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Pre-hospital Barriers to Emergency Obstetric Care

*Studies of Maternal Mortality and Near-miss
in Bolivia and Guatemala*

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Abstract

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Maternal mortality is a global health concern but inequalities in utilization of maternal health care are not clearly understood. Severe morbidity (near-miss) is receiving increased attention due to methodological difficulties in maternal mortality studies.

The present thesis seeks to increase understanding of factors that impede utilization of emergency obstetric care (EmOC) in Bolivia and Guatemala. *Studies I and IV* employed qualitative interviews to explore the role of traditional birth attendants (TBAs) and the care-seeking behaviour of women who arrived at hospital with a near-miss complication. *Studies II–III* documented maternal mortality and near-miss morbidity at the hospital level and investigated the influence of socio-demographic factors and antenatal care (ANC) on near-miss upon arrival.

The studies identified unfamiliarity with EmOC among TBAs and a lack of collaboration with formal care providers. A perception of being dissociated from the health care system and a mistrust of health care providers was common among near-miss women from disadvantaged social backgrounds. In the Bolivian setting, 187 maternal deaths per 100,000 live births and 50 cases of near-miss per 1000 were recorded. Causes of near-miss differed from those of maternal deaths. Most women with near-miss arrived at hospital in critical condition: severe preeclampsia, complications after childbirth at home and abortions were mostly encountered among them. Lack of ANC, low education, and rural residence were interactively associated with near-miss. ANC reduced socio-demographic differentials for near-miss.

Complementing maternal mortality reviews with data on near-miss morbidity increases the understanding of priority needs and quality of maternal health care. Additionally, focusing on near-miss upon arrival was found useful in exploring pre-hospital barriers to EmOC. The findings identified subgroups of women who seemed especially vulnerable to pre-hospital barriers. They also underscored the need for initiatives to reduce the effect of social marginalization and to acknowledge the influential role of formal and informal care providers on the utilization of EmOC.

Keywords: pre-hospital barriers, maternal mortality, near-miss, traditional birth attendants, social marginalization, Bolivia, Guatemala.

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Resumen (abstract in Spanish)

La mortalidad materna es un tema de inquietud global, sin embargo la comprensión de las desigualdades en la utilización de los servicios de salud materna es limitada. La morbilidad obstétrica severa (near-miss) está recibiendo creciente atención, producto de problemas metodológicos en los estudios de mortalidad materna.

El objetivo de la presente tesis es aumentar la comprensión de factores que impiden la utilización de la atención obstétrica de emergencia en Bolivia y Guatemala. Los estudios I y IV usaron metodologías cualitativas en un esfuerzo por explorar el rol de las parteras tradicionales y las estrategias de las mujeres que arriban a los hospitales con una morbilidad obstétrica severa. Los estudios II–III documentaron la mortalidad materna y la morbilidad obstétrica severa en el marco hospitalario e investigaron el impacto de los factores socio-demográficos y el control prenatal en la llegada a los establecimientos de salud con complicaciones severas.

Los estudios identificaron la falta de familiaridad con atención obstétrica de emergencia entre las parteras tradicionales y la falta de cooperación con los profesionales de salud formales. La sensación de estar distanciadas del sistema de salud y la desconfianza hacia los profesionales de la salud eran aspectos comunes entre las mujeres de sectores marginales con experiencias de complicaciones severas. En el contexto boliviano, 187 muertes maternas por cada 100,000 nacidos vivos y 50 casos de morbilidad obstétrica severa por cada 1000 fueron registradas. Las causas de la morbilidad obstétrica severa y las muertes maternas se distinguieron. La mayor parte de las mujeres con morbilidad obstétrica severa llegaron al hospital en condiciones críticas: preeclampsia severa, complicaciones después de partos domiciliarios y abortos eran causas más frecuentes en esta categoría. Combinaciones del bajo nivel de educación con la falta de controles prenatales o la residencia en zonas rurales fueron asociadas con la morbilidad obstétrica severa. El control prenatal redujo diferencias socio-demográficas en lo concerniente a la morbilidad obstétrica severa.

La complementación de estudios de mortalidad materna con datos sobre morbilidad obstétrica severa aumenta la comprensión de las prioridades y de la calidad en la atención de la salud materna. Además, centrándose en la morbilidad obstétrica severa a la llegada al establecimiento de salud, ha sido útil para investigar las barreras pre-hospitalarias en relación a la atención de emergencia obstétrica. Los resultados permiten identificar categorías específicas de mujeres que parecen ser especialmente vulnerables a las barreras pre-hospitalarias. Los resultados, también subrayan la necesidad de iniciativas que reduzcan los efectos de la marginalización social, y que reconozcan el importante rol que tanto el personal de salud formal como informal cumplen en la utilización de los servicios de salud materna.

Palabras claves: barreras pre-hospitalarias, mortalidad materna, morbilidad obstétrica severa, parteras tradicionales, marginalización social, Bolivia, Guatemala.

List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

- I Rööst M, Johnsdotter S, Liljestrand J, Essén B. A qualitative study of conceptions and attitudes regarding maternal mortality among traditional birth attendants in rural Guatemala. *BJOG* 2004;111:1372–7.
- II Rööst M, Altamirano VC, Liljestrand J, Essén B. Priorities in emergency obstetric care in Bolivia—maternal mortality and near-miss morbidity in metropolitan La Paz. *BJOG* 2009;116:1210–7.
- III Rööst M, Conde Altamirano V, Liljestrand J, Essén B. Does antenatal care facilitate utilization of emergency obstetric care? A case-referent study of near-miss morbidity in Bolivia. *Acta Obstet Gynecol Scand*, in press.
- IV Rööst M, Jonsson C, Liljestrand J, Essén B. Social differentiation and embodied dispositions: a qualitative study of maternal care-seeking behaviour for near-miss morbidity in Bolivia. *Reprod Health* 2009;6:13.

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Abbreviations

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
BEmOC	Basic Emergency Obstetric Care
CEmOC	Comprehensive Emergency Obstetric Care
CI	Confidence Interval
ICD	International Classification of Diseases
ICU	Intensive Care Unit
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
OR	Odds Ratio
SBA	Skilled Birth Attendance
SMR	Severe Morbidity Ratio
SNIS	Sistema Nacional de Información en Salud
SUMI	Seguro Universal Materno-Infantil
TBA	Traditional Birth Attendant
WHO	World Health Organization

Glossary and definitions

Adult lifetime risk of maternal death: The probability of dying from a maternal cause during a woman's reproductive lifespan.

Basic emergency obstetric care: Includes the possibility of giving parental antibiotics, oxytocics and anti-convulsants, manual removal of the placenta, removal of retained products of conception, and assisted vaginal delivery.

Comprehensive emergency obstetric care: Capacity to perform caesarean sections and blood transfusions in addition to the basic components of emergency obstetric care.

Interaction: A situation in which the effect of one variable on an outcome differs across strata of another variable.

Maternal health care: Health care during pregnancy (antenatal care), childbirth (intra-partum care), and the puerperium (postpartum care).

Maternal mortality ratio: Number of maternal deaths during a given time period per 100,000 live births during the same time period.

Mortality index: The ratio of maternal deaths to the sum of maternal deaths and near-miss cases, represented as a percentage.

Near-miss maternal morbidity: A life-threatening pregnancy-related complication resolved by chance or medical care.

Severe morbidity ratio: Number of near-miss cases during a given time period per 1000 live births during the same time period.

Skilled birth attendance: Delivery in presence of a skilled birth attendant, with at least midwifery skills, in an environment including availability of equipment, drugs, referral transportation and communication systems.

Total fertility rate: The number of children that would be born per woman if she was to live to the end of her childbearing years and bear children at each age in accordance with prevailing age-specific fertility rates.

Traditional birth attendant: A birth attendant who acquired her skills empirically or through apprenticeship to another traditional birth attendant.

Introduction

“We know what to do to globally reduce maternal ill-health and mortality” is a common message in maternal health literature [1, 2]. From a clinical point of view this message is unquestionable, as both the pathogenesis and medical treatment of nearly all complications that lead to maternal mortality are well known. Most maternal deaths are thus avoidable within a well-functioning health care system that provides high quality obstetric care. However, from a wider perspective, the applicability of the message is not that straightforward. Maternal outcomes in low- and middle-income countries are often a result of a chain of events related not only to medical and obstetric factors, but to a wide range of circumstances that influence the accessibility and utilization of maternal health care. Several actors are involved in this process, including the pregnant woman and her relatives, as well as traditional and formal care providers.

Most research about maternal ill-health and mortality has concentrated on clinical issues and the quality of care at the health care facility level [3]. The determinants for utilization of maternal care and the knowledge of how to effectively increase such utilization in areas with high mortality levels are less clearly understood. The focus of this thesis is on pre-hospital barriers that influence the utilization of emergency obstetric care and thereby affect maternal outcomes. It mainly addresses two different aspects related to maternal ill-health and utilization of care. The main part centers on barriers for women with severe obstetric morbidity and draws on empirical data from Bolivia. It also examines some aspects of the role played by traditional birth attendants in women’s utilization of emergency obstetric care in a rural area in Guatemala. The two settings have high maternal mortality levels in common but have applied very different approaches to reduce them. The intention here is not to directly compare those settings or strategies, but rather to use them to illustrate factors related to utilization of emergency obstetric care.

The global maternal ill-health situation

Maternal ill-health continues to be a major public health concern, despite considerable international development efforts. Although most countries have acknowledged the fifth Millennium Development Goal (MDG-5) of

reducing maternal mortality by 75% between 1990 and 2015, statistics imply that progress has been slow. The achievement of MDG-5 would require each country to decrease its maternal mortality ratio (MMR) by 5.5% per year. However, the most recent estimates available (from 2005) report a global MMR of 402 maternal deaths per 100,000 live births and an annual average decline of only 1.1% [4]. Improvements are mostly seen in middle-income countries in parts of northern Africa, Asia, and Latin America. Several countries in these regions have shown that a reduction in maternal mortality is achievable within a fairly short period of time. Countries like Malaysia, Sri Lanka, Honduras, and Egypt have more than halved their MMRs in seven to ten years, and Thailand has reduced its MMR by 75% in 18 years [5, 6].

No other public health issue shows such wide poor-rich disparities between and within countries and regions as maternal mortality [5]. Almost all maternal deaths (99%) occur in low- and middle-income countries. This discrepancy is most evident when comparing the lifetime risk for maternal death that is as high as 1 in 10 in some of the poorest countries, as opposed to 1 in 15,000 (or less) in some of the richest [7]. Moreover, within low-income countries the risk of maternal death is three-fold higher for the poorest part of the population than for the richest [8].

Most maternal deaths occur during labour, delivery or the first week postpartum. In low-income countries most of these deaths occur at home without the women having had contact with formal health care providers. Five causes account for more than 80% of all maternal deaths globally: haemorrhage, sepsis, unsafe abortion, hypertensive disorders, and obstructed labour. There is heterogeneity in their relative distribution in different areas. In Africa, haemorrhage accounts for most maternal deaths (34%) followed by sepsis (10%) and hypertensive disorders (9%). In Latin America, which has an estimated regional MMR of 132/100,000 live births, hypertensive disorders (26%), haemorrhage (21%), obstructed labour (13%), and unsafe abortion (12%) are the leading causes of maternal death [4, 9].

The global burden of disease related to obstetric morbidity is not fully known, but it is estimated that postpartum haemorrhage occurs in 6% to 10% of all deliveries and that 2% to 8% of all pregnancies are complicated by preeclampsia. Sepsis and obstructed labour are approximated to occur in about 4% of live births each [10-12]. This adds up to that at least 30 million women suffer acute pregnancy-related complications each year. In addition, about 20 million unsafe abortions occur annually, many of which result in severe complications, due especially to sepsis and haemorrhage [13, 14].

Studying maternal mortality and severe morbidity

Maternal mortality has been the traditional indicator for describing maternal ill-health and the main outcome measure in studying both quality of obstetric

care and obstacles to receiving such care. However, figures on maternal mortality in many countries are highly unreliable as a result of insufficient surveillance and inadequate records of vital statistics on births and deaths. Most of levels of maternal mortality in low-income countries, therefore, are based on estimation techniques in national surveys, such as the sisterhood method, and subsequently modeled for uncertainties [7]. As a result, national mortality figures generally contain a wide range of uncertainty and their suitability for trend assessments can be doubted.

Investigations into maternal mortality have several methodological difficulties. Maternal deaths are relatively rare events within a specific setting, in terms of absolute numbers, even in regions with high levels, so that investigations require very large sample sizes or time periods. Furthermore, underreporting and misclassification of maternal deaths are common. This is especially the case in low- and middle-income countries with limited registration of births and deaths [15]. However, it also occurs in countries with well-developed civil registration systems [16, 17]. Underreporting of maternal mortality is thought to be especially common for deaths related to abortions and ectopic pregnancies during early pregnancy [18]. Such methodological limitations not only lead to uncertainty in determining maternal mortality levels, but also make it difficult to analyze factors that impede the utilization of maternal and emergency obstetric care and to evaluate the impact of interventions aimed at reducing maternal ill-health.

Information about pre-hospital barriers related to maternal deaths in low-income countries has largely been derived from verbal autopsies. These techniques focus on establishing the cause of maternal death and the circumstances preceding death by interviewing relatives of the deceased woman [19]. The approach is regarded as capable of producing reliable and repeatable data on the main causes of deaths within a region [20, 21]; however, it provides less clear information about the deceased's perspective on utilization of health care.

The near-miss concept

The investigation of severe acute maternal morbidity, or near-miss, has received increasing attention as morbidity is a more common phenomenon in absolute numbers than maternal deaths. Studies of near-miss can, therefore, provide a more rapid assessment of the burden of maternal ill-health and quality of obstetric care than maternal mortality reviews [22-24]. Near-miss investigations may not present a threat to health care staff since the women concerned have survived, often thanks to the care provided to them. Additionally, the larger number of near-miss cases compared to maternal deaths allows an easier disaggregation of data across subgroups of women [25], and thereby also enables analyses of determinants for adverse maternal outcomes within smaller settings. Another advantage of near-miss investigations is that

first-hand data can be obtained from interviews with women who have survived a severe complication—information that is especially valuable when studying pre-hospital barriers to maternal health care.

Near-miss terminology was first employed in obstetrics in 1991 by Stones and colleagues at St Mary’s Hospital in London in describing women who survived severe pregnancy-related complications [26]. Since then various definitions of near-miss have been proposed, most of which approximately state that a near-miss event is “a life threatening complication that was resolved by chance or by medical care” [24, 27, 28]. The logic behind using this concept in investigating adverse maternal outcomes is based on the assumption that the spectrum from normal pregnancy to maternal mortality is a continuum in which determinants for both severe obstetric morbidity and maternal deaths are similar [29]. Consequently, near-miss studies are thought to have the potential to broaden the understanding of factors behind both maternal morbidity and mortality (Figure 1). It has also been suggested that measures of near-miss may perhaps act as a surrogate variable or proxy for maternal mortality.

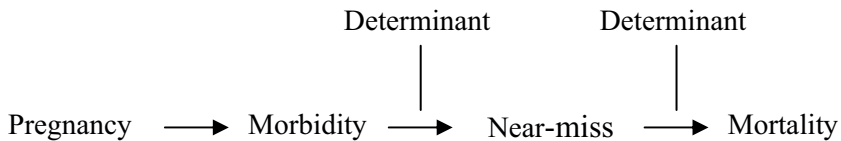


Figure 1. The continuum from pregnancy to maternal mortality. Adapted from Geller et al.

How does one define a near-miss case?

A wide variety of criteria have been used to define near-miss cases in different studies. These can essentially be grouped into three main categories: (1) clinical criteria for common diagnostic categories, (2) management-based criteria related to specific interventions, and (3) organ system dysfunction-based criteria [30-32]. Studies using clinical criteria have generally included cases of severe morbidity resulting from the main causes of maternal mortality, such as haemorrhage, hypertensive disorders, sepsis and, in some studies, obstructed labour and severe anaemia. Management criteria most commonly used to define near-miss include admission to an intensive care unit (ICU) or the use of major interventions such as hysterectomy, blood transfusions or extended hospitalization. Organ system dysfunction as a means of defining near-miss was initially described by Mantel et al. [27] and has been the main approach in high-resource settings. The latter methodology generally includes complications that lead to failure in one or several of the major organ systems, such as renal, respiratory, coagulation, cardiac or cerebral dysfunction.

All of these methods of inclusion have disadvantages that ultimately will affect the reported rates and frequencies of near-miss morbidity, depending on the setting in which they are applied. For example, clinical criteria fail to include indirect causes of severe maternal morbidity. Moreover, the severity threshold for the inclusion of cases is not standardized, opening up the possibility of overestimating near-miss frequencies [33]. Management-based criteria have the disadvantage that the use of interventions varies between settings in relation to resource availability and the variety of indications. Studies using organ system-based criteria require the availability of laboratory tests and medical technologies; they can neither be conducted retrospectively, nor can they utilize standard medical records for data collection [23]. As there has been no consensus on the most appropriate way to clearly define near-miss, it has been suggested that inclusion criteria should be locally adapted to most adequately reflect the situation within a specific setting, and for this purpose the use of combinations of criteria has been recommended [25]. A summary of how the near-miss concept has been commonly employed in the research and evaluation of maternal health is provided in Figure 2.

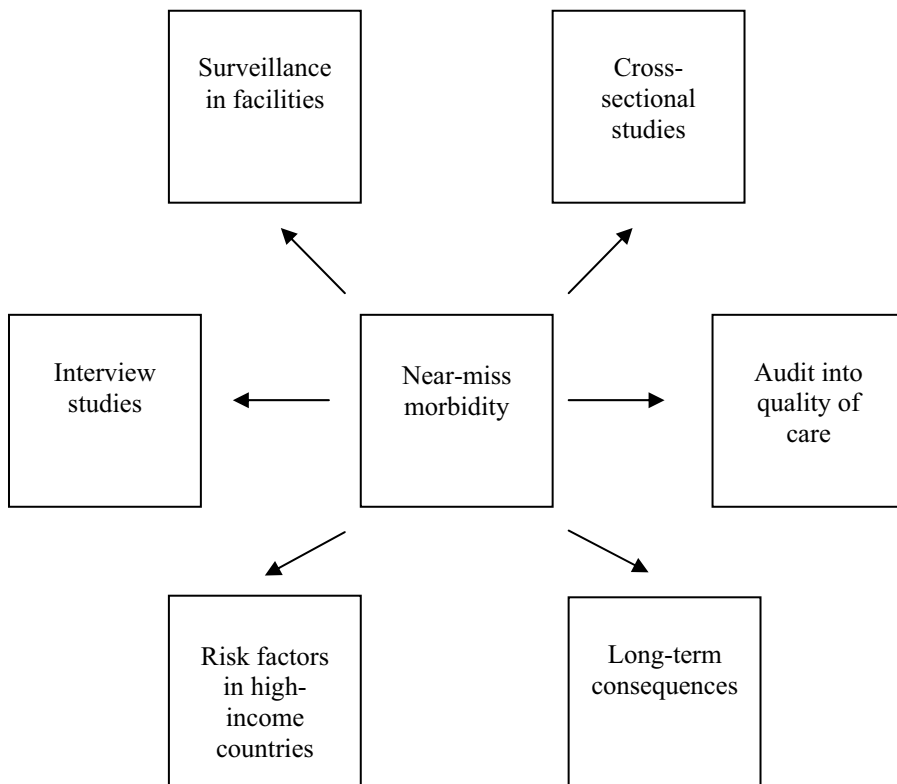


Figure 2. Common ways of using the near-miss concept.

Frequencies and causes of near-miss morbidity

Most near-miss studies have been conducted in European and African tertiary hospitals. They have predominantly been cross-sectional and have, with few exceptions, reported near-miss frequencies ranging from 4 to 10/1000 deliveries in high-income countries to as much as 40 to 80/1000 deliveries in resource-poor settings [30-32].

The vast majority of these studies have described the occurrence of severe complications during late pregnancy, childbirth, and the immediate puerperium, but few have either included or concentrated on near-miss in early pregnancy. The most commonly reported causes of near-miss morbidity in these studies are related to haemorrhage or hypertensive disorders in both low- and high-income countries [34-37].

Associated factors

Studies in high-income countries have shown that factors associated with near-miss morbidity are similar to those related to maternal mortality. A large cohort study in the Netherlands found that advanced age, primiparity, and non-Western ethnic background, as well as such preexisting diseases as diabetes, obesity, hypertension, cardiovascular disorders, and prior caesarean sections were associated with near-miss morbidity [38]. Similar results have been described in case-referent studies from other high-resource settings [39, 40]. However, the knowledge of variables associated with near-miss morbidity in low- and middle-income countries is limited, as is the understanding of how they correspond to risk factors for maternal mortality in such settings.

Pre-hospital barriers

Near-miss has been commonly used as an endpoint in outcome audits. These have provided valuable information on the quality of obstetric care by identifying avoidable factors and substandard care at the facility level [41-43].

Audits have also revealed that the provision of obstetric care is often delayed by pre-hospital barriers to emergency obstetric services. Such audits have reported barriers related to cost and distance or difficulties in recognizing the severity of a complication and factors influencing women's decision to seek care [44, 45]. There are a few examples of qualitative interview studies investigating the experiences of women with a near-miss complication. These have reported similar financial barriers, problems with transportation [46], and the cost of emergency obstetric care having long lasting economical consequences for the woman and her family [47]. However, pre-hospital barriers have generally received little attention in near-miss research; as with most investigations of maternal mortality, near-miss studies have focused on clinical factors and quality of care provided to women presenting at health care facilities with severe complications [3, 25, 48]. Consequently, the focus has been on what happened *after* a woman developed severe complications.

Still, most women with a near-miss event that present at hospital in low-income countries are already in a life-threatening condition upon arrival [45]. The proportion of near-miss upon arrival has been suggested as an indicator of delays in reaching hospital [37]. Investigations concentrating on this category may be especially useful in studying determinants and factors related to pre-hospital barriers for emergency obstetric care.

Trends in strategies to reduce maternal mortality

The reduction of maternal mortality became a global public health priority with the Safe Motherhood Initiative, launched at the Nairobi Conference in 1987. This initiative, whose goal was reducing maternal mortality and identifying its determinants, was a reaction to the fact that maternal and child health programs had given almost no attention to factors responsible for at least 500,000 deaths annually among pregnant women [49, 50]. The initial goal was set at a 50% reduction of global maternal mortality by the year 2000. Within this framework, it was soon recognized that a broad approach, with investments not only in core elements of maternal health care, but also improvements in access to health services and women's status would be needed. The importance of such an approach is restated within the MDGs, acknowledging that in order to reach a 75% reduction in maternal mortality (MDG-5), improvements will be needed in the parallel goals of eradicating poverty (MDG-1), achieving universal primary education (MDG-2), and reaching gender equity and empowerment of women (MDG-3).

Efforts to reduce maternal mortality have employed a range of strategies including family planning, different care approaches during pregnancy, delivery and the puerperium, as well as treatment of complications after unsafe abortions. Major strategies to reduce maternal mortality have changed over time [51]. Some of these are described below in relation to the central concern of this thesis.

The training of traditional birth attendants

The training of traditional birth attendants (TBAs) was actively promoted by the World Health Organization (WHO) as a priority in order to reduce maternal and newborn mortality in low-income countries from the 1970s until the early 1990s, when these programs largely ceased. A TBA is defined as a person who assists childbirth and has acquired her skills empirically or through apprenticeship to another TBA. A trained TBA is one who has received a short course in maternal health care in the formal health sector [52]. Although training programs have differed widely from country to country, most were based on the idea that training should decrease the risk of infection and haemorrhage and increase prompt referrals of complications to for-

mal health care providers. Thus, most programs focused on educating TBAs in sanitary and safe delivery, and in the detection of risk factors and obstetric complications [53, 54]. As no decrease in maternal mortality figures was observed by the 1990s in countries employing the strategy, WHO shifted the emphasis away from training TBAs [55].

To date, we still do not know the effectiveness of training TBAs. Meta-analytic reviews have shown that training programs can reduce perinatal and neonatal death rates [56]. No study has been able to show a significant decrease in maternal mortality from these interventions; findings about their effectiveness in improving safety and hygiene in delivery, knowledge of complications or referral rates have been mixed and inconclusive [53, 56-59]. To have any substantial effect in reducing maternal mortality, trained TBAs need to be backed-up by an effective referral system [60].

Although international health organizations have generally ceased recommending TBA training programs, TBAs continue to assist a great proportion of the pregnant women in low-income countries in childbirth. In such settings, TBAs probably play a role in influencing decisions that have an impact on pre-hospital barriers. However, few studies have explored how TBAs themselves regard obstetric complications and hospital referrals.

Antenatal care and risk screening

Strengthening antenatal care (ANC) was another widely applied approach in seeking to reduce maternal mortality during the early phase of the Safe Motherhood Initiative. It was largely grounded on the expectation that a risk scoring approach could identify those women during pregnancy who would later have serious complications, and that these complications could be averted and maternal mortality thereby decreased [61]. Risk scoring systems are generally based on a combination of medical factors, previous obstetric history, and such demographics as age, parity, and height. Studies have shown such scoring systems to be ineffective in low-income countries, since they have a low predictive value and their sensitivity is only 10% to 30% [62, 63]. Although routine ANC has the potential of directly reducing maternal mortality through early detection and taking measures to address such complications as placenta previa or preeclampsia most complications causing maternal deaths first occur during or after childbirth. The effectiveness of ANC in reducing maternal mortality is therefore thought to be limited [64, 65]. Consequently support for ANC as a strategy to reduce maternal mortality has diminished, and today ANC is mostly regarded as contributing to general maternal health and the survival of infants.

Nevertheless, it can be hypothesized that attending ANC has an impact on the utilization of emergency obstetric care. It is six times more common in low-income countries for women who had at least one ANC visit to give birth within the formal health care system and several studies have found

that low attendance to ANC is related to a higher risk for maternal mortality [65-67]. The relationship between ANC and maternal outcome is, however, generally confounded by socio-demographic factors such as education, residence, and age [61].

The intra-partum strategy

The focus of the Safe Motherhood Initiative in the late 1990s was directed towards the currently prevailing policy of giving priority to the intra-partum period. A core component of this strategy is that all women should have access to skilled birth attendance (SBA), and that such provision can prevent complications related to infection and haemorrhage, as well as facilitate the recognition and treatment of possible complications in a timely manner, so that maternal deaths may be reduced [1]. A skilled birth attendant is defined as a health professional who possesses the skills to provide care for normal pregnancies at a level comparable to that of a midwife or greater, and is able to identify, manage and refer women and newborns with complications for appropriate specialized care [68]. In addition to the presence of a skilled attendant, SBA also calls for the availability of equipment, drugs, referral transportation, and communication systems [69]. The way SBA is defined in practice, however, varies between countries. The main argument for the intra-partum strategy is that most maternal deaths occur around the time of delivery and that most complications causing maternal mortality cannot be predicted or prevented [1]. The current focus on SBA is reflected in its presence as a progress indicator in MDG-5, whose target is that 90% of all births should be assisted by a skilled birth attendant by 2015. Although it is clear that SBA could reduce individual maternal deaths, its proposed effect on the population level largely rests on historical data showing that the implementation of midwifery in countries such as Sweden was followed by a decrease in maternal mortality; or on ecological data describing lower maternal mortality levels in areas where utilization of SBA is high [70]. However, such correlations between SBA and maternal mortality figures drops from a coefficient of determination of $R^2 = 0.79$ to $R^2 = 0.19$ if only countries with MMR greater than 200/100,000 live births are included in the analysis—an indication that other factors are highly important for maternal mortality reduction in low-income countries [71].

The other main component of the intra-partum strategy for reducing maternal mortality is to ensure accessibility to comprehensive emergency obstetric care (CEmOC) when needed. Health care facilities providing CEmOC should be able to do cesarean sections and offer blood transfusions in addition to such basic procedures as administering parenteral antibiotics, oxytocics, and anticonvulsants; performing manual removal of placenta or retained products; and providing assisted vaginal delivery [72]. There are examples where maternal mortality reduction has been achieved without an

increase in SBA. In Matlab, Bangladesh, such a reduction was credited to the high availability of CEmOC [73]. However, within the intra-partum strategy it is generally considered that SBA and CEmOC must co-exist to achieve substantial reductions in maternal mortality [74].

Although there is currently a broad agreement among obstetricians and maternal health agencies that upgrading SBA and CEmOC will be the most important measures to reduce maternal mortality, there have also been calls for more context specific policies to complement the intra-partum strategy [75]. First, in many countries a universal capacity for SBA and CEmOC will be difficult to achieve within a reasonable period of time, hence intermediate strategies may be needed. Second, the effectiveness of the intra-partum strategy for reducing maternal mortality and severe morbidity will largely be dependent on how women access and utilize its services.

Utilization of maternal health care

Empirical data

Most low- and middle-income countries show high maternal mortality figures and low utilization of maternal health care among women with low education, low economic status, and rural residence [5, 65, 76]. Specific studies have statistically associated the use of maternal health care (including ANC, SBA and CEmOC) with several socio-demographic factors, including age, maternal education, poverty, marital status, ethnic background, parity, female autonomy, and provision of health insurance [77-83]. However, the association between these factors and utilization of maternal health care varies empirically in different settings, and the mechanisms that link such characteristics to utilization of health care are not clearly understood and seem to be highly interrelated [84-86].

Recent research has stressed the importance of physical and financial accessibility (as influenced by infrastructure, distance to maternal health facilities, and the cost of maternal care and transportation) [87-90]. However, these factors alone do not give a full understanding of utilization of maternal health care, since the mere availability and accessibility of maternal health care has had reportedly little effect on utilization in a number of settings [77, 78]. Consequently, increased attention with regard to the utilization of maternal health care has been directed toward understanding the motivations and behaviours of pregnant women.

Theoretical framework

Theories about health care-seeking behaviour have focused predominantly on describing and categorizing a series of stages and related actions from the

initial perception of symptoms to the utilization of medical assistance, and on determinants that influence such actions [91]. Two theoretical models of care-seeking that have influenced this thesis are summarized below. These models have many similarities but different points of departure in the ways they describe determinants for utilization of health care.

The Three Delays Model, as proposed by Thaddeus and Maine, has been the most widely applied framework for understanding barriers for access to adequate emergency obstetric care in low- and middle-income countries [84]. This pathway model focuses on the interval between the onset of an obstetric complication and its outcome and dividing this interval into three temporal phases with related categories of delays. The *first delay* is related to the decision to seek care and, according to the model, is mainly influenced by actors involved in making that decision (the pregnant woman, family, TBAs). The *second delay* involves difficulties in reaching an adequate health care facility and is related to the availability of and physical accessibility to maternal health care. The *third delay*, receiving adequate care at the facility, mainly relates to quality of care at the level of the facility. The model describes some factors as influencing both the first and second delays, such as distance, availability of facilities, women's economic status, and cost of care and transportation. Additionally, it describes factors specifically tied to the decision to seek care: the ability to recognize severe complications, how the quality of care at the facility level is perceived, and maternal education.

Andersen's Behavioural Model departs in determinants and seeks to account for and predict the use of health services in general by individuals by describing this use as dependent on the interaction between individual traits, population characteristics, and the surrounding environment [92]. Andersen proposes grouping the relevant factors into three main categories: an individual's *predisposition* to use medical services; *enabling or impeding circumstances*; and the *need* for health care. Predisposing characteristics are related to demographic elements and social structure, including age, gender, residence, occupation, education, ethnicity, and attitudes toward health. Enabling elements consist of community factors that affect the availability and accessibility of health care, and personal factors such as knowing how to take advantage of available health care. Finally, characteristics associated with need include types of illness, perceived health status, and expected treatment outcome. Within the present thesis, need is referred to as perceived need.

Although the importance of determinants and barriers are differently emphasized in different models, most, including the two described above, tend to focus on the individual's actions and strategies involving use of health care at a time of illness from a rational choice perspective (e.g., individuals logically trying to maximize benefit by the choices they make). Accordingly, these models have been criticized for giving less valid explanations of how care-seeking practices are socially structured, and how they are influenced by health system factors [91].

Social structure has received increased attention as determining inequalities in general health and mortality in both low- and high-income countries [93-97]. In addition to the association between economic capital and health, researchers have drawn upon the importance of social and cultural capital as involved in causal mechanisms that go beyond individual explanations. These forms of capital have mainly been highlighted as offering explanations of the social gradients of general health in high-income countries [98, 99]. However, some studies from low- and middle-income countries investigate the influence of social capital on child nutritional status and HIV transmission [100-102]. In public health research, social capital has been defined from a communitarian approach as trust in others and institutions, as well as participation in social networks [103]. Health related cultural capital is often referred to in terms of compromising factors such as values, behavioural norms, knowledge, education, and operational skills [104]. In health research the importance of different forms of capital has generally been studied independently of each other. In the original theory developed by Bourdieu, these forms of capital are described as closely linked and relational in determining the connection between individuals and structure [105, 106]. Central to this theoretical approach is the concept of “habitus” as a structured and structuring pattern to which people resort as a framework for perceptions, thoughts, and actions. A form of accumulated dispositions, habitus is a result of the constant exposure to the different forms of capital from a certain relative position within a particular field or social space. According to this theory, people with similar social positions will develop systematic homogeneity concerning habitus and will accordingly share dispositions capable of generating similar practices, or collective schemes of practice [106]. In this sense, health-related behaviour, as any social behaviour, will be relational and determined by implicit, routinised logic influenced by position within the broader social structure [107, 108]. In the present thesis, such theoretical perspective is applied to certain empirical findings of collective behaviours related to utilization of emergency obstetric care.

Guatemala: characteristics and main policies

Guatemala is a lower middle-income country situated in Central America. The estimated population is about 14 million, of which 40% is indigenous. Half of the population lives in urban areas. Life expectancy at birth is 70 years and the annual population growth rate is 2.4%.

In Guatemala, reliable figures on most maternal health indicators are generally lacking. The most recent estimate of MMR at 290/100,000 is entirely based on statistical modeling and has a very large range of uncertainty (100 to 650) [4]. A national survey of maternal mortality in the year 2000 reported a much lower figure of 153/100,000 and revealed that 44% of the 651

maternal deaths encountered had not been reported to health authorities [109]. The main causes for maternal deaths reported in that survey were haemorrhage (53%), infection (14%), and hypertensive disorders (12%). About one-third of the maternal deaths occurred at hospital.

There are no professional midwives in Guatemala. Utilization of formal maternal health care is generally low, except for attendance at ANC which covers 84% of the pregnant population. However, with regard to delivery itself, almost half of all pregnant women (48%) give birth with assistance from a TBA (in Guatemala referred to as *comadrona*), whereas only 41% give birth in the presence of professional health care staff (37% attended by doctors and 4% attended by nurses) [110]. Assistance by a TBA is especially common in the southwest parts of the country (63%) and among women of indigenous origin (80%).

Training programs for TBAs were initiated in 1955 and continue to be the main national policy for improving maternal health [111]. This training, organized by the Ministry of Health or non-governmental organizations, has consisted of short courses of up to five days taught by a nurse with at least one year of nursing education [112]. The programs include training in hygiene, promotion of ANC and post-partum follow-ups, as well as referral of women with complications to hospital. Additional training is generally available through monthly meetings at health care centers, although there are examples of other training models offering more continuous support and feedback to TBAs in some regions [113].

There is no ongoing evaluation of the effectiveness of TBA training in Guatemala. As in other countries investigations have shown mixed results. Bailey et al. examined the effect of TBA training on the detection of obstetric complications, referral to health facilities, and use of formal health care services by pregnant women in a department where TBAs cover most deliveries. They found that TBA referral rates did not significantly increase after training; neither did women's utilization of health care services [114]. Other studies have described increased referral rates among trained TBAs in other areas in Guatemala, especially for pre-term labour [112, 115].

Table 1. National reproductive characteristics in Guatemala and Bolivia

	Guatemala ^{a, b}	Bolivia ^c
MMR: National estimate	153/100,000	229/100,000
MMR: WHO estimate	290/100,000	290/100,000
<i>Delivery attendance</i>	%	%
Professional	41	61
TBA	48	6
Family member	11	31
Home delivery	58	42
Attendance at ANC	84	79
Postpartum checkups	20	24
Caesarean section rate	11	15
Total fertility rate	4.4	3.8
Neonatal mortality ratio	22/1000	27/1000
Infant mortality ratio	39/1000	54/1000
< 5 years mortality ratio	53/1000	75/1000

Sources: ^aNational maternal and child health survey, 2002; ^bMaternal mortality baseline survey, 2000; ^cDemographic and health survey, 2003.

Bolivia: characteristics and main policies

Bolivia is a landlocked, lower middle-income country located at the centre of South America with an estimated population of 10 million, of whom 65% live in urban areas. About 55–70% of the population has an indigenous background. Life expectancy at birth is 67 years and the population grows by about 2% per year.

In Bolivia, maternal mortality data is derived from estimates based on household surveys. These report an MMR that has decreased from 416/100,000 live births in 1989 to 229/100,000 live births in 2003 [116, 117]. The estimates are based on the sisterhood method, which is known to often understate the frequency of maternal deaths and is generally not recommended for trend assessment [118]. Whether maternal mortality levels are decreasing in Bolivia or not is thus difficult to conclude with certainty. WHO estimates update the latest national MMR figure to 290/100,000 live births (range of uncertainty 160–430/100,000) after modeling for methodological deficiencies [7]. The 2001 census provides yet another MMR figure

of 235/100,000, after adjustments based on a post-census study that included verbal autopsies [119]. Main causes were haemorrhage (33%), infections (18%), and unspecified abortions (9%). This survey described 37% of maternal deaths as occurring at the hospital level, which may reflect an underestimation of maternal deaths in the community, low quality of care, or a high uptake of obstetric complications in hospitals.

According to the national surveys, utilization of maternal health care has increased. The proportion of pregnant women who deliver in a health care facility has risen from 38% in 1989 to 57% in 2003, and antenatal care coverage (at least one visit) increased from 45% to 79% during the same period [116, 117]. However, this increase in utilization of maternal health care has been leveling off in recent years and inequalities in coverage remain among the highest in the world. For example, in 2003 only 22% of pregnant women in the poorest quintile of the population gave birth at a health care facility. This proportion was similar for women with the lowest educational level (26%) or for those living in rural areas (33%). In contrast to Guatemala, it is very uncommon that women in Bolivia are attended by a TBA during childbirth (6%) [117]. Since the 1970s, when midwifery was outlawed in Bolivia due to political opposition, there are no professional midwives in Bolivia.

The Bolivian government's main policy in addressing high levels of maternal mortality has been to increase accessibility by reducing financial barriers. Pregnant women and children under five years of age have been provided with free health care since 1996 through a government subsidized program currently known as Seguro Universal Materno-Infantil (SUMI). SUMI entitles pregnant women to a wide range of medical services for up to six months after giving birth. These include ANC, hospital delivery, caesarean section, as well as medical and surgical treatment of complications [120, 121]. It is generally thought that the program has improved availability of drugs at the hospital level. Further, it is believed that it has played an important role in the observed increase in utilization of maternal health care, although no studies have been done to investigate this [122].

In addition to providing free maternal health care, the Bolivian government has implemented financial incentives for using maternal health services. Beginning in 2009 this include a cash payment of 258 USD to women who attend four ANC sessions, have postpartum check-ups following hospital delivery, and return for check-ups with their newborns until they are two years old [123].

Aims

The general aim of this thesis was to increase understanding of factors that contribute to severe maternal morbidity and maternal mortality, with special focus on factors that impede accessibility and utilization of emergency obstetric care.

The specific objectives of the different studies were:

1. To explore conceptions of emergency obstetric care and hospital referrals among traditional birth attendants.
2. To document and compare frequencies and causes of maternal mortality and near-miss morbidity in early and late pregnancy at hospital level.
3. To describe the proportion of near-miss upon arrival at hospital as an indicator of pre-hospital barriers to emergency obstetric care.
4. To investigate whether lack of antenatal care is associated with late arrival at hospital for severe obstetric complications.
5. To evaluate the influence of socio-demographic factors on late arrival at hospital for severe obstetric complications.
6. To explore the way health care-seeking is conditioned for women arriving with a near-miss complication at hospital.

Material and methods

Study settings

This thesis is based on studies from two different areas that were selected for the appropriateness of their characteristics in relation to the research questions pursued. Both regions have high maternal mortality levels but differ in the political strategies applied to combat them. Guatemala stands out from most low- and middle-income countries in its ongoing focus on training TBAs as the means of ensuring safe motherhood [111]. The Bolivian setting, on the other hand, was found especially suited for studying near-miss and its relation to care-seeking behaviour and socio-demographic factors. The urban setting chosen in Bolivia, with provision of free maternal health care, theoretically offers an opportunity to explore the importance of factors related to the utilization of obstetric care other than distance and cost.

San Miguel Ixtahuacán, Guatemala

Study I was set in the region of San Miguel Ixtahuacán in the western highlands of Guatemala. This mountainous area with 19 rural villages has a population of approximately 35,000 inhabitants, which includes about 100 traditional birth attendants. Most of the population is indigenous and is engaged in small-scale agriculture.

Health facilities are scarce and 88% of all births are attended by TBAs [124]. The majority of the remaining 12% give birth in the presence of family members. The central village of the area has one health post that is staffed on weekdays by auxiliary nurses and by a physician two days a week. The nearest hospital is located in the city of Huehuetenango, about a two hour drive from the central village. In 2000 the local maternal mortality ratio for San Miguel Ixtahuacán was said to be 349/100,000 live births, with haemorrhage and retained placenta as the only reported causes [124].

La Paz district, Bolivia

Studies II–IV were set in the cities of La Paz and El Alto, the major urban areas of Bolivia's La Paz district. It is situated in the north-west of Bolivia and has a population of approximately 2.4 million, including about 540,000 women of reproductive age. One-third of the population lives in the city of

La Paz, one-third in El Alto, and one-third in the surrounding rural areas, respectively. Almost 60% have an indigenous background, which is mainly Aymara or Quechua. The La Paz district is highly segregated and El Alto and the rural areas are almost exclusively inhabited by an indigenous population [125]. Most women in the district are employed in the sales or service sectors (36%) or in agriculture (28%) [117]. About one-third of the women (29%) have received more than a primary level education (8 years).

La Paz City, the administrative capital, is situated 3600 m above sea level. El Alto has been transformed from a suburb of La Paz to a semi-autonomous city located 4200 m above sea level. Since the 1950s, when El Alto had 11,000 inhabitants, the population has increased by an average of 8.2% per year [126]. This rapid rise in population is mainly a result of massive rural-urban migration of poor and indigenous people and has resulted in a lack of basic needs for many of the inhabitants. In El Alto, 82% of the people live below the national poverty line, compared to the district average of 59% [125]. A prominent feature of these urban settings is the great importance of the informal economy. This is especially notable in El Alto with 74% of the economically active population engaged in the informal sector. The urban areas are further characterized by a relatively high availability of maternal health care facilities; there are short distances from homes to hospitals, along with abundant public transportation. On the contrary, there is a lack of health care facilities in rural areas where roads are generally unpaved and large areas are difficult to access.

The most recent maternal mortality figures that differentiate between regions in Bolivia estimate that about one-third (38%) of all maternal deaths in the country occur in the La Paz district, resulting in a regional MMR of 345/100,000 live births. About one-third of the deaths in the district are reported to have occurred at a health care facility, resulting in a facility level MMR of 302/100,000 live births. Most reported deaths in the district took place in the intra- or post-partum period (78%) [119].

In the La Paz district, utilization of maternal health care is less common than the national average. Only 41% of all women give birth at health care facilities, whereas 59% deliver at home without skilled birth attendance [117]. The proportion giving birth at a facility providing basic or comprehensive EmOC has been estimated at 26% [127]. Although the majority (76%) attends ANC, only 46% comply with the national recommendations to have at least four ANC visits. Other reproductive and epidemiological characteristics of the La Paz district include a fertility rate of 3.9, a neonatal mortality rate of 27/1000, an infant mortality rate of 52/1000 live births, and an under five mortality rate of 72/1000 live births [117].

Studies II–IV were set at four hospitals in the La Paz district. Two of these are first referral level hospitals in El Alto, and two are second referral level hospitals in La Paz city. The four hospitals together account for 75% of all hospital deliveries and receive the vast majority of complicated pregnan-

cies and deliveries in the area. All have 24 hour capacity for CEmOC (including medical and surgical treatment of pregnancy-related complications), although the availability of blood transfusions is limited. Patients requiring intensive care are referred to one of the two existing independent ICUs in La Paz, with a total of 9 beds. These ICUs were included in the study when patients were referred to them by the four hospitals that constituted the primary sources.

Study design and data collection procedures

This thesis is based on both qualitative (Studies I and IV) and quantitative methodologies (Studies II and III). An overview of the design, participants, and methodologies is given in Table 2.

Exploring conceptions of emergency obstetric care among traditional birth attendants (Study I)

The data collection for this explorative qualitative study was conducted in June and July 2002. A heterogeneous group of TBAs were purposely chosen to represent different villages, ages, and experience (in years) as TBAs. All informants had some training in pregnancy care, as they had attended short courses for TBAs provided by the Ministry of Health or by a non-governmental organization. As a result, 13 TBAs from 11 villages were interviewed. Their approximate ages ranged between 30 and 80 years and the time they had been active as birth attendants varied from a few years to 45 years. The number of women they attended per year ranged from 2 to 36 for each informant.

Interviews were semi-structured and were guided by pre-defined themes. To enhance the flexibility of this interview technique, all questions were open-ended. Interviews were conducted in Spanish and lasted approximately one hour. The initial interview topics included their experiences of complications related to pregnancy and childbirth, the conceptions as to the causes of complications, and attitudes towards hospital care. In an attempt to minimize cultural and communicational misunderstandings, a key informant interview was held with the local TBA coordinator, who was an auxiliary nurse with a background as a TBA.

Table 2. Design, data collection, participants, and analytic approach in Studies I–IV

Study	Design	Data collection and participants	Analysis
I	Qualitative	Semi-structured interviews with 13 traditional birth attendants	Thematic analysis
II	Cross-sectional	Prospective identification of maternal deaths and near-miss cases	Descriptive statistics
III	Case-referent	Women with near-miss upon arrival compared to women with uncompleted hospital deliveries	Logistic regressions
IV	Qualitative	Semi-structured interviews with 30 women with near-miss upon arrival	Modified analytic induction

Definitions of maternal mortality and near-miss morbidity (Studies II–IV)

The inclusion and classification of maternal deaths in Study II followed the WHO definitions described in the 10th version of the International Classification of Diseases (ICD-10): “Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes” [128]. In ICD-10 maternal deaths are further classified as *direct* (resulting from obstetric complications during pregnancy, labour, and the puerperium) or *indirect* (resulting from previously existing disease aggravated by the physiological effects of pregnancy). As compared to earlier versions, the ICD-10 also includes *late* maternal deaths that occur more than 42 days but less than one year after termination of pregnancy. Due to the difficulties in identifying medical causes of maternal deaths, WHO also gives a further definition of *pregnancy-related deaths* as the death of a woman during pregnancy, childbirth, or the puerperium, irrespective of the cause of death [15]. In Study II pregnancy-related death was used as a classification when an exact cause could not be specified.

Studies II–IV focused on women admitted to a hospital with a near-miss event. Throughout these studies, near-miss was defined as a life-threatening complication that was resolved by chance or by medical care [24]. A combination of clinical and management-based criteria was applied to define near-miss cases. These were influenced by previously applied criteria, with modifications for inclusion of anaemia because of the high altitude in La Paz and El Alto [37, 40]. The criteria focused on the five major diagnostic groups related to maternal mortality: severe haemorrhage, severe hypertensive disorders (severe preeclampsia and eclampsia), sepsis, obstructed labour, and severe anaemia. Specific inclusion criteria are presented in Table 3.

Near-miss morbidity was further differentiated into two groups, depending on the point in time when they fulfilled the inclusion criteria [37]. Women arriving with a life-threatening complication were classified as near-miss upon arrival. Women with near-miss who did not fulfill the inclusion criteria upon arrival but developed a severe complication during their hospital stay were classified as near-miss after arrival.

Table 3. Combined clinical and management-based inclusion criteria for near-miss morbidity (Studies II–IV). Modified from Filippi et al. [37] and Waterstone et al. [40]

Diagnostic group	Definition	Specific criteria
Haemorrhage	Severe bleeding	Emergency hysterectomy Hypovolemic shock Repeated blood transfusions
Hypertensive disorders	Eclampsia	Convulsions without history of epilepsy or other medical reason
	Severe preeclampsia	BP > 140/90mmHg or BP-increase > 30/15mmHg and neurological symptoms and either HELLP or proteinuria > 1 g/24h
Infection	Clinical signs of sepsis	Hypo/hyperthermia and BP < 90/60mmHg and HR > 120bpm
Obstructed labour	Uterine rupture	Surgical findings
	Impending rupture	Clinical findings: Bandl's ring
Anaemia	Severe anaemia without signs of haemorrhage	Verified anaemia ^a and clinical signs of anaemia

^a Severe anaemia was defined as haemoglobin < 9 g/dl in La Paz and < 9.5 g/dl in El Alto, corresponding to < 6 g/dl at sea level [129].

Cross-sectional facility based study (Study II)

This facility-based cross-sectional study prospectively included all maternal deaths and near-miss cases encountered at the four hospitals in La Paz and El Alto during a period of six months (1 September 2006 to 28 February 2007). The study was also the basis for the subsequent investigations of near-miss morbidity.

In two hospitals, all medical and antenatal records for women admitted to both the obstetric and gynaecology wards were reviewed to identify maternal deaths and near-miss cases. A pilot study made it clear that data collection procedures in two hospitals had to be modified due to logistical problems with clinical records. In these hospitals a dedicated group of nurses and doctors on the obstetric and gynaecology wards were assigned to identify all pregnancies and deliveries with medical problem of any kind. These cases were reviewed for inclusion using the same predetermined criteria as in the other two hospitals. To control for selection bias, registers for births, surgery, and hospitalized patients were screened weekly to see if patients with severe complications had been missed. However, this procedure did not result in the identification of any new cases.

Maternal deaths were evaluated through clinical records, staff discussions, and monthly meetings with the regional maternal mortality review committee. As an autopsy was performed in only one case, information about cause of death was based on clinical and surgical findings.

Data on deliveries and live births were derived from monthly statistics reported by the hospitals to the National Health Information System SNIS (Sistema Nacional de Información en Salud).

Investigating the association between lack of ANC, socio-demographic factors, and near-miss upon arrival (Study III)

In this case-referent study, all women who had been classified as near-miss upon arrival at hospital in the cross-sectional study were included (n = 297). After the registration of a near-miss case, the next woman at the same hospital who presented with an uncomplicated delivery was selected as a referent.

Socio-demographic characteristics for cases and referents were assembled from antenatal registers and clinical records. These included age at admission to hospital, parity (defined as the number of previous pregnancies resulting in abortion or delivery), level of education, residency, marital status, and frequency of attendance to antenatal care.

Exploring care-seeking behaviour (Study IV)

This qualitative study was based on interviews with 30 women who had experienced a near-miss event and had been admitted to one of the four hos-

pitals in La Paz or El Alto. The informants were recruited from the cross-sectional study base and strategically selected to represent women with one of the most common causes of near-miss upon arrival at hospital, as they are thought to have generally experienced pre-hospital barriers. In addition, we sought informants with different socio-demographic backgrounds to be able to illustrate a range of variations within the study area [130].

Interviews were conducted at the hospitals when the women had recuperated from their complication and often took place on the last day of care before they were discharged. The interviews were semi-structured in nature but the informants were encouraged to speak freely about what they had experienced from the onset of their complications up to the time of the interview. Interview topics centered on the informant's health care experiences during prior pregnancies, her antenatal care, her family's delivery traditions, her preferences regarding where to deliver, and her knowledge of the SUMI program. The interviews were conducted in Spanish and lasted 45 to 60 minutes.

Data analysis

Qualitative data analysis (Studies I and IV)

Analysis of qualitative data was initiated during the data collection phase and was a continuous process. Such sequential analysis provides the possibility to elaborate on questions and interview themes in an attempt to follow-up important findings in depth [131]. Further, it enables a search for deviant cases that can be useful to question or refine evolving hypotheses during the analytical process. Sampling of informants was continued until theoretical saturation had been experienced by the interviewer (i.e., until no further information related to the research questions was discerned) [132].

Qualitative data was iteratively coded and categorized in order to structure, visualize, and interpret patterns and themes related to the research questions. Investigator triangulation was applied to increase credibility in the analyses and to optimize the use of the qualitative data through the initial independent analysis of data by researchers with backgrounds in different scientific disciplines. This was followed by recurring discussions about interpretations of findings [130].

In Study IV the data analysis was guided by the procedures of analytic induction that seek to elaborate and refine explanations of a phenomenon through a systematic search for contradictory evidence [133]. This analytic approach has several similarities with the constant comparative method often used in Grounded Theory, as both are generative and seek to develop a theoretical model by comparing segments of data [132]. However, they differ in that analytic induction acknowledges the use of pre-formulated, or early-generated, hypotheses and also aims at testing their explanatory value [134].

In its original and extreme form analytic induction was constructed to establish universal patterns of causality across all relevant groups and settings [133]. The present thesis, however, employs it to identify and explain patterns of behaviour within our specific setting, an approach sometimes referred to as modified analytic induction. The procedures of analytic induction can be described as a cyclic process including (a) early formulation of one or more hypothetical explanations of a phenomenon, (b) continuing data collection and analysis with a conscious and systematic search for evidence that could falsify the formulated hypotheses, and (c) discharge, elaboration, or reformulation of hypotheses on the basis of subsequent findings [134]. In Study IV, early hypotheses for the utilization of maternal health care were both formulated prior to data collection on the basis of government (policy) documents and discussions with staff and health authorities, and on empirical findings during data collection.

Statistical analyses (Studies II and III)

SPSS version 13.0 was used for all statistical analyses.

Descriptive statistics

The MMR is the most commonly used measure of maternal mortality and reflects the risk of dying with each pregnancy, also referred to as the obstetric risk [5]. It is calculated as the number of maternal deaths within a given time period per number of live births during the same period [15]. Similarly, a severe morbidity ratio (SMR), or maternal near-miss incidence ratio, has been suggested to reflect the risk for severe obstetric complications [135]. In Study II, live births were used as the denominator to calculate both MMR and SMR. The latter was provided as a total figure of the number of near-miss cases per 1000 live births and in relation to each diagnostic category. To show the relationship between mortality and near-miss, a mortality index was calculated for the ratio of maternal deaths to the sum of maternal deaths and near-miss cases, represented as a percentage [136].

In Study III, simple differences between cases and referents were calculated using Student's *t*-test for normally distributed data (i.e., age), the non-parametric Mann-Whitney *U*-test for non-normally distributed continuous data (i.e., parity and attendance to antenatal checkups), and the Chi-square test for categorical data (i.e., marital status, education, and residency).

Logistic regressions

In Study III logistic regression was used to compute odds ratios (ORs) and their 95% confidence intervals (95% CI) to illustrate differences between cases and referents in crude and adjusted analyses. Multivariate logistic regression was performed step-wise backward, including all variables. Socio-demographic characteristics were classified into categories before entering

the regression models. Age and parity have a non-linear U-shaped (or J-shaped) relation to adverse maternal outcomes. Parity was therefore categorized into three groups (no previous pregnancies; 1 to 4 previous pregnancies; and more than 4 previous pregnancies). However, age could not be grouped in a similar way due to the distribution of the data and so was categorized into four groups (< 20; 20–24; 25–34; \geq 35 years). Other variables were dichotomized: marital status (married or cohabiting vs. single), residency (urban vs. rural), educational status (secondary or higher vs. none or primary), and antenatal checkups during current pregnancy (\geq 1 checkups vs. no checkups).

Age and parity are generally highly interrelated, as illustrated in Study III by the fact that only one woman of advanced childbearing age (\geq 35 years) had had no previous pregnancies and no woman younger than 20 years had previously been pregnant more than four times. For the logistic regressions these variables were analyzed in combination and presented in five groups: (a) < 35 years with one or more previous pregnancies, (b) < 20 years with no previous pregnancy, (c) 20 to 34 years with no previous pregnancy, (d) \geq 35 years with 0 to 4 previous pregnancies, and (e) \geq 35 years with > 4 previous pregnancies.

Missing values in data were less than 0.5% for age, parity, and residency; for these variables missing values were not accounted for in the analyses. Missing data for marital status, education and attendance to ANC was 3% to 6%. In order not to bias the results in favor of the hypothesis, women without data for antenatal checkups were included in the group of those who had attended antenatal visits for the purposes of the logistic regression analyses. Women lacking data for education were included in the group with lower educational levels, and missing values for marital status were assigned the value “single” that, based on the other parameters, was thought to be the best approximation. To assure that this categorization of missing values did not affect our results, the multivariate logistic regression was also performed by grouping women with missing values for education and marital status as having higher educational levels and as married. However, this did not change the results of the analyses.

As interactions were observed between some of the variables (low education, rural residence, and lack of ANC) when interaction terms were introduced to the multivariate regression model, their joint effect was presented relative to the group with neither of these characteristics [137].

Ethical considerations

The studies in the La Paz district of Bolivia were approved by the Bolivian National Committee for Bioethics: Commission for Ethics in Investigations (Comité Nacional de Bioética: Comisión de Ética de la Investigación) in

2006. The Ethics Committee of Lund University gave clearance to these studies as approved in Bolivia (personal correspondence, Susanne Lundin, Scientific Secretary, Regional Ethics Review Board, Lund University [Vet. Sekr. Regionala etikprövningsnämnden, Lunds Universitet]). The studies were discussed and approved by Bolivian authorities (the Ministry of Health and local health care authorities in La Paz and El Alto) and by hospital directors in La Paz and El Alto. Redistribution of data was ongoing in several meetings with health care staff and local authorities. Moreover, preliminary results were presented at a national Bolivian conference on maternal and neonatal mortality (Taller Mortalidad Materna y Neonatal, La Paz, 31 January to 1 February 2007). All interviews were conducted after receiving informed consent from the interviewees, who had previously been provided with oral and written information about the studies (Studies I and IV). It was made clear to all informants that participation was voluntary, that the interviewer was not a representative of any authorities or the hospital staff, and that the identity of the informant would remain confidential.

Results

Conceptions of emergency obstetric care among TBAs in rural Guatemala (Study I)

Throughout the interviews the TBAs described maternal mortality as common in other villages and among other TBAs. However, very few TBAs stated that they had experienced cases of maternal deaths among women whom they had attended themselves.

I have never encountered that, but I have heard about it. Here in this village two died because they went to another traditional birth attendant. They were badly taken care of and the bleeding wouldn't stop. (TBA L)

There are traditional birth attendants who lose women because they don't have enough competence. (TBA B)

There seemed to be a discrepancy between what the TBAs considered appropriate in cases of obstetric complications and the actions they actually took to handle them. Most of the TBAs considered it appropriate to send a woman to a hospital under certain problematic circumstances, including transverse fetal positions, severe maternal bleeding, or high fever. Several TBAs also reported experiencing complications similar to the above among their patients. However, only a few had actually sent a woman to the hospital for such complications. The reasons they gave were a) they never considered it necessary, b) women do not wish to go to the hospital, and c) it would do no good.

The women do not want to go there. They give birth in their house and that's it. I have never taken anyone to hospital—never! (TBA J)

Most of the TBAs said they had never visited a hospital and that they had limited knowledge of hospital care.

When discussing causes of obstetric complications, some TBAs considered very young women having their first baby and older women with many children as being at high risk of complications. The TBAs did not, however, recommend those women to deliver at a hospital. The origin of obstetric complications was commonly described as related to parental lifestyles and attitudes towards the expected baby.

When the baby is born in a sitting position it's because the parents have separated and live in different places. (TBA M)

Sometimes it's because deep in their heart they really don't want the child. (TBA K)

According to the TBAs, a common perception among pregnant women is that fate and the will of God have predestined the outcome of pregnancy and childbirth.

They don't go to a doctor, and that's because of their religion. They believe in God and wait for God to help them—that is their plan. (TBA D)

The majority of the TBAs interviewed said that the decision about going to the hospital in the event of an obstetric complication is made by the woman and her family, and the TBA has more of an advisory role. The informants did report a pronounced aversion against seeking hospital care among pregnant women in the area. Fears of surgical procedures (including caesarean sections), mistreatment, and discrimination at the hospital were cited as common reasons for such aversion.

Frequency and causes of maternal mortality and near-miss (Study II)

During the study period 15 maternal deaths, 401 cases of near-miss and 8028 live births were registered. This gives an MMR of 187/100,000 live births and an SMR of 50/1000 live births. There were 27 near-miss cases to each maternal death, which translates into a mortality index of 3.6%.

Characteristics and classifications of the maternal deaths are provided in table 4. A probable cause of death could be established for 11 women. Sepsis was the most common cause ($n = 6$), followed by uterine rupture ($n = 2$), haemorrhage ($n = 2$), and eclampsia ($n = 1$). An additional four deaths were classified as pregnancy-related, as a specific cause could not be established. Six women died within the first day postpartum and three died during the first week after childbirth. Two additional deaths occurred between the 7th and 42nd day postpartum. Two women died in early pregnancy, in one case as a result of severe haemorrhage and, in another, under unclear circumstances. One woman died from sepsis 61 days after a caesarean section and was classified as a late maternal death. The majority of the women who died arrived at hospital in critical condition ($n = 9$). Delays in referrals to higher levels of care were evident in five cases.

The disease profile for near-miss morbidity differed from that of maternal mortality (Table 5). Most near-miss cases occurred within the diagnostic

categories of severe haemorrhage (24/1000 live births) or severe hypertensive disorders (23/1000). Sepsis (1.4/1000) and obstructed labour (0.4/1000) were uncommon as causes of near-miss but showed high mortality indices. Severe anaemia was also uncommon (1.4/1000).

A large proportion of near-miss cases attributed to severe haemorrhage took place in early pregnancy, defined as a gestational age < 28 weeks (26%, n = 49). Two of these pregnancies were ectopic; the remaining were abortions without further indication in the medical record as to whether they were induced or spontaneous. In total, the proportion of near-miss in early pregnancy was 13% (n = 51).

The total caesarean section rate compromised 28% of all hospital deliveries. Among women with near-miss delivering at hospital, the caesarean section rate was 63%. Only 5.7% of the near-miss cases were treated in an ICU.

Table 4. Characteristics and classifications of maternal deaths

Age (years)	Gestational age ^a	Diagnostic group	Mode of delivery	Time delivery to death	Symptoms upon arrival	Pregnancy outcome
36	Early pregnancy	Haemorrhage	Abortion	—	Shock	Abortion
28	Early pregnancy	Unknown	No delivery	—	Stable, abdominal pain	—
26	Late pregnancy	Haemorrhage	Vaginal (home)	3 hours	Shock	Live birth
19	Late pregnancy	Sepsis	Caesarean	61 days	Septic shock	Live birth
35	Late pregnancy	Sepsis	Vaginal (hospital)	3 days	Stable, fever	Live birth
23	Late pregnancy	Sepsis	Caesarean	7 hours	Septic shock	Stillbirth, fresh
19	Late pregnancy	Sepsis	Vaginal (hospital)	36 days	Septic shock	Live birth
27	Late pregnancy	Sepsis	Vaginal (home)	5 days	Septic shock	No data
32	Late pregnancy	Sepsis	Caesarean	11 days	Septic shock	Live birth
18	Late pregnancy	Obstructed labour	Vaginal (forceps)	3 hours	Stable, in labour	Stillbirth, fresh
24	Late pregnancy	Obstructed labour	Caesarean	30 min	Shock	Stillbirth, macerated
20	Late pregnancy	Eclampsia	Caesarean	31 hours	Severe preeclampsia	Live birth
38	Late pregnancy	Unknown	Vaginal (hospital)	45 min	Stable, abdominal pain	Stillbirth, fresh
24	Late pregnancy	Unknown	Vaginal (hospital)	20 days	No reactions	Live birth
26	Late pregnancy	Unknown	No delivery	—	No reactions	Intrauterine death

^a Gestational age at delivery or death. Late pregnancy defined as a gestational age ≥ 28 weeks. Early pregnancy defined as gestational age < 28 weeks.

Table 5. Classification of complications causing maternal deaths and near-miss morbidity upon and after arrival at hospital (valid percentage)

Diagnosis	Maternal deaths		Near-miss cases		Mortality index (%)
	n = 15	Total n = 401	Upon arrival n = 297	After arrival n = 104	
Severe haemorrhage	2 (13)	191 (47)	103 (35)	88 (84.5)	1.0
Early pregnancy ^a	1 (6.5)	49 (12)	43 (15)	6 (5.5)	
Late pregnancy ^b	1 (6.5)	142 (35)	60 (20)	82 (79)	
Hypertensive disorders	1 (7)	184 (46)	175 (59)	9 (8.5)	0.5
Eclampsia	1 (7)	32 (8)	31 (10)	1 (1)	
Severe preeclampsia	—	152 (38)	144 (49)	8 (7.5)	
Obstructed labour	2 (13)	4 (1)	2 (0.5)	2 (2)	33.3
Sepsis	6 (40)	11 (3) ^c	6 (2) ^c	5 (5)	35.3
Severe anaemia	—	11 (3)	11 (3.5)	—	—
Unknown	4 (27)	—	—	—	—

^a Gestational age < 28 weeks. Includes severe haemorrhage related to abortion and ectopic pregnancies.

^b Includes severe antepartum, intrapartum, and postpartum haemorrhage.

^c Two cases related to unspecified abortion.

Near-miss upon arrival at hospital (Studies II–IV)

The majority of the near-miss cases (74%) fulfilled the criteria for inclusion in Study II already upon arrival at hospital. The percentage for near-miss upon arrival was high for women living in rural areas (80%) as well as urban areas (73%). Among women arriving in critical condition, severe hypertensive disorders were the most common (59%), followed by severe haemorrhage (35%). Moreover, the vast majority of women with near-miss because of severe haemorrhage in early pregnancy presented at hospital in critical condition (88%, $n = 43$). Only 9.5% of all women with near-miss had delivered at home ($n = 38$). Almost all of these women ($n = 37$) were classified as near-miss upon arrival and presented with severe postpartum haemorrhage ($n = 36$).

Socio-demographic characteristics (Studies II–III)

Socio-demographic characteristics of women with near-miss and referents are described in Table 6. Women with near-miss upon arrival lacked antenatal care to a significantly greater extent than women with near-miss after arrival (31% to 16%, respectively). They also had lower educational levels, defined as having received a primary school education or less (45% versus 31%). There were no significant differences between the two groups of near-miss cases in age distribution, marital status, residency, or parity (Study II).

As compared to the references in Study III, women with near-miss upon arrival were significantly older, had lower educational levels, and more commonly resided in rural areas. To a greater extent than the reference group, they had not taken part in ANC. More than half of the women with near-miss upon arrival had attended less than the recommended four antenatal checkups ($n = 149$), and a substantial proportion had attended none ($n = 84$).

Table 6. Socio-demographic characteristics of women with near-miss upon arrival and after arrival at hospital in La Paz and El Alto, Bolivia, and selected referents (valid percentage)

	Near miss cases		Referents
	Upon arrival n = 297	After arrival n = 104	n = 297
Age (years)			
Mean age (SD)	28 (7.4)	28 (6.4)	26 (6.2)
Marital status			
Single	32 (11.5)	13 (13)	42 (14)
Married/Cohabiting	246 (88.5)	89 (87)	254 (86)
Missing	19	2	1
Education			
None	11 (4)	2 (2)	11 (4)
Primary	108 (41)	28 (28)	95 (32)
Secondary	114 (43.5)	47 (49)	153 (52)
Higher	30 (11.5)	20 (21)	36 (12)
Missing	34	7	2
Residency			
Urban	240 (81)	90 (86.5)	269 (91)
Rural	56 (19)	14 (13.5)	28 (9)
Missing	1	0	0
Parity			
0	90 (30)	28 (27)	65 (22)
1–4	162 (55)	62 (60)	200 (67)
> 4	44 (15)	13 (13)	32 (11)
Missing	1	1	0
Antenatal care			
0	84 (31)	16 (16)	41 (14)
1–3	65 (23.5)	30 (30)	90 (31)
≥ 4	125 (45.5)	54 (54)	192 (55)
Missing	23	4	4

Socio-demographic characteristics, antenatal care, and near-miss upon arrival (Study III)

Lack of ANC, lower educational levels, and rural residence were interactively associated with near-miss upon arrival when adjusting for age, parity, and marital status (Table 7). For women with high educational levels, neither rural residence nor lack of ANC was associated with near-miss morbidity upon arrival at hospital. Lesser education in combination with lack of ANC resulted in more than a four-fold increased risk for women living in urban areas. This risk was further increased for women residing in rural areas.

Table 7. Assessment of joint effect of antenatal care, education, and residence on near-miss maternal morbidity upon arrival at hospital in La Paz and El Alto, Bolivia

	Cases	Referents	AOR^a (95% CI)
High education + Urban + ANC ^b	116	149	1
High education + Rural + ANC	8	15	0.75 (0.30–1.89)
High education + Urban – ANC	15	21	0.97 (0.47–2.00)
High education + Rural – ANC	5	4	2.08 (0.53–8.19)
Low education + Urban + ANC	66	85	1.02 (0.67–1.56)
Low education + Rural + ANC	23	7	4.58 (1.84–11.41)
Low education + Urban – ANC	44	14	4.17 (2.12–8.22)
Low education + Rural – ANC	20	2	12.63 (2.82–56.57)

^a AOR: Odds ratios adjusted for age, parity, and marital status

^bANC: antenatal care

Due to the close correlation between age and parity, we calculated the ORs for different combinations of the two variables. First time pregnancy showed an association with near-miss upon arrival that increased with age. Greater maternal age (≥ 35 years) was in itself associated with near-miss; the relation increased when high age was combined with multiparity (Table 8).

Table 8. Odds ratios (OR) with 95% Confidence Intervals (95% CI) for near-miss upon arrival.

		Crude		Adjusted ^a	
		OR	95% CI	OR	95% CI
Age (years)	Parity				
< 35	≥ 1	1		1	
< 20	0	1.71	0.99–2.95	1.96	1.12–3.45
20–34	0	2.30	1.43–3.69	2.89	1.76–4.72
≥ 35	0–4	2.77	1.52–5.04	3.02	1.63–5.59
≥ 35	> 4	5.41	2.60–11.27	4.08	1.91–8.72

^a OR adjusted for marital status, education, residency, and attendance to ANC.

Care-seeking behaviour among women with near-miss upon arrival (Study IV)

In exploring the conditioning of health care-seeking behaviour among women who had experienced a near-miss event and arrived at hospital in critical conditions, we found a socially structured division between two distinct groups of women. This division was reflected by the way they described their attitudes towards maternal health care, as well as in their thoughts and actions in relation to delivery and the use of emergency obstetric care when a severe complication arose.

Women in the first category were conversant with the health care system. They had had experiences of maternal health care through antenatal check-ups or earlier pregnancies and they had planned to deliver in a hospital. These women generally lived in La Paz City.

Women in the second category had a different social background. They all lived in rural areas or in the recently urbanized El Alto and had a lower socio-economic status, as judged by their resources and educational level. These women appeared greatly dissociated from the health care system. Almost without exception, they had no personal or family experience of antenatal visits or obstetric care, and they planned to deliver at home—alone or in the presence of family members. They were also generally unfamiliar with the SUMI program that provides maternal health care free of charge. Some women described anticipated costs as directly influencing their decision not to have antenatal check-ups or arrange for delivery within the health care system.

A woman's initial preference with regard to maternal health care also coincided with her care-seeking behaviour when a complication arose. Women oriented toward delivering at home generally sought health care later. We also noted a consistent pattern in their delaying the decision to seek emergency care until they themselves, or a close relative, perceived their symptoms as directly life threatening. This is illustrated by one woman who was brought to a health care centre by her husband and sister when she became unconscious from severe bleeding. From there she was immediately referred to the hospital.

I was doing the laundry when I suddenly started to bleed. First a little, then more and more, until finally I was bleeding all the time. I didn't know what to do and went to bed, hoping it would just stop by itself. (El Alto woman)

The importance of the social differentiation in shaping maternal care-seeking behaviour was on the one hand seen in how the women's delivery strategy coincided with the traditions and composed experiences of her family. The women told of how they intended to give birth matter of factly. Deliberations on hospital versus home deliveries by weighing positive and negative factors or expectations were not encountered in the women's narratives.

We give birth at home. That's just how we do it. (El Alto woman)

My family told me that it is better to give birth in a hospital than at home. (La Paz woman)

On the other hand, the social conditioning of care-seeking behaviour was illustrated in the self-perception of women oriented towards home deliveries. Women in this category referred to themselves in collective terms; they appeared to have a shared understanding of being fundamentally separated from "others" who use health care. Many women referred to this with expressions such as "hospitals are not for us".

We do not belong there. We know nothing about hospitals, so we give birth at home. (El Alto woman)

Among the women who felt excluded from the health care system, fear of surgical interventions and not being well treated in hospitals was common. None of the informants cited cultural practices (such as the tradition of burying the placenta or using herbal medicines) as reasons for preferring home delivery or delaying in seeking emergency obstetric care. None of them had planned to use the services of a TBA.

There were similarities in informant's impressions about their hospital stay. Perceptions of mistreatment by staff, being kept poorly informed about their condition, their baby's health, and the medical care were common.

The staff is harsh. They don't listen to you and they don't explain anything that they're doing. You just lie alone in your bed feeling scared and lonely. You don't know why you can't go home or what they are doing to you (El Alto woman)

I'm very worried because I don't know what happened to my baby. They took him to another room and then I don't know what happened. (Woman from rural area)

Nevertheless, such negative experiences did not seem to influence the orientation of these women toward the maternal health care system. Those who had planned to deliver at hospital generally stated that they would continue to avail themselves of institutional health care, although they would choose another hospital. Similarly, women influenced by tradition to deliver at home were reinforced in their preference, saying that if they were to have another child, they would definitely want to give birth at home.

Discussion

Although it is well known that utilization of maternal health care in low- and middle-income countries varies widely between women with different socio-demographic characteristics, the mechanisms behind this are not clearly understood. This thesis investigated adverse maternal outcomes and pre-hospital barriers to CEmOC, drawing on qualitative and quantitative data from Bolivia and Guatemala. The findings reiterate the complexity of determinants for utilization of maternal health care and contribute to understanding the role of formal and informal care providers, as well as the care-seeking behaviour of women arriving at hospital with near-miss morbidity. The studies illustrate that there is an unfamiliarity with emergency obstetric care and hospital referrals among trained TBAs in rural Guatemala (Study I); that pre-hospital barriers to emergency obstetric care can be significant, even in settings with a broad availability of free maternal health care; that the disease profile for near-miss differs from that of maternal mortality at hospital level (Study II); that combinations of such disadvantages as low education, rural residence, and lack of ANC are associated with near-miss upon arrival; that ANC seems to reduce socio-demographic differentials for near-miss upon arrival (Study III); and that the way women perceive themselves in relation to others is important in shaping maternal health care-seeking behaviour (Study IV).

Methodological considerations

Study design and limitations

Study II shows that investigations combining data on near-miss morbidity and mortality can be used to clarify the epidemiologic spectrum for adverse maternal outcomes at hospital level. However, facility-based studies may have some general limitations that affect the interpretation of their results, as does this thesis. These include an incomplete picture of the occurrence and causes of adverse maternal outcomes in the region [138]. To correct this would require including maternal deaths occurring in the community [139]. Moreover, determinants for near-miss morbidity cannot be generalized as having the same influence on women with severe obstetric complications who never reach hospital and die at home. In accordance with our findings, pre-hospital barriers for women with near-miss are more commonly related

to the first delay and to care-seeking behaviour patterns than to factors associated with the second delay [45], although the latter may be of greater importance for women who never reach hospital.

The extent to which qualitative research is able to produce knowledge that is generalizable beyond the study sample has been subject to considerable debate. Alternative terminologies, including transferability, comparability, and extrapolations, have been suggested as more appropriate for qualitative research, but this has not ended the debate. Some scholars find that qualitative research reflects diversity rather than being generalizable, while others consider that certain empirical generalizations can be made against a background population with regard to the existence of phenomena and tendencies [140] and that the possibilities of generalizing findings are enhanced by ensuring that the research setting is sufficiently spelled out [141]. Qualitative research findings may best be judged by their ability to produce generalizable statements (i.e., theories) to account for phenomena [142]. In this sense theoretical generalizability refers to whether theories that are generated can be used to increase understanding of empirical findings in other settings or research fields. This will depend on the rigour of the research process, including sampling of informants, analytical procedures, consistency between theoretical claims and empirical data, and whether the theoretical perspectives taken are comprehensive and saturated. The methodology of this thesis includes purposive sampling to represent a range of variation within the setting, multiple coding in order to supplement and contest analytical perspectives, and recontextualization to ensure that theoretical patterns agree with empirical data [130, 141].

Case-referent studies are subject to several possible sources of bias regarding the selection of participants, information retrieval, and confounding [143]. To decrease selection bias, all identified cases of near-miss upon arrival were included in the analysis, and referents were chosen from the same hospitals. Socio-demographic characteristics among participants were cross-checked for the subgroup of women interviewed in Study IV, who confirmed the correctness of their data in the medical and antenatal care records. The risk for information bias, therefore, is believed to be small. Confounding occurs when important differences between groups being compared are also related to the variable of interest [144]. A confounding factor is thus associated with both the exposure and the outcome, but is not the result of exposure or an intermediate variable in a causal pathway between the two [143]. Interaction or effect modification, on the other hand, refers to a situation in which the effect of one variable on an outcome differs across strata of another variable [137]. Age, parity, and marital status are possible confounders for an association between attending ANC and education (as exposures) and near-miss upon arrival (as an outcome). Adjustments were made for these factors in the analyses by multivariate logistic regression, while interactions were visualized by stratified analyses. Residual confounding by unmeasured

factors, however, may be present in the associations observed. In this sense, measures of poverty were perhaps the most important factors we could not adjust for in the analyses. Consequently, it cannot be ruled out that poverty is a confounding factor in Study III. It is also possible that poverty acts as a starting point in a causal pathway towards near-miss upon arrival, with ANC and education as intermediate factors; or it may constitute yet another effect modifier. The causality of associations in observational studies is difficult to assess with certainty. Criteria fulfilled in Study III that may suggest causality include exposure that clearly precedes the outcome and associations that have relatively high ORs [143]. However, repeated studies are needed in order to judge the consistency of findings and investigate possible confounding by poverty in order to add arguments for causality.

Classification and reporting of maternal deaths and near-miss morbidity

Care was taken to include maternal deaths in both early and late pregnancy, reducing the risk of underestimating maternal mortality. In one of the hospitals, however, indirect maternal deaths in medical or surgical wards may have been missed, resulting in an underestimation of maternal mortality at the facility level. Nevertheless, excluding that hospital from the analysis resulted in a similar MMR of 205/100,000 live births.

A combination of clinical and management-based criteria was chosen to define near-miss. This was considered likely to convey the most accurate figures of severe morbidity, considering present facility characteristics. Studies using clinical criteria generally report higher near-miss figures (0.8% to 8.2%) than studies using management-based criteria (0.01% to 2.99%) or criteria based on organ system dysfunction (0.4% to 1.1%) [30]. Although clinical criteria have mostly been used in settings where high levels of severe morbidity could be expected, they have been criticized for setting too low a threshold for severity and thereby overestimating the frequency of near-miss events. A Brazilian study comparing different methods for defining near-miss in the same setting concluded that the clinical criteria established by Waterstone et al. gave a much higher SMR (31/1000) than those based on organ dysfunction (15/1000) [33]. In Bolivia the use of the latter would have resulted in an underestimation of severe maternal morbidity, as laboratory tests and medical technology are not readily available. By applying strict combinatory criteria we sought a high threshold for inclusion to decrease the risk of overestimating near-miss. Although a high proportion of near-miss cases related to hypertensive disorders were expected in Latin America, it remains an open question whether the threshold for severe preeclampsia is generally set too low in studies based on clinical criteria.

A standard tool for identifying near-miss in order to facilitate comparability between locales in future studies has recently been proposed by a WHO

working group [135]. The tool utilizes organ system dysfunction criteria, as they are objectively verifiable and have a high threshold for severity. A set of compatible clinical markers for such organ dysfunction is proposed for use in low-resource areas and is about to be tested in demographic and health surveys. However, it is unclear whether a reasonable correlation between criteria based on clinical aspects and organ system dysfunction can be achieved in large surveillance systems. Further, there is no clear reason why high-resource should be comparable to low-resource settings. A more feasible approach might be to develop two separate standards for inclusion. In high-resource instances, organ system dysfunction criteria would be the obvious choice. In the case of low-resources, it might be simpler and more appropriate to develop a specific combination of clinical and management-based criteria.

Results

Frequency and causes of adverse maternal outcomes

There is no previous data on near-miss morbidity from Bolivia. The SMR of 50/1000 in Study II is within the range of investigations from other low- and middle-income settings using similar inclusion criteria (range: 44 to 82/1000) [30, 32]. Comparisons of frequency between studies should be made with caution, however, as the studies do not share exact inclusion criteria.

Most near-miss morbidity was found to be related to severe hypertensive disorders and haemorrhage. This pattern is in accordance with most other studies in both high- and low-income countries, independent of applied inclusion criteria [27, 34, 35, 40, 43, 44, 145]. Thus, in many low- and middle-income countries, the main causes of near-miss provide a fairly good reflection of the diagnostic pattern for maternal mortality within the area of study. However, similar disparities between causes of near-miss and maternal deaths at the facility level, such as were found in the Bolivian hospitals, have also been described in other studies from middle-income countries [35, 43]. This underscores the principle that near-miss morbidity should not be used in place of mortality reviews in investigating principal causes of adverse maternal outcomes, although they provide important complements to them.

Complications in early pregnancy made up a relatively high proportion (13%) of all near-miss cases and maternal deaths in Study II. When looking at near-miss due to severe haemorrhage, we found that 26% of the cases involved a gestational age of less than 28 weeks; complications were generally related to unspecified abortion. Similar proportions (13%) of the role that complications in early pregnancy played in maternal deaths in the La Paz district have been estimated from the 2001 Census [119]. Induced abortion is a sensitive and legally restricted issue in Bolivia, punishable by imprisonment and the loss of free maternal health care. Thus, as in many other countries

with restrictive abortion laws, the impact of unsafe abortions on adverse maternal outcomes is difficult to assess. It is believed that severe abortion-related complications are decreasing in Latin America, partly as a result of greater availability of misoprostol as an alternative to more harmful unsafe abortion practices [146]. Trends in near-miss morbidity in early pregnancy may serve as an indicator of the burden of unsafe abortions in a given setting over time, as has been previously suggested [35], and could be a valuable approach in countries where the exact impact of unsafe abortion is difficult to establish.

Health care factors

This thesis does not include a systematic audit of maternal mortality or near-miss cases, but provides some indirect measures that have been described as related to quality of care at the hospital level. These include a mortality index of 3.6%, implying that hospitals had the capacity to treat the vast majority of severe obstetric morbidity cases. Additionally, it has been suggested that near-miss after arrival reflects quality of care at the facility level [37]. Severe haemorrhage, the most common cause of near-miss after arrival in Study II, only occurred in 1% of hospital deliveries, a relatively low figure in comparison with the 0.07 to 0.9% reported in European hospitals [147]. It can be hypothesized that this low figure is a reflection of an increase in active management of the third stage of labour at hospitals and the improved availability of essential drugs and blood transfusions for treatment of postpartum haemorrhage made available by the government subsidized SUMI program. The maternal mortality review identified some other crucial clinical issues. First, most women who died from sepsis did not come in for postpartum care, resulting in missed opportunities for identifying infectious complications at an early stage. Second, delays in referrals were evident in one-third of the women who died. Proper clinical audits into quality of care would be of great value in determining improvements needed to avert future maternal deaths.

How quality of care is perceived is thought to be an important factor for the utilization of health care [84, 92]. Lack of confidence in the health care system, along with fear of surgical procedures and mistreatment, and being given poor information by hospital staff, was commonly reported for women, both in the Bolivian and Guatemalan settings (Studies I and IV). These perceptions were either based on hearsay or personal experiences. Similar examples of how perceptions of the health care system discourage women from seeking maternal and emergency obstetric care are available from several settings [148-151]. The commonality of this phenomenon underscores that the first delay (i.e., in the decision to seek care) is not solely based on factors concerning a woman and her family, but also on how she perceives and experiences attitudes among potential care providers.

Study I indicates that unfamiliarity with emergency obstetric care and lack of collaboration with the formal health care system still exists among TBAs who had participated in national training programs. A similar situation prevailed in another rural area of Guatemala. A subsequent hospital staff training program in that area, focusing on improving relations with TBAs, managed to greatly increase TBA referral rates and women's acceptance of recommendations that they seek hospitalization [152]. More recent initiatives to improve collaboration with TBAs, (partly drawing on the results of Study I) have reportedly increased referrals to both maternity waiting (lying-in) homes and to hospitals in the district of Huehuetenango, Guatemala [153]. Another example supporting such collaborations in areas where a high proportion of births are attended by TBAs is the partnership approach between formal health care staff and TBAs in Malaysia that is thought to have contributed to a rapid transition towards SBA [6].

As there are no professional midwives in Bolivia or Guatemala, SBA is provided by physicians who are mainly found in urban hospitals. Consequently, most women in rural areas have no access to SBA. Initiatives to reinstate midwifery education in Bolivia are currently in progress. Such a strategy may significantly increase the outreach of SBA into rural areas, such as in Chile, for example, and may include special focus on increasing trust in the health care system among pregnant women [154, 155]. However, the effectiveness of this strategy will also depend on how shortages of emergency obstetric care facilities and referral problems are addressed in such areas.

Utilization of emergency obstetric care

Most women with near-miss morbidity and those women who died after admission were already in critical condition upon arrival at hospital. This indicates that pre-hospital barriers to emergency obstetric care can be of great importance, even in settings where free maternal health care is readily available (Study II). The studies contained in this thesis identified a number of factors that may act as barriers to deter women from timely arrival at hospital.

Certain diagnostic categories were represented more than others among women with near-miss upon arrival, suggesting that the nature of the complication may determine how women utilize emergency obstetric care. The finding that women with near-miss due to complications in early pregnancy were almost exclusively in a critical condition already upon arrival at hospital may be explained by that fear of prosecution and stigma delay care-seeking for abortion-related complications. Additionally, women with some combination of low education, rural residence, and lack of ANC seemed especially vulnerable to pre-hospital barriers (Study III). Such effect modifications emphasize the complexity of the relationship between determinants for utilization of maternal health care [84, 85].

Education seems to be the socio-demographic factor most consistently associated with such utilization [85, 87]. The results from Study III suggest that maternal education is also an important determinant at the time of severe obstetric complications. Our observations show that the effect of education is not constant across areas of residence, supporting the perspective that the determining force of education diminishes in urban areas where maternal health care is easier to access [79]. Still, women in urban areas with low education were at risk for near-miss upon arrival at hospital if they had not had ANC. This contradicts the view that educational differentials may simply be a confounding effect of residence.

ANC interventions are generally regarded as having little direct effect on severe morbidity and mortality at the group level [61, 65]. It is difficult to assess the extent to which associations observed between recourse to ANC and utilization of other maternal health care services are confounded by physical accessibility to both [85]. In Study III, participation in ANC seemed to reduce differentials related to education and residence for near-miss upon arrival. The results indicate that ANC may have a protective effect against late arrival at hospital with severe complications for women with limited education in both urban and rural areas. There may be several explanations for this pattern. ANC offers women an opportunity to discuss childbirth options and actions to take if certain danger signs appear during pregnancy, while simultaneously increasing trust and familiarity with the formal health care system. It is unlikely that missed opportunities for early detection and treatment of preeclampsia could explain the pattern since lack of ANC remained associated with near-miss upon arrival, even when only those women with severe haemorrhage were included in the multivariate analysis. However, we could not conduct interaction analyses for this subgroup since there were too few observations.

Age and parity correlate and are often related to socio-economic status. The independent impact of each variable on adverse maternal outcomes, therefore, is difficult to assess and has been questioned, especially regarding multiparity. The latter has been proposed as a risk factor for maternal mortality only when there is a previous reproductive history of infant deaths, interpreted as a marker for low socio-economic status [156]. Study III included an analysis of associations between combinations of age and parity and near-miss upon arrival. The results suggest that advanced age, regardless of parity, as well as primiparity among women below 35 years of age, is associated with near-miss upon arrival, after adjusting for education, residence, and marital status.

The results of Study IV add to the understanding of socio-economic inequalities in utilization of maternal health care by illustrating how the self-perception of women in relation to others seemed to influence care-seeking behaviour. The centrality of this aspect in the narratives of women who delayed seeking care points to the impact of social marginalization on deci-

sions to utilize maternal health care. Consequently, the influence of social background must be understood in relational terms.

We also found that women who felt dissociated from maternal health care generally had no knowledge of the government subsidized program, further underscoring their marginalized position. Unfamiliarity with the provision of free maternal health care has been previously reported as common in early evaluations of the subvention system [157, 158], and has also more recently been shown in another qualitative study in Bolivia [149]. Difficulties in informing women who are not already using maternal health about the system thus still seem to be prevalent. Women who perceived themselves as outside the health care system only sought such care when a complication was seen as potentially life-threatening. This supports the view that perception of need is a determining factor for utilization of CEmOC [84, 92].

Low use of reproductive health services in Latin America is often ascribed to that the biomedical health model discounts cultural influences among indigenous populations [122, 149, 159]. Religion and preferences for traditional birth practices were described by TBAs as influencing pregnant women's use of CEmOC in the Guatemalan setting (Study I). However, we found no evidence in the narratives of Bolivian informants that preferences for traditional practices played a role in preventing or delaying women from seeking maternal health care (Study IV). The focus on the "cultural barrier" in discussions among health authorities in Bolivia regarding why the benefits of SUMI have not reached a large part of the population makes this finding especially relevant. It raises the question of whether low utilization of maternal health care in Bolivia is as closely related to cultural preferences as has been previously thought, or if it is mostly a result of socially structured disadvantages that are more common among women with indigenous ethnic backgrounds [160]. If the difficulties that indigenous populations face in accessing health care are reduced to endogenous cultural factors, it tends to obscure other determinants and place the blame for failing to access health care solely on these individuals [161].

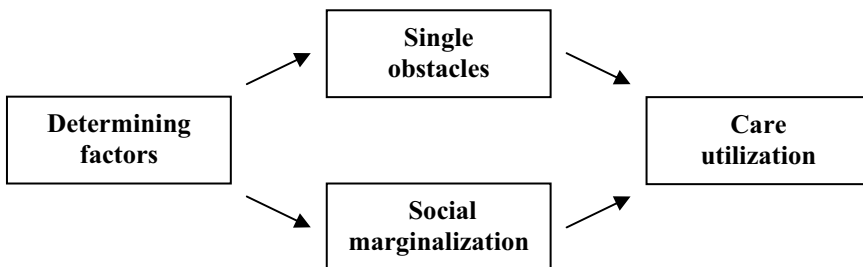


Figure 3. Pathway model linking determining factors to utilization of care.

Determinants for utilization of ANC, SBA, and CEmOC seem to vary between settings; the effect of socio-demographic and environmental factors appears to be context specific. Figure 3 provides a hypothetical model showing how such variations may be understood by applying alternative pathways between determining factors and utilization of care in low- and middle-income countries. Studies on barriers to maternal health care have described how single obstacles can impede utilization, explaining the impact of each obstacle by relating it to a background or determining factor [84, 85]. Examples include not being able to afford the cost of care or transportation due to poverty; rural residence or low availability of facilities resulting in distance and transportation barriers; limited education leading to inadequate knowledge of danger signs or unawareness of the right to free health care, as well as low autonomy and decision making power; and indigenous origin with preference for traditional practices.

Findings from the present thesis illustrate utilization of care as a relational, socially structured phenomenon. This perspective offers an alternative or additional explanatory pathway between determining factors and care utilization. Rather than focusing on how the absence of a single predisposing or enabling element impedes utilization of health care, it suggests a mechanism whereby the relative distribution of determining factors results in a perception of being dissociated from such services. Consequently, this view implies that combinations of determining factors expressing economic, social, and cultural marginalization have an impact on care-seeking behaviour. Such a Bourdieusian approach offers a way of understanding how care-seeking behaviour is patterned and reproduced within groups with similar social positions. Additionally, this relational perspective may partially explain why the effect of such determinants as education, residence, poverty, ethnicity, and marital status on utilization of maternal health care seems to vary between situations. In this sense, individual determinants affect care-seeking through the way they represent social position in a specific setting. Similar perspectives may also be of interest for future research into inequalities in access to and utilization of health care outside the maternal sphere.

Interactive associations between determining factors for utilization of care (Study III) may be understood by applying either of the two pathways described above. If one follows the logic of the first pathway, women with combined disadvantages would have a higher risk of experiencing several barriers, making timely arrival at hospital less likely. Applying the alternative pathway, combinations of socio-demographic disadvantages reflect degrees of social marginalization which, through habitual orientations, impede timely care-seeking.

This model of dual pathways implies that in settings with great inequalities in the distribution of determining factors, interventions targeted at reducing single barriers (such as cost and distance) may have a limited effect on maternal care-seeking behaviour since such factors would only represent

some of the many markers of social marginalization. A tentative explanation is thus provided as to why initiatives to reduce cost, which form a single barrier, have not increased the utilization of maternal health care for a part of the population in Bolivia.

Conclusions

The significance of pre-hospital barriers and determinants for utilization of maternal health care merits further attention within the intra-partum strategy for reducing adverse maternal outcomes. The conclusions of this thesis suggest some recommendations for maternal health policy and point to areas in need of additional research.

The investigation of near-miss morbidity upon arrival aided the exploration of pre-hospital barriers to emergency obstetric care. Combining data on maternal mortality and near-miss morbidity also increased the understanding of maternal ill-health and quality of care at the hospital level, thereby helping to prioritize needs. Such information is especially important in settings with limited surveillance of maternal deaths. Incorporating a combination of near-miss and maternal mortality surveillance on a regional or national level would improve rigour in trend analyses of adverse maternal outcomes and could facilitate evaluations of interventions aimed at reducing maternal ill-health. However, further methodological development on how to scale up the use of the near-miss concept in low-resource settings is needed.

Lack of confidence in formal care providers and fear of hospitals were often cited in this thesis and have been highlighted in several other settings. Additionally, such distrust was enforced by perceptions of being mistreated and deprived of information when hospitalized for a near-miss event. The impact of health care staff on care-seeking behaviour needs to be further acknowledged in strategies aimed at increasing utilization of SBA and CEmOC.

In many areas, the upgrading of SBA has proceeded slowly and women continue to rely on TBAs during pregnancy and childbirth. Although the effectiveness of TBAs in reducing maternal mortality remains unknown, excluding them from the intra-partum strategy in order to increase SBA and access to CEmOC may be counterproductive for childbearing women's utilization of formal health care. The TBA's role as a link between pregnant women and CEmOC should, therefore, not be ignored in planning strategies for safe motherhood. The Guatemalan experience supports the necessity of increasing the collaboration between informal and formal care providers in the interest of decreasing pre-hospital barriers for pregnant women.

The findings of this thesis show that pre-hospital barriers to emergency obstetric care can also play a significant role in urban areas where care is provided without direct cost for women. Further, they identified subgroups

that seem especially vulnerable to such barriers. The findings suggest that determining factors have combinatory effects and that education and ANC are important regardless of residence. ANC seemed to reduce educational differentials in both urban and rural areas for near-miss upon arrival. Targeted initiatives to increase routine ANC among women with low educational levels, including dedicated efforts to upgrade trust in health care services and promote early recourse to them, may lead to reductions in adverse maternal outcomes.

This thesis suggests that social marginalization is a major mechanism in impeding timely utilization of CEmOC among women with disadvantaged socio-demographic characteristics. Initiatives to reduce single barriers need to be complemented by efforts to reduce the effect of social marginalization on care-seeking behaviour.

Studies that can further develop the theoretical understanding of the dynamics of maternal health care utilization and increase knowledge for policy formulation are needed. Research combining methods and perspectives from different scientific disciplines will be valuable. Some specific areas that merit further attention include:

- Implementing audits into quality of care, especially as related to early detection of preeclampsia, postpartum infections, and referral patterns in the La Paz district of Bolivia.
- Investigations into the impact of the rapidly rising caesarean section rates in Latin America on maternal mortality and severe morbidity.
- Interventional research on how to increase utilization of maternal health care among women in populations with socio-demographic disadvantages.
- Studies that further investigate combinations of determinants for utilization of maternal health care to increase understanding of pre-hospital barriers, as well as research about community effects on maternal care-seeking behaviour.
- Thorough documentation of adverse maternal outcomes and pre-hospital barriers to CEmOC related to unsafe abortions. This poses special methodological challenges in countries with restricted abortion laws, such as Bolivia and Guatemala.

Summary in Swedish/Sammanfattning på svenska

Den här avhandlingen handlar om mödradödlighet och allvarliga förlossningskomplikationer i låg- och mellaninkomstländer. I fokus står faktorer som fördröjer och förhindrar användande av akut förlossningsvård. Avhandlingen bygger på resultat från fyra delstudier utförda i Guatemala (Studie I) och Bolivia (Studie II–IV).

Forskning om mödradödlighet och allvarlig sjuklighet i låg- och mellaninkomstländer har framförallt inriktats på vårdkvalitet. Utbildning av traditionella barnmorskor och användande av riskvärderingssystem under mödravårdskontroller har tidigare varit centrala i internationella strategier för att minska mödradödlighet. Strategiernas effektivitet har dock ifrågasatts. De viktigaste faktorerna för att minska mödradödlighet anses idag vara: (1) att öka andelen kvinnor som föder barn med professionell assistens och (2) att ge fler tillgång till kvalificerad akutvård. Det är dock välkänt att användandet av modern mödravård skiljer sig mellan kvinnor med olika sociodemografiska karaktäristika, till exempel utbildningsnivå, även där sådan vård är tillgänglig. Fortfarande är förståelsen avseende mekanismerna bakom dessa skillnader ofullständig. Fördjupad kunskap inom området är av betydelse för hur interventioner som syftar till att minska livshotande graviditets- och förlossningskomplikationer utformas.

Studier om svår maternell sjuklighet, “near-miss”, där en kvinna överlevt en livshotande graviditets- eller förlossningskomplikation, har på senare tid använts som komplement till forskning om mödradödlighet framförallt för att undersöka vårdkvalitet. I den här avhandlingen används near-miss för att studera faktorer som påverkar användandet av akut förlossningsvård. Studier om near-miss antas ge liknande information som forskning om mödradödlighet men reducerar metodologiska problem eftersom: (1) near-miss är vanligare och således förbättras förutsättningarna att uppnå styrka i statistiska analyser, (2) near-miss uppfattas som mindre skuldbeläggande av sjukvårdspersonal jämfört med mödradödsfall, vilket förbättrar tillgången till viktig men känslig information, (3) vårdsökarbeteende kan studeras genom intervjuer med överlevande kvinnor till skillnad från mödradödlighetsstudier där information enbart kan fås av anhöriga eller vårdpersonal. Near-miss kan tidsmässigt delas in i två grupper: de med en livshotande komplikation redan vid ankomst till sjukhus och de som utvecklar ett livshotande tillstånd under

sjukhusvistelsen. Den förstnämnda speglar betydelsen av mekanismer som fördröjer användande av förlossningsvård och den sistnämnda belyser framförallt vårdkvalitet på sjukhus.

Den första delstudien genomfördes i ett landsbygdsområde i Guatemala där nästan alla kvinnor föder med hjälp av traditionella barnmorskor med begränsad sjukvårdsutbildning. Studien syftade till att genom intervjuer med de sistnämnda utforska uppfattningar om förlossningskomplikationer och remitteringsförfarande till sjukhus. Det framkom att de traditionella barnmorskorna inte var förtrogna med den moderna förlossningsvården och att de inte heller remitterade kvinnor i någon större utsträckning. De beskrev också en motvilja inför sjukhusvård bland gravida kvinnor som var baserad på rädsla för kejsarsnitt och att bli negativt särbehandlad av sjukvårdspersonal. Även om traditionella barnmorskor fasas ut från internationella mödravårdsprogram till förmån för mer utbildad personal kommer en stor andel kvinnor i vissa länder fortsatt förlösa med assistens av traditionella barnmorskor. Den aktuella studien belyser behovet av att i dessa områden stärka samarbetet mellan traditionella barnmorskor och sjukvården i syfte att öka remitteringar av kvinnor med graviditets- och förlossningskomplikationer. I linje med dagens strategier skulle det kunna öka behövtligt användande av akut förlossningsvård.

I den andra delstudien jämfördes orsaker till mödradödlighet och near-miss i såväl tidig som sen graviditet vid fyra sjukhus i La Paz och El Alto i Bolivia. En kombination av kliniska och behandlingsrelaterade kriterier användes för att definiera near-miss. I studien registrerades 15 mödradödsfall (187 per 100 000 levande födda barn) och 401 fall av near-miss (50 per 1000). De vanligaste orsakerna till mödradödlighet (allvarlig infektion, livmoderbristning och svår blödning) skilde sig från de för near-miss (svår blödning och allvarlig havandeskapsförgiftning). Majoriteten av kvinnorna med near-miss (74 %) uppfyllde de uppsatta inklusionskriterierna redan vid ankomst till sjukhus. Det understryker att i studiens urbana miljö med gratis mödravård har andra faktorer än geografisk tillgänglighet och kostnad betydelse för användande av akut förlossningsvård. Kvinnor med allvarlig havandeskapsförgiftning, komplikationer efter hemförlossning och aborter återfanns framförallt i gruppen av kvinnor med near-miss vid ankomst. Få studier har tidigare inkluderat komplikationer som sker i tidig graviditet. I den aktuella studien var andelen near-miss i tidig graviditet totalt 13 %. I gruppen med near-miss på grund av livshotande blödning var en fjärdedel av kvinnorna i tidig graviditet. Studien visar att kombinerade analyser av near-miss och mödradödlighet förtydligar sjukdomspanoramata för allvarlig obstetrisk sjukdom. Vidare illustreras vikten av att inkludera kvinnor med livshotande komplikationer i tidig graviditet för att få en komplett bild, men också svårigheterna med att studera abortrelaterade komplikationer i länder med restriktiv abortlagstiftning.

I den tredje delstudien jämfördes deltagande i mödravårdskontroller och sociodemografiska faktorer mellan kvinnor med near-miss redan vid ankomst till sjukhus och kvinnor med okomplicerade förlossningar på sjukhus. Analysen visade att låg utbildning i kombination med antingen boende på landsbygd eller att inte ha gått på mödravårdskontroller innebar en ökad risk för near-miss. Vidare var hög ålder samt att vara förstföderska associerade med near-miss. Resultaten visar att sociodemografiska faktorer har kombinatoriska effekter på användande av förlossningsvård och att utbildning och mödravårdskontroller är viktiga både för kvinnor som bor på landet och i städer. Studien talar för att deltagande i mödravårdskontroller minskar den risk för near-miss som kvinnor med låg utbildning och boende på landsbygden har. Sannolikt beror det på att mödravårdskontroller främjar tidigt vårdsökande i samband med en allvarlig komplikation.

Den fjärde delstudien baserades på intervjuer med kvinnor som anlät till sjukhus med en near-misskomplikation. Syftet var att utforska faktorer som påverkade vårdsökarbeteende bland dessa kvinnor. Resultaten visade att kvinnor med låg socioekonomisk status, boende på landsbygd eller i det nyligen urbaniserade El Alto, generellt inte hade några tidigare erfarenheter av modern mödravård, hade planerat att föda hemma och sökte akutsjukvård först när komplikationen uppfattades som livshotande. Dessa kvinnor upplevde sig exkluderade från sjukvårdssystemet och uttryckte att modern förlossningsvård inte var till för dem. De uttryckte även misstro mot vårdpersonal och hade även en uttalad rädsla för operationer och att bli dåligt behandlade på sjukhus, vilket de också upplevde sig bli. De var inte heller förtrogna med det nationella sjukvårdsprogram som erbjuder mödravård gratis. Studien kunde inte påvisa att kulturella preferenser eller specifika förlossningstraditioner påverkade kvinnornas inställning till att söka vård till skillnad mot den rådande uppfattningen bland sjukvårdspersonal och hälsomyndigheter i Bolivia. Detta är ett särskilt intressant fynd eftersom kulturella förklaringar är väldigt tongivande i diskussioner om orsaker till vissa gruppers låga utnyttjande av mödravård. Studien talar för att beslut om att söka akut graviditets- och förlossningsvård påverkas av kvinnornas sociala sammanhang och att vårdsökarbeteende bör ses som relationella socialt strukturerade praktiker, där social marginalisering är en viktig mekanism.

Sammanfattningsvis belyser avhandlingen olika faktorer som förhindrar eller fördröjer användande av akut förlossningsvård i låg och mellaninkomstländer med exempel från Guatemala och Bolivia. Resultaten understryker behovet av att minska effekterna av social marginalisering och ta hänsyn till traditionella och moderna vårdgivares påverkan på vårdsökarbeteende. Vidare ger avhandlingen information om användbarheten av near-miss men också om vissa begränsningar och problem med denna klassificering. Teoretiska och metodologiska aspekter som presenteras i avhandlingen kan även vara av intresse för att öka förståelsen för hur sociala ojämlikheter påverkar användandet av vård i andra miljöer.

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