

TABLE 1: STUDY METHODOLOGIES OF SELECTED ARTICLES

Author	Year	Title	Primary aim(s)	Study setting	Tool	Methodology	Revisions to SAMM or WHO criteria
Mantel et al. (4)	1998	Severe acute maternal morbidity: a pilot study of a definition for a near-miss	To test the application of a clinical definition of severe acute maternal morbidity	Urban - Kalafong and Pretoria Academic hospitals, catering for the delivery of indigent women in the Pretoria Health Region	SAMM	Prospective, multicentre two-year audit of maternal near misses - All cases fitting the definition of a maternal near miss were identified from review of case notes at the daily morning audit meeting, which covered the previous 24 hours (or previous weekend in the case of a Monday meeting); these meetings last 45 minutes a day and involve consultants, registrars, medical officers and interns.	N/A
Vandecruys et al. (11)	2002	Severe acute maternal morbidity and mortality in the Pretoria Academic Complex: changing patterns over 4 years	To track changing patterns of SAMM and maternal mortality in the Pretoria Academic Complex after the report (initial 2-year audit from 1997-1999)	Urban - Pretoria Academic Complex; four hospitals, two of which receive tertiary referrals from outside the Gauteng Province	SAMM	Population-based prospective study - SAMMs and MD were identified at daily audit meetings and a simplified SAMM audit form was completed for all cases fulfilling the definition of "near miss". The data were compared with the data obtained from the original 2-year audit from the Pretoria Academic Complex, 1 February 1997 - 31 January 1999.	N/A
Cochet et al. (12)	2003	Severe acute maternal morbidity and maternal death audit - a rapid diagnostic tool for evaluating maternal care	To describe the pattern of SAMM and maternal deaths in the Pretoria region for the years 2000 and 2001, and thereby to determine whether collection and analysis of data for women with SAMM and for maternal deaths was beneficial in determining problems in the maternal health service of Pretoria	Urban - Pretoria Academic Complex; Kalafong Hospital and Pretoria Academic Hospital.	SAMM	Descriptive study - women with SAMM and maternal deaths were identified at daily audit meetings and an audit form was completed for all cases fulfilling the definition of SAMM ('near miss') and for all maternal deaths	N/A
Pattinson et al. (13)	2003	Can enquiries into severe acute maternal morbidity act as a surrogate for maternal death enquiries?	To assess whether severe acute maternal morbidity (SAMM, 'near misses') can be used as a surrogate of an analysis of maternal deaths to describe the pattern of severe maternal disease and avoidable factors related to it	Rural and Urban - Free State Provincial Regions A and B and the Pretoria and Greater Soweto areas of Gauteng Province	SAMM	Prospective, descriptive study - Research midwives were specifically employed in each of the three areas to identify all eligible cases and to ensure that the patient notes were made available to the researchers. Decisions on causes of death and avoidable factors, missed opportunities and standard care were made jointly by a specialist obstetrician and the research midwife in each area.	N/A

TABLE 1: STUDY METHODOLOGIES OF SELECTED ARTICLES

Author	Year	Title	Primary aim(s)	Study setting	Tool	Methodology	Revisions to SAMM or WHO criteria
Ghandi et al. (14)	2004	Severe acute maternal morbidity in rural South Africa	To identify the frequency, causes, and avoidable factors of severe acute maternal morbidity (SAMM) in four non-specialist hospitals in rural South Africa	Rural - all four primary hospitals in the rural Jozini Health District of KwaZulu-Natal	SAMM	Prospective audit - using criteria for SAMM suited to the diagnostic and treatment facilities available in the primary hospital setting. For each case of SAMM, a local audit team assessed the standard of care against local management guidelines and examined avoidable factors. An external specialist also retrospectively examined avoidable factors	Differences reflect the absence of advanced techniques for diagnosing or treating severe obstetric complications in primary hospitals. Adaptations: ≥ 4 RBC/volume expanders, clinical signs of respiratory distress (RR>50), eclampsia
Panday et al. (15)	2004	Audit of severe acute morbidity in hypertensive pregnancies in a developing country	To establish a population-based incidence of severe acute maternal morbidity (SAMM) in hypertensive pregnancies and to assess if substandard care was unique to cases of SAMM and mortality or whether it was apparent in uncomplicated pregnancies as well	Urban - KwaMushu (clinics, secondary hospital and tertiary hospital)	SAMM	Retrospective population-based study - Data were collected from the clinics in KM, from the secondary hospital (Addington Hospital) and from the tertiary referral centre, KEH. A daily tally was taken of the total number of deliveries, hypertensive deliveries and SAMM within the designated population area at KEH labour ward. Weekly data of the total deliveries, total hypertensive deliveries and number of SAMM were collected from KM and Addington Hospital. Maternal mortalities were also noted.	N/A
Lombaard et al. (16)	2005	Evaluation of a strict protocol approach in managing women with severe disease due to hypertension in pregnancy: A before and after study	To examine the effect of the introduction of this strict protocol on the outcome of critically ill pregnant women with complications of hypertension in pregnancy and attempts to identify where further research or change in policy is required	Urban - Pretoria Academic Complex: two academic hospitals (Pretoria Academic and Kalafong) and two district hospitals (Mamelodi Day and Pretoria West)	SAMM	Before and after retrospective study - Study group: Indigent South African women managed in the tertiary hospitals of the PAC, data on women with SAMM and MD were collected every morning at the respective hospitals and a near miss form was completed for each woman with SAMM and the maternal death notification form for all maternal deaths.	N/A
Soma-Pillay et al. (17)	2008	Cardiac disease in pregnancy: A 4-year audit at Pretoria Academic Hospital	To assess the profile of cardiac disease and the maternal and fetal outcomes of pregnant patients at Pretoria Academic Hospital (PAH), and to identify risk categories and thus improve quality of care	Urban - PAH is a tertiary referral hospital	SAMM	Retrospective analysis - using information from patient records	N/A

TABLE 1: STUDY METHODOLOGIES OF SELECTED ARTICLES

Author	Year	Title	Primary aim(s)	Study setting	Tool	Methodology	Revisions to SAMM or WHO criteria
Lombaard et al. (18)	2015	An audit of the initial resuscitation of severely ill patients presenting with septic incomplete miscarriages at a tertiary hospital in South Africa	To do a retrospective audit with the purpose of identifying the reasons for the deteriorating mortality index attributed to septic incomplete miscarriage at Steve Biko Academic Hospital	Urban - patients who presented to Steve Biko Academic Hospital with a septic incomplete miscarriage	WHO MNM tool	Retrospective audit - recruited all patients who presented with a septic incomplete abortion resulting in severe acute maternal morbidity (SAMM) or maternal near miss, or a maternal death	N/A
Soma-Pillay et al. (8)	2015	Maternal near miss and maternal death in the Pretoria Academic Complex, South Africa: A population-based study	To determine the spectrum of maternal morbidity and mortality in the Pretoria Academic Complex (PAC), SA	Urban - Pretoria Academic Complex (PAC): Steve Biko Academic Hospital (SBAH) (level 3), Kalafong Provincial Tertiary Hospital (KAH) (level 3), Mamelodi Hospital (level 2), Tshwane District Hospital (TDH) (level 1), Pretoria West Hospital (level 1), Laudium Community Health Centre (CHC) with midwife obstetric unit (MOU), Eersterust MOU, and Stanza Bopape and Dark City clinics (CHCs)	WHO MNM tool	Descriptive population-based study - data were only analysed for women living in the Tshwane region; those living outside were excluded. Cases of abortion and ectopic pregnancy were also excluded from the study. Delivery data were recorded on a daily basis at all the health facilities, and daily audit meetings were held at SBAH and KAH to identify women with life-threatening conditions and organ dysfunction in pregnancy.	Antepartum haemorrhage and non-pregnancy-related infections that are not part of the WHO definition of potentially life-threatening conditions have been included
Soma-Pillay and Pattinson (19)	2016	Barriers to obstetric care among maternal near-misses	To determine the delays/barriers in providing obstetric care to women who classified as a maternal near-miss.	Urban - Steve Biko Academic Hospital (SBAH), Pretoria, South Africa (SA)	WHO MNM tool	Prospective descriptive observational study - One hundred near-miss cases were prospectively identified at daily audit meetings at SBAH using the WHO criteria for a maternal near-miss. 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.	N/A
Maswime and Buchmann (20)	2017	Why women bleed and how they are saved: a cross-sectional study of caesarean section near-miss morbidity	To describe risk factors and causes of near-miss related to BDACS and interventions used to arrest haemorrhage and treat its effects	Urban - 13 government hospitals in southern Gauteng province	WHO MNM tool	Cross-sectional prospective study - The researcher trained obstetric staff in each hospital on how to identify a near-miss from BDACS. Each time such a case was identified, a staff member notified the researcher telephonically. The researcher then travelled to the hospital and screened the file for study eligibility. Data were collected from maternal case records, and supplemented, where necessary, from patients themselves or from staff.	N/A

TABLE 1: STUDY METHODOLOGIES OF SELECTED ARTICLES

Author	Year	Title	Primary aim(s)	Study setting	Tool	Methodology	Revisions to SAMM or WHO criteria
Iwuh et al. (7)	2018	Maternal near-miss audit in the Metro West maternity service, Cape Town, South Africa: A retrospective observational study	To measure the near-miss ratio (NMR), maternal mortality ratio (MMR) and mortality index (MI), and to investigate the near-miss cases	Urban - nine primary care maternity facilities (midwife obstetric units), which refer all complicated maternal cases to two secondary hospitals, New Somerset Hospital and Mowbray Maternity Hospital, or to the maternity centre at the tertiary hospital, Groote Schuur Hospital (GSH)	WHO MNM tool	Retrospective observational study - All near-miss cases managed at the three hospitals were identified weekly by the author, with the assistance of on-site healthcare providers, folders of all the near-misses were reviewed and relevant data were entered into a data collection form adapted from the WHO near-miss form. In addition, the folders were reviewed by two senior obstetric specialists to confirm adherence to the WHO inclusion criteria for near-miss classification, and also to determine avoidable factors in the management of the near-miss cases	adapted the WHO list of severe maternal complications to include the additional categories of acute collapse/ thromboembolism, non-pregnancy-related infections and medical/ surgical disorders
Hlabisa (21)	2019	A retrospective study to identify the prevalence of severe maternal morbidity or "near misses" in obstetric patients who are admitted to maternity high care and the Intensive Care Unit at King Edward VIII Hospital	To determine the near misses in obstetric patients and study the associated factors associated with near misses	Urban - King Edward VIII tertiary hospital, in Durban	WHO MNM tool	Retrospective observational descriptive study - audit of all women who met WHO MNM criteria and were admitted to ICU and maternity high care for the period of 01 April 2015 to 31 March 2016. Data was extracted into a table to provide descriptive statistics	N/A
Heitkamp et al. (6)	2021	Great saves or near misses? Severe maternal outcome in Metro East, South Africa: A region-wide population-based case-control study.	To assess the incidence of severe maternal outcome (SMO), comprising maternal mortality (MM) and maternal near miss (MNM), in Metro East health district, Western Cape Province, South Africa between November 2014 and November 2015 and to identify associated determinants leading to SMO with the aim to improve maternity care.	Urban - Tygerberg Hospital, Metro East Region, Cape Town	WHO MNM tool	Population based prospective cohort study - Healthcare workers and the main researcher (AH) identified women who met MNM criteria on a daily basis at TBH in the clinic and wards. The criteria were discussed in the weekly maternal mortality & morbidity meeting, open to different disciplines in the department, and posters with criteria were present in the wards, on a monthly base the criteria would be send on a phone message to the registrars and medical officers.	Suggestion to include a more comprehensive list of underlying diagnoses/ "potentially life-threatening" conditions into the tool.

N/A not applicable