
Open dialogue to ask questions, learn at their own pace, time for reflection, frequent hands-on training, a test in basic knowledge, create instructional videos in workshops, reflection and discussion, mentorship, supervision, coaching

Although the learning activities in Figure 7 are based on the empirical material, they are also in line with the ICM's essential competencies for midwifery practice and Norwegian regulations for midwifery education (International Confederation of Midwives, 2019; Kunnskapsdepartementet, 2023). Accordingly, that might help midwifery students achieve learning outcomes during their midwifery education and continue to refresh their competencies throughout their midwifery careers, which is in line with the finding that lifelong learning is vital for competent newborn resuscitation.

8.3 Preparedness in a culture of psychological safety

A culture of psychological safety is described as a prerequisite by midwives and midwifery students when sharing emotional reactions in simulation training and clinical practice related to unforeseen events. Torgersen (2015) points out that there is always something new and unpredictable to learn in simulation training. Friberg (2007) supports pedagogical creativity and didactic openness to new methods of learning how to be prepared. This chapter will show that this kind of culture is as important in clinical practice as it is in simulation training, elaborating on both perspectives.

Participants described a need for support and confirmation in simulation training and clinical practice. The model for teaching the unforeseen similarly foregrounds a culture of psychological safety (Torgersen, 2015, p. 330) and emphasises the importance of learning and being flexible, in addition to relationships and competence, for creating a safer culture (Torgersen, 2015). The simulation facilitator plays an important role in creating a safe learning environment in which everyone can flourish (Brown & McCormack, 2016). Moreover, a safe simulation environment is important for midwifery students to become confident and prepare for their clinical practice (Lendahls & Oscarsson, 2017). Simulation training facilitates the connection between theory and practice (Lendahls & Oscarsson, 2017).

Paper 2 clearly recommended that midwifery students participate in in-situ resuscitation training during their clinical practice to learn how to cooperate. Moreover, in-situ simulation training of maternity staff has been reported to improve technical skills and teamwork (Rubio-Gurung et al., 2014), which also helps create a culture of psychological safety. Midwifery workplace culture has been described as consisting of collaborative work; support, respect and understanding at work; a teamwork environment; and opportunities for further education, all of which are important to midwives (Catling et al., 2022). There are numerous reasons for poor workplace culture, including limited resources, poor communication, time pressure, and a lack of leadership; however, inadequate staffing levels and poor management leaves midwives feeling disempowered (Catling & Rossiter, 2020). Therefore, in-situ training might allow everyone to engage by creating a psychological safety culture. According to the empirical material, the culture at maternity wards should be 100% safe.

Participants requested simulation training in a supportive culture where they could learn from their mistakes by training and failing. According to Torgersen et al. (2015), one should learn from one's mistakes rather than looking for scapegoats, which is in line with Wrammert (2017), who emphasises that blaming others for one's own mistakes should be avoided. Although learning from one's own mistakes has been suggested to be helpful, included midwives still report being blamed, scrutinized, and scapegoated. These experiences contribute to feelings of responsibility, shame, and guilt (Mesel, 2014, pp. 195-208), creating the opposite of a culture of psychological safety. In contrast to the lack of psychological safety described by the midwives in study 1, a case study from a UK delivery ward described the results of introducing a new policy of "blame-free reporting" where nobody was blamed for reporting what they saw or experienced in order to create psychological safety and enable students to learn from their experiences (Edmondson et al., 2001). However, such a culture is only possible through teamwork and leadership support (Edmondson & Lei, 2014). Participants from included studies described a lack of support from both leaders and colleagues and were even excluded from participating in debriefings, which they described as terrible.

Midwives described the burden of being responsible for life and death when identifying the need for and initiating newborn resuscitation. While midwives felt like experts during normal births, during newborn resuscitations, they felt like novices and feared being incompetent. They emphasised how a culture of psychological safety could help them prepare for newborn resuscitation, which is in line with the observation that "no-blame no-shame" culture is helpful when learning (Søreide et al., 2013, p. 1490).

8.4 Preparedness for emotional reactions

The findings from study 1 highlight the importance of acknowledging emotional reactions related to newborn resuscitation. Recently, there has been an increased interest in emotional reactions in simulation training (LeBlanc & Posner, 2022), although not yet in reactions to newborn resuscitation among midwives. However, it is also relevant to consider human factors and psychology when designing newborn resuscitation training to gain and retain competence (Global Resuscitation Alliance, 2021, p. 1489).

Participants from study 1 described negative emotions and reactions such as feeling sick, panicking, and blacking out, which they illustrated using metaphors. In describing their experiences, they used metaphors related to how they perceived unforeseen events (Lakoff & Johnson, 2003). For example, during the chaos, one midwife kept her focus using tunnel vision, while another felt like she had fallen into a black hole when she thought she had lost a baby. The metaphors used to express their emotions, like when a midwife described feeling as though time was crawling while waiting for assistance. Most metaphors described midwives' bodily reactions. Although all metaphors reflected powerful and illustrative expressions of their experiences, these experiences seemed to be difficult to describe by using simple words. Similarly, other research has noted using metaphors to describe extreme and critical events related to the unforeseen (Herberg & Torgersen, 2021). A midwife described her understanding of the complexity of the midwifery role in newborn resuscitation through the following metaphor:

> *"I try to behave like a duck when I receive unexpected non-breathing newborns . . . ducks swim quietly and [glide along] the surface of the water, while their legs [beat furiously like] drumsticks below the surface . . . the parents need you to be calm even if your heart is beating inside painfully…"* (8).

For midwives to improve their own professional lives, they need to understand their emotions while they are working (Hunter, 2001). Hunter (2001) identified a lack of research in this field to inform midwifery education and practice. There is a gap in knowledge that this thesis attempts to fill. Midwives' emotional well-being is strongly influenced by several aspects of their working environment, particularly short-staffing, which appears to contribute to poor working conditions (Cramer & Hunter, 2019; Hansson et al., 2022). Other work variables also seem to affect the emotional impact of being involved in challenging or traumatic clinical situations (Cramer & Hunter, 2019).

Participants described their emotional reactions after newborn resuscitation as an adrenaline rush and shared that they sometimes felt shaky for hours afterwards. Participants in study 1 emphasised the burden of balancing life and death and acknowledged their emotional reactions related to

newborn resuscitation. They expressed the need to reflect on these emotions and suggested more time be devoted to reflection in debriefing. However, even though in-situ training in a clinical setting is important, a culture of psychological safety should start with midwifery education, and students should feel comfortable sharing their emotional reactions. Therefore, students' experiences might be transferrable to simulation training in midwifery education. Simulation training includes developing resilience in facing the unforeseen that can enhance students' performance (Herberg & Torgersen, 2021). Resilience allows midwives to remain in their profession after experiencing unforeseen events that affect their emotions. In the empirical material, these events were described as "make it or break it", which I interpret as the midwife can either handle the situation or quit the profession. Midwives must learn resilience by accessing support, developing self-awareness, self-protection and building self-awareness, and identifying their professional identity (Hunter & Warren, 2014). Along with midwives who self-reported a disability, younger and more recently qualified midwives recorded the highest levels of burnout, stress, anxiety and depression (Hunter et al., 2019). However, stress levels were not moderated by resilience, and resilience did not reduce burnout; however, resilience may help students persist in their profession rather than quit (Eaves & Payne, 2019). Therefore, a proposal related to this discussion is to increase the focus on strengthening resilience competence in the midwifery education curriculum.

During simulation training, students experience emotional reactions, which can impact their attention, actions, recall of what they learned in training, judgment and problem-solving approaches, but also their motivation for learning (LeBlanc & Posner, 2022). Nevertheless, the anxiety levels of midwifery students in simulation training remained static even after receiving newborn resuscitation training (Bull & Sweet, 2015). Experienced midwives have also reported feeling anxious and scared during resuscitation resulting in poor resuscitation performance (Moshiro et al., 2018).

In a study where midwifery students were interrupted during classroom lessons to perform emergency obstetric simulations in given roles through real-time simulation, participants reported experiencing emotions and stress responses similar to those midwives experience in real-life resuscitation situations. Midwifery educators should address these when facilitating real-time simulations (Deegan & Terry, 2013). This finding underscores the importance of the facilitator's role

in simulation training and the challenges facilitators face. Educators need to understand how emotions affect individuals' reactions to their environment to be able to better support simulation education (LeBlanc & Posner, 2022). Addressing emotions in debriefing impacts performance and learning (LeBlanc & Posner, 2022). These findings are in line with the emphasis included midwives placed on emotional reactions and their suggestion to focus on these reactions in debriefing.

Acknowledging emotional reactions might improve student learning during simulation training in midwifery education. Furthermore, acknowledging emotional reactions might help midwives remain in their profession after unforeseen events by increasing their resilience.

8.5 Preparedness related to a midwifery focus

The role of midwives in newborn resuscitation has not been sufficiently emphasised in previously published literature. However, there is no doubt that how midwives handle situations that arise in the delivery room is of the utmost importance, especially during the first "golden" minute after birth (Saugstad, 2015), when they play an essential role in identifying the need for newborn resuscitation (Skåre et al., 2015).

The term UN-0 refers to the moment an unforeseen event occurs (Torgersen, 2015, p. 50) and corresponds to the time interval of "the golden minute" in the context of delivery. One of the challenges reported during delivery room resuscitations was that all tasks took longer than the guidelines recommended to complete (McCarthy et al., 2013). Similar findings were reported in a pre-hospital setting of paramedics undergoing training in newborn resuscitation, where participants did not perform the recommended actions at the right time (Trang Kieu et al., 2021). In newborn resuscitation, proper treatment is based on correct identification of the need for resuscitation within a short time interval. Thus, midwives' ability to distinguish normality from pathology is crucial for preventing incorrect assessment and treatment.
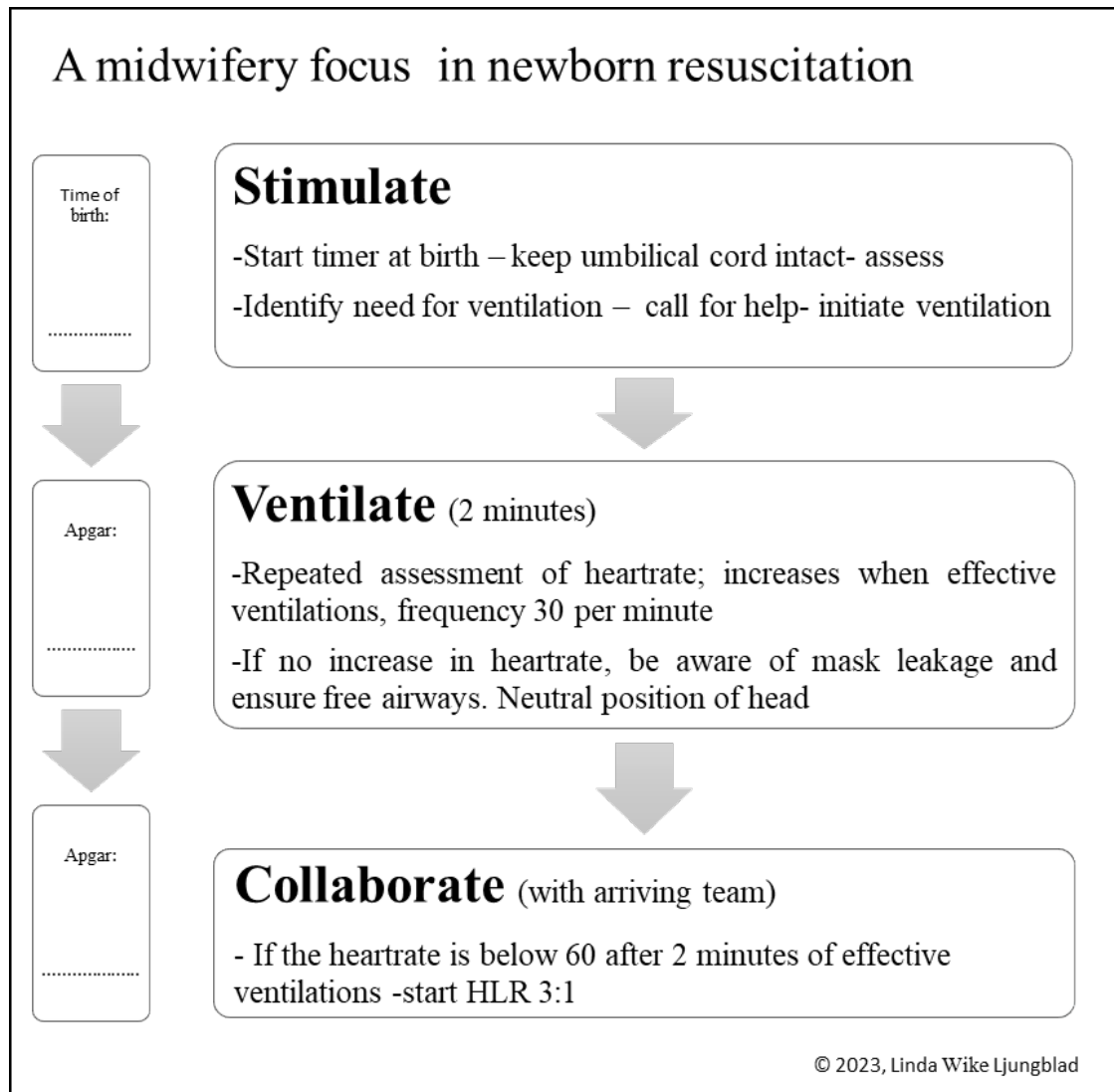
Participants described the midwife's role in newborn resuscitation as complex and extremely stressful due to the need to perform multiple tasks in a limited amount of time. Accordingly, I propose that a discussion be initiated about expanding the time interval of "the golden minute" in guidelines to "the golden minutes". "The golden minute" has been reported to be perceived as shorter than it is (Trevisanuto et al., 2016), which is in line with the participants' experience in this

thesis. A protocol describes plans to look at the possibility of using artificial intelligence (AI) to evaluate the accuracy of the assessments performed during this time interval (Engan et al., 2023). Participants in included studies challenged existing guidelines related to this time interval, which is in line with other studies challenging current algorithms from both low- and high-resource settings (Rettedal et al., 2021; Rettedal et al., 2022).

The existing guidelines are designed for all professionals participating in newborn resuscitation and apply primarily to situations where resuscitation is expected to be necessary. However, the experienced midwives in this study expressed the need for guidelines with a midwifery focus to help them correctly identify the need for and initiate newborn resuscitation in this time interval when not expecting to perform resuscitation. Although international and national guidelines focus on the first 60 seconds in newborn resuscitation to initiate appropriate actions (Madar et al., 2021; Norsk resuscitasjonsråd, 2021), initiating ventilation within the first minute has been reported to be challenging (Vadla et al., 2022). In fact, the time intervals cited in international guidelines are built on expert consensus and not on data from research (McCarthy et al., 2013). Therefore, I argue that this time interval should be reconsidered based on midwives' perspectives because midwives are the ones who provide care when a baby is born not breathing unexpectedly. When this happens, midwives must handle parallel tasks simultaneously in this critical time interval. It is unclear whether following the guidelines as written is beneficial if providers are consistently struggling to meet them (Branche et al., 2020). To address participants' requests for midwifery focused guidelines to handle these complex and simultaneous challenges, I propose "stimulate-ventilate-collaborate: an educational guide to preparing midwifery students for newborn resuscitation" (Figure 8).

Figure 8

Stimulate, ventilate, collaborate – an educational guide to preparing midwifery students for newborn resuscitation

A midwifery focus in newborn resuscitation

Time of birth:

....

Stimulate

-Start timer at birth – keep umbilical cord intact- assess

-Identify need for ventilation – call for help- initiate ventilation

Apgar:

....

Ventilate (2 minutes)

-Repeated assessment of heartrate; increases when effective ventilations, frequency 30 per minute

-If no increase in heartrate, be aware of mask leakage and ensure free airways. Neutral position of head

Apgar:

....

Collaborate (with arriving team)

- If the heartrate is below 60 after 2 minutes of effective ventilations -start HLR 3:1

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This guide was drafted based on the three included studies to address the request for a simplified guide to newborn resuscitation for midwifery students (Figure 8). It draws on the simple steps listed in the top 5 messages (Figure 3) of the updated version of international newborn resuscitation guidelines (European Resuscitation Council, 2021).

The term "practical guidance" is used in the findings for study 3; however, I realized that "guidance" might be confused with "guidelines" or "algorithms," neither of which is an accurate characterisation of the findings of this thesis. Therefore, the word "guide" was chosen to clarify the focus of this figure, which is offering "an educational guide to newborn resuscitation for midwifery

students". This focus is in line with the "Utstein formula of survival" (Figure 1), of which educational efficiency is a critical component (Søreide et al., 2013).

In addition to addressing the concerns raised by participants, the educational guide (Figure 8) responds to another study that calls for clarifying guidelines and responsibilities in newborn resuscitation (albeit for nurse midwives) (Wrammert et al., 2017). Although it does not address any of the aims of the three included studies, the educational guide shown in Figure 8 relates to this thesis's findings and overall aim, namely "preparing midwifery students for newborn resuscitation" (Figure 6). It supplements national guidelines for newborn resuscitation, which according to participants, lack a midwifery focus. The guide is intended as a simplification for educational use to support students and to help them focus when learning how to prepare for newborn resuscitation.

The proposed educational guide (Figure 8) does not challenge existing newborn resuscitation guidelines. Nevertheless, it may inspire a new area of focus in newborn resuscitation, which must be tested on a small scale before attempting large-scale implementation.

8.6 A preliminary newborn resuscitation course for midwifery students

To summarise this discussion, I would like to present my proposed integration of this thesis's findings (Figure 6) into a preliminary newborn resuscitation course for midwifery students (Table 8). In this course, all aspects of preparing for newborn resuscitation presented in Figure 6 can be practised to achieve essential midwifery competencies. Learning outcomes (Table 7) can be achieved through learning activities (Figure 7) using the educational guide (Figure 8), which moreover can be applied throughout the two-year midwifery programme. The findings (Figure 6) are in line with a recent study that points to cognitive, technical and behavioural skills as key for training healthcare professionals, determining learning objectives and using assessment tools (Halamek & Weiner, 2022). Although the latter study refers to "state-of-the-art training in newborn resuscitation", progress has been slow in terms of training in cognitive, technical, and behavioural skills and focusing on educational strategies applied to teaching newborn resuscitation since the Neonatal Resuscitation Program (NRP) was developed as the national standard in 1987 (Halamek & Weiner, 2022; Sawyer et al., 2017). Moreover, these studies do not focus on how midwifery students in particular prepare for newborn resuscitation. On the other hand, Sawyer (2017) points

out that limited attention is given to the science of education in newborn resuscitation. Still, training methodologies and technologies have improved to meet the needs of healthcare professionals (Halamek & Weiner, 2022). In the same manner, I will argue for the need for a course in newborn resuscitation tailored to midwifery students' needs. The findings in this thesis highlight the complexity of midwives' role in newborn resuscitation within a short time interval, which is included in the tailored course.

According to included participants and Sfard (1998), it is vital for students to gain knowledge individually before meeting in small groups and participating in workshops, discussions and reflections. Thus, the following course is designed for midwifery students to gain theoretical knowledge individually before introducing the possibilities for repetition to meet individual learning needs. Moreover, low-fidelity simulation builds knowledge, while mid- and high-fidelity simulation build competence, performance and action (Wolters Kluwer, 2023). During midwifery education, only low-fidelity simulation and skills training are proposed as the primary focus of the first year; however, students are expected to be competent to act and perform newborn resuscitation when graduating from midwifery education.

When designing the newborn resuscitation course (Table 8) for midwifery students, I was inspired by related elements of two didactic relational models (Bjørndal & Lieberg, 1978, p. 135; Torgersen, 2015, p. 330). However, this course is not formed in the diamond structure shape but includes tables and figures already presented throughout this discussion.

Table 8

A preliminary newborn resuscitation course for midwifery students

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1 **Introduction** of the course (video-recorded lesson, 30 minutes).

2 **Theoretical education** (video-recorded lesson, 45 minutes x 2). Followed by a "live" session.

3 **Participation** in simulation training

4 **Regular digital meetings** (x 4 during midwifery education; 45 minutes).

5 **Repeated training** individually to be continued throughout midwifery education.

The course emphasises preparedness through a midwifery focus (Friberg et al., 2007). It is designed to meet individual learning needs, including repetition and various innovative learning methods. Moreover, it includes digital and physical participation components based on engagement and motivation to learn newborn resuscitation in a culture of psychological safety. Learning the competencies necessary to perform newborn resuscitation starts in midwifery education but continues throughout a midwife's career.

The **introduction** of the course will be video-recorded and include a presentation of the course, a definition of newborn resuscitation, and a presentation of the research on which the course is based. Learning outcomes and learning activities will also be presented.

The **theoretical** component of the course will also be video-recorded. It will have a midwifery focus in its presentation of how to identify and initiate newborn resuscitation, concentrating on stimulation, effective ventilation (Figure 8), being aware of mask leakage and head position, and supporting the natural transition to extrauterine life, including keeping the umbilical cord intact during newborn resuscitation. Knowledge of assessment and Apgar scoring is essential.

Participation in simulation training in small groups consisting of 4–6 midwifery students at their own university or university college is vital for students to gain practical hands-on knowledge after individually acquiring theoretical knowledge. There must be an effort to create a culture of psychological safety to ensure the best learning conditions for the students. Simulation training should progress from low to high-fidelity during the two-year midwifery programme. Hence, two scenarios will be presented to support the learning. The first scenario is designed to teach practical skills, while the second scenario addresses competencies related to complex situations that a graduated midwife must handle when attending a birth where newborn resuscitation is required.

Regular digital meetings once every semester during midwifery education, for a total of four meetings, are suggested. All students should come with one reflection or question and make sure to receive feedback or an answer during this session. Relevant articles, podcasts, photos and videos will be shared via students' preferred digital platform for further learning.

Repeated training is expected to be continued individually throughout midwifery education. Since newborn resuscitation is one of the most frequent emergencies midwives encounter, midwifery

students should practice their resuscitation skills repeatedly to achieve low-dose high-frequency training (Haynes et al., 2021). Training once a month is proposed as an appropriate frequency to maintain these skills (Vadla et al., 2022). This level of training might also enhance self-efficacy in dealing with unforeseen events in preparing for clinical practice (Torgersen, 2015). During the theoretical part of midwifery education, such practice might be initiated and scheduled as training at the end of a theoretical classroom session with students making their own checklist for individualised follow-up training. Each student is advised to put a reminder in their calendar for their brief monthly training, giving them the responsibility for their own learning, including when they are in clinical practice (Knowles et al., 2020). Although it is suggested that training starts during the theoretical component of midwifery education, it can also bridge the gap to clinical practice and be used for in-situ simulations and even real-life resuscitations.

Nevertheless, skills training should also be organised during the clinical practice component of midwifery education. Weekly in-situ training in the clinics has shown sustainable improvements after three years (Theilen et al., 2017); therefore, it might be an idea to include midwifery students for such training during their clinical practice period. It is suggested that they prepare using individually chosen learning methods and repeat training until they know the algorithm "by heart".

Skills training to prepare midwifery students for newborn resuscitation, illustrated in Table 9, was designed according to participants' requests. Small groups (4–6 persons) are recommended to ensure everyone receives enough hands-on training while feeling safe. First-year midwifery students may be able to foster a culture of psychological safety in small groups (Brazil et al., 2019), while second-year students may be ready to change groups to better prepare for reality. Increasing fidelity in a progression from the first to the second year is also suggested since real-life situations involve interactions with different colleagues when unforeseen events occur. During skills training, the goal is to achieve practical competence and integrate it as a reflex. Therefore, clear learning outcomes are important. In conjunction with this course, a pilot project of a simulation programme called SimBegin has been set up in which first-year students in midwifery learn how to carry out student-run simulations (SAFER, 2023; Universitetet i Stavanger, 2023). Nevertheless, using a scenario helps create realism and a culture of psychological safety for students when training for unforeseen events, in line with Torgersen et al. (2015).

Table 9

Skills training preparing midwifery students for newborn resuscitation

Group	Midwifery students, 1st year
Theme	Skills training in newborn resuscitation
Focus	Identify and initiate effective ventilation within a short time interval
Learning outcome	Interventions to establish breathing
Time	Preparation: 5 minutes Briefing: 10 minutes Simulation: 5 minutes Debriefing: 25 minutes
Prerequisites	Theoretical knowledge about newborn resuscitation
Literature	National guidelines (NRR)
Roles for participation	4-6 midwifery students; 2 students practice skills training at the time
Preparation of manikin and environment	Baby manikin, mask, bag, asphyxia table, Apgar timer, stethoscope, towels for stimulation, a poster of national algorithm
Description of the scenario	Woman, 29 years old, healthy mother with a healthy pregnancy 39+5, no risk factors identified, first baby (P0), spontaneous start of labour when the water broke, clear amniotic fluid, normal progress during labour, the woman had been eating and drinking regularly during the day, she was sleeping between contractions periodically, relaxing music in the background, the light was dimmed and created a cosy atmosphere, her husband massaged her back during contractions, warm water and acupuncture were used to control the pain, the woman seemed to be comfortable when breathing through her contractions. The heart rate of the baby was considered normal during and after contractions. When the baby was born, the baby was unexpectedly pale, did not cry or breathe initially, and had poor tone. The situation must be assessed and interventions initiated.
Reflections for debriefing	Focus on identifying the need for resuscitation and the performance of technical ventilation skills.

Since newborn resuscitation is not exclusively about technical skills but rather about developing confidence and competence to handle complex situations, high-fidelity simulation training might be an appropriate method to train midwifery students. "See one, do one, teach one" is reported to be an effective approach to teaching and learning skills in small groups (Giacomino et al., 2020; Kotsis & Chung, 2013). Deliberate practice requires students to engage in their own skills acquisition during

frequent training (Ericsson, 2008; Ericsson et al., 2009). However, shaping a culture of psychological safety in simulation training also seems to be essential (Brazil et al., 2019), which is in line with the findings of this thesis.

According to Figure 6 as the summary of findings, "preparedness to clinical practice" and "preparedness related to a midwifery focus" support high-fidelity simulation training to achieve the competence necessary for dealing with the complexity of newborn resuscitation. In order to make training more realistic, manikins and a scenario of delivery including sound effects, are proposed. The sound of a heart rate dropping might effectively illustrate a midwife's stressful situation when identifying the need for and initiating newborn resuscitation. Accordingly, in the second year of midwifery education, practical skills can be integrated into the complex situations practising midwives are expected to handle within "the golden minute". Therefore, the scenario suggested in Table 9 will be elaborated further to include more details and challenges presented in Table 10.

The scenario in Table 10 includes emotional reactions related to the complex situation midwives face during delivery when the woman in labour needs information and her partner needs care. The midwife is responsible for all of these aspects of care and must prioritise and delegate tasks to the assistant nurse in the delivery room. The stress caused by this scenario and how to handle it are the focus in this scenario. The stress in this situation is related to possible unforeseen events (Torgersen, 2015) and can increase for various reasons, such as the mask dropping to the floor when starting ventilation. The midwife's role in these situations is to take care of everyone and everything related to the delivery, be a good leader, act quickly, and have an overview of the situation. The scenario thus focuses on preparing midwifery students for situations that cannot be described beforehand and on handling the stress involved in dealing with unforeseen events (Torgersen, 2015). It represents continuing learning from the first-year scenario (Table 9), including team training and a progression from low to high-fidelity simulation. However, midwifery students must also know that the pedagogical debriefing method after simulation training is about learning and reflection.

Table 10

A scenario of the midwife's complex role in newborn resuscitation

Group	Midwifery students, 2nd year
Theme	The midwife's complex role in newborn resuscitation
Learning outcomes	Can analyse and use relevant methods to observe, assess, consider and independently initiate and document measurements with a midwifery focus #
Time	Preparation: 5 minutes Briefing: 10 minutes Simulation: 5 minutes Debriefing: 25 minutes
Prerequisites	Theoretical knowledge about newborn resuscitation, the national algorithm and knowledge about simulation training
Literature	National guidelines for newborn resuscitation (NRR)
Roles for participation	4-6 midwifery students; 1 is responsible midwife, 1 is assisting nurse, 1 is midwife number 2, 1 is documenting, 2 are observing
Preparation of manikin and environment	Baby manikin, mask, bag, asphyxia table, Apgar timer, stethoscope, towels for stimulation, a poster of the national algorithm, sound of low heart rate
Description of the scenario	Woman, 29 years old, healthy mother with a healthy pregnancy 39+5, no risk factors identified, first baby (P0), spontaneous start of labour when the water broke, clear amniotic fluid, normal progress during labour, the woman had been eating and drinking regularly during the day, she was sleeping between contractions periodically, relaxing music in the background, the light was dimmed and created a cosy atmosphere, her husband massaged her back during contractions, warm water and acupuncture was used to control the pain, the woman seemed to be comfortable when breathing through her contractions. The heart rate of the baby was considered normal during and after contractions. Suddenly, the heart rate dropped to around 60 beats per minute and did not increase before the baby was born on the next contraction. The baby was unexpectedly pale, did not initially cry or breathe, and had poor tone. The situation must be assessed and interventions initiated. Equipment must be brought into the delivery room to keep the umbilical cord intact while conducting interventions. Help must be called for, and tasks delegated. The parents must be given information about the situation. The partner might need to sit down and even be scared or angry. Bleeding after delivery and placenta must be observed and managed. The woman might be in pain and shock. Brief information about the situation regarding the delivery must be given to the team that is called to help. Since all these tasks occur simultaneously within a short interval, notes, including the exact time, are important for documentation.

Debriefing; challenges to be reflected on	**A midwifery focus:** Was I aware of how much time had passed? Did I act quickly enough? Did I assess the situation correctly? Did I manage all necessary tasks within a short time interval? Did I manage to be one step ahead? Was I able to remain calm and manage my stress? Did I ventilate correctly? Was I a clear leader in this situation? How can I use this situation as learning for future events? **The complexity:** How did I manage to appear calm and cool while I was high on adrenaline? How did it feel? **Emotional reactions:** Did I ignore some signs? Did I do something wrong? Did I feel guilt or shame, or feel scrutinised or scapegoated? Was I scared or stressed? What about adrenaline? **Culture of psychological safety:** Did the parents feel safe, and did they trust me? Did the team feel safe when performing newborn resuscitation? Was information delivered in a friendly manner? Did all team members feel comfortable asking questions or speaking up? Did all midwifery students experience a culture of psychological safety? **Communication:** Spoken and unspoken communication: Did I perceive every message given to me? How was information provided to the partner? **Delegation of tasks:** Quick and friendly: Who cared for the parents? Did the parents receive continuous information? How did non-technical skills appear? **Team training:** How did I interact with other professionals? Any challenges? Was a brief report given to the team upon arrival? Did everyone know the equipment well enough? **Experiences:** How did team-members and parents experience the situation? Was everyone given the possibility to talk through the situation?

When newborn resuscitation is required, it is important to be one step ahead and to have planned for what can happen. Midwives must be trained to provide parents with information about what happened and to take care of them. They also must learn how to manage spoken and unspoken communication in the delivery room and remain aware so they can catch any changes by having an overview of the situation at all times. Students must prepare for unforeseen events happening like "lightning from a clear blue sky" (Friberg et al., 2007; Torgersen, 2015).

After the first year of midwifery education, students advance to training in technical skills; in the second year, the focus is on handling complex situations, including non-technical skills and situational awareness (Flynn et al., 2022). These situations include contextual factors that must be described in detail for midwifery students in their second year of education to illustrate the progression in their learning throughout midwifery education.

A newly graduated midwife is expected to act professionally when unforeseen events occur at delivery, although preparing fully for such events is challenging. The duck metaphor shared by one midwife in paper 1 is an apt description of how a midwife is expected to behave when performing newborn resuscitation.

9 Conclusion

This thesis offers new insight into midwives' role in newborn resuscitation as complex, requiring the ability to manage multiple challenges simultaneously. Midwives are the professionals who attend most deliveries in Norway. They are the ones who most frequently identify the need for and initiate newborn resuscitation within the short interval after birth, globally referred to as "the golden minute". Midwives stimulate, ventilate and collaborate.

This thesis's findings guided the further development of the proposed newborn resuscitation course. The course outlines how to achieve essential midwifery competencies in newborn resuscitation through suggested learning outcomes and learning activities. A midwifery focus is emphasised. This thesis proposes that preparing midwifery students for newborn resuscitation in their clinical practice entails a lifelong learning process that begins with midwifery education in a safe culture where emotional reactions are acknowledged.

9.1 Implications and further research

- Implementing and evaluating the newborn resuscitation course tailored for midwifery students is essential, both in Norwegian midwifery education and internationally.

- The findings suggest that further studies on innovative methods using action research to explore how midwifery students can be best prepared for newborn resuscitation would be useful. It would be interesting to videotape students in skills lab to see if this course helped them cooperate and whether low-dose high-frequency training in familiar groups improved their competence.

- Data should be collected from devices (like Neonatalie™ Live or Monivent®) used by students in training to further improve the quality improvement of teaching provided to midwifery students to prepare them for newborn resuscitation.

- The newborn resuscitation course tailored for midwifery students might also benefit clinical midwives in maternity wards and at pre-hospital services in Norway and worldwide.

- Testing the course in-situ at maternity wards where midwifery students practice would be interesting.

- Based on the findings of this thesis, I argue for a greater focus on a culture of psychological safety in simulation training, both in midwifery education and in-situ, that will encourage midwifery students to speak up freely and honestly without fear of being scrutinized, blamed, or scapegoated.

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Appendices

1. REC decision 2018/975

2. NSD approval no 60726 (studies 1 and 2)

3. Recruitment text for Facebook group: «Jordmødre i Norge»

4. Text for further recruitment (snowball sampling)

5. Information letter and consent form (studies 1 and 2)

6. The interview guide (studies 1 and 2)

7. NSD approval no 150366 (study 3)

8. Information letter to midwives about workshops (study 3)

9. Information letter to midwifery students about workshops (study 3)

10. Information letter and consent form, study 3

11. Sikt approval of prolonged data storage

Region:	Saksbehandler:	Telefon:		Vår dato:	Vår referanse:
REK sør-øst	Henriette Snilsberg	22845531		02.07.2018	2018/975/REK sør-øst B
				Deres dato:	**Deres referanse:**
				07.05.2018	

Vår referanse må oppgis ved alle henvendelser

Bente Dahl
Høgskolen i Sørøst-Norge

2018/975 Nyfødt resucitering i jordmorutdanningen - En kvalitativ implementeringsstudie

Vi viser til søknad om forhåndsgodkjenning av ovennevnte forskningsprosjekt. Søknaden ble behandlet av Regional komité for medisinsk og helsefaglig forskningsetikk (REK sør-øst) i møtet 06.06.2018. Vurderingen er gjort med hjemmel i helseforskningsloven § 10.

Forskningsansvarlig: Høgskolen i Sørøst-Norge
Prosjektleder: Bente Dahl

Prosjektomtale (original):
Jeg vil utføre en kvalitativ implementeringsstudie med tre delstudier for å utvikle, implementere og evaluere et utdanningsprogram i nyfødt resucitering for jordmorstudenter. Delstudie I vil utforske jordmødres erfaringer med resucitering av nyfødte. Studien vil benytte individuelle intervjuer for datainnsamling og tematisk analyse av data. Delstudie II vil beskrive prosessen med å utvikle og implementere programmet. En arbeidsgruppe bestående av kandidat og jordmødre vil bli nedsatt for å utvikle et optimalt utdanningsprogram som vil bli iverksatt ved jordmorutdanningen, Høgskolen i Sørøst-Norge. Delstudie III vil utforske og evaluere studentenes erfaringer med programmet. Studien vil øke studentenes kunnskap om og ferdigheter med å utføre resucitering av nyfødte. Dette vil bidra til økt kompetanse og derved økt pasientsikkerhet i fødselsomsorgen.

Vurdering
Hensikten med prosjektet oppgis å være at man skal undersøke jordmødres erfaringer med gjenopplivning av nyfødte på en fødeavdeling, videre å utvikle og implementere et utdanningsprogram i gjenopplivning av nyfødte til bruk i utdanningen av jordmødre, samt evaluere jordmorstudentenes erfaringer med utførelse av gjenoppliving etter deltakelse og gjennomføring av utdanningsprogram

Helseforskningsloven gjelder for medisinsk og helsefaglig forskning, definert som forskning på mennesker, humant biologisk materiale og helseopplysninger, som har som formål å frambringe ny kunnskap om helse og sykdom, jf. helseforskningsloven §§ 2 og 4a. Formålet er avgjørende, ikke om forskningen utføres av helsepersonell eller på pasienter eller benytter helseopplysninger.

Komiteen anser dermed at prosjektet ikke omfattes av helseforskningslovens virkeområde. Det kreves ingen forhåndsgodkjenning fra REK for å gjennomføre prosjektet.

Prosjekter som faller utenfor helseforskningslovens virkeområde kan gjennomføres uten godkjenning av REK. Det er institusjonens ansvar på å sørge for at prosjektet gjennomføres på en forsvarlig måte med hensyn til for eksempel regler for taushetsplikt og personvern.

Vedtak

Besøksadresse:
Gullhaugveien 1-3, 0484 Oslo

Telefon: 22845511
E-post: post@helseforskning.etikkom.no
Web: http://helseforskning.etikkom.no/

All post og e-post som inngår i saksbehandlingen, bes adressert til REK sør-øst og ikke til enkelte personer

Kindly address all mail and e-mails to the Regional Ethics Committee, REK sør-øst, not to individual staff

Etter søknaden fremstår prosjektet ikke som medisinsk eller helsefaglig forskning, og det faller derfor utenfor helseforskningslovens virkeområde, jf. § 2.

Komiteens avgjørelse var enstemmig.

Klageadgang
Du kan klage på komiteens vedtak, jf. helseforskningsloven § 10 og forvaltningsloven § 28 flg. Klagen sendes til REK sør-øst. Klagefristen er tre uker fra du mottar dette brevet. Dersom vedtaket opprettholdes av REK sør-øst, sendes klagen videre til Den nasjonale forskningsetiske komité for medisin og helsefag for endelig vurdering.

Med vennlig hilsen

Ragnhild Emblem
Prof. dr. med
Leder REK sør-øst B

Henriette Snilsberg
komitésekretær

Kopi til:bente.dahl@usn.no; Høgskolen i Sørøst-Norge ved øverste administrative ledelse: postmottak@usn.no

Linda Wike Ljungblad

3603 KONGSBERG

Vår dato: 06.07.2018	Vår ref: 60726 / 3 / EPA	Deres dato:	Deres ref:

Vurdering fra NSD Personvernombudet for forskning § 31

Personvernombudet for forskning viser til meldeskjema mottatt 09.05.2018 for prosjektet:

60726	Newborn resuscitation in Midwifery education
Behandlingsansvarlig	Universitetet i Sørøst-Norge, ved institusjonens øverste leder
Daglig ansvarlig	Linda Wike Ljungblad

Vurdering

Etter gjennomgang av opplysningene i meldeskjemaet og øvrig dokumentasjon finner vi at prosjektet er meldepliktig og at personopplysningene som blir samlet inn i dette prosjektet er regulert av personopplysningsloven § 31. På den neste siden er vår vurdering av prosjektopplegget slik det er meldt til oss. Du kan nå gå i gang med å behandle personopplysninger.

Vilkår for vår anbefaling

Vår anbefaling forutsetter at du gjennomfører prosjektet i tråd med:
• opplysningene gitt i meldeskjemaet og øvrig dokumentasjon
• vår prosjektvurdering, se side 2
• eventuell korrespondanse med oss

Vi forutsetter at du ikke innhenter sensitive personopplysninger.

Meld fra hvis du gjør vesentlige endringer i prosjektet

Dersom prosjektet endrer seg, kan det være nødvendig å sende inn endringsmelding. På våre nettsider finner du svar på hvilke endringer du må melde, samt endringsskjema.

Opplysninger om prosjektet blir lagt ut på våre nettsider og i Meldingsarkivet

Vi har lagt ut opplysninger om prosjektet på nettsidene våre. Alle våre institusjoner har også tilgang til egne prosjekter i Meldingsarkivet.

Vi tar kontakt om status for behandling av personopplysninger ved prosjektslutt

Ved prosjektslutt 01.04.2021 vil vi ta kontakt for å avklare status for behandlingen av personopplysninger.

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Se våre nettsider eller ta kontakt dersom du har spørsmål. Vi ønsker lykke til med prosjektet!

Marianne Høgetveit Myhren

Eva J. B. Payne

Kontaktperson: Eva J. B. Payne tlf: 55 58 27 97 / eva.payne@nsd.no

Vedlegg: Prosjektvurdering

Personvernombudet for forskning

Prosjektvurdering - Kommentar

REK har vurdert at prosjektet ikke omfattes av helseforskningslovens virkeområde.

FORMÅL

Prosjektet er en kvalitativ implementeringsstudie med tre delstudier for å utvikle, implementere og evaluere et utdanningsprogram i nyfødt resuscitering for jordmorstudenter. Delstudie I utforsker jordmødres erfaringer med resuscitering av nyfødte. Studien vil benytte individuelle intervjuer for datainnsamling og tematisk analyse av data. Delstudie II beskriver prosessen med å utvikle og implementere programmet. En arbeidsgruppe skapes for å utvikle programmet som vil bli implementert ved jordmorutdanningen, Universitetet i Sørøst-Norge. Delstudie III utforsker og evaluerer studentenes erfaringer med programmet. Studien vil øke studentenes kunnskap og ferdigheter i utføre nyfødt resuscitering. Dette vil gi økt kompetanse og økt pasientsikkerhet.

VURDERING AV INFORMASJONSSKRIVET OG INNFØRINGEN AV NY PERSONVERNLOVGIVNING

Du har opplyst i meldeskjema at utvalget (jordmødre og jordmorstudenter) vil motta skriftlig informasjon om prosjektet, og samtykke skriftlig til å delta. Vår vurdering er at informasjonsskrivene til utvalget er godt utformet, men vi ber om at følgende endres/tilføyes:

- legg til at prosjektet er meldt til Personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS (personvernombudet@nsd.no, 55 58 21 17)
- tydeliggjør at prosjektslutt er 01.04.2021 og at datamaterialet vil lagres med personidentifikasjon frem til 01.04.2026 for bruk i oppfølgingsstudier/videre forskning

I løpet av 2018 vil ny personopplysningslov med skjerpede krav til informasjon og samtykke tre i kraft. På grunn av prosjektets varighet oppfordrer personvernombudet at det gjøres enkelte tilføyinger i informasjonsskrivene for å imøtekomme disse endringene:

- at samtykke er det lovlige behandlingsgrunnlaget for behandling av personopplysninger
- kontaktopplysninger til institusjonens personvernombud
- deltakernes rettigheter, herunder rett til å få utlevert en kopi av opplysningene som er registrert (dataportabilitet), samt rett til å sende klage til personvernombudet eller Datatilsynet angående behandlingen av personopplysninger

På våre nettsider finnes en ny mal for informasjonsskriv vi anbefaler at det tas utgangspunkt i:
http://www.nsd.uib.no/personvernombud/hjelp/informasjon_samtykke/informere_om.html

Vi ber om at de reviderte informasjonsskrivene sendes til personvernombudet@nsd.no. Husk å oppgi prosjektnummer. Prosjektet kan deretter starte.

TAUSHETPLIKT

Vi minner om at jordmødre har taushetsplikt, og at de ikke kan gi opplysninger som kan identifisere en enkeltperson (mor/far/baby) direkte eller indirekte (med mindre det blir innhentet samtykke til dette). Det er svært viktig at intervjuene gjennomføres på en slik måte at taushetsplikten overholdes. Intervjuer og informanter har sammen ansvar for dette, og bør innledningsvis i intervjuene drøfte hvordan dette skal håndteres. Vi forutsetter at dere er forsiktige ved å bruke eksempler under intervjuene.

INFORMASJONSSIKKERHET

Personvernombudet forutsetter at dere behandler alle data i tråd med Universitetet i Sørøst-Norge sine retningslinjer for datahåndtering og informasjonssikkerhet.

Ifølge informasjonsskrivet kan det være aktuelt å gjennomføre intervju via Skype. Personvernombudet anbefaler at videokonferanseverktøy ikke brukes, siden Skype vil i så tilfelle fungere som databehandler i prosjektet og det ikke er optimalt med tanke på konfidensialitet og informasjonssikkerhet. Bruk av eventuell databehandler må avklares med Universitetet i Sørøst-Norge.

PROSJEKTSLUTT OG VIDERE LAGRING

I telefonsamtale 06.07.18 ble det bekreftet at dato for prosjektslutt er 01.04.2021 og at datamaterialet vil lagres med personidentifikasjon frem til 01.04.2026 for bruk i oppfølgingsstudier/videre forskning.

Vi gjør oppmerksom på at dersom datamaterialet skal benyttes til oppfølgingsstudier/nye forskningsformål, krever dette ny melding til personvernombudet.

Rekrutteringstekst på Facebook «Jordmødre i Norge»:

«Har du som jordmor opplevd å være med på å resuscitere nyfødte barn på din fødeavdeling?

Vil du dele dine erfaringer med meg i mitt doktorgradsprosjekt? Individuelle intervjuer vil foregå høsten 2018. Ta kontakt for mer informasjon: linda.w.ljungblad@usn.no»

Studien *nyfødt resuscitering i jordmor utdanningen* trenger mer jordmor-erfaring, både fra deg som er ny-utdannet og fra svært erfarne jordmødre.

Vil du, eller kjenner du en jordmor som ønsker å bidra med sin erfaring i nyfødt resuscitering i denne studien? All jordmor-erfaring bidrar til et skreddersydd program i nyfødt resuscitering for jordmor studenter.

Vil du dele dine erfaringer med meg i mitt doktorgradsprosjekt? Det vil være individuelle intervjuer, og jeg møter deg der du ønsker. Ta kontakt for mer informasjon: linda.w.ljungblad@usn.no

Kort info til jordmødre som vil bidra med videre rekruttering (snowball-sampling):

Har du som jordmor opplevd å stå med et barn som ikke puster på din fødeavdeling?

Studien *nyfødt resuscitering i jordmor utdanningen* trenger mer jordmor-erfaring, både fra deg som er ny-utdannet jordmor, og fra deg med mye erfaring. Ønsker du å bidra med din erfaring om hvordan det oppleves når et barn ikke puster? All jordmor-erfaring bidrar til et skreddersydd program i nyfødt resuscitering for jordmor-studenter.

Vil du dele dine erfaringer med meg i mitt doktorgradsprosjekt? Det vil være individuelle intervjuer, og jeg møter deg der du ønsker.

Ta kontakt for mer informasjon: linda.w.ljungblad@usn.no

Vil du delta i forskningsprosjektet
"Nyfødt resuscitering i jordmor-utdanningen"?

Del-studie 1 & 2

I dette skrivet gir vi deg informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.
Dette er et spørsmål til deg om å delta i et forskningsprosjekt hvor formålet er å undersøke jordmødres erfaringer med nyfødt resuscitering samt å utvikle og implementere et utdanningsprogram i nyfødtresuscitering ved jordmor-utdanningen, Universitetet i Sørøst-Norge.

Formål
Studien inngår i mitt doktorgradsprosjekt og har til hensikt å 1) undersøke jordmødres erfaringer med nyfødt resuscitering og 2) hva jordmødre erfarer kan være viktige elementer i et opplæringsprogram i nyfødt resuscitering for jordmorstudenter. Resultatene fra studien vil bidra i utviklingen av et skreddersydd utdanningsprogram i nyfødt resuscitering som skal implementeres i jordmorutdanningen ved Universitetet i Sørøst-Norge. Utdanningsprogrammet vil inneholde teoretisk kunnskap og praktisk øvelse i resuscitering av nyfødte, og vil derved forberede studentene på kliniske situasjoner hvor de møter nyfødte barn i akutt behov av resuscitering.

Et fåtall vitenskapelige studier viser til jordmødres erfaringer og opplevelser fra nyfødt resuscitering, og jordmødres erfaringer fra andre land er ikke alltid overførbare til norske forhold. Dine erfaringer er derfor viktig for å få økt kunnskap om dette temaet.

Hvem er ansvarlig for forskningsprosjektet?
Universitet i Sørøst-Norge

Hvorfor får du spørsmål om å delta?
Du får spørsmål om å delta i studien fordi du har erfaring i å stå med nyfødt resuscitering og er villig til å dele dine erfaringer med meg. Målet er å inkludere 10-15 jordmødre i denne studien. Både jordmødre med lang og kort yrkeserfaring er velkommen til å delta, og det spiller det ingen rolle hvor i landet du bor.

Hva innebærer det for deg å delta?
Hvis du etter å ha lest informasjonsskrivet ønsker å delta i studien, tar du kontakt med meg via e-post, der du forteller at du er interessert i å delta og er villig til å bli intervjuet. Jeg vil deretter ta kontakt med deg for å avtale tid og sted for å gjennomføre intervjuet. Det er opp til deg om intervjuet foregår hjemme hos deg, eller på mitt kontor på Universitetet i Sørøst-Norge, studiested Vestfold. Intervjuet vil foregå som en samtale der du blir bedt om å fortelle fritt om dine erfaringer med nyfødt resuscitering og dine tanker om hva som bør inngå i utdanningsprogrammet. Du bør sette av en times tid til intervjuet.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Hvis du velger å delta, kan du når som helst trekke samtykket tilbake uten å oppgi noen grunn. Alle opplysninger om deg vil da bli anonymisert. Det vil ikke ha noen negative konsekvenser for deg hvis du ikke vil delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Intervjuet vil bli tatt opp og lagret som en lydfil på forskningsetisk forsvarlig måte før den slettes ved studiens slutt. Alt du forteller vil bli avidentifisert og behandlet konfidensielt ifølge krav om taushetsplikt. Det er en kode som knytter deg til dine opplysninger. Opplysningene vil oppbevares i låsbart skap på Universitetet i Sørøst-Norge, der kun jeg og mine veiledere har tilgang. Lydfiler fra intervju vil bli lagret et eget forskningssikret passord beskyttet område så lenge arbeidet med studien pågår, og deretter tilintetgjort. Det vil ikke være mulig å identifisere deg i resultatene som blir publisert etter denne studien. Utskrifter fra intervjuene er planlagt oppbevart i 5 år etter at avhandlingen er levert i tilfelle det blir aktuelt å skrive flere artikler basert på samme datamaterialet.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Prosjektet er søkt til Regional komite for medisinsk og helsefaglig forskningsetikk, 2018/975/REK sør-øst B, der studien faller utenfor helseforskningslovens virkeområde. Søknad er sendt og godkjent hos personvernombudet for forskning, NSD - Norsk senter for forskningsdata AS (personvernombudet@nsd.no, 55 58 21 17). Prosjektet skal etter planen avsluttes 01.04.2021. Data med personopplysninger som er gitt vil oppbevares frem til 2026 for eventuelle oppfølgingsstudier i samme tema. Disse opplysningene oppbevares anonymisert på samme sikre måte som tidligere beskrevet.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og
- å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Universitetet i Sørøst-Norge har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?

- Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med: doktorgradsstudent Linda Wike Ljungblad, Universitetet i Sørøst-Norge, mob: 93458429, e-post: linda.w.ljungblad@usn.no
- Veileder/ førsteamanuensis Bente Dahl e-post: bente.dahl@usn.no
- Vårt personvernombud ved Universitetet i Sørøst-Norge: Mette Kammen, telefon: 35575036/ 90922799
- NSD – Norsk senter for forskningsdata AS, på epost (personvernombudet@nsd.no) eller telefon: 55 58 21 17.

Med vennlig hilsen,

Bente Dahl   Linda Wike Ljungblad

Prosjektansvarlig /Veileder   Doktorgradsstudent

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *«Nyfødt resuscitering i jordmorutdanningen»*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

- ☐ å delta i individuelt intervju

- ☐ at mine personopplysninger lagres etter prosjektslutt, for kommende studier basert på samme tema – frem til 2026, deretter slettes.

Jeg samtykker til at mine opplysninger behandles frem til prosjektet er avsluttet, ca. 01.04.2021

(Signert av prosjektdeltaker, dato)

Linda Wike Ljungblad, Ph.D.-student

**Universitetet
i Sørøst-Norge**

Intervjuguide del-studie 1og 2, informant nummer: ……

Hei og takk for at du vil dele dine erfaringer om nyfødt resuscitering. Først vil jeg stille deg noen spørsmål før selve intervjuet starter:

Hva heter du? Hvor gammel er du?

Hvor jobber du, og hvor mange fødsler er det på ditt sykehus? Har du erfaring fra andre sykehus tidligere?

Hvor tok du din jordmor-utdanning? Hvor lenge har du vært jordmor?

Har du andre relevante kurs eller utdanning etter jordmor-utdanningen din?

Har du lest infoskrivet, og skrevet under samtykke-erklæring til deltakelse i denne studien?

Dette er studien forklart i korthet: (nå leser jeg litt for å ikke hoppe over noe..)

Dette er en kvalitativ studie, der jeg ønsker å få frem jordmors erfaringer i hvordan det er å stå med et nyfødt barn i behov av nyfødt resuscitering. Resultatene vil bidra til å utvikle et utdanningsprogram i nyfødt resuscitering til jordmor utdanningen ved Universitetet i Sørøst-Norge.

Min bakgrunn for å forske på nyfødt resuscitering startet i 1999 da jeg jobbet som sykepleier på en nyfødtintensiv-avdeling med ekstremt premature nyfødte ned til gestasjonsuke 23-24. Min interesse og nysgjerrighet for nyfødt resuscitering har vedvart videre gjennom 14 år som jordmor. Jeg har engasjert meg i ulike opplæringsmodeller i nyfødt resuscitering.

Når du møter meg som forsker, vil jeg presisere at jeg ikke har noe ønske eller behov av å irettesette, ansvarlig gjøre eller kritisere dine jordmor-vurderinger. Dette er en kvalitativ studie, der jeg ønsker å få frem DINE erfaringer i hvordan det er å stå med et nyfødt barn i behov av nyfødt resuscitering.

Spørsmålene i intervjuet handler om DINE egne erfaringer og opplevelser, og ikke utfallet for barnet. Hvis intervjuet vekker minner fra erfaringer som du har behov for å snakke om, vil jeg være tilgjengelig for en samtale om dette etter intervjuet.

Intervjuet kan vare opp til en time, varierende utfra hva du ønsker å dele av erfaringer. Jeg setter av en times tid til å gjennomføre dette intervjuet. Hvis det blir stille under intervjuet, gir jeg deg en pause til å tenke. Det er DINE fortellinger og erfaringer som er viktige i denne studien. Trenger du pause underveis, er det såklart helt i orden.

Ikke stress, men ta deg god tid til å tenke. Er du klar?

Jeg setter på båndopptakeren nå.

Linda Wike Ljungblad, Ph.D.-student

Universitetet i Sørøst-Norge

Man/en!!!

1. **Fortell om en situasjon der DU står med et barn som ikke puster, og utdyp så mye du klarer.**
Klarer du å sette ord på følelsene du hadde i situasjonen? Hvordan «kjentes det» inni deg?
Hvordan var det å være deg i den situasjonen?
Hvilke tanker og refleksjoner har du rundt din historie?
Har dette preget deg på noen måte til den jordmoren du er i dag?
Hva bærer du med deg videre?
Dette skjedde for en stund siden, hva tenker du om det nå?
Hva tenker du om sen avnavling og resuscitering?

2. **Hvordan opplever du å være rustet il å stå i slite situasjoner?**
- Hva skal til for at du skal oppleve det trygt/tryggere å stå i disse situasjonene?

3. **Tenk deg kommende jordmødre: Hvordan skal vi klare å forberede jordmorstudenter til å møte barn som ikke puster rett etter fødsel?**
Hva bør et opplæringsprogram for i nyfødt resuscitering bestå av?
- Hvordan bør de ulike deler vektlegges?
- Utdyp så grundig du klarer
- Har du andre erfaringer som er du vil dele?
- Har du erfaring med noe som ikke har fungert godt i opplærings-situasjoner?

4. **I simuleringstrening, finnes det flere viktige komponenter. Disse kan beskrives som: kunnskap, ferdigheter, kommunikasjon og team-arbeid. Kan du si noe om dine erfaringer i nyfødt resuscitering knyttet til:**
- **Kunnskap**
- **Ferdigheter**
- **Kommunikasjon**
- **Team-arbeid**

5. **Har du andre kommentarer eller noe du ikke har fått frem i intervjuet?**

Tusen takk for at du delte dine erfaringer.

Båndopptakeren slåes nå av, og lydfilen lagres på forskningsetisk forsvarlig måte før den slettes ved studiens slutt.

ɅSD NORSK SENTER FOR FORSKNINGSDATA

Meldeskjema

Referansenummer

150366

Hvilke personopplysninger skal du behandle?

- Navn (også ved signatur/samtykke)
- Fødselsdato
- Adresse eller telefonnummer
- E-postadresse, IP-adresse eller annen nettidentifikator
- Bilder eller videoopptak av personer
- Lydopptak av personer

Prosjektinformasjon

Prosjekttittel

The golden midwifery minute; sub-study 3

Prosjektbeskrivelse

Formålet med denne studien er å utvikle et skreddersydd utdanningsprogram i nyfødtresucitering som planlegges igangsatt ved Universitetet i Sørøst-Norge. Dette programmet vil blant annet bygge på kunnskap fra del-studie 1 og 2, og vil bidra med nye læringsmuligheter for studentene slik at de kan møte mer forberedt til nyfødt resuscitering.
Et fåtall vitenskapelige studier viser til jordmødres erfaringer og opplevelser fra nyfødt resuscitering, og vi kan ikke direkte overføre jordmødres erfaringer fra andre land som en bakgrunn for å utvikle et opplæringsprogram i nyfødt resuscitering ved en norsk jordmorutdanning. Dine erfaringer er derfor viktig for å økt kunnskap om norske jordmødres erfaringer fra nyfødt resuscitering.

Dersom opplysningene skal behandles til andre formål enn behandlingen for dette prosjektet, beskriv hvilke

Personopplysningene jeg trenger er kun for å kommuniserer med informantene ved planlegging og opptak av workshopene, og for å sende skriftlig informasjon i forkant av disse.

Begrunn behovet for å behandle personopplysningene

Jeg ønsker å gjøre lydopptak på worksopene, slik at ideer og innspill som kommer frem underveis sikres å bli oppfattet. Utover at informantene møter opp og deltar fysisk på disse workshopene, er det ikke behov for ytterligere personopplysninger.

Ekstern finansiering

Type prosjekt

Forskerprosjekt

Behandlingsansvar

Behandlingsansvarlig institusjon

Universitetet i Sørøst-Norge / Fakultet for helse- og sosialvitenskap / Institutt for sykepleie- og helsevitenskap

Prosjektansvarlig (vitenskapelig ansatt/veileder eller stipendiat)

Bente Dahl, bente.dahl@usn.no, tlf: 4790626991

Skal behandlingsansvaret deles med andre institusjoner (felles behandlingsansvarlige)?

Nei

Utvalg 1

Beskriv utvalget

Jordmødre, jordmor studenter og lærere på jordmorutdanningen som ønsker å bidra til utvikling av et skreddersydd program i nyfødtresuscitering for jordmor studenter

Rekruttering eller trekking av utvalget

Jordmødre som har deltatt i del-studie 1 og 2 har fått informasjon om del-studie 3 tidligere, vil bli kontaktet per e-post for å få mulighet til å delta. Jordmor studenter får informasjon via fellesportalen Canvas om muligheten til deltakelse. Lærerne får tilsendt mail om deltakelse. Vi inkluderer etterhvert som deltakerne melder sin interesse.

Alder

20 - 70

Personopplysninger for utvalg 1

- Navn (også ved signatur/samtykke)
- Fødselsdato
- Adresse eller telefonnummer
- E-postadresse, IP-adresse eller annen nettidentifikator
- Bilder eller videoopptak av personer
- Lydopptak av personer

Hvordan samler du inn data fra utvalg 1?

Felteksperiment/feltintervensjon

Grunnlag for å behandle alminnelige kategorier av personopplysninger

Samtykke (art. 6 nr. 1 bokstav a)

Informasjon for utvalg 1

Informerer du utvalget om behandlingen av opplysningene?

Ja

Hvordan?

Skriftlig informasjon (papir eller elektronisk)

Tredjepersoner

Skal du behandle personopplysninger om tredjepersoner?

Nei

Dokumentasjon

Hvordan dokumenteres samtykkene?

- Elektronisk (e-post, e-skjema, digital signatur)
- Manuelt (papir)

Hvordan kan samtykket trekkes tilbake?

Informantene får skriflig informasjon i forkant av workshopene der det er beskrevet at de kan trekke seg når som helst uten at det gir noen negative konsekvenser.

Hvordan kan de registrerte få innsyn, rettet eller slettet opplysninger om seg selv?

Informantene kan få se på opptak etter workshop.

Totalt antall registrerte i prosjektet

1-99

Tillatelser

Skal du innhente følgende godkjenninger eller tillatelser for prosjektet?

Behandling

Hvor behandles opplysningene?

- Maskinvare tilhørende behandlingsansvarlig institusjon
- Mobile enheter tilhørende behandlingsansvarlig institusjon

Hvem behandler/har tilgang til opplysningene?

- Prosjektansvarlig
- Student (studentprosjekt)
- Interne medarbeidere
- Databehandler

Hvilken databehandler har tilgang til opplysningene?

Jeg vil bruke USNs Zoom for å gjennomføre workshops med sikker innlogging via FEIDE.

Tilgjengeliggjøres opplysningene utenfor EU/EØS til en tredjestat eller internasjonal organisasjon?

Nei

Sikkerhet

Oppbevares personopplysningene atskilt fra øvrige data (koblingsnøkkel)?

Ja

Hvilke tekniske og fysiske tiltak sikrer personopplysningene?

- Opplysningene anonymiseres fortløpende
- Adgangsbegrensning

Varighet

Prosjektperiode

01.05.2020 - 01.12.2022

Hva skjer med dataene ved prosjektslutt?

Data anonymiseres (sletter/omskriver personopplysningene)

Hvilke anonymiseringstiltak vil bli foretatt?

- Personidentifiserbare opplysninger fjernes, omskrives eller grovkategoriseres
- Koblingsnøkkelen slettes
- Lyd- eller bildeopptak slettes

Vil de registrerte kunne identifiseres (direkte eller indirekte) i oppgave/avhandling/øvrige publikasjoner fra prosjektet?

Nei

Tilleggsopplysninger

Dette er en oppdatert utgave/ endringsmelding pga Covid-19 situasjonen da vi ønsker å gjennomføre workshops med opptak via USNs Zoom med innlogging via FEIDE, og med dette gjøre opptak av både lyd og video. Datamaterialet vil lagres, oppbevares og anonymiseres slik lydfilene allerede er planlagt håndtert.

Dette er som tidligere nevnt en endring i et pågående prosjekt (60726). Grunnet nytt system melder jeg endring i del-studie 3 på denne måten etter telefonsamtale med Eva J. B. Payne i dag. Endringen består i å inkludere studenter og lærerer i tillegg til jordmødre til workshoper for å utvikle et skreddersydd program i nyfødt resuscitering for jordmor studenter.

Hei ……. (Jordmors navn)

Takk for at du stilte opp til intervju med meg og bidro med dine erfaringer fra nyfødt resuscitering. Jeg skriver nå to artikler basert på intervjuene. Det var interessante erfaringer og viktige refleksjoner som kom frem. Ditt bidrag og vilje til å dele dine erfaringer har stor betydning for dette prosjektet. Artiklene er i prosess, og planlegges publisert i snarlig fremtid.

I denne tredje del-studien av min doktorgradsavhandling, inviterer jeg til to workshoper, der vi sammen tenker kreative tanker rundt hvordan et opplæringsprogram bør se ut. Første workshop vil det kun være jordmødre tilstede. Andre workshop vil jeg invitere jordmor-studenter, jordmødre og jordmor-lærere i fellesskap.

Jeg ønsker innspill fra deg som vil bidra til at vi sammen kan utvikle et skreddersydd utdanningsprogram i nyfødt resuscitering på USN. Målet med workshopene er å lære av hverandre og sammen komme opp med nye ideer.

Du trenger ikke forberede noe på forhånd. Workshopene vil vare 60-90 minutter og vil foregå på Zoom (https://usn.instructure.com/courses/17714/pages/klient-nedlasting). Ikke nøl med å ta kontakt med meg hvis du trenger hjelp med Zoom eller har andre spørsmål.

Hvis foreslåtte tider ikke passer, og du ønsker å delta, gi meg beskjed, så finner vi en løsning sammen. Jeg setter opp tre ulike tidspunkter du kan velge mellom:

Workshop 1: Mandag 18 mai kl. 10
(https://usn.zoom.us/j/65492527971?pwd=NDlIb2l2VDFyamJnZGdHS1FnNHZzdz09.
Meeting ID: 654 9252 7971. Password: 879353)

Workshop 2: Mandag 25 mai kl. 18
(https://usn.zoom.us/j/69236107671?pwd=T0Rxc1R2TEU0Z0NQbHZsS0UxT3BLdz09.
Meeting ID: 692 3610 7671. Password: 924748)

Workshop 3: Onsdag 27 mai kl. 10
(https://usn.zoom.us/j/62901739517?pwd=Q1BtbW13ZnliY1JIYkZvRDdRaHZDUT09. Meeting ID: 629 0173 9517. Password: 950855)

Du er eksperten her. Uten dine innspill og ideer ville dette arbeidet vært umulig å gjennomføre. Ditt bidrag betyr mye.

Hvis du ønsker å delta, tar kontakt med meg via mail eller SMS.

Jeg håper å høre fra deg.

«Nyfødt resuscitering i jordmor-utdanningen"
Vennlig hilsen,

Stipendiat Linda Wike Ljungblad

Universitetet i Sørøst-Norge

Tlf. +47 93458429

e-mail: linda.w.ljungblad@usn.no

Kjære jordmor-student

Jeg er jordmor og skriver en doktorgradsavhandling om jordmødres erfaringer med nyfødt resuscitering og tar med disse erfaringene inn i utviklingen av å skreddersy et utdanningsprogram for jordmor-studenter i nyfødt resuscitering. Her trenger jeg ditt bidrag, fordi du er ekspert på å være jordmor student, og kan bidra med tanker om hva og hvordan du best tilegner deg kunnskap. Jeg inviterer til en workshop, der vi sammen tenker kreative tanker rundt hvordan et opplæringsprogram bør se ut.

Du trenger ikke forberede noe på forhånd! Målet med workshopene er å lære av hverandre og sammen komme opp med nye ideer. Det vil være lærerikt for oss alle som deltar.

Workshopen vil vare en times tid og vil foregå på Zoom. Tidspunkt for workshop finner vi ut av sammen i løpet av september/ oktober.

Du er eksperten her. Uten dine innspill og ideer ville dette arbeidet vært umulig å gjennomføre. Ditt bidrag betyr mye.

Du som ønsker å delta, tar kontakt med meg via mail eller SMS, så vil du motta mer informasjon om studien.

Jeg håper å høre fra deg.

Vennlig hilsen,

Linda Wike Ljungblad (jordmor og Stipendiat)

Universitetet i Sørøst-Norge

Tlf. +47 93458429

E-mail: linda.w.ljungblad@usn.no

Vil du delta i forskningsprosjektet

"Nyfødt resuscitering i jordmorutdanningen"?

Delstudie 3

I dette skrivet får du informasjon om målene for prosjektet og hva deltakelse vil innebære for deg.
Dette er en invitasjon til deg om å delta i forskningsprosjektet for å skreddersy et program for jordmor-studenter i nyfødt resuscitering.

Formål
Formålet med denne studien er å utvikle et skreddersydd utdanningsprogram i nyfødt resuscitering som skal implementeres ved Universitetet i Sørøst-Norge. Dette programmet vil blant annet bygge på kunnskap som fremkom i to foregående del-studier, og vil kunne bidra med nye læringsmuligheter for studentene slik at de kan være mer forberedte til nyfødt resuscitering.

Et fåtall vitenskapelige studier viser til jordmødres erfaringer og opplevelser fra nyfødt resuscitering, og vi kan ikke direkte overføre jordmødres erfaringer fra andre land som en bakgrunn for å utvikle et opplæringsprogram i nyfødt resuscitering ved en norsk jordmor-utdanning. Dine innspill og erfaringer er derfor viktig inn i utviklingen av et skreddersydd utdanningsprogram i nyfødt resuscitering for jordmor-studenter.

Hvem er ansvarlig for forskningsprosjektet?
Universitet i Sørøst-Norge

Hvorfor får du spørsmål om å delta?
Du får spørsmål om å delta i studien fordi du har erfaring i å stå med nyfødt resuscitering, eller har lyst til å bidra til å utvikle et utdanningsprogram i nyfødtresucitering. Både jordmødre, jordmor-studenter og lærere med lang og kort yrkeserfaring er velkomne til å delta.

Hva innebærer det for deg å delta?
Når du har lest informasjonsskrivet og ønsker å delta i studien, tar du kontakt med meg via e-post, der du forteller at du er villig til å delta. Deltakelse i studien innebærer at er villig til å delta i workshop hvor vi sammen diskuterer utdanningsprogrammets innhold og struktur. Du trenger ikke å forberede noe til workshop, men vi skal tenke høyt sammen underveis. Arbeidsgruppen vil bestå av jordmor-studenter, jordmødre og jordmor-lærere. Du får informasjon opp tidspunkt for workshops i et separat skriv.

Det er frivillig å delta

Det er frivillig å delta i prosjektet. Alle opplysninger om deg vil bli anonymisert. Du kan når som helst trekke samtykket tilbake uten å oppgi noen grunn. Det vil ikke ha noen negative konsekvenser for deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger

Vi vil bare bruke opplysningene om deg til formålene vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Informasjonen som registreres om deg skal kun brukes slik som beskrevet i hensikten med studien. Workshopene vil bli tatt opp og lagret på forskningsetisk forsvarlig måte. Alt du forteller vil bli avidentifisert og behandlet konfidensielt ifølge krav om taushetsplikt. Det er en kode som knytter deg til dine opplysninger. Opplysningene vil oppbevares i låsbart skap på Universitetet i Sørøst-Norge, der kun jeg og mine veiledere har tilgang. Opptakene vil bli lagret et eget forskningssikret passord beskyttet område så lenge arbeidet med studien pågår, og deretter anonymiseres. Det vil ikke være mulig å identifisere deg i resultatene som blir publisert. Anonymiserte og transkriberte data fra workshopene vil lagres for å kunne brukes skrive flere artikler basert på samme datamateriale.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?

Prosjektet er søkt til Regional komite for medisinsk og helsefaglig forskningsetikk, 2018/975/REK sør-øst B, der studien faller utenfor helseforskningslovens virkeområde. Prosjektet avsluttes 01.012.2021. Data med dine personopplysninger vil da slettes.

Dine rettigheter

Så lenge du kan identifiseres i datamaterialet, har du rett til:
- innsyn i hvilke personopplysninger som er registrert om deg,
- å få rettet personopplysninger om deg,
- få slettet personopplysninger om deg,
- få utlevert en kopi av dine personopplysninger (dataportabilitet), og å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger

Hva gir oss rett til å behandle personopplysninger om deg?

Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Universitetet i Sørøst-Norge har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Hvor kan jeg finne ut mer?
- Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med: doktorgradsstudent Linda Wike Ljungblad, Universitetet i Sørøst-Norge, mob: 93458429, e-post: linda.w.ljungblad@usn.no
- Veileder/ førsteamanuensis Bente Dahl e-post: bente.dahl@usn.no
- Personvernombud ved Universitetet i Sørøst-Norge: Mette Kammen, telefon: 35575036/ 90922799
- NSD – Norsk senter for forskningsdata AS, på epost personverntjenster@nsd.no eller telefon 55 58 21 17.

Med vennlig hilsen,

Bente Dahl   Linda Wike Ljungblad

Prosjektansvarlig/ Veileder   Doktorgradsstipendiat

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om prosjektet *«Nyfødt resuscitering i jordmorutdanningen»*, og har fått anledning til å stille spørsmål. Jeg samtykker til:

☐   å delta i workshop

☐   at mine personopplysninger oppbevares frem til prosjektslutt 01.12.2021, deretter anonymiseres data og lagres til fremtidige studier basert på samme tema.

(Signatur, dato)

◖◗ Sikt

Vurdering av behandling av personopplysninger

Referansenummer	**Vurderingstype**	**Dato**
150366	Standard	12.12.2022

Prosjekttittel
The golden midwifery minute; sub-study 3

Behandlingsansvarlig institusjon
Universitetet i Sørøst-Norge / Fakultet for helse- og sosialvitenskap / Institutt for sykepleie- og helsevitenskap

Prosjektansvarlig
Bente Dahl

Prosjektperiode
01.05.2020 - 01.12.2023

Kategorier personopplysninger
Alminnelige

Lovlig grunnlag
Samtykke (Personvernforordningen art. 6 nr. 1 bokstav a)

Behandlingen av personopplysningene er lovlig så fremt den gjennomføres som oppgitt i meldeskjemaet. Det lovlige grunnlaget gjelder til 01.12.2023.

Meldeskjema ↗

Kommentar
Personverntjenester har vurdert endringen i prosjektsluttdato.

Vi har nå registrert 01.12.2023 som ny sluttdato for behandling av personopplysninger.

Hvis det blir nødvendig å behandle personopplysninger enda lengre, så kan det være nødvendig å informere prosjektdeltakerne.

Vi vil følge opp ved ny planlagt avslutning for å avklare om behandlingen av personopplysningene er avsluttet.

Kontaktperson: Gry Henriksen
Lykke til videre med prosjektet!

Paper I

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B. (2020). Balancing Life and Death During the Golden Minute - Midwives' Experiences of Performing Newborn Resuscitation. *Journal of Multidisciplinary Healthcare*, *13*, 943-952. https://doi.org/10.2147/jmdh.S268959

ORIGINAL RESEARCH

Balancing Life and Death During the Golden Minute – Midwives' Experiences of Performing Newborn Resuscitation

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Purpose: To explore midwives' experiences in performing newborn resuscitation on maternity wards.

Patients and Methods: It was a qualitative study, using a phenomenological hermeneutic approach. Individual interviews with 16 clinical midwives working in Norwegian maternity wards were conducted from August 2018 to January 2019.

Results: The complexity underlying how midwives balance responsibility and vulnerability when performing newborn resuscitation during the Golden Minute was revealed. Midwives described the stress they experienced during resuscitation events and their need for support and confirmation after performing newborn resuscitation.

Conclusion: The vulnerability and responsibility that midwives bear for mothers and newborns simultaneously affected midwives in several ways. We saw that midwives need support and confirmation to be prepared for newborn resuscitation. We also found that a lack of knowledge, skills and experience were barriers to midwives feeling prepared. Simulation training, including tailored programs, are suggested to improve midwives' skills and help them feel prepared for real-life resuscitations. The importance of midwives' assessment during the Golden Minute and further investigation from other perspectives are needed to understand fully this clinical complexity.

Keywords: experiences, Golden Minute, midwife, newborn resuscitation, qualitative research

Introduction

I was alone with life and death in my hands. My hands were shivering and I was sweating. The adrenaline was pumping. I was terrified. It was like being on the top of the mountain on the verge of falling down. Was this baby already dead? I felt numb. Would help arrive too late this time? I pretended to be calm outwardly, but inside I felt helplessness and chaos. The baby had been doing fine throughout labour. Did I ignore something? What will my colleagues say?

An included midwife (3) in this study is describing a situation where she had to perform newborn resuscitation.

Globally, midwives on maternity wards experience non-breathing newborns every day.[1,2] A reduction in infant mortality can be prevented through immediate newborn assessment and resuscitation.[3] Broadly defined, newborn resuscitation is a set of interventions undertaken immediately after delivery to support the onset of

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breathing and circulation for newborns.[4] Newborns generally require little assistance to adapt to extrauterine life, but worldwide up to 10% need immediate help with their breathing.[5] Less than 1% require advanced resuscitation.[6]

The Golden Minute refers to the first 60 s of a newborn's life,[7] during which the complex but natural transition from intra- to extrauterine life occurs.[8] Typically, midwives perform newborn assessment during the Golden Minute. Guidelines for basic newborn assessment suitable for contexts worldwide have been developed to facilitate effective practice when newborn resuscitation is required.[9,10] It is important that the skills specific to newborn assessment and the provision of help when needed be relevant to the various contexts that exist.[11] Newborn resuscitation skills are essential components in midwifery care and should be improved continuously.[12]

In Norway, maternity care is differentiated and decentralized on three levels: university hospitals, medium-sized maternity clinics and midwifery-led birth wards. Midwives possess the necessary qualifications and legal authority to assist normal births and identify pathological conditions, and are required to contact an obstetrician or pediatrician if needed. Consequently, they must be capable of quick decision-making, which in turn necessitates both knowledge and experience.[13]

Research concerning midwives' experiences of performing newborn resuscitation is scarce. However, the need to clarify guidelines, responsibilities and the importance of teamwork in newborn resuscitation has been emphasized.[14] Furthermore, lack of experience, knowledge, skills, inadequate teamwork and organizational constraints sometimes prevent midwives from performing newborn resuscitation.[15,16] Studies demonstrate that midwives find it challenging to assess non-breathing newborn babies,[17] they lack skills to resuscitate newborns and adequate help is not always immediately available.[18] Understanding the role as a midwife is important to improve confidence and knowledge in newborn resuscitation[19] and studies describe that strengthening newborn resuscitation skills has resulted in improved birth outcomes.[20] To improve resuscitation skills, frequent hands-on training programs have been recommended.[21]

In the global context, several publications highlight the need for understanding and exploring the complexity in newborn resuscitation for midwives both in low- and high-income countries. So far, research about midwives performing newborn resuscitation has focused on practical hands-on training, skills and teamwork. However, we have not been able to locate studies addressing the complexity of these situations, including not only skills, hands-on-training and teamwork, but also the emotional challenges midwives' experience when faced with a non-breathing newborn. This paper is a contribution from a highly developed medical system. We therefore designed a study to explore midwives' experiences of performing newborn resuscitation on maternity wards.

Patients and Methods

We conducted a qualitative study, using a phenomenological hermeneutic approach.[22] This design was appropriate to explore midwives' experiences in newborn resuscitation, as previous research about the topic was scarce.

Recruitment

We anticipated recruiting nineteen midwives to the study, but in the end interviewed 16 midwives as data saturation had been reached (see data analysis section).[24] To recruit eligible midwives, we posted an invitation to participate in the study on a Norwegian midwifery forum on Facebook consisting of 2300 midwives in August and September 2018. We also undertook snowball sampling. Midwives working on high-risk and midwifery-led maternity wards in several hospitals were asked to pass along word-of-mouth information and/or flyers to colleagues they believed would meet the inclusion criteria.[23] The inclusion criteria were registered midwives who had performed newborn resuscitation during the Golden Minute on Norwegian maternity wards. Nineteen midwives contacted the first author to participate in the study. They all fulfilled the inclusion criteria.

Participants

The participants were female, native speakers of Scandinavian languages, aged 32–61 years, and lived in different parts of Norway. They worked at small midwifery-led wards, maternity clinics or university hospitals where the number of deliveries varied from 30 to 7000 births annually. Their working experience varied from one to 35 years (mean 14 years), and they had varied experience of newborn resuscitation from 26 different maternity wards (Table 1). Fourteen participants had graduated from Norwegian university colleges or universities and two from other Nordic countries. A majority had completed other forms of postgraduate education or courses, and some had experience of working abroad.

Table 1 Description of Included Participants

Participants	Age	Years of Midwifery Practice	Level of Maternity Ward, Number of Births per Year	Experiences from Different Maternity Wards
1	40	12	University hospital (7000)	1
2	38	2	Midwifery-led maternity wards (400), (2000)	2
3	50	14	University hospital (6000), Maternity Clinic (1400)	2
4	35	5	University hospitals (7000), (2750)	2
5	37	1	Maternity Clinics (2000), (63000), (650)	3
6	36	2	University hospital (6000) Midwifery led- ward (450)	2
7	56	25	University hospital (6000), Maternity-led wards (500), (50 000)	3
8	56	26	University Hospital (6000), Maternity wards (2000) (500)	3
9	32	5	University hospitals (6000) (5000), Maternity wards (1500)	3
10	52	28	University hospital (6000) Maternity Clinics (1600), (2000), (350), (30), (150)	6
11	40	7	Maternity Clinic (3000)	1
12	40	5	Maternity clinic (3000)	1
13	61	35	University hospital (7000), Maternity clinics (800), (500), (2000), (3000)	5
14	56	32	Maternity clinics (430), (2000)	2
15	44	15	Maternity Clinics (2200), (600), (2000), (800), (1500), (500)	6
16	42	15	Maternity Clinics (60), (2000), (4000)	3

Data Collection

The first author conducted individual interviews between August 2018 and January 2019 at different locations chosen by the participants. All interviews were conducted in the Norwegian language as all participants understood and spoke the language. The conducted interviews had two aims: I) to explore midwives' experiences of performing newborn resuscitation and II) to explore midwives' experiences about what constitutes relevant content and structure in a newborn resuscitation program. This paper focuses on the first aim. Two pilot interviews were conducted with colleagues handpicked by the first author prior to the start of the study. These were not included, but were essential to adjusting the interview technique and interview questions. The interviews took place where the participants wished to be interviewed and started with an open-ended question: "Could you please tell me about a situation when you experienced a non-breathing newborn baby immediately after delivery". The participants were encouraged to narrate their experiences of performing newborn resuscitation freely and were only interrupted by follow-up questions when clarification or further elaboration was needed. Field notes were written during and immediately after each interview. The interviews lasted 22–49 mins (mean 32). All interviews were digitally recorded and transcribed verbatim by the first author.

Ethics

The study was conducted in accordance with the WMA Declaration of Helsinki Ethical Principles for Medical Research in Human Subjects.[25] Approval for the study was granted by The Regional Committee for Medical and Health Research Ethics (2018/975). The Norwegian Centre for Research Data assessed the study and considered it to be outside the scope of sections 2 and 4 of the Health Research Act (60726). Prior to interviews, all participants received written and oral information about the study, including assurances of anonymity and confidentiality. Prior to being included in this study, all participants provided informed consent to publish anonymised data material, including quotes. They were informed that they could withdraw from

the study at any time without giving reasons. If participation led to any adverse emotional reactions, participants could contact the first author, but none did so.

Data Analysis

We used a phenomenological hermeneutic method consisting of three phases to analyze the data.[22] The method was developed to understand morals and ethical thinking of nurses and physicians expressed in interview texts. In this analysis method, the interpretation implies a dialectic movement between the text as a whole and parts of the text, influenced by Ricoeur's phenomenological hermeneutic interpretation theory.[26]

First, we conducted a naïve or open-minded reading to gain an overall impression of the text, providing access to midwives' experiences of performing newborn resuscitation. We then undertook a structural analysis by dividing the text into meaning units, ie, sentences, parts of sentences or paragraphs containing related meaning content. These meaning units were in turn condensed into themes and sub-themes. The structural analysis aimed to explain what the text was saying. It was an iterative process, and we validated or refuted the meaning units based on our impressions from the naïve reading.[22] Lastly, we formulated a comprehensive understanding by re-reading the text as a whole while taking into consideration our pre-understanding, the naïve reading and the structural analysis as well as relevant studies.

Results

Naïve Understanding

Most participants experienced newborn resuscitation to be one of the most frightening situations a midwife can experience. They described feeling an enormous and simultaneous responsibility for the mother and newborn when performing newborn resuscitation and noted their experiences of a life-and-death-perspective in such situations. They talked about being courageous enough, feeling uncertainty, scrutinizing themselves and being critical of own skills. They described physical symptoms from the stress that such situations could cause and experienced that they swung between feeling like experts during normal births and novices when performing newborn resuscitation. They feared they would be found to be insufficiently competent or would be blamed or scapegoated.

Structural Analysis

Four themes emerged from the analysis. An overview of the themes and sub-themes is presented in Table 2.

Feeling Stress and Battling the Seconds
Experiencing Stress

Most participants could experience physical symptoms from stress when they performed newborn resuscitation. A participant stated that she felt as if the heavy burden she bore was a weighty stone wandering through her body, from her heart to her stomach. Others experienced an extreme adrenaline rush, describing their bodies as being in "high gear". They could perceive this adrenaline rush as being positive because it helped them focus, or as being negative, because it could make them almost lose control. When elaborating on the emotions, the participants noted that they felt anxious, sick or panicked. Some experienced a sense of internal chaos, others an extremely elevated pulse rate. Some felt cold, clammy, sweaty or incapable of thought or communication, while others cried or vomited. A participant described her feelings thus:

> … I felt like the blood drained from my body … a huge adrenalin rush … like being on the top of a mountain on the verge of falling down …. (3)

Another participant stated that she started to shiver so much that she had difficulty controlling her hands when opening ampoules. Others described a numb feeling all over their body, a type of panic, and that they could "feel shaky" for hours afterwards. The adrenaline rush was stronger when they were under time pressure and they noted that newborn resuscitation was one of the most frightening situations a midwife can experience and described the stress felt during the situation as incomparable to anything else.

Managing Stress

The midwives experienced multiple challenges when having to initiate newborn resuscitation, noting that the situation was stressful until help arrived and that bearing responsibility for the mother and newborn simultaneously made them feel insufficient. The time that elapsed until adequate help arrived could differ, as well as their experiences of this time. Some were alone, perceiving the seconds go by terribly slowly, as if time had slowed down. Some could access help through a video monitor, while others were never alone. A participant stated that she felt as if she was waiting for help for an entire shift, while in

Table 2 Overview of Themes and Sub-Themes

Themes	Sub-Themes
Feeling stress and battling the seconds	Experiencing stress Managing stress
Being vulnerable and in need of support and confirmation	Being scrutinised Feeling vulnerable Needing support to remain as a midwife
Being responsible for life and death - a balancing act	Feeling the burden of responsibility Being professional Working in trustful teams
Being prepared for newborn resuscitation	Increasing one's knowledge Understanding the importance of correct assessment

reality, the time that elapsed was 3.5 mins. Some midwives found it difficult to state accurately how long they were waiting for help, but noted that they managed to perform a great number of tasks while waiting.

> It felt like I was waiting for help for 3 hours … but it was only 4 minutes … it was more than enough … and it felt like 3 hours … do they never come?. (12)

One midwife decided to initiate newborn resuscitation herself, even if she felt that she was skilled insufficiently because it took a long time for help to arrive. Another blacked out during a newborn resuscitation, even though she had practiced a hundred times on manikins. All midwives, even those who had been teaching colleagues, stated that simulated situations did not match real-life clinical situations.

Being Vulnerable and in Need of Support and Confirmation

Being Scrutinized

The midwives were scared they would perform newborn resuscitation incorrectly. They spoke of blaming themselves and their need for confirmation after newborn resuscitation. Such self-blame could include whether they acted quickly enough or whether they should have identified risk indicators earlier. They described balancing multiple challenges simultaneously and questioning their own assessments. After a newborn resuscitation, they experienced that they were scrutinised and that both colleagues and/or parents could blame them, noting that such scrutiny and blame was a heavy burden to bear:

> We seek to find someone or something to blame of course … it's natural that you seek to find a reason or a scapegoat … if the reason was an infection, it would be easier to accept, and the midwife did not have to become the scapegoat …. (14)

The participants were afraid they would be unable to defend their actions or that they would be blamed for having forgotten to do something during newborn resuscitation. A midwife noted that after the death of a baby she received unpleasant private messages from the mother, which she described as a heavy burden.

Feeling Vulnerable

The midwives expressed their emotions, frustrations and sorrows in several ways. A participant described her experience as a painful secret that she had never shared, others were left "alone" after an incident and expressed frustration that their colleagues did not support them. Another said she felt like she fell into a deep black hole and was struggling to get out of the hole. Yet another revealed her vulnerability after the death of a baby by describing the misunderstood care she received:

> … and the worst part was that when we should have a debriefing, I was told that I did not need to come because they would protect me from it … it was absolutely horrible … It was my delivery, and I knew what really happened in that labour room … all [those] thoughts I needed to discuss afterwards, and I would not be allowed to attend … it was misunderstood care for me …. (3)

This midwife perceived that she would have needed support and confirmation from her colleagues. The participants also mentioned respect and disrespect from professionals from other professions as being an important factor in their feeling vulnerable. Some midwives stated that they experienced misunderstood care and could not answer when asked how they should prepare themselves to face such situations again.

Needing Support to Remain as a Midwife

The midwives stated that they needed support and confirmation from their colleagues after a newborn resuscitation. While some received support from their midwife leaders, others did not. They spoke of the importance of being debriefed after the resuscitation, noting that not talking about the experience could leave them traumatized. A participant mentioned that she would have left the profession if not for the support she received from her colleagues:

It was absolutely horrible … I was scared and cried … I had good colleagues who supported and comforted me, luckily, and they stood by me during the next delivery … I believed that I did a good job, but the results turned out to be wrong … I just wanted to stop being a midwife … and start selling shoes in a shop or work in a grocery store … if I make a mistake during delivery, the baby can actually die …. (11)

The participants needed confirmation to maintain their self-confidence regarding their capacity to assess similar situations correctly in the future because such situations could appear like "a thunderbolt out of the blue".

Being Responsible for Life and Death – A Balancing Act
Feeling the Burden of Responsibility

The midwives perceived their inherent responsibility for life and death to be a challenging burden. A participant spoke of the responsibility she bore during newborn resuscitation as feeling like she was caring for her own baby, who was hovering between life and death. They revealed a fear of being considered negligent, and noted that the profession was "tough" and not for everyone. Some mentioned that they could lose focus, "lose themselves" or even "lose their heads" when performing newborn resuscitation and one midwife illustrated her actions by comparing herself to a duck:

I try to behave like a duck when I receive unexpected non-breathing newborns … ducks swim quietly and [glide along] the surface of the water, while their legs [beat furiously like] drumsticks below the surface … the parents need you to be calm even if your heart is beating inside painfully …. (8)

A midwife described feeling numb when resuscitating a baby while calming the parents down simultaneously. Another described how she struggled to support a mother's birthing partner who was crying in the corridor, saying that if newborn resuscitation did not "break" her (the midwife), nothing would.

Being Professional

Most midwives perceived themselves to be novices, not experts, during newborn resuscitation, which they attributed to adrenaline and fear. Some questioned whether they were responsible for a baby's death. They spoke of the importance of balancing various factors when critical situations occurred: a normal Apgar score, a baby's slow onset of breathing and their patience and skills in identifying risk factors during delivery. A participant mentioned that she as a midwifery student learned the importance of remaining calm from a supervisor, who she experienced as being a good role model:

I remember that I was impressed by my supervisor … she did not panic, but kept calm … she acted quickly and was explicit in giving clear instructions … I remember that I wanted to be like her … she was a good role model, because she kept the acute situation calm. (16)

Most midwives revealed that one important characteristic of being professional was being a good role model. They described the importance of balancing several skills simultaneously when performing newborn resuscitation, and learned from colleagues that mistakes were not allowed. Many also experienced that providing parents with good care in chaotic situations was difficult.

As part of being professional, the midwives sought to be available for parents who had experienced a traumatic resuscitation for some weeks after the incident, stating that it was important that they answer questions for as long as needed. One midwife even said that the families with whom she had close contact with after newborn resuscitation would have a place in her heart forever. Yet some noted that midwife leaders did not always encourage such actions or could even provide resistance to midwives acting in such a manner, requiring the midwives to act during their free time.

Working in Trustful Teams

The midwives expressed the need to understand newborn resuscitation fully. They maintained that good collaboration with other professionals was important, noting underlying challenges such as sharing information correctly or getting qualified help quickly. They expressed that cooperation was important when performing resuscitation, expressed here as "complementing one another": sharing information correctly, receiving qualified help quickly. Such cooperation should be based on collective knowledge. A participant described her key for success:

I discovered a huge gap in knowledge about natural transition … I have increased and shared my knowledge with my colleagues, so we have the same [knowledge] base … when we have the same base, we do not have to discuss … to succeed with newborn resuscitation, we have to maintain this collective base. (3)

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The midwives perceived themselves to be an important link between the various team members. Some explicitly stated that they needed qualified help when performing newborn resuscitation, but could encounter scared, inexperienced paediatricians. They noted the various perspectives that other professionals could have and emphasized the importance of trusting in themselves as midwives to provide safe care. To maintain their resuscitation skills, some frequently trained with other professionals. Others stated that they trained every second year but would prefer training that was more frequent.

Being Prepared for Newborn Resuscitation
Increasing One's Knowledge
The midwives expressed the need to increase their knowledge of newborn resuscitation, and an experienced midwife described her attainment of knowledge as a "steep learning curve" because she learned from her mistakes. The participants described being prepared as understanding how and when one should act so as to provide the best care. They noted that each clinical experience was an opportunity to learn, share and engage in quality improvements. Yet they felt that being prepared for newborn resuscitation was incredibly difficult; even ventilation was considered a difficult skill. A midwife spoke of her wish to increase her knowledge:

> … it felt like burning under my feet in an extremely difficult situation … I have not spoken to any colleagues about this experience … it has been aggravating and somewhat educational for me … but I really want to increase my knowledge from all situations to be more prepared for unexpected newborn resuscitation …. (10)

Some participants used the terms "inadequate or unprepared" when describing themselves initiating newborn resuscitation alone, maintaining that they were insufficiently experienced to bear such a responsibility. They noted that after traumatic situations they were unable to talk about the experience. One midwife described how, after a negative outcome she decided that she wanted to become skilled at performing newborn resuscitation. They repeated that all midwives would experience non-breathing newborns eventually. They spoke of their lack of experience and the need for continuous, repeat training, while also revealing a broad variation in the practical training they had received.

Understanding the Importance of Correct Assessment
The midwives highlighted that they were the first profession to assess each baby after delivery. They emphasized that newborns' natural transition from intra- to extrauterine life took time. Some even claimed that they had the clinical skill to determine which newborns would need resuscitation. A participant spoke of the importance of acting and not waiting:

> I was worried, and knew this was about life and death … that's why it is important to act, not wait for another professional [who is] more knowledgeable than me … sometimes I think that I am only a midwife, and therefore I cannot initiate newborn resuscitation … but you are responsible for life and death …. (11)

They perceived that although they were calmer when they were prepared, they nonetheless felt the burden of their responsibility and were frightened to perform an assessment incorrectly. Several participants related that they were extremely focused when performing resuscitation, comparing it to having "tunnel vision"; they knew their role and what they had to do. Some spoke of the need for "automatic hands" and systematic work when performing resuscitation. Still, a midwife questioned whether she would ever be prepared sufficiently, noting that she feared the day when her knowledge would be insufficient. All participants stated that assessments must be performed correctly, but noted the challenges underlying the acquisition of such skills and knowledge.

Discussion and Comprehensive Understanding
From the findings, we discerned the complexity underlying how midwives balance stress when performing newborn resuscitation during the Golden Minute. The midwives seemed to be vulnerable, and they needed support and confirmation to manage the enormous responsibility they bore.

Our interpretation of the results can be presented through one midwife's quote where she compares midwives performing newborn resuscitation with the metaphor of a swimming duck; above the surface of the water, the duck swims calmly while underneath its legs paddle furiously. The duck appears untroubled and calm, similar to how midwives strive to present themselves as professionals. This metaphor describes midwives' lived experiences in a dimension that, while not translatable, it adds depth meaning to the text.[26] Using this

metaphor, we understand the complexity inherent in performing newborn resuscitation.

Our understanding is based on person-centredness and a person-centred practice framework that focuses on the constructs necessary for providing a person-centred service.[27] The framework pays attention to the characteristics of person-centred services at all levels of an organization and thus is a whole-systems approach to developing and ensuring a person-centred service. We use this framework at all levels throughout this study.

Performing newborn resuscitation in complex settings, midwives are expected to appear professionally competent.[27] Some participants revealed the complexity of newborn resuscitation in everyday clinical practice, and the extent of the burden of responsibility that they bear as midwives. They described how the stress linked to such responsibility affected them in varied ways. They felt anxious, sick or panicked or could even cry or vomit after a newborn resuscitation, noting physical symptoms from the stress they experienced. We also found that when the midwives performed newborn resuscitation alone they perceived that time moved slowly, regardless of the actual length of time that elapsed before help arrived. This is in line with Trevisanuto et al (2016), who found that those participating in a newborn resuscitation program perceived time intervals to be shorter than the actual time intervals.[28] Seemingly, when there is a lot at stake, time appears to move slowly. Nevertheless, this fact highlights how the situation for midwives differs from that of pediatricians or neonatal nurse practitioners, who have no responsibility for the mother, as well the obstetricians, who have no responsibility for the baby. This underlines the complexity of newborn resuscitation for midwives.

When understanding that midwives feel vulnerable and need support after newborn resuscitation, vulnerability needs to be considered. The expression of emotions, frustrations and sorrows are typical responses to vulnerability and some of the responses used by the midwives in this study. One explanation for this can be that midwives are dependent on others.[27] Midwives revealed that they sought support and confirmation from their colleagues, and furthermore stated that after a newborn resuscitation they needed support if they were to continue working as midwives. This places them in an apparent dichotomy, as on one hand they need support from colleagues and need to make themselves dependent on others for this; whilst on the other, this can be seen by others as a weakness. Seen both here and in other studies, midwives perceive support and confirmation from their organization, management and colleagues as being important, but challenging.[27] In our

study, some participants received frequent daily support from their midwifery leaders, while others did not. Some even experienced that, in an attempt to provide support, their midwifery leaders did not debrief them, which was perceived as misunderstood care. The extent to which nurses and midwives feel supported by their organization is a key consideration in their retention as employees and has been demonstrated in numerous studies as the key factor as to why nurses and midwives leave their job.[29] This factor was also evident in the findings of this study and according to one midwife, she would have left her profession if not for the support she received from her colleagues. Stress experienced by lack of support can also impact on a midwife's ability to assume the responsibility needed in newborn resuscitation. This support is related as an essential component for midwives to remain as midwives after stressful and traumatic experiences.[27]

The midwives felt newborn resuscitation to be a burden of responsibility. Even if midwives have not necessarily chosen the responsibility inherent in performing newborn resuscitation, they cannot avoid it. We found that being responsible included midwives being professionally competent.[27] Being responsible for life and death is challenging, and midwives in other studies have demonstrated poor skills levels in basic newborn resuscitation.[21,30] Here the participants described how, when performing newborn resuscitation, they became novices instead of experts, a change they associated with adrenaline and fear. This demonstrates how difficult it is to perform newborn resuscitation in real life, and highlights the importance of training in newborn resuscitation if midwives are to be expected to assume responsibility for it as a part of their professional role.

In our study, midwives expressed the need to increase their knowledge, and noted that while real-life experience gave them the opportunity to learn and develop, it was difficult or even impossible to prepare for newborn resuscitation. They also highlighted the importance of performing newborn assessment correctly. Even if they focus on normality, midwives are continuously aware of pathological changes. Various researchers have found that midwives report a lack of knowledge, skills and experience in newborn resuscitation.[15,16,21] Researchers saw improved technical skills and teamwork in newborn resuscitation after multidisciplinary team training.[31] Our study suggests that simulation is necessary but not sufficient with regard to preparing midwives, even though simulation training is currently the most commonly used method to develop newborn resuscitation skills.

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This study represents midwives' experiences with newborn resuscitation in a context characterized by low tolerance for maternal or newborn deaths. Obviously, this influences midwives' perceptions of responsibility, stress and vulnerability regarding newborn resuscitation. We recommend further research from other perspectives and cultural contexts to understand fully this clinical complexity about midwives' experiences in performing newborn resuscitation.

Strengths and Limitations

The research group included two professors, an associate professor and a doctoral candidate. Two members are nurses and two have extensive practice in nurse-midwifery, including newborn resuscitation. This provided a solid knowledge base our clinical and theoretical backgrounds ensured inside – as well as outside perspectives on newborn resuscitation.

To ensure trustworthiness, a large amount of data about midwives' experiences performing newborn resuscitation at maternity wards was provided.[24] During the interviews, participants were given the opportunity to share rich descriptions of their experiences to provide credibility. A detailed description of the research process, including data collection and analysis are described to ensure transferability. However, we are aware that our interpretation is one possible way of understanding midwives' experiences of performing newborn resuscitation.[26]

The interviews consisted of one open question, limiting the possibility that our pre-conceptions would influence the data material. However, because the participants took a strong interest in the research topic their willingness to participate might influence the findings.[24] The possibility of bias in the sample is present because midwives place a significant importance on newborn resuscitation as a key area of practice. However, their interest in this practice also demonstrates their motivation to participate in this study. Some midwives described situations from many years previously, and recall bias might also be an issue in the sample.

Conclusion

The vulnerability and responsibility that midwives bear for mothers and newborns simultaneously affected midwives in several ways. We saw that midwives need support and confirmation to be prepared for newborn resuscitation. We also found that a lack of knowledge, skills and experience were barriers to midwives feeling prepared. Simulation training, including tailored programs and debriefing, is suggested to improve midwives' skills and help them feel prepared for real-life resuscitations. The importance of midwives' assessment during the Golden Minute and further investigation from other perspectives are needed to understand fully this clinical complexity.

Disclosure

The authors declare no conflict of interests for this work.

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Paper II

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An exploration of midwives' perceptions of newborn resuscitation programmes for midwifery students

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Introduction

Around the world, significant issues are reported in midwifery education regarding newborn resuscitation. These issues are similar to those raised two decades earlier (Halamek et al., 2000); for example, in 2000, Halamek et al. reported that the newborn manikin's lack of fidelity compared to a newborn baby for realistic training was a major limitation—20 years later, we see the same issue in newborn resuscitation simulation training. Though there has been progress in newborn care, mission has been claimed uncompleted and more work is necessary (Halamek, 2016). A focus on the remaining tasks has therefore been called for, to initiate a cultural change underpinning the essential components regarding the provision of care to all newborns worldwide, every day (Halamek, 2016). One way to implement this cultural change is to draw on a person-centred nursing framework, as its foundation is composed of the core values guiding this paper (McCormack and McCance, 2017).

Newborn resuscitation represents basic, essential skills for midwives worldwide, skills that require continuous improvement (Enweronu-Laryea et al., 2015). Simulation-based training in midwifery skills has been reported to be beneficial, as midwives can learn from mistakes without risk to patients; it may also address the challenge of building competency in infrequent clinical situations (Cooper et al., 2012; Ennen and Satin, 2010). While mastering the skills involved in newborn resuscitation is difficult, both in high- and low-resource settings (Thallinger et al., 2015), there is no universal training programme in these skills (although there are guidelines) (World Health Organization, 2012; Wyllie et al., 2015). In other words, many questions remain unanswered around determining best practice and outcomes for newborns (Ades and Lee, 2016). Nevertheless, strengthening simulation-based medical education is argued as key to successful newborn resuscitation (Mileder et al., 2014).

In 1987, the American Academy for Paediatrics initiated a newborn resuscitation programme (NRP), which has been continuously improved upon in accordance with new evidence (Sawyer et al., 2017). Despite decades of multiple simulation training programmes, midwives still report a need to improve their skills and knowledge in newborn resuscitation (Alhassan et al., 2019). More than half of the midwives from a low-risk unit had imperfect resuscitation skills in a simulation context (Rovamo et al., 2013)—this highlights the urgency of ensuring that these skills are improved, as up to 10% of all newborns will eventually need resuscitation (Lee et al., 2011). A formal endeavour to increase midwifery competence in newborn resuscitation therefore needs to be supported by national policies (Khriesat et al., 2017).

Tailored training programmes in newborn resuscitation, in which individuals' professional background is taken into consideration, have been found useful (De Bernardo et al., 2016; Malmström et al., 2017). Because of their infrequent exposure to clinical newborn resuscitations, training programmes should be tailored to each profession's experiences, to ensure success in improving the providers' skills. Bernando et al. (2016) also reported a significant correlation between technical and nontechnical scores, which highlights the importance of adding nontechnical skills to the current guidelines on newborn resuscitation.

Research about midwifery students' experiences in newborn resuscitation is limited. In three studies from Australia, midwifery students described their experience of simulation exercises in newborn resuscitation (Bull and Sweet, 2015; Carolan-Olah et al., 2016, ; 2018). The available evidence shows that midwifery students improved their knowledge, confidence and skills in newborn resuscitation after simulation exercises (Carolan-Olah et al., 2016, ; 2018). Still, anxiety levels remained static, even if midwifery students felt more prepared after simulation training (Bull and Sweet, 2015). One of the identified benefits of simulation training as a method for learning is that it is designed for small groups; as such, everyone can take an active role, and have the time to reflect during the debriefing on their own communication and situational awareness (Carolan-Olah et al., 2018). Repeated simulation training over a longer period of time was also found to enhance preparedness for newborn resuscitation (Carolan-Olah et al., 2016). Further, researchers have discussed the importance of role understanding as essential to ensuring correct priorities and responsibilities (Carolan-Olah et al., 2016).

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Table 1
Description of included participants.

Participant	Age	Years of practice	Level of maternity ward, number of births/year	Experiences from different maternity wards
1	40	12	University hospital (7000)	1
2	38	2	Midwifery-led maternity wards (400), (2000)	2
3	50	14	University hospital (6000), maternity clinic (1400)	2
4	35	5	University hospitals (7000), (2750)	2
5	37	1	Maternity clinics (2000), (63,000), (650)	3
6	36	2	University hospital (6000) Midwifery-led ward (450)	2
7	56	25	University hospital (6000), Maternity-led wards (500), (50 000)	3
8	56	26	University hospital (6000), Maternity wards (2000) (500)	3
9	32	5	University hospitals (6000) (5000), Maternity wards (1500)	3
10	52	28	University hospital (6000) Maternity clinics (1600), (2000), (350), (30), (150)	6
11	40	7	Maternity clinic (3000)	1
12	40	5	Maternity clinic (3000)	1
13	61	35	University hospital (7000), Maternity clinics (800), (500), (2000), (3000)	5
14	56	32	Maternity clinics (430), (2000)	2
15	44	15	Maternity clinics (2200), (600), (2000), (800), (1500), (500)	6
16	42	15	Maternity clinics (60), (2000), (4000)	3

Because midwifery students' limited exposure to newborn resuscitation, researchers suggest that institutions prioritise the enhancement of bereavement support training, in an effort to practice these complex situations in midwifery education (Forster and Donovan, 2016). A study in which midwifery students were 'interrupted' while in a university classroom setting with an obstetric emergency—as a 'real-time' simulation—proved successful in helping them develop knowledge and skills for real practice (Deegan and Terry, 2013). However, though simulation has been used widely in midwifery education, the simulations have been reported to lack realism; this is compounded by the fact that some situations are impossible to simulate (McKenna et al., 2011).

Norwegian midwives attend most births and are not under the direction of physicians—as such, they are independently responsible for normal pregnancies and births (Skåre et al., 2015; Wyllie et al., 2015). Our research group emphasise that newborn resuscitation is demanding, especially for midwifery students, who still are novices within midwifery. As newly graduated midwives, they will often have the sole responsibility for neonatal resuscitations, but (as mentioned earlier) existing guidelines in newborn resuscitation are not specifically adapted to midwifery. Thus, it is crucial to develop a programme to help prepare midwifery students for these demanding situations. However, developing such a programme is made more challenging by the fact that limited research has been published on this topic—highlighting a clear gap in midwifery education. To help bridge this gap, we performed a qualitative study to explore midwives' perceptions about what constitutes necessary content and methods of instruction in a newborn resuscitation program tailored for midwifery students.

Methods

We conducted a qualitative study, using an exploratory, interpretive design (Creswell and Poth, 2018); this is proved to be a suitable method for exploring midwives' perceptions about developing the programme.

Table 2
Semi-structured interview-guide.

1.	Do you feel prepared for newborn resuscitation?
2.	How can midwifery students prepare themselves for newborn resuscitation?
3.	What should an educational programme in newborn resuscitation include?
4.	Can you please relate your experience in newborn resuscitation to knowledge, skills, communication and teamwork in simulation training?
5.	Do you have other comments or want to share experiences that have not been discussed during this interview?

Recruitment

To recruit eligible midwives, we posted an invitation to participate in the study on a Norwegian midwifery forum on Facebook consisting of 2300 midwives in August and September 2018. We also employed snowball sampling. Midwives working in high-risk and midwifery-led maternity wards in several hospitals were asked to pass along word-of-mouth information and/or flyers to colleagues they believed would meet the inclusion criteria (Creswell and Poth, 2018). The inclusion criteria were: registered midwives (whether newly graduated or experienced) who had performed newborn resuscitation on Norwegian maternity wards. We included a convenience sample of 16 midwives (Creswell and Poth, 2018).

Participants

The participants were female, Scandinavian language-speaking, aged 32–61 years, and representing urban and rural parts of Norway. They worked at small midwifery-led wards, maternity clinics or university hospitals, in which the number of births ranged from 30 to 7000 births annually. Their working experience varied, from 1 to 35 years (mean of 14 years), and they had experiences with newborn resuscitation from 26 different maternity wards (Table 1). 14 participants had a Norwegian university-college- or university-education and two were educated from institutions in other Nordic countries. Most of them had completed postgraduate education or courses, and some had worked abroad.

Data collection

Individual interviews was conducted by the first author, lwl, between August 2018 and January 2019 at different locations chosen by the participants. When themes began appearing repeatedly, the first and last author agreed on the 'richness' of the data and stopped recruiting (Graneheim and Lundman, 2004). The interviews had two aims: 1) to explore midwives' experiences of performing newborn resuscitation (Ljungblad et al., 2020); and 2) to explore midwives' perceptions about what constitutes necessary content and methods of instruction in a newborn resuscitation program tailored for midwifery students. The data presented in this paper focus on the second aim. Two pilot interviews were conducted, which were not included but which prompted adjustments to the interview technique and questions. This part of the interview followed a semi-structured interview guide consisting of 5 questions (Table 2), and lasted from 15 to 43 min (mean of 26). All interviews were recorded and transcribed verbatim by the first author. The data collected comprised a range of experiences relating to the content and methods of a tailored newborn resuscitation programme for midwifery students.

Data analysis

Systematic text condensation (STC) was used to analyse the data (Malterud, 2012). The analysis was conducted by the first and last authors and discussed and agreed upon by all authors. STC is a four-step cross-sectional thematic analysis (Malterud, 2012). In the first step, the

material was read to achieve an overall impression of the data and elicit preliminary themes. Preliminary themes centred around skills practice, theoretical knowledge, pedagogical tools, teamwork, learning from experience, reflection and structure. In the second step, the interview texts were read line-by-line, identifying meaning units representing midwives' perceptions of what constitutes the essential content and methods of a newborn resuscitation programme. The meaning units were coded and organised, and given the preliminary code-group names of 'craft knowledge', 'content' and 'structure'. In step three, we identified sub-groups exemplifying key aspects of each code group, and meaning units within the subgroups were summarised and condensed. Finally, we created an analytical text, based on the condensed subgroups. The titles were adjusted and elaborated, and quotations were used to elucidate the findings.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki; Ethical Principles for Medical Research in Human Subjects (World Medical Association, 1964). Approval for the study was granted by the Regional Committee for Medical and Health Research Ethics (2018/975). The Norwegian Centre for Research Data assessed the study and considered it to be outside the scope of sections 2 and 4 of the Health Research Act (60,726). Prior to the interviews, all participants received written and oral information about the study, including assurances of anonymity and confidentiality. They were informed that they could withdraw from the study at any time without explanation, and each participant provided written consent.

Results

This study highlights a significant need for simplified guidelines in newborn resuscitation adapted to the midwifery profession, as described in Table 3. Moreover, innovative methods are needed when developing a tailored programme in newborn resuscitation, and a supportive culture is emphasised as essential when performing newborn resuscitation.

> Guidelines for newborn resuscitation must be simplified and adapted to the midwifery profession

Pedagogical tools

The participants suggested that engaged educators from clinical practice be involved in the development of a tailored programme. They recommended that paediatricians start the session by speaking about the theory of basic normal transition, followed by an open dialogue with the possibility to ask questions and thus facilitate discussion. Further, these sessions should be precipitated by an e-learning programme, to provide basic knowledge in advance of the theoretical session. Videos and illustrations (preferably used in combination) were described as enhancing

Table 3
Overview of the code groups and sub-groups.

Code-groups	Sub-groups
Guidelines for newborn resuscitation must be simplified and adapted to the midwifery profession	Pedagogical tools Time and frequency Midwife-friendly approach
Innovative methods are needed when developing a tailored programme in newborn resuscitation	Practical skills Theoretical skills Midwifery competency
A supportive culture is essential when performing newborn resuscitation	Trusting and clear communication Safe culture

midwifery students' ability to acquire new knowledge. It was considered especially useful that videos can be watched repeatedly.

> I really believe in the use of videos, good videos that you can see repeatedly. And the use of mannequins of course… it must be hands on (10).

In addition, the participants emphasised that midwifery student's need authentic equipment to practise resuscitation, and that it is essential that they have a thorough understanding of all the equipment. However, some mannequins were described as too advanced or too rigid for students. Participants also felt students should be allowed to learn in their own way, in their own rhythm. They asserted that role play simulations must be stress- and expectation-free—and include circumstances in which students can make mistakes.

> We need to provide a safe context… that is very important, I think. You want to demonstrate that you are good and you fear making a fool of yourself as this will influence what your colleagues think of you (6).

Moreover, having enough time for reflection and frequent hands-on training was mentioned as important for increasing students' knowledge. A test (preferably undertaken as a quiz) in basic knowledge, both theoretical and practical and including foetal circulation and newborn transition, was suggested; relatedly, a competition around learning how to prepare the asphyxia table for transportation was highlighted as a way for midwifery students to rapidly become very skilled. A final suggestion was that midwifery students could make instructional videos in workshops, in which they argue for why they do which action at what time, to promote their own understanding of newborn resuscitation.

> …that students make instructional videos where they must argue professionally for the decisions they make. Then they need to argue why they start using oxygen or start bagging… what are their motivations for these actions (11).

Time and frequency

The midwives warned against training too many students in newborn resuscitation within a limited timeframe, as this can lead to frustration when students have insufficient time to become familiar with the equipment. Students need to learn about ventilation, mask positioning, equipment and free airways—all of which are time consuming. In addition to the duration of the training, the frequency of the training was deemed equally important, specifically regarding practising ventilation and assessing the mannequins for chest expansion. Several midwives emphasised that newborn resuscitation should be given greater priority, and should be practised at least four times during the midwifery education, preferably more often and in small groups.

> To avoid ending up becoming obstetric nurses we must rely on our professional knowledge and our abilities, and this requires training… at least four times during the education. This should be prioritized because we need midwives who are professionally confident (8).

The participants argued that while this training is not a direct replacement for hands-on clinical practice, it still resulted in more knowledge than a PowerPoint presentation.

Nevertheless, participants also suggested that students extend their clinical practice at the neonatal intensive care unit, and that they participate in a practical training session just before certification, once the students had gained a deeper understanding of the newborn. According to the participants, there can never be too much practical hands-on training. As one midwife argued,

> …everyone should practise all tasks in simulation training… everyone should be able to feel it in their fingers—there should be time enough so everyone can try, at least once (5).

Midwife-friendly approach

Midwives are responsible for assessing all newborn babies within the 'golden minute': within the first 60 s following birth, they must confirm normal onset of breathing, or initiate ventilation and simultaneously call for help if needed. A midwife in this study underpinned the responsibility involved in assessing a newborn baby:

> We are the first persons on the spot, so 'the golden minute' is still the most important time I think. You need knowledge about free airways, how to ventilate and how to call for help… we play an important role during the first minute (1).

According to the participants, midwives play an important role in the first minute, and the skills (e.g. ventilation) needed in this timeframe should therefore be the focus of the guidelines. As such, it was recommended that simplified guidelines be created for midwifery students, since the existing guidelines contained too much text to be considered midwife-friendly. They suggested that:

> 'Keep it simple' could be a useful motto, and a simplified print 'pocket' version of the guidelines would be ideal (1).

Innovative methods are needed when developing a tailored programme in newborn resuscitation

Practical skills

According to the midwives, students need to have frequent hands-on training to integrate the resuscitation guidelines into their day-to-day competence, as midwives often release the mask too quickly to assess the baby. Students need to be prepared before starting their first placement, and they need to know what is expected from them in newborn resuscitation to avoid panicking the first time they experience a non-breathing newborn. Several midwives suggested that frequent training in 'real life' was the only way to gain a 'clinical gaze'. 'Drilling days' in clinical practice, described as days of intensive skills practice, were described as beneficial and were advised to be held regularly.

> 'Drilling days' are good but practicing once a year is not enough since these days cover a variety of acute procedures. We need to practice at least twice a year, maybe every third month (4).

Moreover, to become skilled practitioners, the participants noted that students need to be curious about the equipment—not only to find out how it works but to feel safe using it in real situations. They also argued that simulation training with team members from other professions in practice placements at maternity wards could be beneficial; even though simulation is not a direct replacement for real life, participants felt that it provides students with necessary training before starting their clinical practice. The participants emphasised that midwives also need to be trained to take responsibility to perform newborn resuscitation whilst waiting for the resuscitation team to arrive. These kinds of skills (for example, ventilation) cannot be learned by watching from the bedside.

> You have to get it under your skin. You can read 100 books, but it cannot exclusively prepare you for such situations: feeling the bag in your hands when ventilating a baby (6).

Theoretical skills

The participants stated that studying theory about newborn resuscitation is easy—the challenging, but necessary, aspect is for students to *embody* the theory. Moreover, they argued that midwifery students need knowledge about the natural transition of the newborn as well as knowledge about anatomy, physiology and pathology in order to understand when and how to initiate resuscitation; this would enhance the confidence needed to determine the order of when and which actions to perform.

Knowledge about anatomy, physiology and pathology are important to know why we do what we are doing. So, obviously, the students must learn this. However, they also need to learn the concrete resuscitation procedure… what do we do when we resuscitate (13).

As such, they emphasised, an education programme should focus on providing students with sufficient knowledge for them to feel safe when initiating newborn resuscitation. It was suggested that one way to achieve this was for the theoretical and clinical parts of the resuscitation programme to have a 50/50 ratio. After having attended the programme, the students should be familiar with the guidelines and then practise newborn resuscitation repeatedly.

> So, practicing resuscitation regularly is important … we did that in school, but then everything was new, and it was difficult to understand what being in a situation like that would be like (5).

Midwifery competency

The participants described having developed a 'gut feeling' that they used when assessing the baby's breathing—which highlights the fact that not all newborns start breathing immediately. Some participants described colleagues as forgetting about midwifery competency and normal transition physiology; others said they felt inadequate yet still responsible for the situation. This responsibility was described as overwhelming even if the midwives had been trained for it.

> It feels like you are holding the baby's life in your hands… and in a way you do… That is why it's important to act and not wait for someone more skilled or experienced to turn up. Sometimes I think that I am 'only' a midwife, and I am not qualified to do this, but you are qualified. It sometimes feels like being responsible for life and death (11).

Relatedly, preparing midwifery students for such situations was reported as challenging, as one needs to 'just act' in these situations since newborn resuscitation consists of much more than a technical procedure. To avoid these situations, participants' emphasised knowledge about risk factors as essential—and that midwifery students be able to act on this knowledge automatically, when needed.

> It sometimes takes more than one minute before the colour changes, but I think that if you experience that the baby is slack and completely blue and it has a low heart rate, you understand that you need to act (4).

A supportive culture is essential when performing newborn resuscitation

Trusting and clear communication

The midwives argued that, to become clinical experts, midwifery students need to have a strong motivation to become skilled, gain knowledge and have the courage to discuss this topic. Here, having the ability to process by talking through critical situations and following up with a thorough debriefing was deemed essential. In addition, the participants emphasised that resuscitation teams require clear leadership to provide the necessary oversight around planning the next step in newborn resuscitation. In their own experience, they found closed-loop communication to be key in these situations. The participants underscored that, when performing resuscitation, it is vital that messages are clearly communicated and roles are clarified through both verbal and non-verbal communication.

> When you are standing in the labour ward with a baby in need of help, or if you are about to resuscitate a baby, communication with all parts involved is extremely important, especially communication with the persons who arrive at the resuscitation table when you come running out with the baby (8).

Consequently, it was recommended that students practise (verbal and non-verbal) communication as part of their education and, moreover, that communication skills be drilled in acute situations whenever possible in students' clinical practice. This latter should focus on students' ability to answer what, how and to whom do you communicate in this situation.

Communication is a tool and a skill, which is important to practice (2).

Safe culture

The participants felt that a universal theoretical foundation for all professions included in the team was key for understanding each other's roles in newborn resuscitation. It was thus advised that midwifery students practise their own role in conjunction with other members of the team, to make simulation training more realistic—participants argued that this would help increase the knowledge the students learned through their clinical practice.

Students should participate in the resuscitation training at their place of practice. It is extremely important to learn how to cooperate in acute settings (16).

It was recommended that they practise for at least half a day in these collaborative role-play simulations. Video-recording the simulation scenario was mentioned as a method to help facilitate effective debriefings following the activity and to enhance self-confidence and security.

Networking was recommended as a tool to help strengthen understanding and communication around the other team members' roles—and, importantly, to facilitate a safe and supportive culture. Teamwork was described as essential to both learning and practising newborn resuscitation—and teamwork in simulations was emphasised as a way to allow midwifery students to fail without fear.

In the beginning, it is ok just to learn the principles and avoid too much stress. You should be allowed to try and fail… to know that you can do that (9).

It was also emphasised that a team is essential to managing newborn resuscitation—or birth, more generally. They described having a good team member as a positive, and that *being* a good team member is important. Some acute resuscitation situations were described as impossible to prepare for, but that this was mitigated by support from colleagues. One midwife explicitly stated that students should never be made to feel afraid to call for help. This kind of supportive culture, they argued, would also help enhance midwifery students' confidence in performing newborn resuscitation in maternity wards. As one participant remarked,

…the culture in the maternity ward should be supportive, and you should never be alone, (…) the ward culture, communication culture, should be 100% safe—you are never alone, that should be the culture (15).

Discussion

We aimed to explore midwives' perceptions about what constitutes necessary content and methods of instruction in a newborn resuscitation programme tailored for midwifery students. The findings highlight a significant need for simplified guidelines for midwifery students, the use of innovative methods to increase midwifery students' competency, and facilitating a supportive culture to manage newborn resuscitation.

One of the main findings in this study revealed that the existing guidelines in newborn resuscitation are too complex and contain too much text, making them confusing for clinical midwives to follow systematically. In addition, the participants suggested that the guidelines

then be printed in a pocket version. They were confident that these elements (especially simplifying the guidelines) would enhance midwifery students' ability to manage newborn resuscitation. This finding has not been identified elsewhere, and adds new insight into the needs of midwifery competency in newborn resuscitation.

Research has shown that midwifery students had the same level of theoretical knowledge six months following newborn resuscitation training, even they had not retained their practical skills as well (Caldelari et al., 2019). This demonstrates that the frequency of training is essential to maintaining practical skills. Our participants suggested the motto 'keep it simple' as a way to ensure proper focus in newborn resuscitation: i.e. on ventilation within the 'golden minute', in which midwives assess all newborns before consulting other professions for help. However, a need to increase midwifery knowledge and skills and to improve midwifery students' confidence in newborn resuscitation simulation training is supported by findings from a recent Australian study (Carolan-Olah et al., 2016).

Nevertheless, it has been found difficult to construct real-time simulation in a university context, even though it helped midwifery students develop their knowledge and skills in managing newborn resuscitation (Deegan and Terry, 2013). An open debate was recently introduced in midwifery education about the pedagogical use of the High-Fidelity Perinatal Simulation (Vermeulen et al., 2017). As a positive perspective into midwifery education, our study's findings contribute to this debate by suggesting pedagogical improvements and simplified guidelines in newborn resuscitation. Karakoc et al. (2019) suggested computer-assisted simulation as a student evaluation at maternity wards to effectively improve knowledge and skills—a suggestion made by the participants in our study as well. There are a range of new technological tools available today; for example, with Lerdal's eSim, one can repeatedly resuscitate a virtual newborn to learn the steps in newborn resuscitation, and simultaneously receive feedback for use in self-reflection (Ghoman and Schmölzer, 2019; Ghoman et al., 2020). In addition, virtual reality can enhance the simulation experience for midwifery students and may be an ideal method to learn newborn resuscitation (Williams et al., 2018). We suggest that innovative methods for learning newborn resuscitation, including virtual reality, be implemented in an educational programme, as this method includes no risk for newborns regarding patient safety (World Health Organization, 2011). In the future, it is possible that technological developments will lead to 'life-like' scenarios, specifically tailored for clinical midwives and students to repeatedly train and prepare themselves for real life newborn resuscitations.

Our findings agree with those of other studies describing a need for educators to engage in designing and conducting research on using virtual reality in midwifery programmes (Fealy et al., 2019); this kind of approach would help midwifery students gain this knowledge 'by heart'. However, theoretical knowledge is also required—especially, as the participants in our study highlighted, regarding the natural transition for newborns. Midwives delayed starting ventilation, were unable to keep the mask sufficiently tight, over-expanded the lungs and followed the guidelines inadequately even after simulation training; as such, the authors recommend frequent hands-on training programmes in newborn resuscitation (Rovamo et al., 2013). The findings from our study suggest that e-learning and practical hands-on training should thus be more frequently used in tandem in midwifery education.

The need for frequent simulation training was also raised by the participants. Other research has demonstrated similar findings, reporting that frequent, brief, on-site training was beneficial (Mduma et al., 2015). Participants referenced storytelling as a helpful debriefing method—this suggestion is supported by a recent study reporting positive student evaluations of web-based, interactive storytelling as having the potential for learning and teaching in midwifery education (Scamell and Hanley, 2017). The contextual setting does not matter in storytelling, and as

such does not require expensive and technological equipment; this kind of person-centred context is highly valued in a person-centred nursing framework (McCormack and McCance, 2017). Participants also recommended the use of performance skills stations, integrated skills stations, simulations and debriefing, all of which build on existing systematic advances in newborn resuscitation (Sawyer et al., 2017).

Our findings highlight the need for midwifery students to have a safe context in which to interact and communicate. Midwifery competency, knowledge and intuition are closely related to embodied knowing and knowing one's self, components in a person-centred nursing framework (McCormack and McCance, 2017). We argue that we must draw on the values in person-centredness concerning mutuality, reciprocity, empowerment, participation and critical reflexivity, as key for enabling midwifery students to understand their role in newborn resuscitation, to ensure correct responsibilities and priorities (Carolan-Olah et al., 2016; McCormack et al., 2017). Moreover, midwifery students' understanding about their role improves in simulation training, specifically when communication skills and task delegation are areas of focus (Ruyak et al., 2018). In simulation training, too, midwifery students prepare themselves—and reflect upon this preparedness—to manage newborn resuscitation (Forster and Donovan, 2016).

Participants in our study further argued that a supportive culture is essential for midwives to feel safe learning and practising newborn resuscitation. Prior research shows that even when midwifery students are more prepared for newborn resuscitation after simulation training, their anxiety levels remain static (Bull and Sweet, 2015). As such, a supportive culture when working in teams is key to reducing this anxiety, and thus a person-centred approach in the ward or in simulation training should be emphasised (McCormack et al., 2017).

A recent study found that even when the midwives reported improved knowledge, confidence and skills, they still felt unprepared for newborn resuscitation, and requested a newborn resuscitation programme to strengthen their knowledge and confidence (Carolan-Olah et al., 2018). Moreover, the authors report that the midwives requested active participation in simulations, to learn from each other in a collaborative approach (Carolan-Olah et al., 2018; McCormack et al., 2017). However, simulation training in newborn resuscitation is argued to be more beneficial if it takes place earlier in the midwifery curriculum (Coyer et al., 2014), which is in line with our study's findings. Here, simulation training in newborn resuscitation should be focused not just on improving midwifery students' practical skills but it also needs to include reflection and critical thinking; in this context, the educator plays an important role in facilitating a safe culture of learning and practice (McCormack and McCance, 2017; Lendahls and Oscarsson, 2017).

Related to this, participants pointed to the helpfulness of debriefing to create a safe maternity ward culture. However, although others have found debriefing to be a critical component in simulation, the participants in this study were frustrated by a lack of systematic debriefing to enhance their practice (Sawyer et al., 2016). Simulation training has had positive outcomes in this respect, strengthening midwifery students' professional training and facilitating a culture of safety and support (Reyhan et al., 2018).

Strengths and limitations

A qualitative study is not meant to make changes at a macro level. However, the use of a convenience sample with thick descriptions may still provide insight, and ensure sufficient information both to enhance credibility and for the reader to conclude whether the findings are transferrable to similar situations (Lincoln and Guba, 1985). To enhance the study's validity, we drew on Malterud's (2001) concepts of internal and external validity and reflexivity. The research group included two professors, an associate professor and a doctoral candidate; two members are nurses and two have extensive practice in nurse midwifery, including in newborn resuscitation. This provided a solid knowledge base and

a varied perspective on the study topic. We discussed whether the study explored what it intended to explore, and if appropriate methods were chosen; it was decided that the use of individual interviews allowed the participants to speak freely about challenging situations at a personal level. Regarding external validity, we agreed to have a sufficiently varied sample (Malterud, 2001); we included midwives living in urban and rural areas in Norway with different experiences, all of whom were engaged in the topic. This latter issue may be a limitation, however, as their willingness to participate may represent self-selection bias. Finally, midwifery students were not included in our sample, and this may have affected external validity (Malterud, 2001).

Conclusion

This study highlights a significant need for simplified guidelines in newborn resuscitation adapted to the midwifery profession. Innovative methods are necessary when developing a tailored programme to increase midwifery students' competency, and a supportive culture is emphasised as essential when performing newborn resuscitation. We suggest that all aspects of the existing guidelines be taken into account when developing a newborn resuscitation programme tailored to midwifery students. Further research—including the development and implementation of a tailored programme in newborn resuscitation in midwifery education—is recommended, to help prepare midwifery students for their clinical practice and everyday work.

Conflict of interest

None declared

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.midw.2021.103021.

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Paper III

Ljungblad, L. W., Skovdahl, K., McCormack, B., & Dahl, B. (2022). "Keep It Simple"-Co-Creation of a Tailored Newborn Resuscitation Course for Midwifery Students. *Advances in medical education and practice*, *13*, 81-93. https://doi.org/10.2147/AMEP.S346991

ORIGINAL RESEARCH

"Keep It Simple"—Co-Creation of a Tailored Newborn Resuscitation Course for Midwifery Students

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Purpose: To develop a tailored newborn resuscitation course for midwifery students.

Patients and Methods: A qualitative study using an explorative, abductive approach was applied. Co-creation through workshops was facilitated to develop a tailored newborn resuscitation course for midwifery students. Four workshops with midwifery students and midwives were conducted from May to October 2020. Twenty participants attended one workshop of their choice. Five out of Norway's six midwifery education programmes participated, and included midwives from across Norway. All workshops were held digitally via the Zoom platform. A seven-step framework analysis method was applied to analyse the workshop data.

Results: We identified four themes: 1) practice guidance, 2) technical skills 3) non-technical skills 4) innovative methods.

Conclusion: Findings emphasize the importance of practice guidance, technical skills, non-technical skills and innovative methods to facilitate the learning process. However, these skills cannot be acquired without the context to facilitate them, and thus a supportive culture is essential to sustain newborn resuscitation expertise as a midwife/midwifery student. We found that midwives expressed the same need to learn, train and prepare themselves for newborn resuscitation as midwifery students. The importance of facilitating the learning of newborn resuscitation with low-dose, high-frequency training in a supportive culture thus matters to both midwifery students and expert midwives.

Keywords: co-creation, course, framework analysis, midwifery students, midwives, newborn resuscitation, PARIHS framework

Introduction

Newborn resuscitation is largely defined as a set of interventions initiated after delivery to help newborn babies start breathing.[1] The complexity of handling newborn resuscitation is particularly pertinent to midwifery, as midwives perform the most deliveries globally.[2] Approximately 10% of all newborn babies need some assistance with the natural transition to breathing after birth,[3] and recent evidence suggests that this might be as high as 20%.[4] It is therefore essential that midwives are able to respond appropriately, and to maintain their newborn resuscitation skills. Moreover, to ensure that midwives handle newborn resuscitation appropriately, midwifery students must learn these skills before becoming registered midwives.[5]

However, newborn resuscitation has historically been a challenge for midwives. In 1987, the American Academy for Pediatrics (AAP) implemented a newborn

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resuscitation programme (NRP) that has been continuously improved.[6] Two decades ago, a new paradigm in teaching newborn resuscitation was recommended, due to the lack of fidelity of the newborn manikin traditionally used.[7] While this goal has been addressed in recent years, calls remain for a cultural change around what constitutes the essential components of newborn resuscitation.[8] Moreover, midwifery studies from around the world report other challenges associated with performing newborn resuscitation: among these are a lack of knowledge and skills, organizational constraints and inadequate teamwork.[9,10] Additional studies highlight an urgent need to strengthen simulation-based training for effective newborn resuscitation, and for formal education in order to increase midwives' competency in this area.[11,12]

In a previous study, we found that midwives described newborn resuscitation as frightening, complex and challenging;[2] we thus identified the importance of tailoring a course for midwifery students to prepare them for newborn resuscitation through their own contextual understandings. This tailored newborn resuscitation course emphasizes a supportive culture and simplified guidelines for performing newborn resuscitation.[5]

Further, although effective ventilation is the most critical step in newborn resuscitation[13] and indeed has been described as a cornerstone in newborn resuscitation,[14] ineffective ventilation is often the reason for unsuccessful resuscitation.[15] Due to midwives' infrequent exposure to newborn resuscitation in clinical training, professional development programmes are needed to improve their skills in this area.[16] In the current study, therefore, we focused on midwifery students' process of learning about and preparing for newborn resuscitation; we then developed a prospective course through co-creation with midwifery students and midwives, which might be transferrable to similar settings.

Maternity services in Norway operate from the perspective that all pregnant women are healthy or without complicating factors during their pregnancies. Healthy women are selected into categories in delivery with a midwife in charge. Any pathologies in pregnancy that require medical treatment are seen by an obstetrician in addition to the midwife. Norwegian midwives are registered with an additional authorization after being registered as nurses, and are solely responsible for all normal deliveries. This responsibility is split between actively supporting a mother's safe delivery of her baby and her baby's need of newborn resuscitation.

Norwegian midwives assess all newborn babies for Apgar scores at 1, 5 and 10 minutes following birth.[17] When newborn babies do not breathe within one minute, immediate assistance is required. As midwives are present at most deliveries, they are tasked with providing newborn babies sufficient assistance at the correct time to naturally transition to breathing. This transition also needs "some seconds", and it is challenging to measure precisely when the situation is no longer normal: this can be described as tacit knowledge based on years of midwifery experience and practice. The midwifery role and midwives' tacit knowledge in newborn resuscitation is essential for their ability to conduct correct assessments and initiate newborn resuscitation at the correct time. In addition, there is a need to consider contextual factors that impact on the gaining and sustaining of these skills, like the culture created at each maternity ward.[18]

There is limited research on how midwifery students learn to perform newborn resuscitation. However, three Australian studies describe midwifery students' experiences of simulation exercises for newborn resuscitation.[19–21] While midwifery students reported improved knowledge, confidence and skills in newborn resuscitation after these exercises,[20,21] their anxiety levels stayed static, even though they were better prepared.[19] Simulation training as a method of learning has been emphasized as suitable for small groups, in which everyone has an active role in debriefing and reflecting on the clarity of communication and situational awareness.[21] Notably, for it to be effective, this training needs to be repeated over a longer period of time.[20] Additionally, role understanding is highlighted as essential in midwifery to ensure correct priorities and responsibilities.[20] Students have limited opportunity to practise newborn resuscitation in clinical practice; as such, there is a need to improve support in midwifery education to manage such complex situations.[22] Moreover, research suggests that the current approach to improving midwifery students' understanding and developing their cognitive skills needs to be changed.[23]

Despite decades of multiple simulation training programmes, midwives still report a need to improve skills and knowledge to be prepared for newborn resuscitation.[24] Although courses have been developed and published, no consensus has been reached about how best to prepare midwifery students for the complexity of newborn resuscitation. We therefore designed this study to develop a tailored newborn resuscitation course for midwifery students.

Materials and Methods

Aim

The aim of this study was to develop a tailored newborn resuscitation course for midwifery students.

Design

A qualitative study with an explorative design and an abductive approach was applied.

Theoretical Underpinning

Changing practice and implementing new ideas in midwifery education is complex with respect to both macro and micro aspects. Conceptual frameworks have been developed to help promote the implementation of research into practice,[25] as the latter can be "complex, messy and demanding".[26] In this study, the Promoting Action on Research Implementation in Health Services (PARIHS) framework was used to design, plan and facilitate the workshops. This framework is multidimensional and consists of three core structures derived from research on practice development and quality improvement: evidence, context and facilitation. Successful implementation occurs when the evidence matches the context (ie, professional consensus and patient needs). Moreover, to change the culture, leadership that includes internal and external facilitators of change is needed.[25] The PARIHS framework has been further developed and validated, especially through "the meaning of context" to promote evidence-based practice.[27] The PARIHS framework, as a theory of change, informed our decisions when drawing on the empirical evidence base, contextualizing that evidence base and utilizing local experience and expertise. These components

are recognized as part of the evidence constructed in the PARIHS framework. Co-creation in the workshops was facilitated to develop a tailored newborn resuscitation course for midwifery students.[28] We discussed the design of the course with the participants; we also discussed how it might work in their specific contexts. We worked iteratively throughout the entire process using the lenses of evidence, context and facilitation.

Recruitment and Participants

Recruiting midwives and midwifery students to participate in the workshops was a two-step-process. In total, 8 midwives and 12 midwifery students contacted the first author, LWL, to participate in 1 of the 4 workshops. Students from five of Norway's six midwifery programmes participated, as did midwives from across Norway. Table 1 provides details of the characteristics of the workshop participants. Two workshops were comprised of a mix of registered midwives, and two workshops consisted of midwifery student participants.

Midwives

A convenience sampling method was applied. We recruited midwives for participation from a previous study we conducted that focused on midwives' experiences of newborn resuscitation.[2] Sixteen midwives from the prior study were contacted and asked if they would be interested in participating digitally in the co-creation of a newborn resuscitation course. Eight midwives attended either of the two workshops that were scheduled at dates and times convenient for participants.

Table 1 Characteristics of the Workshop Participants

	Participants, in Total	Registered Midwives	Years of Midwifery Practice	Midwifery Students 1st Year	Midwifery Students 2nd Year
Workshop 1	3	3	Midwife 1: 3 years Midwife 2: 14 years Midwife 3: 37 years	–	–
Workshop 2	5	5	Midwife 1: 7 years Midwife 2: 16 years Midwife 3: 20 years Midwife 4: 28 years Midwife 5: 30 years	–	–
Workshop 3	4	–	–	–	4
Workshop 4	8	–	–	6	2

Midwifery Students

Midwifery students were recruited from most of the midwifery programmes in Norway to ensure a wide distribution in our sample. They received information about the study via Facebook (a midwifery forum) and Canvas (the universities' digital platform for midwifery education). They were willing to give their perspectives on the prospective content of a newborn resuscitation course for midwifery students.

Data Collection

Four digital workshops were conducted from May to October 2020 via the Zoom platform due to COVID-19 restrictions. The workshops lasted from 70 to 111 minutes. LWL facilitated all workshops, of which a co-researcher attended two. LWL emphasized the value of participating in the development of this newborn resuscitation course. The aim was to create a safe, respectful and non-judgemental atmosphere, by emphasizing expert competence and valuing all participants' ideas, perspectives and experiences.

All participants briefly introduced themselves, and they were encouraged to talk freely and to interrupt when they had ideas to share. We used several creative tools in the workshops to stimulate participant engagement. For example, we focused on the top section of the existing guidelines by holding up an empty gold frame. This frame symbolized the "golden minute", to help participants visualize the importance of a midwifery focus when encountering non-breathing newborn babies at birth. The participants were asked to describe and discuss what this focus should consist of. Next, a video clip from the British Broadcasting Corporation (BBC) production Call the Midwife[29] was used to illustrate what a period of 60 seconds feels like in a resuscitation situation. Participants then made a word cloud online with words they would use to describe and characterize newborn resuscitation. After this introduction, participants were encouraged to discuss how to tailor a newborn resuscitation course for midwifery students. A poem describing newborn resuscitation from outside the discipline of midwifery was read aloud to stimulate further discussion.[30]

We chose to conduct workshops to build on each other's experiences and ideas in a co-creation process. To ensure that all participants' voices were heard, follow-up questions were asked to give each participant the opportunity to contribute. The workshops were both audio- and video-recorded through Zoom. Three-hundred and fifty-one minutes of workshop-material was transcribed verbatim, resulting in 143 pages of data for analysis.

The themes that emerged from the analyses were then translated into a prospective newborn resuscitation course for midwifery students. The outline for this course was sent by e-mail to all participants for review, and we asked for their feedback: all participants who answered agreed to the course outline.

Ethical Considerations

The study was conducted in accordance with the Helsinki Declaration.[31] Approval for this study was given by the Regional Ethics Committee, and the Norwegian Centre for Research Data. Coreq checklist was applied. All participants received written information about the study, including assurances of anonymity and confidentiality, with the opportunity to withdraw from the study at any time without explanation. This information was sent by e-mail to all participants before participating in the workshops. All participants also received an e-mail with an invitation to the digital workshops and agreed to participate by entering the digital workshop room at the scheduled time. Audio- and video-recordings from each workshop were accepted by the participants and field notes were written. Data were stored on a safe server at our university, accessed only by the first author. Lists of participants and codes were kept separately in a locked drawer. To further ensure confidentiality, the quotations selected for this article do not expose any participants' identity.

Data Analysis

Data analysis was informed by a seven-stage model of framework analysis,[32,33] detailed below.

Stage 1: Transcription. LWL transcribed each workshop verbatim and anonymized all participants before starting the analysis. Double spacing and large margins were created for later coding, impressions and analytical comments.

Stage 2: Familiarization with the data. LWL transcribed and re-listened to all workshop recordings, and thus familiarized herself with the empirical material as a whole. LWL also read and read the notes, comments and impressions she had written. The other researchers read the transcribed material or attended the workshops.

Stage 3: Coding. This stage was informed by the constructs from the overarching PARIHS framework. The transcriptions were read line by line and marked with codes describing what participants found important eg,

values, behaviours, incidents or structures within newborn resuscitation. We coded all data for further comparison with the entire data set. The coding was done with pen, paper, a yellow highlighter and sticky notes of varying colours.

Stage 4: Developing a working analytical framework. After coding the transcripts, the labels were compared and grouped together into categories. The researchers met weekly (digitally) to work on the development of this analytical framework. It was an iterative process, and several codes and different approaches were tried out to help us visualize the framework.

Stage 5: Applying the analytical framework. Each code was used as an index for easy identification in the transcripts. We structured and organized the data to make it accessible for further analysis.

Stage 6: Charting data into the framework matrix. A large amount of data were entered into the framework matrix. A vital step in the analysis process was to summarize and reduce the data. Whole segments of data relating to different categories from each workshop transcript were first entered into the matrix before they were reduced, but they retained their original meaning. Illustrative quotations were also noted.

Stage 7: Interpreting the data. LWL wrote notes before, during and after the workshops to make sure that impressions, thoughts and early understandings of the data were noted. In this final stage, we revisited these notes after working on the matrix, and found a general similarity to our initial understanding of the data. Gradually, however, differences between the data emerged, and four clear themes were identified in response to our study aim.

Results

We identified four themes that emerged regarding the development of a tailored newborn resuscitation course for midwifery students: 1) practice guidance, 2) technical skills, 3) non-technical skills, and 4) innovative methods. These themes are illustrated in Figure 1, and form the framework for learning newborn resuscitation.

Practice Guidance

Participants emphasized the importance of basic theoretical skills in the first minute of newborn resuscitation, also describing it as "the most frightening minute". A midwifery student in Workshop 3 described newborn resuscitation as a "make-it-or-break-it experience", which she experienced as traumatic. After the experience, she was
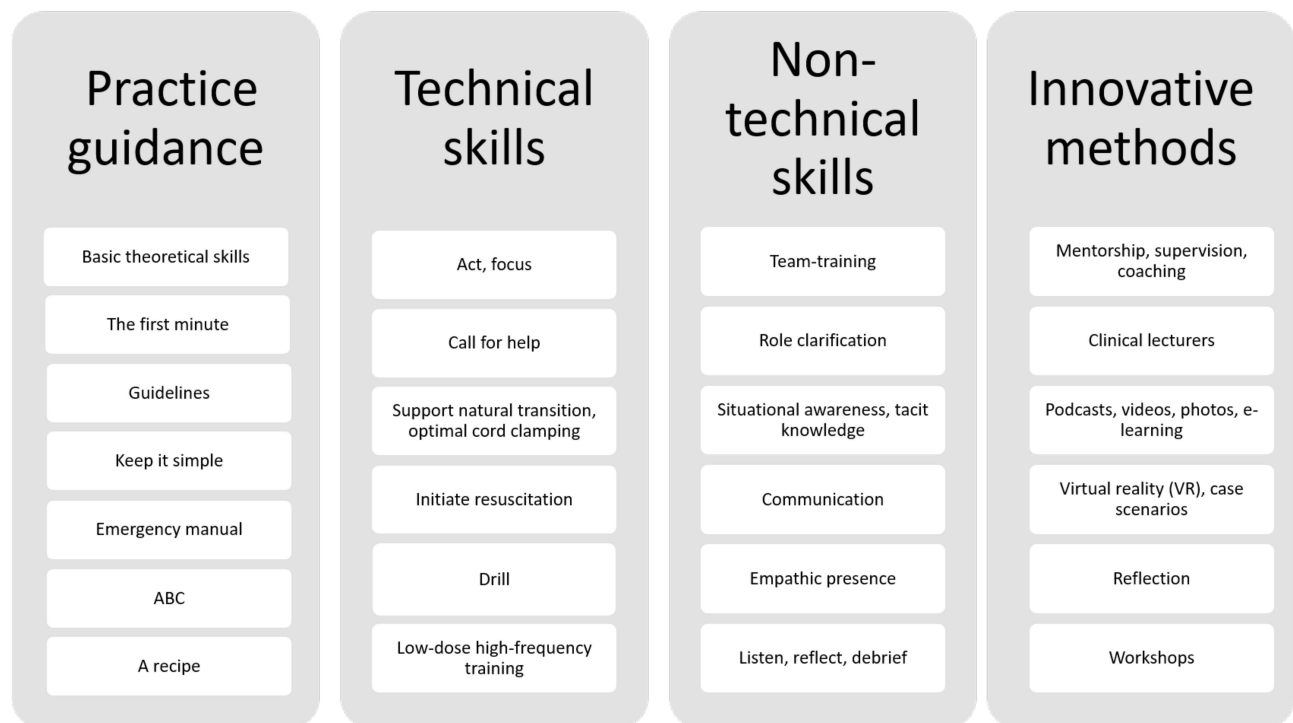

Figure 1 Themes regarding the development of a midwifery newborn resuscitation course.

uncertain as to whether she wanted to continue training to be a midwife; it had occurred early in her placement, and she had felt unsupported during it. Another midwife concurred:

> I believe that everyone is scared when initiating newborn resuscitation, but it helps me when I have gained the knowledge I need to be able to act to resolve situations … It is frightening every time I do not know what to do … It is still the same feeling even after decades of experience … I feel a lump in my stomach, but then my mind focuses and it's as if my brain is going through a tunnel. (Midwife, Workshop 1)

Other participants agreed with this statement, and noted that they felt unprepared to handle these situations because of a lack of training and infrequent clinical emergencies. In each workshop, the complexity of the existing guidelines were discussed. Participants described the national guidelines in newborn resuscitation as overly complex, containing too much text, difficult to understand and hard to follow in emergency situations. An experienced midwife described this as follows:

> I believe that is because it's too complex … I find that the guidelines are too complex even though I have had 35 years of midwifery practice … To make it simple enough is what is most difficult … focusing on the top section of the guidelines … Surrounding factors also matter. (Midwife, Workshop 1)

Additionally, midwives discussed the challenge of being responsible for the mother and the baby simultaneously, and how this was complicated by the overly complex guidelines. They thus recommended simplified, clear guidelines —such as a checklist or "recipe"—to tell them exactly what to do and when. Indeed, "keep it simple" was repeatedly mentioned among the participants. They suggested that the emergency manual be written like a "recipe" or as an "ABC" specifying the three most important elements, which one person could then read aloud in a resuscitation situation. As this midwife described:

> To simplify the three most important elements … Experience, recognition and awareness are complicated to learn … Even after 20 years I question whether I did everything correctly … but I know what to do … Three elements, like an ABC for students. Then experience will come later. (Midwife, Workshop 2)

Technical Skills

Technical skills were highlighted as a priority. Participants noted that all students and midwives need this basic knowledge before advancing their skills and integrating non-technical skills into the complexity of newborn resuscitation situations:

> Learning by doing … hands on … It might be a secure start if the teacher enters the room after the students have practised for a while … It is about feeling secure, and being allowed to fail. (Midwifery student, Workshop 4)

Keeping a clear focus on ventilation in newborn resuscitation was described as essential, as well as being familiar with all equipment. Moreover, most participants cited calling for help and initiating resuscitation by stimulation and ventilation as supporting newborns' transition to breathing. Optimal cord-clamping was mentioned as another important measure to continue to provide newborn babies with already pre-warmed oxygenated blood. Participants also discussed that resuscitations could often be avoided if the cord was kept intact:

It's important to teach midwifery students that as long as the placenta and the cord are intact, there is no need to panic, because the "life-vest", the umbilical cord, is still attached to the newborn baby and we must support this normal phenomenon. Warm, oxygen-rich whole blood is still finding its way from the placenta into the newborn baby. (Midwife, Workshop 2)

Technical equipment was pointed to as important for supporting the natural transition to breathing and simultaneously initiate resuscitation. A drill to "practise, practise, and practise" systematically was mentioned as the only way to gain and sustain skills in newborn resuscitation. Regular simulation training and practical training were requested, as many midwives reported having simulation training only once per year. Short sessions, repeated frequently and preferably mandatory, were recommended. As this midwifery student explained:

> 'Training has to be frequent … regular and frequent … Instead of training for two hours, it should be repeated until one becomes skilled and feels safe and secure'. (Midwifery Student, Workshop 3)

Low-dose high-frequency training was suggested by the participants as a solution to becoming skilled in newborn resuscitation. Another midwifery student highlighted the following goal:

The goal must be to train as much as necessary until one can act automatically when required … just acting without stopping and thinking … I believe it is the

frequency of the training that gives the feeling of safety and security. (Midwifery student, Workshop 4)

Non-Technical Skills

Team-training was suggested as a solution for all professions to get to know each other for better cooperation. Role clarification was discussed as essential for successful resuscitation. Several midwives described having unclear roles, and often experiencing conflicts of values in situations where the mother and newborn baby were separated after delivery because the equipment for resuscitation was placed in another room.

Participants discussed how all midwives will experience newborn resuscitation at some point in their career. They pointed out that although tacit knowledge and midwifery experience are often forgotten in a busy ward, they are important to teach midwifery students. Here, situational awareness and embodying the essential principles of resuscitation were seen as essential to learn—but challenging to teach. One midwife described this as follows:

> You cannot transfer 10 years of midwifery knowledge and 3 to 4 resuscitations into a student … This is my intuitive understanding, where I save my thousands of impressions and do not have to analyse but immediately recognize similar situations … I value my knowledge gained through years of experience as pure gold, calling it my "emergency tool-box" … We can give students tools for building their experience … and help them dare to be humble and ask for help … This is the content of tacit midwifery knowledge. (Midwife, Workshop 2)

Participants considered communication as a bridge among all professionals on the birth team. They were clear about the need for training in effective communication, and claimed it was "the root of everything". They emphasized the importance of being skilled in non-verbal communication, as well, such as facial expressions or glances. As one midwife noted:

> I just nodded my head and my colleagues responded with a smile to confirm that everything was okay'. (Midwife, Workshop 1)

Relatedly, the midwives emphasized that "chaos control" was important for students to learn as part of non-verbal communication. Some midwives described how tranquillity could quickly turn to chaos. Further, participants noted and discussed the impact of their empathic presence on the emergency team. Moreover, feeling safe in the team was emphasized as important:

> We all quickly become part of a culture, good or bad. It is our responsibility to be aware and include students in a positive environment … to support each other to become good at what we do … to become part of our winning team. (Midwife, Workshop 2)

"Listening and reflection groups" were suggested as a way to help midwives reflect on their own and other's actions. One midwife described this as follows:

> No matter how much education we embed in the students, it does not change the fact that the maternity ward is an acute ward and midwives will encounter difficult situations as part of the job. We need to reflect together in systematic debriefing sessions. You cannot be a midwife by only approaching the positive aspects. (Midwife, Workshop 2)

To facilitate reflection and discussion, self-selected small groups were preferred—especially for debriefing. As this midwifery student stated:

> It has to be a safe learning environment, preferably in small groups … with somebody you feel safe with … and somebody who focuses on the fact that it is not a test, but a training session … But we are kind of tested all the time in our practical placement. (Midwifery student, Workshop 3)

Innovative Methods

Participants highlighted the importance of mentorship and supervision in developing midwifery students' confidence and preparation regarding newborn resuscitation. The participants discussed various creative and innovative methods for learning newborn resuscitation. Midwifery students requested engagement from clinical lecturers, as they could bring their clinical experience into their teaching about newborn resuscitation. The students described newborn transition as the most difficult topic to learn, because of the advanced physiology of cardiopulmonary circulation. They requested more lectures about this, as they highlighted the importance of this understanding.

Podcasts were mentioned as effective tools for learning this physiology, because they could be listened to repeatedly. Videos, photos and e-learning about how to assess newborn babies were pointed to as other useful learning tools. Virtual reality (VR) and case scenarios were also described as beneficial, as they emphasized students' active role in their own learning.
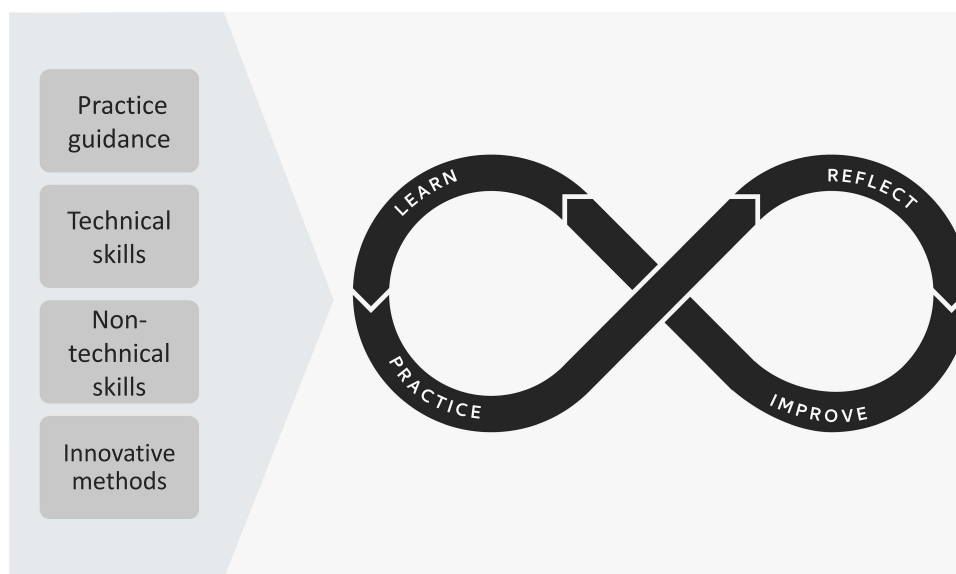
Figure 2 Midwifery newborn resuscitation course.

We use VR and it is fantastic. You get your nose out from the books … It is an excellent way of learning, but it has to be related to existing routines … It would be interesting to try newborn resuscitation in VR … It should be more widely used in midwifery training. I am very happy with it and positively surprised. (Midwifery student, Workshop 4)

Supervision and coaching were reported as the most effective way of learning newborn resuscitation, especially with reflection as the focus. Here, reflection on one's own learning was described as visualizing what each midwife or student needed to enhance practice. One way of facilitating reflection was to create workshops that include first- and second-year students and help them reflect upon their own learning and be creative within a safe culture. As one student described,

Workshops with first and second year students for sharing recent experiences about being new into midwifery could be useful … It would have been good to share my experiences with somebody at a similar level of education. (Midwifery student, Workshop 3)

Summarized and Interpreted Results

The very first results is presented in Figure 1 are recognized as essential components. The midwifery newborn resuscitation course illustrated in Figure 2 is based on participants' discussions and co-creation in the workshops. New knowledge, practise and reflection are important in order to both improve and maintain skills in newborn resuscitation. Participants in our study were clear about keeping it simple, and we were guided by their advice and feedback when developing our course (Figure 2). The eternity symbol demonstrates the importance of continual training, and that all midwives need to practise newborn resuscitation skills as a lifelong learning process.

Discussion

From the results of this study, we discerned the importance of 1) practice guidance, 2) technical skills, 3) non-technical skills and 4) innovative methods in the co-creation and tailoring of a newborn resuscitation course for midwifery students. These themes relate to the process of learning technical and non-technical skills, as well as how midwifery students are being supported and supervised in practice. The themes further relate to developing a culture that enables these students to continue practising their newborn resuscitation skills' as lifelong learning, even once they become midwives.

Table 2 The Andragogical Model

1	Need to know
2	Learners' self-concept
3	Role of learners' experiences
4	Readiness to learn
5	Orientation to learning
6	Motivation

Note: Data from Knowles et al.[34]

To understand midwifery students' learning process, which is essential to helping them prepare for newborn resuscitation, we drew on[34] andragogic model. The authors describe six assumptions developed for adult learning, illustrated in Table 2. They define learning as a process, emphasizing that individualization, responsibility of learning and timing are important factors in the gaining of knowledge.[34] Especially pertinent to our study is students' need to know, readiness to learn and how they move from one developmental stage to the next; Figure 2 describes how the newborn resuscitation course can spark a *newborn resuscitation course* lifelong learning process for midwifery students. This is what the eternity symbol in Figure 2 is intended to represent: new questions will be raised that demand new answers, which in turn require further learning and development, sparking new questions, and so the cycle continues. The curiosity appears when midwifery students bring their theoretical knowledge into their clinical practice.

Learn

To learn newborn resuscitation, workshop participants were clear that it must be made as simple as possible. Indeed, as previously stated, "keep it simple" was a common refrain among participants. A key consideration therefore in tailoring our course was to make it simple enough both to follow and to help students understand the complexity of newborn resuscitation (see Figure 2). This course was tailored to the individual via a stepwise approach to learning. In this process, midwifery students defined their "need to know" and take responsibility for their own learning in accordance with the andragogical model.[34] This relates to workshop participants' requests for tools upon which to build their experience: that they requested new approaches to learning highlights their sense of responsibility for their own learning. In the workshops, midwifery students explained that, following their first clinical practice, they were motivated to learn skills in newborn resuscitation because they had first-hand knowledge of what was at stake. Here, personal motivation was highlighted by most participants as essential, since it was clear that all midwives would eventually deliver a newborn baby in need of resuscitation. This finding is important, as motivation must be present if the learning process is to start, according to the andragogical model:[34] in other words, midwifery students will master newborn

resuscitation skills once they are ready to learn them. We understand this as students' need to understand why they need to know this information before they develop the motivation to learn it. Following the andragogical model, it all starts with a "why", which must be answered individually by each midwifery student to tailor their own learning process—much like pressing a "start button".

Practice

Our findings indicate that midwifery students did not feel ready to perform newborn resuscitation upon graduation. This suggests that the integration of new methods into current midwifery programmes may help midwifery students learn and prepare for newborn resuscitation. Moreover, we found that, here, innovation may be important: in our course, each student learns the necessary skills through a variety of innovative methods that prepare them to handle newborn resuscitation. This learning process demonstrates the importance of individual methods for learning and each student being responsible for their own learning process, according to the andragogical model.[34]

An important issue in preparing midwifery students for newborn resuscitation is to help them understand the complexity of newborn resuscitation. However, developing this kind of professional understanding is challenging when one has not yet entered the profession, as students must be clear as to why the understanding is necessary.[34] Moreover, students reported a disconnect between their training in basic skills and the lack of sustained practice (under the guidance of a mentor). Without this latter, the students described it as a challenge to adapt their basic skills knowledge to their daily work. To facilitate this translation of theoretical knowledge into everyday clinical practice, midwifery students must be provided specific tools for learning. By integrating these innovative methods for learning newborn resuscitation in our course, we add new perspectives into the existing simulation training.

Participants described non-technical skills as challenging in newborn resuscitation, and requested that these be part of the tailored course—especially those related to communication. They wanted more training in communication to prepare themselves, and described instances in which poor communication between team members had led to negative outcomes for the newborn baby. Gaining competence in communication and teamwork has also been reported as challenging in previous research.[10] The

significant correlation between technical and non-technical scores in training underlines the need for resuscitation education programmes to extend beyond training in technical skills.[16] In our study, participants emphasized this through their focus on non-verbal communication: for example, the use of a "nod or a look" to confirm to colleagues whether or not the baby was breathing.

Innovative methods for learning newborn resuscitation is one of the themes that emerged in this study. In the workshops, discussions arose about how different people both gain new knowledge and build on prior knowledge in newborn resuscitation. Additionally, it was emphasized that newborn resuscitation skills need to be continuously improved.[35] For decades, these skills have been practised through simulation training; however, simulation creates realistic contexts, evidence suggests that it can never be a substitute for real clinical midwifery experience.[36] These authors additionally suggest the development of strategies to help midwifery students reflect on their practice, which relates to our tailoring a course specifically for midwifery students (Figure 2). All students learn differently, and some need more time and repetition than others, which is supported by individualization in the andragogical model. Indeed, participants emphasized different methods for learning as being important, as these would provide them with tools to enhance their own learning. We argue that one size does not fit all, and this study adds new knowledge for learning and understanding the complexity of newborn resuscitation for midwifery students.

One innovative method that emerged from the workshops relates to the use of VR. VR was considered to be beneficial by participants in this study, and research highlights its risk-free potential in clinical skills training.[37] Workshop participants recommended increasing the use of VR in midwifery education and newborn resuscitation training. Another innovative learning method that participants cited as beneficial were podcasts. Podcasts were seen as easy to use and could be repeatedly accessed whenever needed. In addition to VR and podcasts, low-dose, high-frequency training was considered to be one of the most important factors in preparing midwives for undertaking newborn resuscitation. Indeed, prior research argues that regular training of practical delivery room understanding should be mandatory.[38] In our study, participants stated that this kind of training was not mandatory in any of their hospitals, and the frequency of the training they did have varied widely. None of the participants mentioned that

they trained too frequently, however, and in fact they requested more frequent training to feel prepared and to maintain their skills.

Reflect

One important finding is the participants' emphasis on the (over)complexity of existing guidelines in newborn resuscitation, and their suggestion that innovative methods be used to create an "ABC" approach. Similarly, Wrammert et al[39] found positive impacts of clarifying guidelines and responsibilities. Another study suggests that the perceived complexity may also be due to a lack of competency and skills among midwives.[10] Indeed, participants in our study described newborn resuscitation as "one of the most frightening situations a midwife will experience". This statement underpins the importance of meeting their requested need for increased knowledge and skills. Some participants expressed that they were practically prepared for newborn resuscitation, but not for the culture of the practice.

As noted earlier, international evidence supports the need for formal education to increase midwives' competency in newborn resuscitation,[12] and participants in our study concurred with this. They noted that, alongside the teaching of ventilation skills, the contextual factors that impact everyday practice must also be included in any newborn resuscitation course (Figure 2). Moreover, they stated that these contextual factors must be further developed in small debriefing and reflection groups. While they mentioned that practical guidance was important—and indeed they requested more of this—they emphasized that it is not enough in itself to prepare them for practice. Moreover, many of the experienced midwives voiced that, while they had been trained in newborn resuscitation, they were unable to perform it. As such, they stated, something in the culture must change. Whilst practice guidelines may be visible (as posters) in clinical settings, they felt newborn resuscitation should be embedded in a supportive culture where the midwives felt safe, confident and trusted to be able to work together as a team.

In the workshops, participants discussed how best to prepare midwifery students for the reality of meeting newborn resuscitation in different contexts in practice. They noted that, although simulation training with mannequins has been used for decades, it may no longer meet students' learning needs. Instead, the focus must be on helping midwifery students connect their theoretical education

with clinical practice. This relates to the findings of this study with regards to practice guidance. Both midwifery students and midwives emphasized the complexity of translating theory into practice, and the need for reflection and mentorship to develop this ability. As some participants explained, even though they may be trained to handle newborn resuscitation, they still need to be supported and empowered as midwives when they are enacting that practice. Therefore, the complexity of newborn resuscitation requires more than just offering simulation training: we need to look into the context, culture and guidelines to fully understand newborn resuscitation and midwives' learning needs in this area.

Improve

This article offers new insights into tailoring newborn resuscitation course courses to midwifery students; moreover, it shows how a course like this may spark a lifelong learning process, which students will carry into and throughout their midwifery practice. In the andragogical model, Knowles et al[34] describe "moving from one developmental stage to the next"; in our study, we understand this as the improvement of one's own knowledge and practice. In Figure 2, we illustrate this through the "circle of eternity", showing how midwifery students advance from basic skills and continue developing in a never-ending process.

We know that there are challenges in preparing midwifery students for newborn resuscitation, even when simulation training is frequently offered. Some of these challenges are linked to poor mannequins or lack of fidelity, relying exclusively on simulation and even the transferability of evidence into practice; nevertheless, we continue to prepare midwifery students using similar methods.[7] With a solid evidence base, our paper identifies the need to change the methods we use to train midwifery students for newborn resuscitation. Participants in our study explicitly requested a course tailored to midwives, as existing models prepare other professionals for their tasks in newborn resuscitation.[6]

Halamek et al[8] have detailed the need for a cultural change regarding what are viewed as the essential components of newborn resuscitation. Here, we add that there is also a need for a different approach concerning how we prepare midwifery students for this practice. Midwives are the bridge between obstetricians and paediatricians, and can therefore play an important role in the development of a new, simplified approach to learning newborn resuscitation.

Strengths and Limitations

A strength in our research team was the contribution and variety of inside and outside perspectives on newborn resuscitation, forming a solid knowledge base ensured by our clinical and theoretical backgrounds. Our research group consisted of two professors within nursing, one professor within midwifery and a PhD candidate within midwifery. Two researchers have been clinical midwives, and have experience with newborn resuscitation.

We were surprised that conducting workshops digitally turned out to be a strength rather than a limitation in this study. The digital workshops contributed to dynamic, equal participation and fruitful discussions, as everyone had their cameras turned on. The facilitator ensured that every voice was heard; moreover, the engaged dialogue among participants from across Norway (unknown to each other before the workshop) meant the researchers' voices were not prioritized over the participants' in this co-creation, thereby minimizing our interpretations. Although the workshops were originally planned to be held physically, COVID-19 restrictions necessitated that they be conducted digitally. We consider this a strength, as it enabled a wider sample of participants to attend, from all over Norway. This sample gave us a broader perspective on the topic than initially planned.[40]

Another strength of this study was that the data were collected from both the expert midwives and the students for whom the course was tailored. Their strong interest in participating demonstrates their motivation to learn more about this topic. (However, this might also be a considered a limitation, as their interest could represent selection bias.) We found the recruited sample appropriate for developing a tailored newborn resuscitation course for midwifery students. We also found that this course sparked a learning process that promised to continue beyond just the course, which represents another strength.

As user involvement is a strength and important in creating a course, this study was centred on workshops in co-creation with the stakeholders who will be the end-users of this course, as well as their facilitators and supervisors. We asked them how newborn resuscitation skills can best be learned. In these workshops with midwifery students and midwives, we collaborated to identify key factors in order to tailor a newborn resuscitation course for midwifery students. Existing courses for midwifery students in newborn resuscitation are not reported to include user-involvement, which reflects an important knowledge gap. Based on the theoretical framework of the PARIHS framework, we

emphasize user involvement, co-creation and all participants' expert competence in this study.

The core constructs of the PARIHS framework are based on evidence, context and facilitation, which have shaped this study through all its stages. The evidence was collected from two prior studies to form a solid base for further development of the newborn resuscitation course. The context was broad and flexible, as methods for collecting data in workshops were based on creative elements. In each workshops, the facilitation of discussion was attended to, in an effort to create engagement and a safe environment in which participants could freely discuss. Further evaluation and implementation is planned. As such, the theoretical constructs are important in creating a solid foundation for this study.

Conclusion

The results of this study emphasize the importance of practice guidance, technical skills, non-technical skills and innovative methods when tailoring a newborn resuscitation course for midwifery students. Although these skills cannot be learned without a context to facilitate these skills, a supportive culture is essential in performing newborn resuscitation—both for midwifery students and midwives. This learning is a lifelong process, starting when one is a midwifery student and continuing onwards, throughout one's professional career as a midwife.

Although this paper focuses on how to prepare midwifery students for newborn resuscitation, we were surprised to find that midwifery students and experienced midwives alike expressed the same need to learn, train and prepare themselves for newborn resuscitation. The importance of facilitating lifelong learning in newborn resuscitation with low-dose, high-frequent training in a safe culture matters equally to both midwifery students and expert midwives.

Acknowledgments

Disclosure

The authors declare no conflict of interests.

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Errata

Page	Line	Bullet point	Original text	Corrected text
24	22		30	50
25	6		Individual in-depth interviews in the number of …	Individual in-depth interviews in the number of 16
61	22	Bullet point 4 in table 7	Knowledge: Interventions to establish breathing and circulation *	Skills: Interventions to establish breathing and circulation *
72	20	Bullet point 3 in table 8	**Regular digital meetings** (x 4 during midwifery education; 45 minutes).	**Participation** in simulation training.
81	6		Midwives stilmulate, ventilate and I.	Midwives stimulate, ventilate and collaborate.

**Preparing midwifery students
for newborn resuscitation:
Stimulate-ventilate-
collaborate**
Linda Wike Ljungblad

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