

# Barriers to obstetric care among maternal near-misses

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**Background.** There are several factors in the healthcare system that may influence a woman's ability to access appropriate obstetric care.

**Objective.** To determine the delays/barriers in providing obstetric care to women who classified as a maternal near-miss.

**Methods.** This was a descriptive observational study at Steve Biko Academic Hospital, a tertiary referral hospital in Pretoria, South Africa. One hundred maternal near-misses were prospectively identified using the World Health Organization criteria. The 'three-delays model' was used to identify the phases of delay in the health system and recorded by the doctor caring for the patient.

**Results.** One or more factors causing a delay in accessing care were identified in 83% of near-miss cases. Phase I and III delays were the most important causes of barriers. Lack of knowledge of the problem (40%) and inadequate antenatal care (37%) were important first-phase delays. Delay in patient admission, referral and treatment (37%) and substandard care (36%) were problems encountered within the health system. The above causes were also the most important factors causing delays for the leading causes of maternal near-misses – obstetric haemorrhage, hypertension/pre-eclampsia, and medical and surgical conditions.

**Conclusions.** Maternal morbidity and mortality rates may be reduced by educating the community about symptoms and complications related to pregnancy. Training healthcare workers to identify and manage obstetric emergencies is also important. The frequency of antenatal visits should be revised, with additional visits in the third trimester allowing more opportunities for blood pressure to be checked and for identifying hypertension.

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Obstetric emergencies may occur in women with known risk factors (pre-existing medical disease or recurrent miscarriage) or may be caused by pregnancy itself, gestational hypertension or obstetric haemorrhage. A significant proportion of serious complications in pregnancy occur in women with no recognisable risk factors.<sup>[1,2]</sup> A serious complication may progress rapidly to a life-threatening situation. Access and timely referral to appropriate emergency obstetric care are therefore important components of the healthcare system. The World Health Organization (WHO) estimates that about 88 - 98% of maternal deaths can be avoided with timely access to existing emergency obstetric intervention.<sup>[3]</sup> However, there is increasing evidence that the majority of women classified as near-miss cases in developing countries arrive at referring hospitals in a critical condition.<sup>[4]</sup>

Several factors may influence a woman's ability to access appropriate obstetric care. Thaddeus and Maine<sup>[5]</sup> developed the 'three-delays' model in 1994. The model evaluates circumstances surrounding access to appropriate emergency obstetric care. The three components are as follows: phase I delay – delay in deciding to seek care by the individual and/or family; phase II delay – delay in reaching an adequate healthcare facility; and phase III delay – delay in receiving adequate care at the healthcare facility. Several authors have used the three-delays model to investigate delays related to maternal morbidity and mortality.

A maternal near-miss is defined as a woman who nearly died as a result of but survived a complication that occurred during pregnancy or childbirth.<sup>[6]</sup> Studying circumstances around near-miss cases has an advantage over cases of maternal death because near-miss patients are able to provide direct information after an event.

## Objective

To determine the reasons for delay in accessing appropriate obstetric care for women who were classified as maternal near-misses.

## Methods

This was a descriptive observational study performed at Steve Biko Academic Hospital (SBAH), Pretoria, South Africa (SA), from 1 August 2013 to 30 October 2015. SBAH is a tertiary referral hospital that serves as a referral hospital for the central and eastern Tshwane regions. Patient referrals are mainly from a level 1 hospital (Tshwane District Hospital) situated adjacent to SBAH and a level 2 hospital (Mamelodi Hospital) in Tshwane east. Very ill patients may be referred directly from midwife obstetric units in the referral area. Obstetric patients with underlying medical disease may be referred in from neighbouring provinces.

One hundred near-miss cases were prospectively identified at daily audit meetings at SBAH using the WHO criteria for a maternal

**Table 1. The three-delays model**

A. Community-level factors associated with delay in seeking healthcare (phase I)
Desire for home delivery
Lack of knowledge of the problem
Inadequate antenatal care (late attendance/delayed visits)
Non-compliance with healthcare provider's advice
Belief in alternative care
Family member prevented woman from accessing healthcare
B. Factors associated with delay in reaching the health system (phase II)
Lack of finance
Lack of transport
C. Factors associated with delays in the health system (phase III)
Delay in patient admission, referral or treatment
Lack of resources (blood/intensive care)
Substandard care (inappropriate diagnosis or treatment)

near-miss.<sup>[7]</sup> Data were recorded by the doctor caring for the patient. Information on antenatal care was obtained from case notes recorded on the patient's antenatal card, from the maternity case record and from patient interviews. The antenatal care schedule for low-risk patients adopted by our district is based on the WHO model of reduced visits: booking and 20, 26, 32 and 38 weeks, with an appointment at the hospital at 41 weeks. The three-delays model<sup>[5]</sup> was used to evaluate reasons for delay. Table 1 describes the factors in each phase that were evaluated in the study. Phase III delays include all delays within the healthcare system, from the moment a patient presents to a health facility, irrespective of the level of care, until she receives the appropriate care for her condition.

### Statistical analysis

Descriptive statistics in the form of means and standard deviations (SDs) in the case of continuous data and frequencies and percentages in the case of categorical data were calculated. Ethical approval was obtained from the University of Pretoria Ethics Committee (ref. no. 125/2013).

**Table 2. Antenatal history and monitoring (N=100 near-miss cases)**

Age (yr), mean (SD) (range)	29.7 (6.3) (17 - 46)
Parity, mean (range)	1.4 (0 - 4)
Medical history, <i>n</i>	
Chronic hypertension	6
Diabetes mellitus	7
Cardiac disease	10
Other	12
Timing of event, <i>n</i>	
Antenatal	62
Intrapartum	7
Postpartum	31
Presence of obstetric complications during pregnancy, <i>n</i>	
Yes	23
No	67
Unknown/unbooked	10

### Results

Data were collected for 100 maternal near-miss cases. Forty-one patients were referred in from other institutions, while 59 were known to the hospital or presented directly with an acute obstetric emergency. Information on antenatal history and monitoring is shown in Table 2.

The most important obstetric causes for a maternal near-miss were obstetric haemorrhage (*n*=31), medical and surgical disorders (*n*=31), and complications of hypertension and pre-eclampsia in pregnancy (*n*=24). One or more factors causing a delay in accessing care were identified in 83% of near-miss cases (Table 3). Phase I and III delays, in particular lack of knowledge of the problem (40%),

**Table 3. Barriers to accessing care for maternal near-misses (N=100)**

	<i>n</i>
Community-level factors associated with delay in seeking healthcare (phase I)	
Desire for home delivery	0
Lack of knowledge of the problem	40
Inadequate antenatal care (late attendance/delayed visits)	37
Non-compliance with healthcare provider's advice	16
Belief in alternative care	6
Family member prevented woman from accessing healthcare	2
Factors associated with delay in reaching the health system (phase II)	
Lack of finance	6
Lack of transport	8
Factors associated with delays in the health system (phase III)	
Delay in patient admission, referral or treatment	37
Lack of resources (blood/intensive care)	14
Substandard care (inappropriate diagnosis or treatment)	36

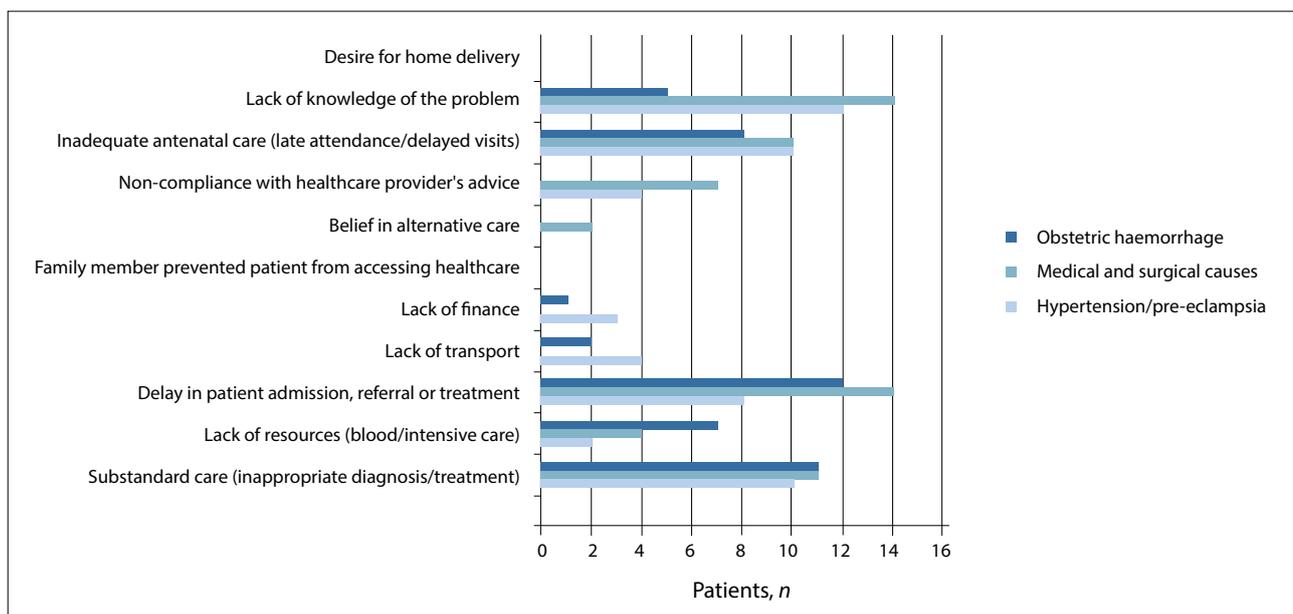


Fig. 1. Barriers to accessing care in cases of obstetric haemorrhage, medical and surgical disorders and hypertension and pre-eclampsia.

inadequate antenatal care (37%), delay in patient admission, referral and treatment (37%) and standard care (36%), were the most common factors in the study population. These factors were also the most important contributors when cases of obstetric haemorrhage, medical and surgical disease and hypertension in pregnancy were analysed separately (Fig. 1).

The near-miss events among hypertensive patients occurred between 24 and 38 weeks' gestation, with most occurring between 26 and 38 weeks (Table 4 and Fig. 2). Five (21%) of the patients categorised as hypertensive near-misses were unbooked, while booking information was not available for four patients (17%). The

**Table 4. Timing of events of hypertensive near-misses (N=24)**

Patient no.	Gestational age at near-miss event (wk)	Gestational age at last antenatal clinic visit prior to near-miss event (wk)
1	31	29
2	32	28
3	24	Unbooked
4	26	26
5	36	36
6	37	32
7	30	26
8	35	Unbooked
9	38	37
10	28	28
11	32	26
12	29	29
13	37	Unknown
14	39	Unbooked
15	Postpartum	Normotensive at delivery
16	34	32
17	27	24
18	27	Unbooked
19	30	26
20	26	Unbooked
21	37	Unknown
22	37	32
23	30	Unknown
24	33	Unknown

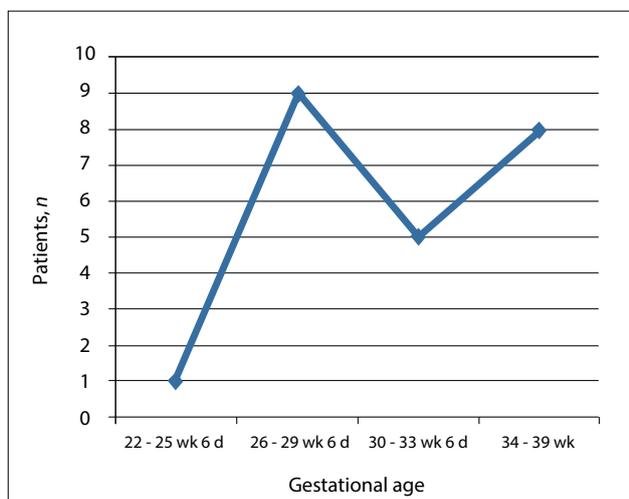


Fig. 2. Gestational age at which hypertensive near-miss events occurred.

average time between the last antenatal visit and the near-miss event was 2.6 weeks.

Phase III delays were significant barriers encountered by patients with obstetric haemorrhage. Delay in recognising the problem of bleeding, delay in initiating steps to stop bleeding and delay in patient transfer were the problems identified in 75% of cases. Lack of intensive care beds and lack of blood and blood products were problems observed in 17% of cases. There were two cases of antepartum haemorrhage in patients with undiagnosed placenta praevia. Both patients were booked, but the location of the placenta was not recorded on the ultrasound report. There were three cases of uterine rupture. Two patients had had unsafe terminations of pregnancy requiring hysterectomy, and the other patient had had two previous caesarean sections, was unbooked and presented in labour with uterine rupture. Obstetric haemorrhage related to abruptio placentae was an important cause of morbidity. Inadequate antenatal care for abruptio placentae related to hypertension and delay in patient transfer were important avoidable factors.

There were six maternal near-misses due to parasuicide/unsafe termination of pregnancy. In these cases, lack of knowledge of the problem (4/6), inadequate antenatal care (5/6) and non-compliance with healthcare worker advice (3/6) were the most important barriers identified. These were also the most important factors in cases of non-pregnancy-related infections.

### Discussion

This study shows an unacceptably high rate of barriers encountered by patients during pregnancy. Sixty-six percent of near-miss patients encountered more than one delay. Inadequate antenatal care and lack of patient knowledge of the underlying problem were important phase I delays. Inadequate antenatal care was a problem in 37% of cases. This is similar to the rate of 30% found in a Brazilian study in which an association between delay in seeking healthcare services and maternal near-miss and death was observed.<sup>[8]</sup> Delay in seeking health services was 2.5 times more frequent in maternal near-miss patients and increased six-fold in mothers who died compared with women who had uncomplicated pregnancies.<sup>[8]</sup> More than a quarter of our patients (29% of pre-eclamptic near-misses and 26% of near-misses with medical disease) had risk factors for hypertension in pregnancy, had an underlying medical condition but booked after 20 weeks' gestation, or had inadequate antenatal care due to non-compliance with the required antenatal visits. Several studies in low- and middle-income countries have shown that many women are unable to judge the severity of their disease pathology and may only seek care once their condition becomes life-threatening.<sup>[9-11]</sup> This highlights the need for community education about pregnancy risks, which may be promoted by encouraging all women to register with mobile phone/web-based sites such as MomConnect. After a complicated pregnancy, mothers should also be counselled about future pregnancy risks.

All the hypertensive near-miss events occurred between 24 and 39 weeks, with peaks between 26 and 39 weeks. Almost 60% of these patients booked for antenatal care, but their acute condition could not have been detected in time with the current protocol of antenatal visits. Similarly, the Birthplace in England Collaborative Group<sup>[2]</sup> reported that a significant proportion of serious complications occur in women with no recognisable risk factors. The antenatal care protocol used in our complex is based on the WHO recommendation of four antenatal visits for low-risk patients.<sup>[12]</sup> Unfortunately this protocol was unable to detect and prevent an acute hypertensive emergency timeously. The average time between the last antenatal

visit and the near-miss event was 2.6 weeks. The period between antenatal visits using our current guidelines is 6 weeks. This time period is too infrequent to detect significant changes in blood pressure. The current guideline on the frequency of antenatal visits should be revised as additional visits, especially in the third trimester, should be implemented. Blood pressure must be recorded at every visit. Alternatively, an integrated approach to antenatal care could be considered whereby a pregnant mother visits a day clinic, undertakes home monitoring or is examined by an occupational nurse at the workplace so that her blood pressure can be recorded every 2 weeks from 24 weeks' gestation.

Delay in patient admission, referral and treatment and substandard care were important barriers identified for near-miss cases related to haemorrhage, hypertension and medical disease in pregnancy. Obstetric haemorrhage is a medical emergency that requires timely diagnosis and aggressive resuscitation and management by the labour ward team. Fire-drills in obstetric emergencies should be practised by labour ward teams. The National Committee for Confidential Enquiries into Maternal Deaths in SA has proposed a referral algorithm for patients with underlying cardiac and medical disease in pregnancy.<sup>[13]</sup> All patients with underlying medical disease should be risk-assessed and referred timeously to the appropriate level of care. Such protocols should also be followed for other obstetric emergencies.

### Study strengths and limitations

This is the first study in SA in which near-miss patients provided a direct account of obstacles they had to overcome before receiving the appropriate form of healthcare.

The study is limited because it involves only one tertiary institution, but we believe that the situation would be similar at other sites, as the delays detected are common in maternal deaths due to hypertension.<sup>[13]</sup>

We do not know how many patients with hypertension were detected and managed appropriately. However, the high institutional maternal mortality ratio (iMMR) of hypertension in pregnancy, and the fact that the iMMR has been relatively constant for a decade, suggest a health system problem in detecting and managing

hypertension. The problem (of a protocol of reduced antenatal visits) has been demonstrated clearly in this study.

### Conclusions

Obstetric morbidity may be reduced by overcoming barriers preventing patients from accessing care. Healthcare managers need to continually assess and revise policies to improve obstetric care. This study has shown that the current schedule of antenatal care visits should be revised so that women are seen more frequently during pregnancy and their blood pressure can be monitored. Patient education and healthcare worker training need to be strengthened.

1. Soma-Pillay P, Pattinson RC, Langa-Mlambo L, Nkosi BSS, Macdonald AP. Maternal near-miss and maternal death in the Pretoria Academic Complex, South Africa: A population-based study. *S Afr Med J* 2015;105(7):578-583. DOI:10.7196/SAMJnew.8038
2. Birthplace in England Collaborative Group. Perinatal and maternal outcomes by planned place of birth for healthy women with low risk pregnancies: The Birthplace in England national prospective cohort study. *BMJ* 2011;343:d7400. DOI:10.1136/bmj.d7400
3. World Health Organization. Mother-Baby Package: Implementing Safe Motherhood in Countries. WHO/FHE/MSM/94.11. Geneva: Maternal Health and Safe Motherhood Programme, Division of Family Health, 1994.
4. Filippi V, Richard F, Lange I, Ouattara F. Identifying barriers from home to the appropriate hospital through near-miss audits in developing countries. *Best Pract Res Clin Obstet Gynaecol* 2009;23(3):389-400. DOI:10.1016/j.bpobgyn.2008.12.006
5. Thaddeus S, Maine D. Too far to walk: Maternal mortality in context. *Soc Sci Med* 1994;38(8):1091-1110. DOI:10.1016/0277-9536(94)90226-7
6. Pattinson RC, Hall MH. Near misses: A useful adjunct to maternal death enquiries. *Br Med Bull* 2003;67(1):231-243. DOI:10.1093/bmb/ldg007
7. Say L, Souza JP, Pattinson RC. Maternal near-miss - towards a standard tool for monitoring quality of maternal care. *Best Pract Res Clin Obstet Gynaecol* 2009;23(3):287-296. DOI:10.1016/j.bpobgyn.2009.01.007
8. Pacagnella RC, Cecatti JG, Parpinelli MA, et al. Delays in receiving obstetric care and poor maternal outcomes: Results from a national multicentre cross-sectional study. *BMC Pregnancy Childbirth* 2014;14:159. DOI:10.1186/1471-2393-14-159
9. Killewo J, Anwar I, Bashir I, Yunus M, Chakraborty J. Perceived delay in healthcare-seeking for episodes of serious illness and its implications for safe motherhood interventions in rural Bangladesh. *J Health Popul Nutr* 2006;24(4):403-412.
10. Rööst M, Jonsson C, Lilijestrand J, Essen 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. DOI:10.1186/1742-4755-6-13
11. Pembe AB, Urassa DP, Darj E, Carlsted A, Olsson P. Qualitative study on maternal referrals in rural Tanzania: Decision making and acceptance of referral advice. *Afr J Reprod Health* 2008;12(2):120-131.
12. Dowswell T, Carroli G, Duley L, et al. Alternative versus standard packages of antenatal care for low-risk pregnancy. *Cochrane Database Syst Rev* 2015, Issue 7. Art. No. CD000934. DOI:10.1002/14651858.CD000934.pub3
13. Pattinson RC, ed. Saving Mothers 2011-2013: Sixth Report on Confidential Enquiries into Maternal Deaths in South Africa. Pretoria: National Department of Health, 2014.

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