



Patient safety in intrapartum care

Adverse events and healthcare professionals' perceptions of
patient safety, patient safety culture and teamwork

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ABSTRACT

Patient safety in intrapartum care – Adverse events and healthcare professionals' perceptions of patient safety, patient safety culture and teamwork

The overall aim of the thesis was to describe adverse events for women with planned vaginal births and healthcare professionals' perceptions of patient safety. Further, to test the reliability and validity of a teamwork questionnaire and to investigate patient safety culture and teamwork among healthcare professionals in intrapartum care.

Methods: Paper I had a retrospective design, with 311 birth record reviews. Paper II had a descriptive and qualitative design using a phenomenographic approach, including interviews with 19 healthcare professionals in three labor wards. Paper III and IV had cross-sectional designs. Healthcare professionals (n=450) in various wards responded to the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ) (III). Healthcare professionals (n=184) in three labor wards responded to the Swedish version of the Hospital Survey on Patient Safety Culture and the T-TPQ (IV). Confirmatory factor analysis and descriptive and inferential statistics were used.

Main results: Adverse events in women occurred in 11% of planned vaginal births (I). Four descriptive categories with nine perceptions described patient safety for women giving birth (II). Confirmatory factor analysis of the T-TPQ indicated a good fit (III). Main and interaction effects of profession and labor ward on patient safety culture and teamwork were found (IV).

Conclusions: The results highlight the occurrence of 3rd- or 4th-degree lacerations, distended urinary bladder, and anesthesia-related adverse events. For safe care, it is crucial for healthcare professionals to provide supportive care and to listen to the woman in childbirth. Using team members' competences in a tolerant atmosphere, a reasonable workload, and learning from failure as well as from success are preconditions for patient safety in labor ward. The Swedish version

of the T-TPQ shows acceptable reliability and validity. Both labor ward and profession have an impact on healthcare professionals' perceptions of patient safety culture and teamwork.

Keywords: adverse events, construct validity, healthcare professionals' perceptions, interviews, intrapartum care, labor ward, questionnaire, patient safety, patient safety culture, profession, record review, reliability, teamwork, women giving birth.

SAMMANFATTNING

Patientsäkerhet i förlossningsvård – Skador och vårdpersonals uppfattningar av patientsäkerhet, patientsäkerhetskultur och teamarbete

Det övergripande syftet med avhandlingen var att beskriva skador hos kvinnor med planerad vaginal förlossning och vårdpersonals uppfattningar av patientsäkerhet. Vidare var syftet att testa ett frågeformulär med fokus på teamarbete för reliabilitet och validitet, samt att undersöka patientsäkerhetskultur och teamarbete bland vårdpersonal inom förlossningsvård.

Metoder: I paper I användes retrospektiv design där 311 förlossningsjournaler granskades. I paper II användes beskrivande och kvalitativ design med fenomenografisk ansats som omfattade intervjuer med 19 vårdpersonal från tre förlossningsavdelningar. I paper III användes tvärsnittsdesign där 450 vårdpersonal från olika avdelningar besvarade frågeformuläret TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ). I paper IV användes tvärsnittsdesign där 184 vårdpersonal från tre förlossningsavdelningar besvarade den svenska versionen av Hospital Survey on Patient Safety Culture och T-TPQ. Konfirmatorisk faktoranalys och beskrivande och analytisk statistik användes.

Huvudresultat: Skador hos kvinnor med planerad vaginal förlossning förekom i 11% av förlossningsjournalerna (I). Fyra beskrivande kategorier och nio uppfattningar beskriver patientsäkerhet för födande kvinnor (II). Konfirmatorisk faktoranalys av frågeformuläret T-TPQ visade en god reliabilitet och validitet (III). Profession och förlossningsavdelning påverkade vårdpersonalens uppfattningar avseende patientsäkerhetskultur och teamarbete (IV).

Slutsatser: Resultatet visar att de vanligaste skadorna var förlossningsbristningar av grad 3 eller 4, blåsöverfyllnad och anestesirelaterade skador. För att uppnå en säker vård är det avgörande att personalen tillhandahåller en stödjande omvårdnad och lyssnar till den födande kvinnan. Att använda teammedlemmarnas

kompetens i en öppen atmosfär, att ha en rimlig arbetsbelastning och att lära från kritiska händelser är förutsättningar för patientsäkerhet i förlossningsvård. Den svenska versionen av T-TPQ visar acceptabel reliabilitet och validitet. Såväl förlossningsavdelning som profession har betydelse för vårdpersonals uppfattningar av patientsäkerhetskultur och teamarbete.

Nyckelord: skador, begreppsvaliditet, vårdpersonals uppfattningar, intervjuer, förlossningsvård, förlossningsavdelning, frågeformulär, patientsäkerhet, patientsäkerhetskultur, profession, journalgranskning, reliabilitet, teamarbete, födande kvinnor.

ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
GTT	Global Trigger Tool
HRO	High-reliability organization
HSOPS	Hospital Survey on Patient Safety Culture
SEIPS	Systems Engineering Initiative for Patient Safety
S-HSOPS	Swedish version of the Hospital Survey on Patient Safety Culture
TeamSTEPPS®	Team Strategies and Tools to Enhance Performance and Patient Safety®
T-TPQ	TeamSTEPPS® Teamwork Perceptions Questionnaire

ORIGINAL PAPERS

This thesis is based on the following papers, which will be referred to by their Roman numerals throughout the thesis:

- I. Skoogh, A., Hall-Lord, M.L., Bååth, C. & Sandin Bojö, A-K. (2021). Adverse events in women giving birth in a labor ward: A retrospective record review study. *BMC Health Services Research*, 21(1), 1-8.
- II. Skoogh, A., Bååth, C., Sandin Bojö, A-K. & Hall-Lord, M.L. (2020). Healthcare professionals' perceptions of patient safety for the woman in childbirth in Sweden – An interview study. *Nursing Open*, (7), 642–649.
- III. Hall-Lord, M.L., Skoogh, A., Ballangrud, R., Nordin, A. & Bååth, C. (2020). The Swedish version of the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ): A validation study. *Journal of Multidisciplinary Healthcare*, 13, 829-837.
- IV. Skoogh, A., Bååth, C. & Hall-Lord, M.L. Healthcare professionals' perceptions of patient safety culture and teamwork in intrapartum care: A cross-sectional study (submitted).

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Papers I-IV

INTRODUCTION

Patient safety is a global health priority, and it can be understood as a framework of activities that creates patient safety cultures and processes in healthcare that lower risks and reduce the occurrence of preventable harm and adverse events (World Health Organization [WHO], 2021). In Sweden, safe care has been identified as one of six core competences in healthcare (Svensk sjuksköterskeförening et al., 2016). In the Swedish action plan for increased patient safety, the importance of patient safety culture and teamwork are emphasized (National Board of Health and Welfare, 2020a).

In the 1990s, it was found that patient safety in healthcare was similar to safety in other high-risk organizations. The frequency of adverse events among hospital patients was substantial, but it had been seldom recognized (Kohn et al., 2000). Human factors have been identified to contribute to adverse events (Hooker et al., 2019) and to depend on healthcare professionals operating in error-prone and complex healthcare systems (Mannion & Braithwaite, 2017). A strong patient safety culture is stated as one important aspect of patient safety in healthcare organizations (WHO, 2021). Patient safety culture includes leadership commitment, open communication, effective teamwork and learning from errors and best practices (Waterson, 2014). Effective teamwork is an essential element in patient safety and can positively affect clinical performance (Hughes et al., 2016).

Intrapartum care in Swedish hospitals serves as the context for this thesis. Midwives, physicians and nursing assistants work in teams with the woman and the partner. To improve patient safety for women, it is important to understand the phenomenon of patient safety and to increase the knowledge and awareness of adverse events, patient safety culture and teamwork.

As a midwife, working in a labor ward has inspired me to reflect upon patient safety challenges. Before graduating as a midwife, I had previous experience working with patient safety and quality improvement in healthcare.

BACKGROUND

This section describes the main concepts in the thesis. Theoretical perspectives of patient safety are described first, and then intrapartum care, adverse events, patient safety culture and teamwork are described.

Patient safety

Florence Nightingale was one of the first to focus on patient safety and stated that the first principle of healthcare was not to harm the sick. Among other things, Nightingale contributed to increasing patient safety by developing and practicing new hygiene routines. This could be exemplified by decreased mortality among wounded soldiers during the Crimean War (Nightingale, 1969).

The Institute of Medicine report titled “To err is human”, published in 2000, estimated that a large extent of patients were unintentionally harmed while receiving healthcare, which contributed to death during the patients’ hospital stays. The report drew parallels between healthcare organizations and other high-risk organizations and called for actions for improved patient safety (Kohn et al., 2000). The WHO defines patient safety as “the reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum” (WHO, 2009, p.22).

The theoretical underpinning of patient safety draws on safety science and the reasons why errors and accidents occur (Le Coze, 2008). Reason (1990) investigated human error and how it contributes to latent conditions and active failures. Reason developed the Swiss cheese model of accident causation; the model consists of slices of cheeses illustrating successive layers of defenses in the healthcare organization. If an error, visualized as an arrow, breaks through all slices of the cheese, an accident occurs. Healthcare professionals on the “sharp end” are close to potential patient harm, i.e., active failures, while leaders and policy makers on the “blunt end” contribute to latent conditions (Reason, 2000). The Swiss cheese model remains relevant because of its systems approach, adaptable graphical presentation, and

sustained use in high-risk organizations, but it is also criticized for its limitations of linearity (Larouzee & Le Coze, 2020). If an accident occurs (i.e., an adverse event), root cause analysis is a structured method intended to identify the active failures and latent conditions contributing to the adverse event (Bagian et al., 2002). Root cause analysis is widely used to prevent the recurrence of adverse events. Traditional approaches to patient safety management have focused primarily on measuring adverse events and understanding how things go wrong. This perspective is termed Patient Safety I (Hollnagel et al., 2015) .

The development of patient safety has been highly influenced by the theory of high-reliability organizations (HROs), which was developed to study high-risk organizations such as aviation and nuclear power organizations using complex processes to manage safety (Weick & Sutcliffe, 2015). Ideas associated with the theory of HROs can be traced to 25 years ago (Weick, 1987). The concept of the HRO is based on five guiding principles. 1) It is recommended that all failures be monitored because minor failures can be symptoms of larger problems. This principle has relevance for detecting adverse events. 2) To avoid simplifying the system with generalizations, every situation can be reviewed with a new lens. 3) Sensitivity to operations is important to understand because unexpected events can still occur. 4) Frontline expertise should be trusted, and healthcare professionals should be empowered to speak up regarding safety relevant issues. This principle is relevant to patient safety culture and teamwork competences. Hierarchies are generally detrimental to maintaining safe systems, as they defer to authority rather than to expertise. 5) Commitment to resilience refers to the ability to quickly regain a steady state mood after adverse events. These five principles are considered to create a collective mindfulness in HROs (Weick & Sutcliffe, 2015).

The WHO (2021) refers to HROs and their principles in the global patient safety action plan and expresses that resilient healthcare can be viewed as the practical application of the concept of HROs. The resilience approach provides an alternative and complementary management perspective by focusing on the presence of safety and understanding how things go right. This perspective is termed Patient

Safety II (Hollnagel, 2018; Hollnagel et al., 2015). Resilient healthcare concerns the ability to sustain everyday performance under anticipated and unanticipated conditions. Both the Patient Safety I and Patient Safety II perspectives are necessary and complement each other (WHO, 2021).

Human factors are crucial to create high-reliability, resilient systems in healthcare organizations (WHO, 2021). From a human factors perspective, patient safety can be described as the psychological and physical factors that affect human performance (Holden et al., 2013). Human factors contribute to the knowledge of the effects of tasks, workspace, culture and organization for improving system performance and preventing harm (Russ et al., 2013).

The human factor model Systems Engineering Initiative for Patient Safety (SEIPS), developed by Carayon et al. (2006), is a dynamic system approach to patient safety. The model is based on elements of Donabedian's (1988) structure-process-outcome quality of care model. SEIPS 2.0 is a further development of the SEIPS model for studying and improving patient safety in various healthcare settings (Holden et al., 2013). SEIPS 2.0 consists of three interacting parts: the work system, processes, and outcomes. Feedback loops between these parts are used to reflect upon, redesign and improve patient safety (Holden et al., 2013). The work system is described as a sociotechnical system that consists of six components whereof the person(s) is located in the center. The person(s) component consists of the patient, healthcare professionals as individuals or in teams, and/or family members. Other components are tasks, tools & technology, organization, internal environment, and external environment. The components interact with each other in different ways and magnitudes depending on the situation. Processes consist of professional work, collaborative professional-patient work and patient work. Outcomes are the states or the condition resulting from the processes. Patient outcomes can consist of adverse events, perception of satisfaction or patient participation. Professional outcomes constitute perceptions of job satisfaction and teamwork. Organizational outcomes can be workload and perceptions of patient safety culture. These outcomes can be

proximal or distal (i.e., short term or long term) and desirable or undesirable (Holden et al., 2013).

Intrapartum care

Intrapartum care is defined as “the care of the women and their babies from the onset of labour and immediately after birth” (National Institute for Health and Care Excellence, 2015, p.2). In this thesis, intrapartum care starts with admission to the labor ward and lasts until discharge from the labor ward. Worldwide, intrapartum care is offered in different ways and settings (WHO, 2018a). Within the 21 regions of Sweden, almost all childbirths occur in labor wards. The main type of labor ward takes care of all kinds of births. Approximately 113 000 childbirths occurred in 2020. The most common mode of birth was spontaneous vaginal birth (75.5%). Cesarean section was performed in 17.9% of all childbirth whereof 9.7% of the women underwent emergency cesarean section. The incidence of cesarean section has increased over time (5.3% in 1993). The incidence of instrumental vaginal birth was found to be 6.6% (National Board of Health and Welfare, 2021b).

In Sweden, intrapartum care is provided by teams including midwives, physicians and nursing assistants. The woman giving birth and her partner are also a part of the team. Midwives are the primary caregiver in planned vaginal birth and have independent responsibility in expected normal childbirths. Midwives collaborate with nursing assistants and other midwives and with physicians if complications arise and in complicated births (Swedish Associations of Midwives, 2018). For the woman, a positive birth experience is emphasized (WHO, 2018a). A positive birth experience is related to the transition to motherhood and positive feelings toward the newborn (Zdolska-Wawrzekiewicz et al., 2020). The midwife cares for the woman and her partner in a trustful relationship to keep the birth safe (de Jonge et al., 2021; Renfrew et al., 2014).

The complexity of intrapartum care has increased in Europe due to the rise in maternal age and obesity (Euro-Peristat Project, 2018). Advanced maternal age is associated with an increased risk of

emergency cesarean section in first-time mothers undergoing induction of labor (Bergholt et al., 2020). The frequency of induction of labor has increased to one out of five childbirths in Sweden, with regional differences (National Board of Health and Welfare, 2020b). Induction of labor in obese women leads to longer labor duration and was found to increase the risk for emergency cesarean section (Ellis et al., 2019).

Previous research on patient safety in intrapartum care has often focused on neonates (McArdle et al., 2018; Millde Luthander, 2016; Ota et al., 2020; Wennerholm et al., 2019), but women giving birth are also exposed to patient safety risks (Jacobson et al., 2013). Previous research has shown that midwives, physicians and nurses experience safety concerns (Maxfield et al., 2013) and that failure to listen to or respond to safety concerns could lead to risk for women during childbirth (Lyndon et al., 2012). Few studies have examined patient safety in intrapartum care from healthcare professionals' perspective.

Adverse events

Adverse events are undesired in patient safety work. The following definition of adverse events is used in this thesis: "unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment or hospitalization, or that results in death" (Griffin & Resar, 2009, p.5).

There are slightly similar concepts describing adverse events in the literature, which are often used interchangeably (Runciman et al., 2009). Harm is defined as "impairments of function or structure of the body and/or any deleterious effect arising there from. Harm includes disease, injury, suffering, disability and death" (WHO, 2009, p.23). An error is defined as "failure to carry out a planned action as intended or application of an incorrect plan" (WHO, 2009, p.22). A patient safety incident is defined as "an event or circumstance which could have resulted, or did result, in unnecessary harm to a patient" (WHO, 2009, p.22).

In intrapartum care in high-resource settings, most childbirths are uneventful in terms of complications and adverse events (WHO, 2018a). The most severe adverse event is maternal or neonatal death, but such events are rare. Underreporting of serious adverse events has been shown to be a problem and to indicate substandard care (Esscher, 2014; Nyfløt et al., 2018; Wise, 2015). Conditions in any childbirth can rapidly deteriorate (Danilack et al., 2015), requiring interventions through prompt action (Amatullah, 2018). Intrapartum emergency interventions (e.g., cesarean section) intend to be life-saving, but unnecessary interventions could lead to adverse events. Unnecessary interventions are those that can be described as “too much, too soon” and include the routine overmedicalization of normal births in high-resource settings; such interventions stand in contrast to interventions that are “too little, too late” in low-resource settings (Miller et al., 2016).

Previous studies have shown that incidence of adverse events in intrapartum care varies from 0.4–3.6%, with a preventability level of up to 56.3% (Aibar et al., 2015; Aibar et al., 2014; Florea et al., 2010; Forster et al., 2006). Forster et al. (2006) specified three adverse events in women: 3rd-degree laceration in connection to instrumental vaginal birth, inappropriate response to postpartum hemorrhage, and postdural puncture headache. Aibar et al. (2014) related the adverse events to different procedures.

To detect and measure adverse events in intrapartum care, various methods have been used, such as clinical surveillance (Forster et al., 2006), voluntary patient safety incidents reports in combination with quality indicators (Florea et al., 2010), and different screening guides (Aibar et al., 2015; Aibar et al., 2014). Adverse event studies have combined intrapartum care with gynecological care (Mortaro et al., 2021; Swedish Association of Local Authorities and Regions [SALAR], 2014b) or surgical care (Hwang et al., 2014; Landrigan et al., 2010). Due to methodological diversity, such as in review methods, samples, inclusion criteria, adverse event types and context of care, it is difficult to draw any conclusions regarding the pattern of adverse events in intrapartum care.

The detection of adverse events by retrospective record review using the Global Trigger Tool (GTT) method has been more successful than other methods (Classen et al., 2011). The GTT from the Institute for Healthcare Improvement was developed in 2003 (Griffin & Resar, 2009). To improve patient safety in healthcare, the GTT helps teams to rapidly review a small sample of records from admission in the hospital to within 30 days of discharge to identify “triggers” that may signal harm from the patient’s point of view (Griffin & Resar, 2009; The Health Foundation, 2010). A systematic review found that the GTT was effective in detecting adverse events in healthcare (Hibbert et al., 2016). The Swedish version of the GTT has been implemented as part of the national patient safety program (Nilsson et al., 2018; SALAR, 2012; SALAR, 2014a). In Sweden, no study of adverse events with the use of the GTT in intrapartum care has been found.

Patient safety culture

Patient safety culture originates from the theory of HROs (WHO, 2021) and is viewed as an important organizational aspect that influences patient safety, teamwork, communication about error, event reporting, and organizational learning (Waterson, 2014). A strong patient safety culture is an established precondition for reducing patient harm (Weaver et al., 2013) and is stressed in the global patient safety action plan (WHO, 2021), as well as the Swedish action plan (National Board of Health and Welfare, 2020a). In addition, patient safety culture is critical for providing a safe working environment for healthcare professionals (WHO, 2021).

The Agency for Healthcare Research and Quality [AHRQ] contributed to early work on patient safety culture and adopted a definition stemming from a definition of safety culture developed in the nuclear power field, summarizing the concept as an organizational product of values, attitudes, perceptions and patterns of behavior (Nieva et al., 2005). In this thesis, the following European-based definition of patient safety culture was used: “an integrated pattern of individual and organizational behavior, based upon shared beliefs and values that continuously seeks to minimize patient harm, which may result from the processes of care delivery” (European Network for Patient Safety,

2010, p.4). This definition was chosen because its focus on the care process.

Measurements of patient safety culture in healthcare organizations can be useful. The results of the measurements promote awareness about patient safety among healthcare professionals and managers and identify areas for improvement. To measure healthcare professionals' perceptions of patient safety culture, the following questionnaires can be used: the Hospital Survey on Patient Safety Culture (HSOPS) from the AHRQ (Sorra et al., 2016) and the Safety Attitudes Questionnaire (SAQ) (Sexton et al., 2006). Both the HSOPS and SAQ were found to be reliable and valid (Etchegaray & Thomas, 2012).

Danielsson et al. (2019) investigated perceptions of patient safety culture in general wards, emergency care and psychiatric care. Dimensions with high scores were "Teamwork within units" and "Nonpunitive response to error", while "Staffing" was one of the lowest rated dimensions (Danielsson et al., 2019). Willmott and Mould (2018) showed that healthcare professionals in different hospital wards had different views of patient safety culture, with physicians perceiving poorer patient safety culture than other professional groups.

In intrapartum care, Raftopoulos et al. (2011) investigated perceptions of patient safety culture measured by the SAQ-Labor version. They found that experienced midwives rated teamwork, safety climate, job satisfaction and working conditions higher than less experienced midwives. Siassakos et al. (2011) used the SAQ and included midwives, physicians, nursing assistants, anesthetists, and neonatologists. The results showed positive perceptions of patient safety culture, teamwork, and job satisfaction. Furthermore, patient safety culture in intrapartum care has also been investigated in combination with other units, such as gynecology and neonatology units (Fujita et al., 2014; Ribeliene et al., 2019) and operating rooms (Akbari et al., 2017). In sum, there is a gap in knowledge of healthcare professionals' perceptions of patient safety culture in intrapartum care.

Teamwork

Teamwork is another central aspect of patient safety. Almost all patient care is provided by teams collaborating through teamwork. A team could be described as two or more individuals who have clear roles and adapt to each other when working to achieve a shared goal (Salas et al., 2008). The WHO (2011) strongly recommends a multiprofessional approach to teamwork. An important reason for healthcare professionals' willingness to work in teams is that the possibility of reaching a shared goal is greater than if the work were to be done individually (Markiewicz, 2010). Xyrichis and Ream defined teamwork as follows:

“A dynamic process involving two or more health professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning or evaluating patient care. This is accomplished through interdependent collaboration, open communication and shared decision-making” (Xyrichis & Ream, 2008, p.238).

Extensive research on teamwork resulted in the “Big Five” framework, which includes the core components of effective teamwork: team leadership, mutual performance monitoring, backup behavior, adaptability and team orientation. The underlying mechanics of closed loop communication, mutual trust, and shared mental models coordinate the core components of the “Big Five” (Salas et al., 2005).

Further research built on the “Big Five” resulted in the development of the evidence-based team training program Team Strategies and Tools to Enhance Performance and Patient Safety® (TeamSTEPPS®) with the goal of increasing the quality of US healthcare (King et al., 2008). As a part of the TeamSTEPPS® program, the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ) was developed by the American Institute of Research on behalf of the AHRQ (Battles & King, 2010). Measurements of perceptions of teamwork can be used to evaluate and provide feedback to healthcare professionals and managers to support team performance. The questionnaire measures how healthcare professionals perceive the present state of teamwork in their workplace. It is universal and can be used in various healthcare settings and specialties (Battles & King, 2010). The T-TPQ was found to be

relevant for a Swedish healthcare context and permission to translate the T-TPQ into Swedish was provided by the AHRQ. The T-TPQ has been translated into other languages, such as Norwegian, French and Japanese (Ballangrud et al., 2017; Diep et al., 2021; Unooki et al., 2020). When a questionnaire is translated into another language, psychometric testing is required (Polit & Yang, 2016).

Rosen et al. (2018) found that teamwork quality impacts patients, healthcare professionals, and organizational outcomes. Structural issues, such as team composition and task interdependence, and contextual issues, such as leadership and patient safety culture, are important for teamwork performance (Rosen et al., 2018). A systematic review and meta-analysis showed that effective teamwork had a medium-sized effect on clinical performance in various settings in healthcare (Schmutz et al., 2019). Previous research found that effective teamwork is associated with fewer medical errors (Manser, 2009), increased job satisfaction in healthcare professionals (Buttigieg et al., 2011), prevention of patient harm and the creation of a positive workplace (Lyubovnikova et al., 2015). Insufficient communication and teamwork contributes to preventable patient harm (Guisse & Segel, 2008; Rabøl et al., 2011).

A study in intrapartum care clarified the diversity of team constellations and the complexity in teamwork by observing 99 teams (Brogaard et al., 2019). In intrapartum care, efficient teamwork may be crucial in emergencies requiring immediate action. These situations are often stressful and unpredictable and can pose an ethical dilemma (Fransen et al., 2020). Inefficient teamwork and communication have been reported in intrapartum care (Hansson et al., 2019; Lyndon et al., 2014; Maxfield et al., 2013). Rönnerhag et al. (2019) found barriers to communication and teamwork among healthcare professionals in labor wards including a lack of respect, a fear of being questioned and a failure to be listened to. There is a need for knowledge of healthcare professionals' perceptions of teamwork due to their closeness to potential patient harm on the "sharp end".

RATIONALE FOR THE THESIS

Most childbirths in intrapartum care are safe. Patient safety challenges and increased complexity in intrapartum care can, however, lead to adverse events for women. In previous research on adverse events in intrapartum care, studies have been characterized by methodological diversity, and the assessment of adverse events has been conducted with other specialties. Therefore, increased knowledge about women's adverse events during planned vaginal birth is needed.

Previous research has shown that healthcare professionals experience safety concerns in intrapartum care. Healthcare professionals' perceptions of patient safety in connection to the woman in childbirth have not been fully explored.

Patient safety culture and teamwork are important aspects of patient safety. A strong patient safety culture is highly recognized not only for creating safety and preventing adverse events but also for providing safe working conditions for healthcare professionals. In addition, focusing on patient safety culture is stressed in action plans for increased patient safety, both internationally and nationally. Effective teamwork is required to keep childbirth safe and minimize adverse events.

Understanding potential adverse events and perceptions of patient safety, patient safety culture and teamwork among healthcare professionals is valuable for disseminating knowledge and increasing awareness that can result in action and improvement of care for women in intrapartum care. Intrapartum care with patient safety awareness can reduce patient harm and adverse events in women giving birth.

OVERALL AND SPECIFIC AIMS

The overall aim of the thesis was to describe adverse events for women with planned vaginal births and healthcare professionals' perceptions of patient safety. Further, to test the reliability and validity of a teamwork questionnaire and to investigate patient safety culture and teamwork among healthcare professionals in intrapartum care.

The specific aims were as follows:

- I. To describe adverse events, including the preventability and severity of harm during planned vaginal births, in women giving birth in the labor ward.
- II. To describe healthcare professionals' perceptions of patient safety, with a focus on the woman in connection to childbirth.
- III. To test the reliability and construct validity of the Swedish version of the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ).
- IV. To 1) investigate differences between professions (midwives, physicians, nursing assistants) and between labor wards in relation to perceptions of patient safety culture and teamwork and 2) explore potential associations between teamwork and overall perceptions of patient safety and frequency of events reported.

METHODS

This section describes the design, setting, sample, data collection and data analysis.

Design

This thesis is based on both the positivistic paradigm where the reality is objective and generalizable and the naturalistic paradigm where the reality is multiple and subjective (Polit & Beck, 2021). The thesis comprises four papers (I-IV). To address the overall aim, different designs with quantitative (I, III-IV) and qualitative (II) methods were used. Paper I had a descriptive and retrospective design to describe adverse events in women's birth records. Paper II had a descriptive and qualitative design using a phenomenographic approach (Marton, 1981) to describe healthcare professionals' perceptions of the phenomenon of patient safety, with a focus on the woman in connection to childbirth. Finally, cross-sectional designs were used to validate a teamwork questionnaire (III) and to investigate differences in perceptions of patient safety culture and teamwork between professions and between labor wards and to explore potential associations between teamwork and overall perceptions of patient safety and frequency of events reported (IV). An overview of the papers in the thesis is shown in Table 1.

Table 1. Overview of the papers in the thesis

Paper	Design	Sample	Data collection	Data analysis
I.	Descriptive Retrospective	311 birth records	Birth record review March 2016 – January 2017	Statistics
II.	Descriptive Qualitative	19 healthcare professionals	Individual interviews August 2016 – June 2017	Phenomenography
III.	Cross- sectional	450 healthcare professionals	Questionnaire September – December 2018	Statistics
IV.	Cross- sectional	184 healthcare professionals	Questionnaire September – December 2018	Statistics

Setting and sample

In paper I, the setting was one labor ward in Sweden with 2600 low-risk and risk childbirths annually. The sample consisted of birth records for women with planned vaginal births. The inclusion criteria were women aged ≥ 18 years registered in Sweden with singleton spontaneous vaginal birth, instrumental vaginal birth or emergency cesarean section. Exclusion criteria were women with multiple births, elective cesarean section, unintentional birth outside of the hospital, or stillbirth.

Based on the inclusion and exclusion criteria, the sample was estimated to comprise a total of 2200 childbirths. The number of birth records was estimated according to the incidence of 3rd- or 4th-degree lacerations. The power analysis was based on the fact that 3rd- or 4th-degree lacerations are a predefined perinatal adverse event in the GTT (SALAR, 2012, 2014a). The occurrence of 3rd- or 4th-degree lacerations is reported annually from Swedish labor wards to the Medical Birth Register, and the incidence was 3.6% in 2013 (National Board of Health and Welfare, 2014). The power analysis revealed that to detect an incidence of 3.6%, 40 birth records per month for 14 months were needed. Since informed consent from the women to review their birth records was needed, a loss of at least 30% was expected. Therefore, the number of birth records was increased to 60 per month, for a total of 840. A total of 314 consent forms were received, and 311 (37.5%) birth records were reviewed, as three did not meet the inclusion criteria. Of these, five consent forms in a language other than Swedish were received. For the women represented in the 311 birth records, the mean age was 31 years, 48.6% were nulliparous women (first-time mothers), and 51.4% were parous women. The outcome of mode of birth was spontaneous vaginal birth, 83.3%, followed by instrumental vaginal birth, 9.6%, and emergency cesarean section, 7.1%.

In paper II, the settings were three labor wards in three mid-size hospitals in two regions in Sweden. All frontline midwives, nursing assistants and physicians working in the labor wards were invited to participate in the study. According to the phenomenographic approach, the intention is a purposive sample to achieve variation in informants' characteristics (Marton, 1981), in this study to obtain

variation in profession, age and work experience in intrapartum care. Nineteen healthcare professionals participated in the study. The experience in intrapartum care varied from less than six years to more than 30 years. The participants' profession and age group are shown in Table 2.

In paper III, the included settings were medical wards, emergency rooms, labor wards, gynecological and intensive care, and anesthesia and operating rooms located in four hospitals (Hospital A, B, C, and D) in three regions in Sweden. Frontline healthcare professionals, consisting of physicians, registered nurses, midwives, nursing assistants, and allied health professionals (n=1176), working in the wards were invited to participate. The participants' characteristics are shown in Table 2.

In paper IV, four labor wards in four hospitals in three regions in Sweden were included. Two wards were merged since they were within the same region and had the same head manager. The settings were labeled Labor ward 1, Labor ward 2, and Labor ward 3. The labor wards included low-risk and risk childbirths. The numbers of childbirths in 2018 were 2879 (Labor ward 1), 3600 (Labor ward 2), and 3430 (Labor ward 3). All frontline healthcare professionals, including midwives, physicians and nursing assistants (n=365), were invited to participate in the study. The exclusion criteria were sick leave or parental leave. The participants' characteristics are shown in Table 2.

Table 2. Response rate and characteristics of the participants (II-IV)

Paper	II n (%)	III n (%)	IV n (%)
Invited/participate/response rate	19	1176/450 (38.3)	365/184 (50.4)
Profession			
Midwives	8 (42)	116 (27)	103 (58)
Physicians	6 (32)	68 (16)	44 (25)
Nursing assistants	5 (26)	111 (26)	30 (17)
Registered nurses	-	133 (31)	-
Allied health professionals	-	7 (2)	-
Missing		15	7
Age groups (years)			
≤25	0	23 (5)	2 (1)
26-35	1 (5)	100 (23)	37 (21)
36-45	5 (26)	99 (23)	45 (25)
46-55	4 (21)	98 (22)	49 (28)
≥56	9 (47)	118 (27)	44 (25)
Missing		12	7
Work experience in the ward (years)			
0-3	-	125 (29)	33 (19)
>3-7	-	96 (22)	42 (24)
> 7-15	-	96 (22)	50 (28)
≥16	-	110 (26)	51 (29)
Missing		23	8
Hours per week			
1-20	-	7 (2)	3 (2)
21-39	-	238 (56)	96 (56)
40	-	104 (24)	36 (21)
>41	-	77 (18)	36 (21)
Missing		24	13

Data collection

The data collection was conducted with a measurement tool (I), qualitative interviews (II), and questionnaires (III-IV).

Measurement tool (I)

In paper I, the Swedish version of the GTT was used for the review of birth records from admission to the labor ward to within 30 days of discharge (SALAR, 2012, 2014a). The tool is used for retrospective record review for detecting and measuring adverse events based on triggers (Griffin & Resar, 2009). A trigger is a predefined “clue”. A positive trigger in the record review may indicate the presence of an adverse event. The Swedish version of the GTT contains 44 triggers into six modules: “Care”, “Laboratory”, “Surgical and other invasive procedures”, “Medication”, “Intensive care”, and “Perinatal”. There are

four types of adverse events, i.e., “Care”, “Infections”, “Complications in surgical and other invasive procedure”, and “Other”, and each type consists of various subtypes (SALAR, 2012). Furthermore, there are five categories of severity of harm, from E, “Contributed to or resulted in temporary harm and required intervention”, to I, “Contributed to patient death” (National Coordinating Council for Medication Error Reporting and Prevention, 2001).

The Swedish version of the GTT includes guidelines to facilitate the assessment of preventable adverse events in connection to each trigger (SALAR, 2014a) and a 4-degree scale of preventability (SALAR, 2012). The degrees were merged into two groups: degrees 1-2 (the adverse event *was not* preventable/the adverse event *was probably not* preventable) and degrees 3-4 (the adverse event *was probably* preventable/the adverse event *was* preventable). Only degrees 3 and 4 were termed preventable adverse events. Similar to the previous study by Rutberg et al. (2016), degrees 1 and 2 were grouped and contrasted with degrees 3 and 4. The GTT has been found to be sensitive and reliable for detecting adverse events (Hibbert et al., 2016).

Qualitative interviews (II)

In the study reported in paper II, the following two open-ended questions were asked:

- “What does patient safety with a focus on the woman in childbirth mean to you?”
- “How do you perceive patient safety with a focus on the woman in childbirth, based on your experience?”

The first question was asked to ensure that the informants talked about the phenomenon of interest, and the second question concerned *how* the healthcare professionals perceived the phenomena (c.f. Marton, 1981). Further probe questions were also asked, such as “Can you express yourself further? Could it vary? Can you give an example?” The purpose of the probe questions was to obtain richer descriptions.

Questionnaires (III-IV)

In papers III and IV, the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ) was used to measure individuals' perceptions of teamwork in their workplace (Battles & King, 2010). The T-TPQ consists of 35 items with seven items in each of the following five dimensions: "Team structure" and the four team competencies "Leadership", "Situation monitoring", "Mutual support", and "Communication". In each dimension, there are five response options on a Likert scale ranging from 1="strongly disagree with the statement" to 5="strongly agree with the statement". The scores for the total scale and for each dimension were calculated by adding all items and dividing the score by the number of items in each dimension and in the total scale.

The original T-TPQ was translated to Swedish. The T-TPQ translation was made with the permission of the AHRQ from the TeamSTEPPS 2.0 National Implementation (accessible at <http://teamstepps.ahrq.gov/>). The translation process was inspired by Brislin (1970), and the following steps were used.

- A bilingual professional translator with Swedish as the native language conducted the forward translation of the T-TPQ from English to Swedish.
- Conceptual and semantic adjustments were made to the translated version by the research team.
- A bilingual professional translator with English as the native language conducted back translation of the reviewed Swedish version to English.
- The Swedish version underwent minor revisions and was pilot tested by 15 frontline healthcare professionals to establish semantic equivalence.
- Clarifying changes were made to the language and concepts in the pilot study.

The original English version of the questionnaire was tested for reliability and validity. Keebler et al. (2014) found acceptable internal consistency by Cronbach's alpha = 0.92 to 0.94. Construct validity by confirmatory factor analysis indicated a good fit.

In paper IV, the Swedish version of the Hospital Survey on Patient Safety Culture (S-HSOPS) was used to measure healthcare professionals' perceptions of patient safety culture. The original HSOPS designed by the AHRQ consists of 12 dimensions, 42 items, and two outcome items (Nieva & Sorra, 2003; Sorra et al., 2016). The S-HSOPS consists of 14 dimensions with 48 items and three outcome items (Hedsköld et al., 2013).

The dimension items are answered on a 5-point Likert response scale from “strongly disagree” to “strongly agree” or from “never” to “always”. The outcome item “Patient safety grade” is answered from “failing” to “excellent”. The outcome item “Number of events reported” is answered in six frequency groups, from “no events” to “≥21 events”, and the Swedish additional outcome item “Number of risk reported” is answered in six frequency groups, from “no risks” to “≥21 risks”.

Eighteen items that are negatively worded were reversed. The scores for the total scale and for each dimension were calculated by adding all items and dividing the score by the number of items in each dimension and in the total scale. Table 3 shows the dimensions, outcome items, and number of items in the S-HSOPS.

Table 3. S-HSOPS¹ dimensions, outcome items and number of items

Dimensions	Items
Unit level	
Communication openness	3
Feedback and communication about error	3
Nonpunitive response to error	3
Organizational learning – continuous improvement	3
Staffing	4
Supervisor/manager expectations and actions promoting patient safety	4
Teamwork within units	4
Information and support to patients and family who have suffered an adverse event ²	4
Information and support to staff who have been involved in an adverse event ²	2
Hospital level	
Handoffs and transitions	4
Management support for patient safety	3
Teamwork across units	4
Outcome	
Frequency of events reported	3
Overall perceptions of patient safety	4
Outcome items	
Patient safety grade	1
Number of events reported	1
Number of risks reported ³	1

¹S-HSOPS=Swedish version of the Hospital Survey on Patient Safety Culture. ²Additional dimension in the S-HSOPS. ³Additional outcome item in the S-HSOPS.

The HSOPS and the S-HSOPS have been tested for reliability and construct validity by confirmatory factor analysis. Sorra and Dyer (2010) found that all HSOPS dimensions except one had acceptable internal consistency (Cronbach's alpha=.62 to .85), and confirmatory factor analysis indicated a good fit. Hedsköld et al. (2013) found that the S-HSOPS had acceptable internal consistency except for three dimensions (Cronbach's alpha=.66 to .87), and confirmatory factor analysis indicated a good fit.

Background questions and variables (I-IV)

The background questions concerned profession (II-IV), age groups (II-IV), experience in intrapartum care (II), work experience in the ward (III-IV), and hours per week (III-IV).

Procedure (I-IV)

For paper I, a civil servant in the hospital provided a simple random sampling of 60 birth records each month over 14 months. The civil servant provided a list of the women's names and addresses. Written information about the birth record review and a request to participate by giving informant consent for the review was sent to the women. One reminder was sent. All potential participants were provided with information in Swedish, English, Arabic and Somali. A pilot birth record review was conducted by two researchers of the research team (AS, AKSB) with clinical experience as midwives and knowledge of the context. Eleven birth records were reviewed independently to test the trigger tool, resulting in 100% agreement in detecting the same positive triggers. The thesis author conducted the remaining birth record review and identified potential adverse events that were discussed by the research team. An obstetrician with previous clinical experience with the GTT reviewed the birth records with potential identified adverse events. This resulted in agreement between the obstetrician and the thesis author regarding adverse events, preventability and severity of harm.

In paper II, two pilot interviews were conducted and transcribed verbatim for subsequent discussion in the research team. The pilot interviews were included in the study, as no changes to questions were needed. The individual face-to-face interviews were conducted in the hospitals, with one exception for an informant who preferred to be interviewed at home. The interviews were digitally recorded and transcribed verbatim by the thesis author (n=7) and by an assistant (n=12). The interviews lasted between 36 and 94 minutes (median 54 minutes).

In papers III-IV, the chief managers administered the paper questionnaires and information letter to all the healthcare professionals and reminded the healthcare professionals about the study by e-mail and during meetings. Completed questionnaires were returned to the research team in preprinted envelopes.

Data analysis

Statistics (I, III-IV)

The data analyses were performed using IBM Social Package of Social Science (SPSS) Statistics, version 22 (I) and 25 (III-IV), and IBM AMOS version 25 (III). Nonparametric and parametric statistics and confirmatory factor analysis were used (Byrne, 2010; Pallant, 2013; Polit & Yang, 2016; Tabachnick & Fidell, 2014). A p value of $<.05$ was set for the analysis (I, III-IV), except when Levene's test was significant a more stringent significance level of $<.01$ was set (Pallant, 2013) (IV). The statistics are described in Table 4.

Table 4. Statistics used in the papers

Statistics	Application of statistical analyses
Frequency, percentage, mean, standard deviation, median, and range	To describe the study samples (I, III-IV) and frequency of adverse events and preventable adverse events (I).
Pearson's chi-square test	To analyze differences between women with or without adverse events for the variables mode of birth, parity, and gestational age (I).
Student's t test	To analyze differences between women with or without adverse events for the variable age (I).
Cronbach's alpha coefficient	To test the reliability of the T-TPQ ¹ (III).
Intercorrelation coefficient Pearson's r	To examine the construct interdependence of the T-TPQ ¹ (III).
Confirmatory factor analysis including goodness-of-fit-indexes: x ² (df), p value Normed chi-square Root mean square error of approximation (RMSEA) Confidence interval (CI) Tucker–Lewis index (TLI) Comparative fit index (CFI)	To test construct validity of the T-TPQ ¹ with the hypothesized 5-factor model (Model 1 and Model 2) (III).
Kruskal–Wallis H test	To analyze differences between professions and between labor wards according to background questions (IV). To analyze differences between professions and between labor wards in relation to outcome items in the S-HSOPS ² (IV).
Two-way ANOVA	To explore the main and interaction effect of profession and labor ward regarding the S-HSOPS ² and the T-TPQ ¹ dimensions (IV).
Levene's test	To test homogeneity of variance in the two-way ANOVA (IV).
Tukey's HSD post hoc test	To identify differences between groups when the two-way ANOVA was significant for profession and labor ward (IV).
Standard linear multiple regression analysis	To explore potential association between two outcome dimensions in S-HSOPS ² (dependent variables) and five teamwork dimensions in T-TPQ ¹ (independent variables) (IV).

¹T-TPQ=TeamSTEPPS® Teamwork Perceptions Questionnaire. ²S-HSOPS=Swedish version of the Hospital Survey on Patient Safety Culture.

Phenomenography (II)

In paper II, the data were analyzed by a phenomenographic approach. Phenomenography was developed by Marton (1981) and is often used in education and healthcare research. In phenomenography, the researcher is interested in the “second-order perspective”, which means how a phenomenon is perceived in the world around us. This differs from the “first-order perspective”, which concerns the phenomenon itself. Phenomenography distinguishes and identifies variations – similarities and differences – in perceptions of a phenomenon (Marton, 1981, 1986, 2000). The phenomenon in paper II was patient safety with a focus on the woman in connection to childbirth. Data were analyzed according to Dahlgren and Fallsberg's (1991) seven steps, as shown in Table 5. The steps were repeated to ensure similarities within and differences between the categories.

Table 5. Phenomenography data analysis according to Dahlgren and Fallsberg's (1991) seven steps

Analysis steps	Descriptions of the steps
1. Familiarization	The transcripts were read by the research team to become familiar with the whole to establish an overall impression of the data.
2. Condensation	The most significant statements made by the participants were selected. Statements were condensed to obtain a representative version of the entire dialog concerning the phenomenon.
3. Comparison	A comparison of the selected significant statements was made in order to identify sources of variation or agreement.
4. Grouping	Answers that appeared to be similar were grouped together.
5. Articulating	A preliminary attempt to describe the essence of similarity within each group of answer was made.
6. Labelling	The various categories were denoted by constructing a suitable linguistic expression.
7. Contrasting	The obtained categories were compared with regard to similarities and differences.

The result is presented in a nonhierarchal “outcome space”, defined as a logically structured complex (Marton, 2000).

ETHICAL APPROVALS AND CONSIDERATIONS

The study reported in paper I (2015/493) was approved by the Regional Ethical Review Board in Uppsala, Sweden. The studies reported in paper II (C 2016/363) and paper III-IV (C 2018/50) were approved by the Research Ethics Committee at Karlstad University. For all studies, the head of the departments at the hospitals gave permission to conduct the studies. The studies reported in the thesis papers were conducted in accordance with ethical principles stated in the Declaration of Helsinki (World Medical Association, 2013). The General Data Protection Regulation (GDPR) and local guidelines at Karlstad University were followed (European Parliament and Council of the European Union, 2018; Karlstad University, 2002).

In paper I, written informed consent to conduct a record review was obtained from the women. To respect the vulnerable situation after childbirth, the study information and the request to participate were distributed approximately two months after childbirth, and only one reminder was sent. The women were informed what to do if the information led to potentially negative feelings about the previous childbirth.

Participants received study information orally and in writing (II-IV). The written information contained the aim of the study and noted that participation was voluntary and could be withdrawn without any reason and that no unauthorized persons would have access to the data. In paper II, the healthcare professionals were invited to contact the thesis author if they were interested in participating in the study. Written informed consent was obtained before the interviews. The questionnaires in paper III-IV were answered anonymously, and informed consent to participate in the study was obtained when healthcare professionals completed and returned the questionnaire.

Information about the identities of the research participants was kept separately from the data and was stored securely at Karlstad University, with access only for the research team.

MAIN RESULTS

The results are presented in the following order: adverse events, preventability and severity of harm (I), perceptions of patient safety (II), reliability and construct validity (III), and perceptions of patient safety culture and teamwork (IV).

Adverse events, preventability and severity of harm (I)

In 118 out of 311 birth records for women with planned vaginal births, 209 positive triggers were identified. Adverse events were detected in 34 (10.9%) of the birth records. Two adverse events were detected in four of the birth records, for a total of 38 adverse events. The most prevalent adverse events were 3rd- or 4th-degree lacerations (n=10), distended urinary bladder (n=7), and anesthesia-related adverse events (n=6). Of all 38 adverse events, 28 (73.7%) were assessed as preventable adverse events. Table 6 displays the adverse events and preventable adverse events.

The numbers of adverse events belonging to the categories of severity of harm were as follows: E, “Contributed to or resulted in temporary harm and required intervention” (n=12); F, “Contributed to or resulted in temporary harm required outpatient care, readmission or prolonged hospital care” (n=24); and H, “Event that required lifesaving interventions required within 60 minutes (n=2).

A subgroup analysis between women with and without an adverse event found statistically significant differences in the mode of birth and parity. A greater proportion of women who underwent instrumental vaginal birth (30%) had an adverse events than women with spontaneous vaginal birth (9.3%) or emergency cesarean section (4.5%, $p=.002$). Furthermore, a higher proportion of nulliparous women (14.6%) were exposed to an adverse event than parous women (7.5%, $p=.046$).

Table 6. Adverse events and preventable adverse events

	Total adverse events n=38	Preven- table adverse events n=28
OTHER (n=26)		
Postpartum adverse event/obstetric adverse event		
3 rd - or 4 th -degree lacerations	10	9
Laceration (cervix/vagina)	5	0
Obstetric pelvic hematoma	2	0
Anesthesia-related adverse event		
Postdural puncture headache	3	3
Unintentional dural puncture	2	2
Unintentional long-term neurological impact after spinal anesthesia	1	1
Neurological adverse event		
Transient loss of sensation after positioning on operating room table	1	1
Transient loss of sensation after positioning leg support in labor room	1	1
Other adverse events		
Fracture of coccyx	1	0
CARE (n=7)		
Distended urinary bladder	7	7
INFECTIONS (n=5)		
Sepsis	1	1
Urinary tract infection	2	1
Infection other		
Infection after repaired laceration	1	1
Fever in connection with prolonged premature rupture of membranes	1	1

Perceptions of patient safety (II)

Healthcare professionals' (midwives, physicians, nursing assistants) perceptions of patient safety with a focus on the woman in connection to childbirth resulted in a nonhierarchal outcome space and was summarized according to four descriptive categories with nine perceptions.

Safeguarding the woman

This descriptive category includes two perceptions: “Supporting the woman” and “Listening to the woman”.

“Supporting the woman”. The presence of a midwife or a nursing assistant creates safe conditions and is connected with a lower frequency of tearing, less need for pain relief, and augmentation of labor. In addition, it leads to less anxiety and physical tension in the woman. It is not ultimately necessary for the midwife or nursing assistant to be continuously present, as it is more important that the woman receives the best medical treatment available. Support included offering fluids and food, helping the woman to change positions, and motivating her to get up and move about.

“Listening to the woman”. Having a complete picture as possible of the woman’s situation during childbirth is important. When a woman shares information, her care becomes safer, and the risk of unnecessary interventions and potential harm is reduced. Being open and listening to the woman’s feelings, needs, and desires is meaningful and can help inform the woman about the various alternatives available during childbirth. The woman should not always be part of medical decisions and situations, e.g., the decision to perform an emergency cesarean section or to induce labor. If the woman and the healthcare professionals do not speak the same language, warning signs may not be disclosed, and risky situations can develop.

Safeguarding the birth process

This descriptive category includes two perceptions: “Following the stages of labor” and “Avoiding unnecessary interventions”.

“Following the stages of labor”. Observing, reporting, and monitoring women during childbirth is crucial for patient safety. It is important to have knowledge of risk conditions, such as obesity and complications that can occur during childbirth, which may lead to a negative birth experience. Using a structured communication method at shift changes and during rounds reduces the risk of missing information. Involving the woman and her partner when performing hand-over strengthens

patient safety. Easily accessed guidelines support monitoring and follow-ups during childbirth. Unintended poor monitoring after childbirth may result in a postpartum hemorrhage that could lead to blood transfusions and prolonged hospital care.

“Avoiding unnecessary interventions”. Interventions such as the induction of labor, cesarean section, and instrumental vaginal birth can affect patient safety and lead to potential harm. Time-out where healthcare professionals discuss the necessity of instrumental vaginal birth is valuable. Interventions to strengthen labor are necessary when labor is not progressing.

Respecting the individual and the team

This descriptive category includes three perceptions: “Using each other’s competence”, “Striving for openness and a tolerant atmosphere”, and “Supporting new colleagues”.

“Using each other’s competence”. Knowing other team members’ competences and roles is important, especially in emergencies when many actions are performed simultaneously. Otherwise, uncertainty and lack of trust can develop. Team training leads to a better understanding of each other’s competence and knowing what to do in different situations.

“Striving for openness and a tolerant atmosphere”. Patient safety is improved if healthcare professionals dare to ask each other for help. A kind and a non-blaming culture that involves respect and trust for each other’s professional roles is important. Healthcare professionals and students are encouraged to give their points of view. This openness can lead to better decisions when faced with complicated birthing situations.

“Supporting new colleagues”. It is important for experienced healthcare professionals to adjust their support to new colleagues and explain that it takes time to grow into a new role and to feel secure. Teaching practical skills to new colleagues is relatively simple; what is more complicated is passing on a sense of security to the woman giving

birth. Newly qualified midwives are invited by more experienced colleagues to learn and receive support to increase patient safety.

Managing the workforce and learning

This descriptive category includes two perceptions: “Having a reasonable workload” and “Learning from critical incidents”.

“Having a reasonable workload”. Workload is affected by the number of childbirths, more complicated childbirths, and less experienced and lower numbers of healthcare professionals. A reasonable workload is essential in ensuring patient safety. Patient safety is increased if an experienced midwife is scheduled for each shift. Extreme workload is connected to a risk of missing information and difficulty in reading birth records and carrying out rounds. This may lead to stress and a limited overview when midwives have to take care of several women simultaneously and physicians have to manage multiple interventions. Women without specific medical needs may not receive enough attention.

“Learning from critical incidents”. Reflecting on better and worse birthing situations to increase learning is essential but may be difficult to achieve regularly.

Reliability and construct validity (III)

The internal consistency based on Cronbach’s alpha coefficients was 0.94 for the total T-TPQ and varied from 0.79 to 0.92 for the dimensions. Table 7 presents the results of the confirmatory factor analysis, which showed moderate goodness-of-fit indexes in the hypothesized five-factor model of the five dimensions (Model 1). To improve the fit of the model, post hoc modifications (Model 2) according to Keebler et al. (2014) were made. Four sets of items with high modification indexes were included: two items in the “Leadership” dimension, four items in the “Mutual support” dimension, and two items in the “Communication” dimension. Model 2 showed an adequate fit with the data.

Table 7. Confirmatory factor analysis fit indexes for each model

	Unmodified – Model 1 N=416	Modified – Model 2 N=416
χ^2 (df), <i>p</i> value	1402, 617 (550), $p<.001$	1230, 105 (546), $p<.001$
Normed chi-square	2.54	2.25
RMSEA ¹ (CI) ²	.061 (.057, .065)	.055 (.051, .059)
TLI ³	.877	.901
CFI ⁴	.758	.909

¹ RMSEA=root mean square of error approximation. ² CI=confidence interval. ³ TLI=Tucker–Lewis index.

⁴ CFI=comparative fit index.

Perceptions of patient safety culture and teamwork (IV)

Between the professions, a significant difference was found in hours per week ($p=.000$). The physicians worked the most. Between the labor wards, a significant difference was found in age group ($p=.010$). The healthcare professionals in Labor ward 2 were the youngest.

Table 8 displays the significant main effects between profession and between labor ward. The two-way ANOVA showed a statistically significant main effect for profession on two patient safety culture dimensions and on one teamwork dimension. Physicians scored lower than nursing assistants in “Staffing” and higher than midwives in “Information and support to patients and family who suffered an adverse event”. Physicians scored lower than nursing assistants and midwives in “Team structure”.

Furthermore, the two-way ANOVA showed a significant main effect for labor ward on four patient safety culture dimensions and on four teamwork dimensions. Labor ward 2 scored significantly higher than Labor ward 1 in “Feedback and communication about error”, “Nonpunitive response to error”, and “Organizational learning – continuous improvement”. Labor ward 2 scored higher than Labor ward 1 in “Team structure” and “Communication”. Labor ward 2 scored higher than Labor ward 3 in “Situation monitoring” and “Communication”. In turn, Labor ward 3 scored higher in “Leadership” than Labor ward 1 and Labor ward 2.

Table 8. Main effect by two-way ANOVA between profession and labor ward

	Mean (SD)	Mean (SD)	Mean (SD)	F	p value	Tukey HSD	Effect size ⁵
S-Hospital Survey on Patient Safety Culture							
Profession	Midwives (m)	Physicians (p)	Nursing assistants (n)				
Unit-level dimensions							
Staffing ¹	3.3 (.89)	2.9 (.99)	3.6 (.65)	F(2,165)= 5.16	.007 ⁴	n > p (p=.002)	.06
Information and support to patients and family who have suffered an adverse event ¹	3.8 (.58)	4.1 (.64)	3.9 (.73)	F(2,165)=4.73	.010	p > m (p=.012)	.05
Labor wards	Labor ward 1	Labor ward 2	Labor ward 3				
Unit-level dimensions							
Feedback and communication about error ²	3.5 (.67)	4.0 (.70)	3.9 (.67)	F(2,164)=9.07	.000	2 > 1 (p=.001) 3 > 1 (p=.008)	.10
Nonpunitive response to error ¹	3.6 (.74)	3.9 (.76)	3.7 (.80)	F(2,164)=4.01	.020	2 > 1 (p=.014)	.05
Organizational learning – continuous improvement ¹	3.4 (.55)	3.7 (.64)	3.8 (.60)	F(2,164)=8.97	.000	2 > 1 (p=.001) 3 > 1 (p=.001)	.10
Hospital-level dimensions							
Teamwork across units ¹	3.5 (.58)	3.3 (.75)	3.7 (.66)	F(2,166)=5.22	.006 ⁴	3 > 2 (p=.002)	.06
TeamSTEPPS® Teamwork Perceptions Questionnaire							
Profession	Midwives (m)	Physicians (p)	Nursing assistants (n)				
Team structure ³	4.0 (.61)	3.7 (.83)	4.3 (.67)	F(2,168)=7.21	.001	n > p (p=.000) m > p (p=.022)	.08
Labor wards	Labor ward 1	Labor ward 2	Labor ward 3				
Team structure ³	3.8 (.69)	4.1 (.75)	3.9 (.59)	F(2,168)=3.07	.049	2 > 1 (p=.011)	.04
Leadership ³	3.4 (.76)	3.5 (1.03)	4.1 (.74)	F(2,168)=8.67	.000 ⁴	3 > 1 (p=.000) 3 > 2 (p=.001)	.09
Situation monitoring ³	3.9 (.59)	4.1 (.66)	3.7 (.54)	F(2,167)=4.87	.009	2 > 3 (p=.003)	.06
Communication ³	3.8 (.65)	4.1 (.59)	3.8 (.56)	F(2,168)=4.68	.011	2 > 1 (p=.006) 2 > 3 (p=.007)	.05

¹Scale ranged from 1= “strongly disagree” to 5= “strongly agree”. ² Scale ranged from 1= “never” to 5= “always”. ³Scale ranged from 1= “strongly disagree with the statement” to 5= “strongly agree with the statement”. ⁴ Levene’s test was significant: $p < .01$. ⁵ Effect size partial eta squared.

Table 9 displays the interaction effects in the two-way ANOVA on four patient safety culture dimensions, see also Appendix 1, three in the unit-level dimension and one in the outcome dimension, and on four teamwork dimensions, see also Appendix 2.

Table 9. Interaction effect by two-way ANOVA between profession and between labor ward

	<i>F</i>	<i>p</i> value
S-Hospital Survey on Patient Safety Culture		
Unit-level dimensions		
Staffing	$F(4,165)=4.37$.002
Supervisor/manager expectations and actions promoting patient safety	$F(4,164)=3.04$.019
Information and support to staff who have been involved in an adverse event	$F(4,164)=2.82$.027
Outcome dimension		
Overall perceptions of patient safety	$F(4,165)=2.94$.022
TeamSTEPPS® Teamwork Perceptions Questionnaire		
Team structure	$F(4,168)=2.62$.037
Situation monitoring	$F(4,167)=2.76$.030
Mutual support	$F(4,167)=3.58$.008
Communication	$F(4,168)=2.86$.025

The score for the outcome item “Number of events” reported in the S-HSOPS was significantly different between the professions (midwives, Mean=1.9; physicians, Mean=2.2; nursing assistants; Mean=1.3, $p=.000$). The score for the outcome item “Number of risks reported” was significantly different between the labor wards (Labor ward 1, Mean=1.7; Labor ward 2, Mean=1.4; Labor ward 3, Mean=1.7; $p=.021$).

A standard linear multiple regression analysis revealed that four teamwork dimensions (“Team structure” $B=.287$, $p=.000$; “Leadership” $B=.253$, $p=.000$; “Mutual support” $B=.181$, $p=.043$; “Communication” $B=.173$, $p=.021$) (independent variables) explained 40% of the variance in the patient safety culture outcome dimension “Overall perceptions of patient safety” (dependent variable).

DISCUSSION

In this section, the results are discussed, first regarding adverse events in women giving birth and thereafter regarding perceptions of patient safety and perceptions of patient safety culture and teamwork.

Adverse events in women giving birth

The results in this thesis contribute to the knowledge of adverse events through a focus on women with planned vaginal birth in intrapartum care. The incidence of adverse events in women giving birth was 11%, which is higher than reported in previous studies in intrapartum care (Aibar et al., 2015; Aibar et al., 2014; Florea et al., 2010; Forster et al., 2006). Adverse events could be seen as a proximal (i.e., short term) and undesirable patient outcome and which depends on the work system and processes described in the SEIPS 2.0 model.

The most common adverse events were 3rd- or 4th-degree lacerations, distended urinary bladder, and anesthesia-related adverse events. The incidence of 3rd- or 4th-degree lacerations was 3.2%, which agrees with the figure (3.1%) documented in Sweden in 2015 (National Board of Health and Welfare, 2020b). Clinical recommendations to prevent lacerations have been developed by the Swedish Society of Obstetrics and Gynecology and Swedish Associations of Midwives (2017). According to the recommendations, care should be organized in terms of two midwives present during the end of the childbirth. In a Swedish multicenter randomized controlled study the result showed that two midwives during the end of childbirth decreased 3rd- and 4th-degree lacerations with 30% in nulliparous women (Edqvist et al., 2022). The results elucidate the necessary organizational precondition for midwives to collaborate in safe teamwork during childbirth. The SEIPS 2.0 put the patient (in this thesis the woman) and/or the team in the center of the work system, and a human factor contribution is that the system has to be adapted to individuals and teams, not the opposite. Watchful attendance during childbirth is emphasized by de Jonge et al. (2021).

The results in the thesis show that the proportion of nulliparous women and women with instrumental vaginal birth with adverse events was higher than the proportion of parous women and women with spontaneous vaginal birth. Nulliparous women have an increased risk for 3rd- and 4th-degree lacerations (Wilson & Homer, 2020). It is important to pay more attention to first-time mothers' need for support and effective teamwork during labor to reduce the need for instrumental vaginal births.

Another adverse event observed in this thesis was distended urinary bladder. The WHO (2018a) recommends that urine voids should be documented within six hours after childbirth. A systematic review indicated several risk factors for distended urinary bladder, such as epidural anesthesia, instrumental vaginal birth, and nulliparity. More attention given to women with these conditions has been recommended (Li et al., 2020). This type of adverse event is common in other care contexts, such as surgical and medical care, and is often preventable (SALAR, 2020).

The results of anesthesia-related adverse events in this thesis revealed that half of them were postdural puncture headaches. A study in Canada of anesthesia-related adverse events in obstetric care reported a dominance of postdural puncture headache (Baghirzada et al., 2022). Forster et al. (2006) also found postdural puncture headache but did not assess this adverse event as preventable.

In Sweden, normal postpartum hemorrhage is defined as hemorrhage up to 1000 ml, regardless of the mode of birth (Pihl, 2020). In the original GTT, a perineal trigger of estimated blood loss greater than 500 ml for vaginal birth or greater than 1000 ml for cesarean section is included (Griffin & Resar, 2009). This trigger was removed from the Swedish version of the GTT, which may be seen as a limitation (SALAR, 2012, 2014a). Another limitation in the GTT methodology is the focus on physical adverse events, which from an intrapartum care perspective exclude women suffering a traumatic childbirth. According to a systematic review, up to 33% of women perceived a negative birth experience (Chabbert et al., 2021).

The Swedish action plan for increased patient safety states that it is important to increase knowledge and awareness of adverse events. It is important to measure adverse events and learn from them in an ongoing process to improve patient safety (National Board of Health and Welfare, 2020a).

Perceptions of patient safety

The results in this thesis contribute to understanding the phenomenon of patient safety with a focus on the woman in connection to childbirth. The healthcare professionals perceived that support and listening to the woman was connected to patient safety, with less lacerations and less need for pain relief. Other studies also found that listening to the woman was important (e.g. Berg et al., 2012; Bradfield et al., 2018). The relationship between the midwife and the woman is a central component of practice of being with the woman (Bradfield et al., 2018). Requesting information on women's experience of healthcare professionals' presence and support could be a supplementary question to guide the adaptation of collaborative professional-patient-work generating feedback (Holden et al., 2013).

Respectful behavior from healthcare professionals toward the woman giving birth is a critical component of intrapartum care (Shakibazadeh et al., 2018). Effective communication is needed (Renfrew et al., 2014), but there is a research gap regarding how to support communication between healthcare professionals and women during childbirth (Chang et al., 2018). Wiklund et al. (2020) interviewed women and their partners about experiences of healthcare professionals' bedside handover during childbirth. Bedside handover made the woman feel safe and positively included. The healthcare professionals were described as respectful and as good listeners.

There was variation in the healthcare professionals' perceptions of whether the woman should be included in medical decisions. This issue is important to raise and discuss in accordance with respectful intrapartum care. Kennedy et al. (2021) explored physicians' and midwives' experiences of consent practice regarding interventions in women giving birth in the labor ward. Discussing risk with women in

an appropriate way at an appropriate time was challenging, and women's autonomy was limited due the prioritization of neonatal health. The WHO (2021) states that the most prominent flaw in the clinical process is the failure to communicate well with the patient. It is important for patient safety that healthcare professionals include the woman in the team. The woman has valuable information about her condition and is the only member of the team who is present at all times during care (WHO, 2011). It is important to listen and communicate well during the childbirth process if complications arise (WHO, 2021).

The healthcare professionals perceived that they followed the stage of labor and avoided unnecessary interventions. Avoiding unnecessary interventions is important in midwifery care (Borrelli et al., 2016; de Jonge et al., 2021; International Confederation of Midwives). The challenge in the intrapartum care work system is to determine if interventions are necessary. Strategies are needed to reduce cesarean section to strengthen physiological birth for healthy women (Betran et al., 2018; WHO, 2018b).

The healthcare professionals perceived that compliance with guidelines for monitoring and follow-ups during childbirth strengthened patient safety. In a study in intensive care, first-line managers perceived that compliance with evidence-based guidelines was important, but they emphasized the need for healthcare professionals' adaptive behavior since guidelines do not cover unexpected events (Hedsköld et al., 2021). However, Nyfløt et al. (2018) suggested that a more systematic implementation of evidence-based guidelines regarding hypertension, induction of labor and stabilization of the woman before emergency cesarean section may result in better patient outcomes. Another study described guidelines as restricting healthcare professionals' autonomy in decision-making (Hansson et al., 2019).

The results describe that striving for openness and a tolerant atmosphere makes it easier to dare to ask for help from colleagues. The value of facilitating trust and respectful communication for better decision-making in the healthcare professionals was found in a study by Rönnerhag et al. (2019). Mutual support and open communication

are important team competencies (Battles & King, 2010) to create a positive patient safety culture (Nieva & Sorra, 2003). Unoki et al. (2020) found that changing the culture of blame was important for reducing physical restraint among nurses in intensive care units. Hierarchy in healthcare teams is still a patient safety problem (Green et al., 2017). High-performance labor wards create hierarchies around expertise rather than around professional silos (Liberati et al., 2021). In contrast to the thesis results of striving for openness and a tolerant atmosphere, an interview study found a conflict between midwives and physicians. Challenges in addressing safety concerns and speaking up were barriers. Acceptance of errors, debriefing conflict situations and training in communication facilitated safe communication (Schmiedhofer et al., 2021).

Using each other's competences was perceived as most important in emergencies. Other studies found that physicians and midwives did not use each other's competences sufficiently regarding teamwork skills and technical skills (Kimmich et al., 2019; Kimmich et al., 2018).

A reasonable workload for the healthcare professionals was crucial for ensuring patient safety. In contrast, facing an extreme workload was perceived as a safety threat. Pressure connected to high workload was found to be prominent in other studies (Aune et al., 2014; Hunter & Warren, 2014), and such pressure may affect healthcare professionals' working conditions and patient safety (National Board of Health and Welfare, 2018; Smeds Alenius, 2019). Midwives' working conditions show a strained work situation and imbalance between high expectations and a lack of organizational resources (Hansson, 2021). According to Amiri (2020), sufficient numbers of midwives and nurses are crucial for sustained patient safety during childbirth.

The healthcare professionals perceived that learning from adverse events and reflecting on better or worse birthing situations was crucial for ensuring patient safety. From an international perspective, intrapartum care in Sweden is of high quality of care, considering the low maternal mortality (WHO, 2022). Despite this, continuous improvements are needed, and it is important to learn not only from failures and adverse events (Patient Safety I) but also from success

(Patient Safety II) (Dieckmann et al., 2017; Liberati et al., 2021). Learning from adverse events by conducting root cause analysis is common, but a systematic review found that it is not clear if linear root cause analysis is effective in preventing the recurrence of adverse events (Martin-Delgado et al., 2020). A complementary method to root cause analysis is the functional resonance analysis method (FRAM), which takes the complexity and variability in clinical practice into account (Hollnagel et al., 2015). The WHO recommends building high-reliability healthcare organizations that protect patients from harm and adverse events by “develop[ing] and sustain[ing] a culture of respect, openness and transparency that promotes learning, not blame” (WHO, 2021, p.26).

Liberati et al. (2021) developed features of safety to guide learning and improvement in intrapartum care that have similarities to strategies in both the Swedish national action plan and the global action plan for patient safety (National Board of Health and Welfare, 2020a; WHO, 2021).

Perceptions of patient safety culture and teamwork

The results presented in this thesis contribute to the knowledge about the main and interaction effects of profession and labor ward on patient safety culture and teamwork perceptions. The results on perceptions of patient safety culture could be referred to as organizational outcome, while perceptions of teamwork could be referred to as professional outcome through the lens of the SEIPS 2.0 model (IV) (Holden et al., 2013).

The results revealed that the healthcare professionals had an overall positive view of patient safety culture and teamwork. There were significant differences between the professions and between the labor wards with regard to patient safety culture and teamwork. Furthermore, four dimensions of patient safety culture and four dimensions of teamwork showed an interaction effect, which indicates that both profession and labor ward had an impact on these perceptions.

Regarding patient safety culture, the two-way ANOVA showed significant differences between the professions in two dimensions and between the labor wards in four dimensions. Concerning profession, physicians had lower scores than nursing assistants in the “Staffing” dimension. Other studies also show low scores for “Staffing” (Okuyama et al., 2018; Reis et al., 2018). An explanation could be that physicians with a high workload and several work hours perceived that there are not enough permanent healthcare professionals to provide the best care for the women in childbirth. A study of intrapartum care found that midwives’ job satisfaction was negatively affected by high demand and lack of organizational support (Hansson, 2021).

Labor ward 2 scored significantly higher than Labor ward 1 in the patient safety culture dimensions: “Feedback and communication about error”, “Nonpunitive response to error”, and “Organizational learning – continuous improvement”. These dimensions have been emphasized as typical patient safety concerns from an organizational perspective to reduce error and adverse events (Kohn et al., 2000). “Feedback and communication about error” is about being informed about errors and adverse events that happen, providing feedback about changes implemented and enablers’ opportunities to discuss how to prevent errors and adverse events (Sorra et al., 2016). According to Reason (2000), humans make errors, but errors create important opportunities for organizational learning and improved patient safety. “Organizational learning – continuous improvement” means mistakes have led to positive changes and changes subsequently been evaluated for effectiveness (Sorra et al., 2016). Voluntary patient safety incident reporting has traditionally been a foundation for this kind of patient safety work (Michel et al., 2004), but the method suffers from underreporting and lack of organizational learning (Griffin & Resar, 2009; Mitchell et al., 2016; Wrigstad, 2018). An interview study of physicians found that expectations of being infallible reduce their willingness to speak about errors they made, thus limiting opportunities for learning from errors (Danielsson et al., 2018).

Regarding teamwork, the two-way ANOVA showed significant differences between the professions in the dimension “Team structure”, with physicians scoring the lowest. “Team structure”

addresses organizational structures, healthcare professionals' roles and responsibility, and the ward's goals, efficiency, and resources to ensure patient safety (Agency for Healthcare Research and Quality [AHRQ], 2019). The low scores from the physicians may indicate unfulfilled anticipation of system components in team structures to ensure patient safety. Structural issues serve as the basis for improvement and are important for teamwork performance (Rosen et al., 2018). It is important that healthcare professionals in intrapartum care know each other well, have good relationships and could work effectively across professions. Furthermore, shared goals and respectful and open communication are crucial (Liberati et al., 2021).

There were significant differences between the labor wards in four teamwork dimensions. Labor ward 3 scored higher than the other labor wards in the "Leadership" dimension. "Leadership" is about the ability to maximize the activities of team members by ensuring that team actions are understood and changes in information are shared so that the team members have the necessary resources (AHRQ, 2019). In intrapartum care, team leadership is both important and challenging, with high complexity given that conditions in any childbirth can rapidly deteriorate and require interventions in prompt action by the team (Amatullah, 2018). Evidence-based insights in leadership and management in crisis partly include the ability to adapt to the changing situation by deferring to team members' expertise and to support organizational resilience by providing relational resources (Reyes et al., 2021).

Labor ward 2 had the highest score in the "Situation monitoring" and "Communication" dimensions. The "Situation monitoring" dimension reflects the process of actively scanning and assessing situational elements to gain information or understanding or to maintain awareness to support team functioning (AHRQ, 2019). The "Communication" dimension is described as the structured process by which information is clearly and accurately exchanged among team members (AHRQ, 2019). The implementation of a team training program showed that the interprofessional team experienced greater awareness and knowledge of common teamwork skills, more

systematic information exchange and increased use of tools (Ballangrud et al., 2021).

It is difficult to interpret what the differences between the labor wards depend on. The Swedish Medical Birth Register shows that interventions in intrapartum care differ substantially between regions in Sweden. An example is cesarean section, which varies between 8% and 25% (National Board of Health and Welfare, 2021b). Cesarean section increases the risk of adverse events for both the woman and the child (National Board of Health and Welfare, 2021a). The Swedish patient safety action plan highlights that a positive patient safety culture is an important condition for safe care in the healthcare organization (National Board of Health and Welfare, 2020a). It is important to provide equal healthcare (National Board of Health and Welfare, 2021a). Differences in the care between labor wards could by extension mean differences for women giving birth and negatively affect patient safety.

Four teamwork dimensions were associated with the outcome dimension “Overall perceptions of patient safety”. This result indicates the importance of teamwork competencies for procedures and systems to prevent error and patient safety problems. Teams and team performance are crucial in complex healthcare systems and in system theory about patient safety (Holden et al., 2013). Human factors involve the integration of healthcare professionals’ teamwork skills into their working environment, which is important for patient safety management. Team training can improve the effectiveness of interprofessional teams (Hughes et al., 2016) in terms of teamwork performance (McEwan et al., 2017) and has positive effects on patient safety culture (Hughes et al., 2016; Salas et al., 2020), clinical care processes and reduction in adverse events (Costar & Hall, 2020).

METHODOLOGICAL CONSIDERATIONS

A combination of quantitative and qualitative methods was used to achieve the overall aim in this thesis. The methodological considerations are discussed in relation to validity and reliability in the three quantitative papers (I, III-IV) and in relation to trustworthiness in the qualitative paper (II).

Validity and reliability (I, III-IV)

Validity refers to the degree to which appropriate inferences can be made. Furthermore, validity concerns how accurately a method measures what it is intended to measure. There are different types of validity, such as internal validity, statistical conclusion validity, construct validity and external validity. Internal validity refers to the extent to which it is possible to make an inference that a relationship between variables cannot be explained by alternative explanations. Statistical conclusion validity concerns the validity of the conclusions in a study that an empirical correlation between variables exists and is based on adequate analysis of data. Construct validity concerns the extent to which a measurement is consistent with the theoretical construct. External validity refers to the ability to generalize the research results to a wider population (Polit & Beck, 2021).

Reliability concerns consistency, namely, the extent to which a measurement is free from measurement error. There are different types of reliability, such as internal consistency and interrater reliability. Internal consistency concerns the degree to which items in a questionnaire measure the same underlying latent trait. Interrater reliability refers to the degree to which two raters independently apply the same rating values for an attribute being measured (Polit & Beck, 2021).

A descriptive and retrospective design was appropriate when describing adverse events in women giving birth (I), because this design describes and documents situations as they naturally occur (Polit & Beck, 2021). A cross-sectional design was chosen to validate the T-TPQ (III), and then the T-TPQ and the S-HSOPS were used to

investigate healthcare professionals' perceptions of teamwork and patient safety culture (IV). A large number of variables were collected, which is a strength of the cross-sectional design. Another strength of the cross-sectional design is its inexpensiveness, as cross-sectional studies are not resource-intensive and thereby are relatively easy and quick to conduct (Wang & Cheng, 2020). One limitation with the cross-sectional design is its lower placement in the evidence hierarchy (Polit & Beck, 2021).

Paper I was conducted only at a single site, which is a limitation. Fewer women than expected consented to participate, which led to the number of birth records not reaching the calculated number in the power analysis. However, the number of women who consented was relatively evenly distributed over 14 months, which minimized selection bias. Selection bias is a threat to internal validity and occurs when crucial circumstances are not distributed equally among conditions or groups being compared (Polit & Beck, 2021). The low proportion of returned consent forms might be explained by pregnant women's reasons to not participate in research as related to general inconvenience and third-party influences such as discussion with family members or family problems (van der Zande et al., 2018). Even if the request to participate in research was made after pregnancy, women just giving birth might have had other priorities than to participate in a research study. Because the number of birth records did not reach that calculated for the power analysis and only a single site was included, caution must be taken in generalizing the results. A threat to external validity is limited sample size and the use of a single site (Polit & Beck, 2021).

A strength in papers III and IV was the samples, which consisted of healthcare professionals in various wards, hospitals and regions. Hence, a limitation in paper III was the low response rate, but the sample size was sufficient to perform a confirmatory factor analysis of the T-TPQ. A sample size of 10 cases for each variable is desirable (Schreiber et al., 2006), which means a minimum of 350 cases in this thesis. The HSOPS assumes at least a 50% response rate (Sorra et al., 2016), which was achieved (IV). The T-TPQ does not provide recommendations for minimum sample sizes (Battles & King, 2010).

Another limitation was that no dropout analysis could be conducted since the questionnaires were answered anonymously (III-IV). The studies were performed in Sweden. Intrapartum care differs across countries, which should be taken into account in terms of generalizability of the results.

The translation of the original English version of the T-TPQ to Swedish was conducted inspired by the model of Brislin (1970) (III). After back-translation and minor revisions, the translated version was pilot tested among 15 healthcare professionals working in different clinical practices to establish semantic equivalence. Semantic equivalence refers to the adequacy of the translation and whether the meaning of the translated items is in line with the target culture as it was in the original culture (Polit & Yang, 2016). In Sweden, there may be differences between different settings regarding the extent to which healthcare professionals work in teams and whether the concepts of teamwork have been acknowledged.

A strength of the thesis is the use of reliable and valid measurements: the GTT (I) (Griffin & Resar, 2009), the T-TPQ (III-IV) (Battles & King, 2010) and the S-HSOPS (IV) (Hedsköld et al., 2013). The GTT was considered reliable according to a systematic review by Hibbert et al. (2016). To evaluate internal consistency, Cronbach's alpha was used in this thesis (III). The Cronbach's alpha values of the T-TPQ were considered acceptable (III), in line with previous studies (Ballangrud et al., 2017; Battles & King, 2010; Keebler et al., 2014). The internal consistency of the S-HSOPS was also considered acceptable according to Hedsköld et al. (2013).

Interrater reliability was used in the pilot test of the birth record review concerning trigger detection (I). It was found to be 100% for detecting the same positive triggers, which is a strength. A threat to interrater reliability is inconsistency among raters (Polit & Beck, 2021; Schildmeijer et al., 2012). Possible adverse events were discussed in the research team in an ongoing process. Another strength was that the obstetrician independently reviewed the birth records with potential adverse events and then collaboratively reviewed them together with the thesis author. A limitation of retrospective record reviews is the

inherent risk for the underestimation of adverse events due to the quality of the documentation in medical records (National Patient Safety Foundation, 2015).

Construct validity refers to the inference from the specific outcomes of a study to the higher-order constructs that they are intended to represent (Polit & Yang, 2016). A construct can be described as an abstraction or concept that is inferred from human behaviors or human traits (Polit & Yang, 2016). The construct validity of the Swedish version of the T-TPQ was assessed by confirmatory factor analysis (III), which uses goodness-of-fit indexes (Byrne, 2010). The confirmatory factor analysis of the Swedish version of the T-TPQ revealed five dimensions of constructs that are in line with the original version of the T-TPQ (Keebler et al., 2014) and the Norwegian version of the T-TPQ (Ballangrud et al., 2017).

Statistical conclusion validity was enhanced by meeting the assumption of the selected statistical test used in the thesis. The selection of appropriate tests in the thesis was based on the aim of the study, the research design, the data level of measurement, and the sample size.

The use of the parametric test two-way ANOVA provided the opportunity to use two independent variables (profession/labor ward) in the same analysis (IV). Therefore, the main effect for each independent variable and the interaction effect were calculated. The questionnaires (T-TPQ, S-HSOPS) had a response scale at the ordinal data level, but when all mean values for the items in a dimension were collected, the data level could be seen as continuous and thereby eligible for the parametric test (Harpe, 2015).

A two-tailed significance level at $p < .05$ was set for all analyses in the thesis (I, III-IV), except when Levene's test was significant in a few analyses in the two-way ANOVA (IV). This limitation was handled by setting a more stringent significance level at $p < .01$ (Pallant, 2013). A significant Levene's test indicates that variance in the dependent variable across groups is not equal, as is preferable. However, this may not bias the validity of the two-way ANOVA in any decisive way.

Considering the standard deviation, these values were not spread out in relation to the mean score. Furthermore, a post hoc test with Tukey's HSD aimed to control for type I error. Type I error occurs when the researcher interprets that there is a genuine effect in the population when in fact there is not (Field, 2013).

The strength of the standard linear multiple regression analysis (IV) was the insight revealed when exploring the association between the teamwork dimensions on the outcome dimensions of patient safety culture. Multiple regression is based on correlation but has the advantage of generating more sophisticated exploration of the interrelationship among a set of independent variables (Tabachnick & Fidell, 2014), such as the five teamwork dimensions of the T-TPQ. Hence, a threat to internal validity in cross-sectional studies is that it may be unclear whether the independent variable impacts the dependent variable, or vice versa (Polit & Beck, 2021).

Trustworthiness (II)

A descriptive, qualitative design with a phenomenographic approach was found to be suitable to describe variations in the healthcare professionals' perceptions of the phenomenon under study, i.e., patient safety with a focus on the woman in connection to childbirth. To ensure trustworthiness, consideration was given to Lincoln and Guba's (1985, 1986) criteria: credibility, dependability, confirmability, and transferability. Credibility refers to confidence in the findings and the truthful interpretation of the data. Dependability refers to stability over time and conditions and is associated with the consistency of findings. Confirmability concerns objectivity to the data and the phenomenon by an audit strategy. Transferability addresses the degree to which the findings can apply or transfer beyond the study being conducted.

The intention was to ensure variation in perceptions through the use of a purposive sample, which is important in phenomenography. The findings depend on the variation achieved to ensure a broad variation of the phenomena of interest (credibility). Ultimately, there was sufficient variation in terms of profession (including different levels of

physicians), age, and work experience in intrapartum care across the 19 healthcare professionals who participated (credibility).

The author of this thesis performed all interviews, of which two were pilot interviews. All of the interviews were carried out in a similar way, located in the hospitals, with one exception because one participant wished to be at home (dependability, credibility). The same two questions were asked in each of the interviews (dependability), and probe questions were posed to elucidate the healthcare professionals' various experiences related to the phenomenon under study (c.f. Marton & Booth, 1997). The goal was to achieve an authentic understanding of the healthcare professionals' various experiences.

The members of the research team had knowledge and experience of qualitative research. The different steps of the data collection and systematic data analysis were thoroughly described, which strengthened the credibility. Another strength was that the whole research team read all interviews and took part in all steps of the analysis (credibility). The analysis was discussed within the research team, and accounts of the analysis processes were described to establish an "audit trail" (confirmability) (Lincoln & Guba, 1985).

My position as a midwife with experience from intrapartum care enabled me to obtain rich data from the participants. This may have strengthened the credibility, even though it may represent a risk concerning my preunderstandings about the phenomenon. Therefore, my preunderstanding was discussed in the research team (credibility). To thoroughly discuss the pilot interviews, being aware of the interview technique and reflecting individually and within the research team were strategies to reduce the risk of preunderstanding negatively influencing the findings (credibility).

Transferability was achieved through rich "thick descriptions" in the data. The healthcare professionals were recruited from three labor wards in two regions in Sweden. Despite this strength, the findings must be taken into account when considering transferability from a broader perspective (c.f. Lincoln & Guba, 1985). However, this study

may contribute relevant knowledge to healthcare professionals in other labor wards.

CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

- The results highlight the occurrence of 3rd- or 4th-degree lacerations, distended urinary bladder, and anesthesia-related adverse events. No permanent harm according to severity was found.
- Since a majority of the adverse events were assessed as preventable, there is a potential for healthcare professionals to reduce adverse events.
- The incidence of adverse events was higher than in other studies in intrapartum care.
- The GTT is effective in detecting adverse events in intrapartum care.
- Collaboration between midwives at the end of childbirth as well as in the aftermath to increase patient safety for the woman is important.
- It is important to inform and take care of women in childbirth who sustained an adverse event.
- The teams and the managers can use the information about identified adverse events for systematic quality improvement at the micro level. Organizational learning about adverse events can result in increased awareness at both the “sharp” and “blunt” ends in complex healthcare systems.
- The results highlight the importance of healthcare professionals’ providing supportive care and listening to the woman in childbirth.
- Using team members’ competences in a tolerant atmosphere, having a reasonable workload, and learning from failure as well as from success are preconditions for safe care in labor ward.

- The Swedish version of the TeamSTEPPS® Teamwork Perceptions Questionnaire (T-TPQ) is reliable and valid.
- The T-TPQ can be used to evaluate healthcare professionals' perceptions of teamwork in intrapartum care and other healthcare settings.
- The results indicate that both profession and labor ward are important for healthcare professionals' perceptions of patient safety culture and teamwork in intrapartum care.
- Teamwork perceptions are significant for an overall patient safety culture.
- Patient safety culture measurements can be used to shed light on potential areas for improvement in intrapartum care to improve patient safety.

FUTURE RESEARCH

- Conducting an investigation of patient safety culture in relation to adverse events in intrapartum care would be interesting.
- Additional studies of adverse events in planned vaginal births with greater sample sizes in several labor wards are needed.
- It would be interesting to interview women about their experiences of patient safety during childbirth.
- Future studies with larger sample sizes are desirable to confirm the reliability and validity of the Swedish version of the T-TPQ.
- Investigating the impact of interaction effects on patient safety culture and teamwork in intrapartum care would be interesting.
- Future studies are needed to investigate whether teamwork and other factors are associated with patient safety culture.
- Investigating the impact of interprofessional team training with regard to teamwork and patient safety culture can be of interest.
- Using a system perspective such as the SEIPS model for study and improving patient safety in intrapartum care could be fruitful.

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REFERENCES

- Agency for Healthcare Research and Quality. (2019). *TeamSTEPPS 2.0 Curriculum*. <https://www.ahrq.gov/teamstepps/index.html>
- Aibar, L., Rabanaque, M. J., Aibar, C., Aranaz, J. M., & Mozas, J. (2015). Patient safety and adverse events related with obstetric care. *Archives of Gynecology and Obstetrics*, 291(4), 825-830. <https://doi.org/10.1007/s00404-014-3474-3>
- Aibar, L., Rabanaque, M. J., Mozas, J., Puertas, A., Aranaz, J. M., & Aibar, C. (2014). Improving patient safety by detecting obstetric care-related adverse events: application of a new screening guide. *Archives of Gynecology and Obstetrics*, 289(5), 945-952. <https://doi.org/10.1007/s00404-013-3077-4>
- Akbari, N., Malek, M., Ebrahimi, P., Haghani, H., & Aazami, S. (2017). Safety culture in the maternity unit of hospitals in Ilam province, Iran: A census survey using HSOPSC tool. *Pan African Medical Journal*, 27, Article 268. <https://doi.org/10.11604/pamj.2017.27.268.9776>
- Amatullah, A. F. (2018). Using interprofessional simulation-based training to improve management of obstetric emergencies: A systematic review. *Clinical Simulation in Nursing*, 14, 45-53. <https://doi.org/10.1016/j.ecns.2017.10.014>
- Amiri, A. (2020). Role of nurses and midwives in improving patient safety during childbirth: Evidence from obstetric trauma in OECD countries. *Applied Nursing Research*, 56, Article 151343. <https://doi.org/10.1016/j.apnr.2020.151343>
- Aune, I., Amundsen, H. H., & Skaget Aas, L. C. (2014). Is a midwife's continuous presence during childbirth a matter of course? Midwives' experiences and thoughts about factors that may influence their continuous support of women during labour. *Midwifery*, 30(1), 89-95. <https://doi.org/10.1016/j.midw.2013.02.001>
- Baghirzada, L., Archer, D., Walker, A., & Balki, M. (2022). Anesthesia-related adverse events in obstetric patients: A population-based study in Canada [Les événements indésirables liés à l'anesthésie chez les patientes obstétricales: une étude de population au Canada]. *Canadian Journal of Anaesthesia*, 69(1), 72-85. <https://doi.org/10.1007/s12630-021-02101-3>
- Bagian, J. P., Gosbee, J., Lee, C. Z., Williams, L., McKnight, S. D., & Mannos, D. M. (2002). The Veterans Affairs root cause analysis system in action. *Joint Commission Journal on Quality Improvement*, 28(10), 531-545. [https://doi.org/10.1016/s1070-3241\(02\)28057-8](https://doi.org/10.1016/s1070-3241(02)28057-8)

- Ballangrud, R., Aase, K., & Vifladt, A. (2021). Longitudinal team training program in a Norwegian surgical ward: A qualitative study of nurses' and physicians' experiences with implementation. *BMC Health Services Research*, 21(1), 1-13. <https://doi.org/10.1186/s12913-021-06732-6>
- Ballangrud, R., Husebø, S. E., & Hall-Lord, M. L. (2017). Cross-cultural validation and psychometric testing of the Norwegian version of the TeamSTEPPS® teamwork perceptions questionnaire. *BMC Health Services Research*, 17(1), 799. <https://doi.org/10.1186/s12913-017-2733-y>
- Battles, J., & King, H. B. (2010). *TeamSTEPPS® Teamwork Perceptions Questionnaire Manual*. <https://bit.ly/3KTYdY1>
- Berg, M., Ólafsdóttir, Ó. A., & Lundgren, I. (2012). A midwifery model of woman-centred childbirth care – in Swedish and Icelandic settings. *Sexual & Reproductive Healthcare*, 3(2), 79-87. <https://doi.org/10.1016/j.srhc.2012.03.001>
- Bergholt, T., Skjeldestad, F. E., Pyykönen, A., Rasmussen, S. C., Tapper, A.-M., Bjarnadóttir, R. I., Smáráson, A., Másdóttir, B. B., Klungsøyr, K., Albrechtsen, S., Källén, K., Gissler, M., & Løkkegard, E. C. L. (2020). Maternal age and risk of cesarean section in women with induced labor at term: A Nordic register-based study. *Acta Obstetrica et Gynecologica Scandinavica*, 99(2), 283-289. <https://doi.org/10.1111/aogs.13743>
- Betran, A. P., Temmerman, M., Kingdon, C., Mohiddin, A., Opiyo, N., Torloni, M. R., Zhang, J., Musana, O., Wanyonyi, S. Z., Gulmezoglu, A. M., & Downe, S. (2018). Interventions to reduce unnecessary caesarean sections in healthy women and babies. *Lancet*, 392(10155), 1358-1368. [https://doi.org/10.1016/S0140-6736\(18\)31927-5](https://doi.org/10.1016/S0140-6736(18)31927-5)
- Borrelli, S. E., Spiby, H., & Walsh, D. (2016). The kaleidoscopic midwife: A conceptual metaphor illustrating first-time mothers' perspectives of a good midwife during childbirth. A grounded theory study. *Midwifery*, 39, 103-111. <https://doi.org/10.1016/j.midw.2016.05.008>
- Bradfield, Z., Duggan, R., Hauck, Y., & Kelly, M. (2018). Midwives being 'with woman': An integrative review. *Women and Birth*, 31(2), 143-152. <https://doi.org/10.1016/j.wombi.2017.07.011>
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185-216. <https://doi.org/10.1177/135910457000100301>
- Brogaard, L., Kierkegaard, O., Hvidman, L., Jensen, K. R., Musaeus, P., Uldbjerg, N., & Manser, T. (2019). The importance of non-technical performance for teams managing postpartum haemorrhage: Video review of 99 obstetric teams. *BJOG: An*

- International Journal of Obstetrics and Gynaecology*, 126(8), 1015-1023. <https://doi.org/10.1111/1471-0528.15655>
- Buttigieg, S. C., West, M. A., & Dawson, J. F. (2011). Well-structured teams and the buffering of hospital employees from stress. *Health Services Management Research*, 24(4), 203-212. <https://doi.org/10.1258/hsmr.2011.011013>
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications and programming* (2 ed.). Routledge.
- Carayon, P., Schoofs Hundt, A., Karsh, B. T., Gurses, A. P., Alvarado, C. J., Smith, M., & Flatley Brennan, P. (2006). Work system design for patient safety: The SEIPS model. *Quality and Safety in Health Care*, 15(1), 50-58. <https://doi.org/10.1136/qshc.2005.015842>
- Chabbert, M., Panagiotou, D., & Wendland, J. (2021). Predictive factors of women's subjective perception of childbirth experience: A systematic review of the literature. *Journal of Reproductive and Infant Psychology*, 39(1), 43-66. <https://doi.org/10.1080/02646838.2020.1748582>
- Chang, Y. S., Coxon, K., Portela, A. G., Furuta, M., & Bick, D. (2018). Interventions to support effective communication between maternity care staff and women in labour: A mixed-methods systematic review. *Midwifery*, 59, 4-16. <https://doi.org/10.1016/j.midw.2017.12.014>
- Classen, D. C., Resar, R., Griffin, F., Federico, F., Frankel, T., Kimmel, N., Whittington, J. C., Frankel, A., Seger, A., & James, B. C. (2011). 'Global trigger tool' shows that adverse events in hospitals may be ten times greater than previously measured. *Health Affairs*, 30(4), 581-589. <https://doi.org/10.1377/hlthaff.2011.0190>
- Costar, D. M., & Hall, K. K. (2020). Improving team performance and patient safety on the job through team training and performance support tools: A systematic review. *Journal of Patient Safety*, 16(3), 48-56. <https://doi.org/10.1097/pts.0000000000000746>
- Dahlgren, L.-O., & Fallsberg, M. (1991). Phenomenography as a qualitative approach in social pharmacy research. *Journal of Social and Administrative Pharmacy*, 8(4), 150-156.
- Danielsson, M., Nilsen, P., Rutberg, H., & Carlford, S. (2018). The professional culture among physicians in Sweden: Potential implications for patient safety. *BMC Health Services Research*, 18(1), Article 543. <https://doi.org/10.1186/s12913-018-3328-y>
- Danielsson, M., Nilsen, P., Rutberg, H., & Årestedt, K. (2019). A national study of patient safety culture in hospitals in Sweden. *Journal of Patient Safety*, 15(4), 328-333. <https://doi.org/10.1097/PTS.0000000000000369>

- Danilack, V. A., Nunes, A. P., & Phipps, M. G. (2015). Unexpected complications of low-risk pregnancies in the United States. *American Journal of Obstetrics and Gynecology*, 212(6), Article 809.e801–809.e806. <https://doi.org/10.1016/j.ajog.2015.03.038>
- de Jonge, A., Dahlen, H., & Downe, S. (2021). ‘Watchful attendance’ during labour and birth. *Sexual & Reproductive Healthcare*, 28, Article 100617. <https://doi.org/10.1016/j.srhc.2021.100617>
- Dieckmann, P., Patterson, M., Lahlou, S., Mesman, J., Nyström, P., & Krage, R. (2017). Variation and adaptation: Learning from success in patient safety-oriented simulation training. *Advances in Simulation*(2), Article 21. <https://doi.org/10.1186/s41077-017-0054-1>
- Diep, A. N., Paquay, M., Servotte, J. C., Dardenne, N., Istas, L., Van Ngoc, P., Charlier, M., Ghuysen, A., & Donneau, A. F. (2021). Validation of a French-language version of TeamSTEPPS® T-TPQ and T-TAQ questionnaires. *Journal of Interprofessional Care*, Advance online publication. <https://doi.org/10.1080/13561820.2021.1902293>
- Donabedian, A. (1988). The quality of care: How can it be assessed? *JAMA*, 260(12), 1743-1748. <https://doi.org/10.1001/jama.260.12.1743>
- Edqvist, M., Dahlen, H. G., Häggsgård, C., Tern, H., Ängeby, K., Teleman, P., Ajne, G., & Rubertsson, C. (2022). The effect of two midwives during the second stage of labour to reduce severe perineal trauma (Oneplus): A multicentre, randomised controlled trial in Sweden. *The Lancet*, 399(10331), 1242-1253. [https://doi.org/10.1016/S0140-6736\(22\)00188-X](https://doi.org/10.1016/S0140-6736(22)00188-X)
- Ellis, J. A., Brown, C. M., Barger, B., & Carlson, N. S. (2019). Influence of maternal obesity on labor induction: A systematic review and meta-analysis. *Journal of Midwifery & Womens Health*, 64(1), 55-67. <https://doi.org/10.1111/jmwh.12935>
- Esscher, A. (2014). *Maternal mortality in Sweden: Classification, country of birth, and quality of care* [Doctoral dissertation, Uppsala University].
- Etchegaray, J. M., & Thomas, E. J. (2012). Comparing two safety culture surveys: Safety Attitudes Questionnaire and Hospital Survey on Patient Safety. *BMJ Quality & Safety*, 21(6), 490-498. <https://doi.org/10.1136/bmjqs-2011-000449>
- Euro-Peristat Project. (2018). *European perinatal health report: Core indicators of the health and care of pregnant women and babies in Europe in 2015*. <https://www.europeristat.com/>
- European Network for Patient Safety. (2010). *Use of patient safety culture instrument and recommendations*. <https://bit.ly/36pvurP>

- European Parliament and Council of the European Union. (2018). *General Data Protection Regulation (GDPR) 2016/679*. <https://bit.ly/3JnjclH>
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4 ed.). SAGE.
- Florea, A., Caughey, S. S., Westland, J., Berckmans, M., Kennelly, C., Beach, C., Dyer, A., Forster, A. J., & Oppenheimer, L. W. (2010). The Ottawa hospital quality incident notification system for capturing adverse events in obstetrics. *Journal of Obstetrics and Gynaecology Canada*, 32(7), 657-662. [https://doi.org/10.1016/s1701-2163\(16\)34569-8](https://doi.org/10.1016/s1701-2163(16)34569-8)
- Forster, A. J., Fung, I., Caughey, S., Oppenheimer, L., Beach, C., Shojania, K. G., & van Walraven, C. (2006). Adverse events detected by clinical surveillance on an obstetric service. *Obstetrics and Gynecology*, 108(5), 1073-1083. <https://doi.org/10.1097/01.AOG.00000242565.28432.7c>
- Fransen, A. F., de Ven, J., Banga, F. R., Mol, B. W. J., & Oei, S. G. (2020). Multi-professional simulation-based team training in obstetric emergencies for improving patient outcomes and trainees' performance. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD011545.pub2>
- Fujita, S., Seto, K., Kitazawa, T., Matsumoto, K., & Hasegawa, T. (2014). Characteristics of unit-level patient safety culture in hospitals in Japan: A cross-sectional study. *BMC Health Services Research*, 14(1), Article 508. <https://doi.org/10.1186/s12913-014-0508-2>
- Green, B., Oeppen, R., Smith, D., & Brennan, P. (2017). Challenging hierarchy in healthcare teams: Ways to flatten gradients to improve teamwork and patient care. *British Journal of Oral and Maxillofacial Surgery*, 55(5), 449-453. <https://doi.org/10.1016/j.bjoms.2017.02.010>
- Griffin, F. A., & Resar, R. K. (2009). *IHI Global Trigger Tool for measuring adverse events* (2 ed.). Institute for Healthcare Improvement (IHI). <https://bit.ly/3N34FoH>
- Guisse, J. M., & Segel, S. (2008). Teamwork in obstetric critical care. *Best Practice & Research: Clinical Obstetrics & Gynaecology*, 22(5), 937-951. <https://doi.org/10.1016/j.bpobgyn.2008.06.010>
- Hansson, M. (2021). *A meaningful work in a strained context: Exploring midwives' work situation and professional role* [Doctoral dissertation, Institute of Health and Care Sciences, Sahlgrenska Academy, University of Gothenburg].
- Hansson, M., Lundgren, I., Hensing, G., & Carlsson, I. M. (2019). Veiled midwifery in the baby factory: A grounded theory study.

- Women Birth*, 32(1), 80-86.
<https://doi.org/10.1016/j.wombi.2018.04.012>
- Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in Pharmacy Teaching and Learning*, 7(6), 836-850.
<https://doi.org/10.1016/j.cptl.2015.08.001>
- The Health Foundation. (2010). *Evidence scan: Global trigger tools*. The Health Foundation <https://bit.ly/3KUh85g>
- Hedsköld, M., Pukk-Härenstam, K., Berg, E., Lindh, M., Soop, M., Øvretveit, J., & Sachs, M. A. (2013). Psychometric properties of the hospital survey on patient safety culture, HSOPSC, applied on a large Swedish health care sample. *BMC Health Services Research*, 13(1), 332. <https://doi.org/10.1186/1472-6963-13-332>
- Hedsköld, M., Sachs, M. A., Rosander, T., von Knorring, M., & Härenstam, K. P. (2021). Acting between guidelines and reality: An interview study exploring the strategies of first line managers in patient safety work. *BMC Health Services Research*, 21(1), Article 48. <https://doi.org/10.1186/s12913-020-06042-3>
- Hibbert, P. D., Molloy, C. J., Hooper, T. D., Wiles, L. K., Runciman, W. B., Lachman, P., Muething, S. E., & Braithwaite, J. (2016). The application of the Global Trigger Tool: A systematic review. *International Journal for Quality in Health Care*, 28(6), 640-649. <https://doi.org/10.1093/intqhc/mzw115>
- Holden, R. J., Carayon, P., Gurses, A. P., Hoonakker, P., Hundt, A. S., Ozok, A. A., & Rivera-Rodriguez, A. J. (2013). SEIPS 2.0: A human factors framework for studying and improving the work of healthcare professionals and patients. *Ergonomics*, 56(11), 1669-1686. <https://doi.org/10.1080/00140139.2013.838643>
- Hollnagel, E. (2018). *Safety-II in practice : Developing the resilience potentials*. Routledge.
- Hollnagel, E., Wears, R. L., & Braithwaite, J. (2015). *From Safety-I to Safety-II: A white paper*. The resilient health care net: Published simultaneously by the University of Southern Denmark, University of Florida, USA, and Macquarie University, Australia. <https://bit.ly/3tAFcUX>
- Hooker, A. B., Etman, A., Westra, M., & Van der Kam, W. J. (2019). Aggregate analysis of sentinel events as a strategic tool in safety management can contribute to the improvement of healthcare safety. *International Journal for Quality in Health Care*, 31(2), 110-116. <https://doi.org/10.1093/intqhc/mzy116>
- Hughes, A. M., Gregory, M. E., Joseph, D. L., Sonesh, S. C., Marlow, S. L., Lacerenza, C. N., Benishek, L. E., King, H. B., & Salas, E. (2016). Saving lives: A meta-analysis of team training in

- healthcare. *Journal of Applied Psychology*, 101(9), 1266-1304.
<https://doi.org/10.1037/apl0000120>
- Hunter, B., & Warren, L. (2014). Midwives experiences of workplace resilience. *Midwifery*, 30(8), 926-934.
<https://doi.org/10.1016/j.midw.2014.03.010>
- Hwang, J. I., Chin, H. J., & Chang, Y. S. (2014). Characteristics associated with the occurrence of adverse events: A retrospective medical record review using the Global Trigger Tool in a fully digitalized tertiary teaching hospital in Korea. *Journal of Evaluation in Clinical Practice*, 20(1), 27-35.
<https://doi.org/10.1111/jep.12075>
- International Confederation of Midwives. Retrieved 22 01 03 from
<https://www.internationalmidwives.org/>
- Jacobson, C. H., Zlatnik, M. G., Kennedy, H. P., & Lyndon, A. (2013). Nurses' perspectives on the intersection of safety and informed decision making in maternity care. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 42(5), 577-587.
<https://doi.org/10.1111/1552-6909.12232>
- Karlstad University. (2002). *Bevarande- och gallringsplan för forskningsmaterial Dnr 230/02 [Plan for prevention and sorting out research material Dnr 230/02]*. Karlstad University.
- Keebler, J. R., Dietz, A. S., Lazzara, E. H., Benishek, L. E., Almeida, S. A., Toor, P. A., King, H. B., & Salas, E. (2014). Validation of a teamwork perceptions measure to increase patient safety. *BMJ Quality & Safety*, 23(9), 718-726.
<https://doi.org/10.1136/bmjqs-2013-001942>
- Kennedy, S., Lanceley, A., Whitten, M., Kelly, C., & Nicholls, J. (2021). Consent on the labour ward: A qualitative study of the views and experiences of healthcare professionals. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, 264, 150-154. <https://doi.org/10.1016/j.ejogrb.2021.07.003>
- Kimmich, N., Burkhardt, T., Kreft, M., & Zimmermann, R. (2019). Reducing birth trauma by the implementation of novel monitoring and documentation tools. *Acta Obstetrica et Gynecologica Scandinavica*, 98(10), 1223-1226.
<https://doi.org/10.1111/aogs.13660>
- Kimmich, N., Zimmermann, R., & Kreft, M. (2018). Video analysis for the evaluation of vaginal births: A prospective observational study. *Swiss Medical Weekly*, 148, Article w14634.
<https://doi.org/10.4414/smww.2018.14634>
- King, H. B., Battles, J., Baker, D. P., Alonso, A., Salas, E., Webster, J., Toomey, L., & Salisbury, M. (2008). TeamSTEPPS™: Team Strategies and Tools to Enhance Performance and Patient Safety. In K. B. Henriksen, J. & M. Keyes (Eds.), *Advances in*

- patient safety: New directions and alternative approaches* (Vol. 3: Performance and Tools). Agency for Healthcare Research and Quality.
- Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (2000). *To err is human: Building a safer health system*. National Academy Press.
- Landrigan, C. P., Parry, G. J., Bones, C. B., Hackbarth, A. D., Goldmann, D. A., & Sharek, P. J. (2010). Temporal trends in rates of patient harm resulting from medical care. *New England Journal of Medicine*, 363(22), 2124-2134. <https://doi.org/10.1056/NEJMSa1004404>
- Larouzee, J., & Le Coze, J.-C. (2020). Good and bad reasons: The Swiss cheese model and its critics. *Safety Science*, 126, Article 104660. <https://doi.org/10.1016/j.ssci.2020.104660>
- Le Coze, J.-C. (2008). Disasters and organisations: From lessons learnt to theorising. *Safety Science*, 46(1), 132-149. <https://doi.org/10.1016/j.ssci.2006.12.001>
- Li, Q., Zhu, S., & Xiao, X. (2020). The risk factors of postpartum urinary retention after vaginal delivery: A systematic review. *International Journal of Nursing Sciences*, 7(4), 484-492. <https://doi.org/10.1016/j.ijnss.2020.09.002>
- Liberati, E. G., Tarrant, C., Willars, J., Draycott, T., Winter, C., Kuberska, K., Paton, A., Marjanovic, S., Leach, B., & Lichten, C. (2021). Seven features of safety in maternity units: a framework based on multisite ethnography and stakeholder consultation. *BMJ Quality & Safety*, 30(6), 444-456. <https://doi.org/10.1136/bmjqs-2020-010988>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Lincoln, Y. S., & Guba, E. G. (1986). But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. *New Directions for Program Evaluation*, 1986(30), 73-84. <https://doi.org/10.1002/ev.1427>
- Lyndon, A., Sexton, J. B., Simpson, K. R., Rosenstein, A., Lee, K. A., & Wachter, R. M. (2012). Predictors of likelihood of speaking up about safety concerns in labour and delivery. *BMJ Quality & Safety*, 21(9), 791-799. <https://doi.org/10.1136/bmjqs-2010-050211>
- Lyndon, A., Zlatnik, M. G., Maxfield, D. G., Lewis, A., McMillan, C., & Kennedy, H. P. (2014). Contributions of clinical disconnections and unresolved conflict to failures in intrapartum safety. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 43(1), 2-12. <https://doi.org/10.1111/1552-6909.12266>
- Lyubovnikova, J., West, M. A., Dawson, J. F., & Carter, M. R. (2015). 24-Karat or fool's gold? Consequences of real team and co-acting group membership in healthcare organizations.

- European Journal of Work and Organizational Psychology*, 24(6), 929-950.
<https://doi.org/10.1080/1359432X.2014.992421>
- Mannion, R., & Braithwaite, J. (2017). False dawns and new horizons in patient safety research and practice. *International Journal of Health Policy and Management*, 6(12), 685-689.
<https://doi.org/10.15171/ijhpm.2017.115>
- Manser, T. (2009). Teamwork and patient safety in dynamic domains of healthcare: A review of the literature. *Acta Anaesthesiologica Scandinavica*, 53(2), 143-151. <https://doi.org/10.1111/j.1399-6576.2008.01717.x>
- Markiewicz, L. W., M. (2010). Leading groups and teams. In T. Swanwick & J. McKim (Eds.), *ABC of Clinical Leadership* (1 ed.). BMJ Books.
- Martin-Delgado, J., Martínez-García, A., Aranaz, J. M., Valencia-Martín, J. L., & Mira, J. J. (2020). How much of root cause analysis translates into improved patient safety: A systematic review. *Medical Principles and Practice*, 29(6), 524-531.
<https://doi.org/10.1159/000508677>
- Marton, F. (1981). Phenomenography: Describing conceptions of the world around us. *Instructional Science*, 10(2), 177-200.
<https://doi.org/10.1007/bf00132516>
- Marton, F. (1986). Phenomenography: A research approach to investigating different understandings of reality. *Journal of Thought*, 21(3), 28-49.
- Marton, F. (2000). The structure of awareness. In J. Bowden & E. Walsh (Eds.), *Phenomenography* (pp. 102-116). RMIT University.
- Marton, F., & Booth, S. (1997). *Learning and awareness*. N.J. Erlbaum.
- Maxfield, D. G., Lyndon, A., Kennedy, H. P., O'Keeffe, D. F., & Zlatnik, M. G. (2013). Confronting safety gaps across labor and delivery teams. *American Journal of Obstetrics and Gynecology*, 209(5), 402-408 e403.
<https://doi.org/10.1016/j.ajog.2013.07.013>
- McArdle, J., Sorensen, A., Fowler, C. I., Sommerness, S., Burson, K., & Kahwati, L. (2018). Strategies to improve management of shoulder dystocia under the AHRQ Safety Program for Perinatal Care. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 47(2), 191-201.
<https://doi.org/10.1016/j.jogn.2017.11.014>
- McEwan, D., Ruissen, G. R., Eys, M. A., Zumbo, B. D., & Beauchamp, M. R. (2017). The effectiveness of teamwork training on teamwork behaviors and team performance: A systematic review and meta-analysis of controlled interventions. *PloS One*,

- 12(1), Article e0169604.
<https://doi.org/10.1371/journal.pone.0169604>
- Michel, P., Quenon, J. L., de Sarasqueta, A. M., & Scemama, O. (2004). Comparison of three methods for estimating rates of adverse events and rates of preventable adverse events in acute care hospitals. *BMJ*, 328, Article 199.
<https://doi.org/10.1136/bmj.328.7433.199>
- Millde Luthander, C. (2016). *The national perinatal patient safety programme: Challenges of implementation and evaluation* [Doctoral dissertation, Karolinska Institutet].
- Miller, S., Abalos, E., Chamillard, M., Ciapponi, A., Colaci, D., Comande, D., Diaz, V., Geller, S., Hanson, C., Langer, A., Manuelli, V., Millar, K., Morhason-Bello, I., Castro, C. P., Pileggi, V. N., Robinson, N., Skaer, M., Souza, J. P., Vogel, J. P., & Althabe, F. (2016). Beyond too little, too late and too much, too soon: A pathway towards evidence-based, respectful maternity care worldwide. *Lancet*, 388(10056), 2176-2192.
[https://doi.org/10.1016/S0140-6736\(16\)31472-6](https://doi.org/10.1016/S0140-6736(16)31472-6)
- Mitchell, I., Schuster, A., Smith, K., Pronovost, P., & Wu, A. (2016). Patient safety incident reporting: A qualitative study of thoughts and perceptions of experts 15 years after 'To Err is Human'. *BMJ Quality & Safety*, 25(2), 92-99.
<https://doi.org/10.1136/bmjqs-2015-004405>
- Mortaro, A., Moretti, F., Pascu, D., Tessari, L., Tardivo, S., Pancheri, S., Marta, G., Romano, G., Mazzi, M., Montresor, P., & Naessens, J. M. (2021). Adverse events detection through Global Trigger Tool methodology: Results from a 5-year study in an Italian hospital and opportunities to improve interrater reliability. *Journal of Patient Safety*, 17(6), 451-457
<https://doi.org/10.1097/PTS.0000000000000381>
- National Board of Health and Welfare. (2014). *Graviditeter, förlossningar och nyfödda barn: Medicinska födelseregistret 1973-2013* [Pregnancies, deliveries and newborn infants: The Swedish Medical Birth Register 1973-2013].
- National Board of Health and Welfare. (2018). *Kompetensförsörjning och patientsäkerhet: Hur brister i bemanning och kompetens påverkar patientsäkerheten* [Provision of competence and patient safety: How deficiencies in staffing and competence affect patient safety]. <https://bit.ly/36bykUw>
- National Board of Health and Welfare. (2020a). *Act for safer healthcare: National action plan for increased patient safety in Swedish healthcare 2020-2024*. <https://bit.ly/3rBLT7I>
- National Board of Health and Welfare. (2020b). *Statistics on pregnancies, deliveries and newborn infants 2019*.
<https://bit.ly/3N5Vz3i>

- National Board of Health and Welfare. (2021a). *En indikatorbaserad uppföljning för säker vård [An indicator based follow-up for safer care]*. <https://bit.ly/36qq6YW>
- National Board of Health and Welfare. (2021b). *Statistik om graviditeter, förlossningar och nyfödda [Statistics on pregnancies, deliveries and newborn infants]*. <https://bit.ly/3oO77OR>
- National Coordinating Council for Medication Error Reporting and Prevention. (2001). *Types of medication errors*. <https://bit.ly/2VTmroi>
- National Institute for Health and Care Excellence. (2015). *Health and social care directorate: Quality standards and indicators (Briefing paper)*. <https://bit.ly/3qgk5VV>
- National Patient Safety Foundation. (2015). *Free from harm: Accelerating patient safety improvement fifteen years after To err is human*. <https://bit.ly/3iJfhEX>
- Nieva, V. F., Murphy, R., Ridley, N., Donaldson, B., Combes, J., Mitchell, P., Kovner, C., Hoy, E., & Carpenter, D. (2005). From science to service: A framework for the transfer of patient research into practice. In K. B. Henriksen, J. E. Marks, & D. I. Lewin (Eds.), *Advances in patient safety: From research to implementation* (Vol. 2. Concepts and Methodology). Agency for Healthcare Research and Quality.
- Nieva, V. F., & Sorra, J. (2003). Safety culture assessment: A tool for improving patient safety in healthcare organizations. *Quality and Safety in Health Care*, 12(Suppl. 2), Article ii17-ii23. https://doi.org/10.1136/qhc.12.suppl_2.ii17
- Nightingale, F. (1969). *Notes on nursing: What it is, and what it is not*. Dover Publications.
- Nilsson, L., Borgstedt-Risberg, M., Soop, M., Nylén, U., Ålenius, C., & Rutberg, H. (2018). Incidence of adverse events in Sweden during 2013–2016: A cohort study describing the implementation of a national trigger tool. *BMJ open*, 8(3), Article e020833. <https://doi.org/10.1136/bmjopen-2017-020833>
- Nyfløt, L. T., Ellingsen, L., Yli, B. M., Øian, P., & Vangen, S. (2018). Maternal deaths from hypertensive disorders: Lessons learnt. *Acta Obstetrica et Gynecologica Scandinavica*, 97(8), 976–987. <https://doi.org/10.1111/aogs.13357>
- Okuyama, J. H. H., Galvao, T. F., & Silva, M. T. (2018). Healthcare professional's perception of patient safety measured by the hospital survey on patient safety culture: A systematic review and meta-analysis. *Scientific World Journal*, 2018, Article 9156301. <https://doi.org/10.1155/2018/9156301>

- Ota, E., da Silva Lopes, K., Middleton, P., Flenady, V., Wariki, W. M. V., Rahman, M. O., Tobe-Gai, R., & Mori, R. (2020). Antenatal interventions for preventing stillbirth, fetal loss and perinatal death: An overview of Cochrane systematic reviews. *Cochrane Database of Systematic Reviews*.
<https://doi.org/10.1002/14651858.CD009599.pub2>
- Pallant, J. F. (2013). *SPSS survival manual: A step by step guide to data analysis using the SPSS*. Open University Press.
- Pihl, K. (Ed.). (2020). *Diagnoshandbok för kvinnosjukvården [Diagnostic manual in womens' healthcare]*. Svensk förening för obstetrik och gynekologi.
- Polit, D. F., & Beck, C. T. (2021). *Nursing research: Generating and assessing evidence for nursing practice* (11 ed.). Wolters Kluwer.
- Polit, D. F., & Yang, F. M. (2016). *Measurement and measurement of change: A primer for health professions*. Wolters Kluwer.
- Rabøl, L. I., Andersen, M. L., Østergaard, D., Bjørn, B., Lilja, B., & Mogensen, T. (2011). Republished error management: Descriptions of verbal communication errors between staff. An analysis of 84 root cause analysis-reports from Danish hospitals. *Postgraduate Medical Journal*, 87(1033), 783-789.
<https://doi.org/10.1136/pgmj.2010.040238rep>
- Raftopoulos, V., Savva, N., & Papadopoulou, M. (2011). Safety culture in the maternity units: A census survey using the Safety Attitudes Questionnaire. *BMC Health Services Research*, 11(1), Article 238. <https://doi.org/10.1186/1472-6963-11-238>
- Reason, J. (1990). *Human error*. University Press.
- Reason, J. (2000). Human error: Models and management. *BMJ*, 320(7237), 768-770.
<https://doi.org/10.1136/bmj.320.7237.768>
- Reis, C. T., Paiva, S. G., & Sousa, P. (2018). The patient safety culture: A systematic review by characteristics of hospital survey on patient safety culture dimensions. *International Journal for Quality in Health Care*, 30(9), 660-677.
<https://doi.org/10.1093/intqhc/mzy080>
- Renfrew, M. J., McFadden, A., Bastos, M. H., Campbell, J., Channon, A. A., Cheung, N. F., Silva, D. R., Downe, S., Kennedy, H. P., Malata, A., McCormick, F., Wick, L., & Declercq, E. (2014). Midwifery and quality care: Findings from a new evidence-informed framework for maternal and newborn care. *Lancet*, 384(9948), 1129-1145. [https://doi.org/10.1016/S0140-6736\(14\)60789-3](https://doi.org/10.1016/S0140-6736(14)60789-3)
- Reyes, D. L., Bisbey, T., Day, D., & Salas, E. (2021). Translating 6 key insights from research on leadership and management in times

- of crisis. *BMJ Leader*, 5(291), 291-294.
<https://doi.org/10.1136/leader-2020-000349>
- Ribeliene, J., Blazeviciene, A., Nadisauskiene, R. J., Tameliene, R., Kudreviciene, A., Nedzelskiene, I., & Macijauskiene, J. (2019). Patient safety culture in obstetrics and gynecology and neonatology units: The nurses' and the midwives' opinion. *Journal of Maternal-Fetal & Neonatal Medicine*, 32(19), 3244-3250. <https://doi.org/10.1080/14767058.2018.1461831>
- Rosen, M. A., DiazGranados, D., Dietz, A. S., Benishek, L. E., Thompson, D., Pronovost, P. J., & Weaver, S. J. (2018). Teamwork in healthcare: Key discoveries enabling safer, high-quality care. *American Psychologist*, 73(4), 433-450.
<https://doi.org/10.1037/amp0000298>
- Runciman, W., Hibbert, P., Thomson, R., Van Der Schaaf, T., Sherman, H., & Lewalle, P. (2009). Towards an international classification for patient safety: Key concepts and terms. *International Journal for Quality in Health Care*, 21(1), 18-26.
<https://doi.org/10.1093/intqhc/mzn057>
- Russ, A. L., Fairbanks, R. J., Karsh, B.-T., Militello, L. G., Saleem, J. J., & Wears, R. L. (2013). The science of human factors: Separating fact from fiction. *BMJ Quality & Safety*, 22(10), 802-808. <https://doi.org/10.1136/bmjqs-2012-001450>
- Rutberg, H., Borgstedt-Risberg, M., Gustafson, P., & Unbeck, M. (2016). Adverse events in orthopedic care identified via the Global Trigger Tool in Sweden – implications on preventable prolonged hospitalizations. *Patient Safety in Surgery*, 10(1), Article 23. <https://doi.org/10.1186/s13037-016-0112-y>
- Rönnerhag, M., Severinsson, E., Haruna, M., & Berggren, I. (2019). A qualitative evaluation of healthcare professionals' perceptions of adverse events focusing on communication and teamwork in maternity care. *Journal of Advanced Nursing*, 75(3), 585-593.
<https://doi.org/10.1111/jan.13864>
- Salas, E., Bisbey, T. M., Traylor, A. M., & Rosen, M. A. (2020). Can teamwork promote safety in organizations? *Annual Review of Organizational Psychology and Organizational Behavior*, 7, 283-313. <https://doi.org/10.1146/annurev-orgpsych-012119-045411>
- Salas, E., DiazGranados, D., Klein, C., Burke, C. S., Stagl, K. C., Goodwin, G. F., & Halpin, S. M. (2008). Does team training improve team performance? A meta-analysis. *Human Factors*, 50(6), 903-933. <https://doi.org/10.1518/001872008X375009>
- Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a “Big Five” in teamwork? *Small Group Research*, 36(5), 555-599.
<https://doi.org/10.1177/1046496405277134>

- Schildmeijer, K., Nilsson, L., Arestedt, K., & Perk, J. (2012). Assessment of adverse events in medical care: lack of consistency between experienced teams using the global trigger tool. *BMJ Quality & Safety*, 21(4), 307-314. <https://doi.org/10.1136/bmjqs-2011-000279>
- Schmiedhofer, M., Derksen, C., Keller, F. M., Dietl, J. E., Häussler, F., Strametz, R., Koester-Steinebach, I., & Lippke, S. (2021). Barriers and facilitators of safe communication in obstetrics: Results from qualitative interviews with physicians, midwives and nurses. *International Journal of Environmental Research and Public Health*, 18(3), Article 915. <https://doi.org/10.3390/ijerph18030915>
- Schmutz, J. B., Meier, L. L., & Manser, T. (2019). How effective is teamwork really? The relationship between teamwork and performance in healthcare teams: A systematic review and meta-analysis. *BMJ Open*, 9(9), e028280. <https://doi.org/10.1136/bmjopen-2018-028280>
- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research*, 99(6), 323-338. <https://doi.org/10.3200/JOER.99.6.323-338>
- Sexton, J. B., Helmreich, R. L., Neilands, T. B., Rowan, K., Vella, K., Boyden, J., Roberts, P. R., & Thomas, E. J. (2006). The Safety Attitudes Questionnaire: Psychometric properties, benchmarking data, and emerging research. *BMC Health Services Research*, 6(1), Article 44. <https://doi.org/10.1186/1472-6963-6-44>
- Shakibazadeh, E., Namadian, M., Bohren, M. A., Vogel, J. P., Rashidian, A., Nogueira Pileggi, V., Madeira, S., Leathersich, S., Tuncalp, Oladapo, O. T., Souza, J. P., & Gulmezoglu, A. M. (2018). Respectful care during childbirth in health facilities globally: A qualitative evidence synthesis. *BJOG: An International Journal of Obstetrics and Gynaecology*, 125(8), 932-942. <https://doi.org/10.1111/1471-0528.15015>
- Siassakos, D., Fox, R., Hunt, L., Farey, J., Laxton, C., Winter, C., & Draycott, T. (2011). Attitudes toward safety and teamwork in a maternity unit with embedded team training. *American Journal of Medical Quality*, 26(2), 132-137. <https://doi.org/10.1177/1062860610373379>
- Smeds Alenius, L. (2019). *Conditions for care: Factors in the nursing work environment related to safe and high quality care in acute care hospitals* [Doctoral dissertation, Karolinska Institutet].

- Sorra, J., & Dyer, N. (2010). Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. *BMC Health Services Research*, 10(1), 199. <https://doi.org/10.1186/1472-6963-10-199>
- Sorra, J., Gray, L., Streagle, S., Famolaro, T., Yount, N., & Behm, J. (2016). *AHRQ Hospital Survey on Patient Safety Culture: User's Guide*. (AHRQ Publication No. 15(16)-0049-EF). Agency for Healthcare Research and Quality.
- Svensk sjuksköterskeförening, Svenska Läkaresällskapet, Fysioterapeuterna, Sveriges Arbetsterapeuter, Dietisternas Riksförbund, & Sveriges Tandläkarförbund. (2016). *Säker vård: En kärnkompetens för vårdens samtliga professioner* [Safe care: A core competence for all healthcare professions]. <https://bit.ly/3JvvcS9>
- Swedish Association of Local Authorities and Regions. (2012). *Markörbaserad journalgranskning: För att identifiera och mäta skador i vården* [Trigger based record review: For identification and measurement of adverse events in the healthcare]. <https://bit.ly/3ijWT4C>
- Swedish Association of Local Authorities and Regions. (2014a). *Markörer med definitioner: För att identifiera och mäta skador i vården* [Triggers with definitions: For identification and measurement of adverse events in the healthcare]. <https://bit.ly/34ThxFH>
- Swedish Association of Local Authorities and Regions. (2014b). *Skador i vården – skadeområden och undvikbarhet: Markörbaserad journalgranskning januari 2013–juni 2014* [Adverse events in the healthcare – areas of adverse events and preventability: Trigger based record review January 2013–June 2014]. <https://bit.ly/3JqM78q>
- The Swedish Associations of Local Authorities and Regions. (2020). *Markörbaserad journalgranskning: Skador i somatisk vård januari 2013-december 2019, nationell nivå* [Trigger based record review: Adverse events in somatic healthcare January 2013–December 2019, national level]. <https://bit.ly/3wjEAVp>
- Swedish Associations of Midwives. (2018). *Description of required competences for registered midwives*. <https://bit.ly/3yqhg60>
- Swedish Society of Obstetrics and Gynecology and Swedish Associations of Midwives. (2017). *Bäckenbottenutbildning* [Pelvic floor education]. <https://backenbottenutbildning.se/>
- Tabachnick, B. G., & Fidell, L. S. (2014). *Using multivariate statistics* (6 ed.). Pearson Education.
- Unoki, T., Hamamoto, M., Sakuramoto, H., Shirasaka, M., Moriyasu, M., Zeng, H., & Fujitani, S. (2020). Influence of mutual support and a culture of blame among staff in acute care units on the

- frequency of physical restraint use in patients undergoing mechanical ventilation. *Acute Medicine & Surgery*, 7(1), Article e479. <https://doi.org/10.1002/ams2.479>
- Unooki, T., Matsuishi, Y., Tsujimoto, T., Yotsumoto, R., Yamada, T., Komatsu, Y., Kashiwakura, D., & Yamamoto, N. (2020). Translation, reliability and validity of Japanese version the TeamSTEPPS® teamwork perceptions questionnaire. *Nursing Open*, 8(1), 115-122. <https://doi.org/10.1002/nop2.609>
- van der Zande, I. S., van der Graaf, R., Hooft, L., & van Delden, J. J. (2018). Facilitators and barriers to pregnant women's participation in research: A systematic review. *Women and Birth*, 31(5), 350-361. <https://doi.org/10.1016/j.wombi.2017.12.009>
- Wang, X., & Cheng, Z. (2020). Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, 158(1), 65-71. <https://doi.org/10.1016/j.chest.2020.03.012>
- Waterson, P. (Ed.). (2014). *Patient safety culture: Theory, methods and application*. Ashgate.
- Weaver, S. J., Lubomksi, L. H., Wilson, R. F., Pfoh, E. R., Martinez, K. A., & Dy, S. M. (2013). Promoting a culture of safety as a patient safety strategy: A systematic review. *Annals of Internal Medicine*, 158(5 Pt 2), 369-374. <https://doi.org/10.7326/0003-4819-158-5-201303051-00002>
- Weick, K. E. (1987). Organizational culture as a source of high reliability. *California Management Review*, 29(2), 112-127. <https://doi.org/10.2307/41165243>
- Weick, K. E., & Sutcliffe, K. M. (2015). *Managing the unexpected: Sustained performance in a complex world* (3 ed.). Wiley & Sons.
- Wennerholm, U. B., Saltvedt, S., Wessberg, A., Alkmark, M., Bergh, C., Wendel, S. B., Fadl, H., Jonsson, M., Ladfors, L., Sengpiel, V., Westrom, J., Wennergren, G., Wikstrom, A. K., Elden, H., Stephansson, O., & Hagberg, H. (2019). Induction of labour at 41 weeks versus expectant management and induction of labour at 42 weeks (SWEdish Post-term Induction Study, SWEPIS): Multicentre, open label, randomised, superiority trial. *BMJ*, 367, Article l6131. <https://doi.org/10.1136/bmj.l6131>
- Wiklund, I., Sahar, Z., Papadopolou, M., & Löfgren, M. (2020). Parental experience of bedside handover during childbirth: A qualitative interviews study. *Sexual & Reproductive Healthcare*, 24, Article 100496. <https://doi.org/10.1016/j.srhc.2020.100496>
- Willmott, J., & Mould, J. (2018). Health professionals' perception of patient safety culture in acute hospitals: An integrative review.

- Australian Health Review*, 42(4), 387-394.
<https://doi.org/10.1071/AH16274>
- Wilson, A. N., & Homer, C. S. E. (2020). Third- and fourth-degree tears: A review of the current evidence for prevention and management. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 60(2), 175-182.
<https://doi.org/10.1111/ajo.13127>
- Wise, J. (2015). Substandard care at “dysfunctional” Morecambe Bay maternity unit led to unnecessary deaths. *BMJ*, 350, Article h1221. <https://doi.org/10.1136/bmj.h1221>
- World Health Organization. *The Global Health Observatory*. Retrieved 22 02 01 from <https://bit.ly/3N51RjE>
- World Health Organization. (2009). *More than words: Conceptual framework for the international classification for patient safety*. <https://bit.ly/3xEpsmi>
- World Health Organization. (2011). *Patient safety curriculum guide: Multi-professional edition*. <https://bit.ly/3ij8Ur1>
- World Health Organization. (2018a). *WHO recommendations: Intrapartum care for a positive childbirth experience*. <https://bit.ly/3qviETu>
- World Health Organization. (2018b). *WHO recommendations: Non-clinical interventions to reduce unnecessary caesarean sections*. <https://bit.ly/3ijTIdc>
- World Health Organization. (2021). *Draft global patient safety plan for 2021-2030: Towards elimination avoidable harm in health care*. <https://bit.ly/36woEV2>
- World Medical Association. (2013). *WMA Declaration of Helsinki: Ethical principles for medical research involving human subjects*. <https://bit.ly/3wt9Uh2>
- Wrigstad, J. (2018). *The inside of a paradigm. An expedition through an incident reporting system* [Doctoral dissertation, Lund University].
- Xyrichis, A., & Ream, E. (2008). Teamwork: A concept analysis. *Journal of Advanced Nursing*, 61(2), 232-241.
<https://doi.org/10.1111/j.1365-2648.2007.04496.x>
- Zdolska-Wawrzekiewicz, A., Bidzan, M., Chrzan-Dętkoś, M., & Pizuńska, D. (2020). The dynamics of becoming a mother during pregnancy and after childbirth. *International Journal of Environmental Research and Public Health*, 17(1), Article 57.
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Patient safety in intrapartum care

Patient safety is a global health priority. Knowledge about patient safety and adverse events for women giving birth is necessary. Patient safety culture and effective teamwork are important for safe care provided by midwives, physicians and nursing assistants. The overall aim of the thesis was to describe adverse events for women with planned vaginal births and healthcare professionals' perceptions of patient safety. Further, to test the reliability and validity of a teamwork questionnaire and to investigate patient safety culture and teamwork among healthcare professionals in intrapartum care. A birth record review, interviews and two questionnaires were used. Adverse events were identified in 11% of the birth records, but no permanent harm. Listening to the woman and having a tolerant teamwork atmosphere were important. Both profession and labor ward are important for healthcare professionals' perceptions of patient safety culture and teamwork in intrapartum care.

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