Case report

Case study: Contributory Factors to In-hospital Maternal Mortality in a Governmental Hospital in Khartoum State in 2006

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Abstract

Background: In-hospital maternal mortality rates in Sudan are currently high, at 0.09%(1). According to World Health Organisation standards, in-hospital maternal mortality should not exceed 0.025%(2). Common contributory factors are numerous, both in-hospital and in the community. This study aims to identify specific contributors to maternal mortality and morbidity in a governmental hospital to make recommendations to minimize them.

Materials and Methods: The study basis was an initial case study of maternal morbidity in a governmental hospital with subsequent exploration of contributory factors. A participatory rapid appraisal approach was used, employing observational checklists and

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semi-structured interviews in order to identify problems at every level of the hospital system, cross-checking information with different stakeholders.

Results: Results identified primary delays in seeking care and suboptimal care delivery as the main contributors to in-hospital maternal mortality and morbidity. Interviews with patients and staff also highlighted a need for more patient education and more supervision and training opportunities for junior staff.

Conclusion: Important changes have been highlighted that may contribute to reducing in hospital maternal mortality and morbidity. The main ones in the light of known cases of maternal mortality and morbidity were; physical resources, human resources, maternity information systems, good practice in labour, treatment of and communication with patients and management of Obstetric Emergencies.

Introduction

Sudan is a developing country with a population of approximately 36 million and a GDP per capita of $1, 361. Life expectancy for females was 60 years in 2004[3] with an average of 5.9 births per woman in 2003[4].Urban maternal mortality rates were 514/1000 000 live births in North Sudan in 2005[5].Primary and secondary delays in accessing care are huge contributors to maternal mortality in Sudan, with only 57% of births in 2003 being attended by skilled personnels[6].Howeverfigures for in-hospital maternal mortality rates are currently at 0.09% which is equivalent to 7000 deaths per year. According to WHO standards, in-hospital maternal mortality should not exceed 0.025%. Leading causes of maternal mortality in the past three years, according to statistics from the Ministry of Health and previous studies, have been eclampsia, spontaneous abortion with late presentation, complications of C-section, sepsis, vascular accidents and malaria[6,7].These causes are all preventable and have known interventions. This study aims to identify specific reasons for in-hospital maternal mortality, taking into account the holistic care of a patient from the beginning of pregnancy to the end, whether normal or abnormal, and to make subsequent policy recommendations based on the findings. This study also focuses on the reasons for in-hospital maternal mortality and morbidity, and makes recommendations to improve practice.

Materials and Methods

The study area was a governmental hospital located close to the main centre of Khartoum. Patients with health insurance (approximately 10%)[8] receive free healthcare, but patients with no health insurance, generally those with low socioeconomic status, must pay user fees (although these may be waived or subsidised). The hospital deals with obstetric emergencies on a regular basis, both referred and self-referred.

Case Report

Mrs. X is a 22-yr old woman presenting to the emergency room at 2 am with abdominal pain, exhaustion, haematuria and non-progression of labour. Cervical dilatation was 10 cm, contractions were full and regular. She was sent for USS immediately. The house officer on duty called the Medical Officer but the Medical Officer did not come. There was no progression by 6 am when the

handover team arrived. When the consultant on duty arrived at 8 am she was rushed to theatre with normal vital signs and a full bladder in urine retention. The team was unable to pass a catheter as the baby's head was obstructing. The daytime medical officer decided on C-section. The baby was in posterior lie (not picked up previously due to vulval oedema). The baby showed signs of foetal distress.

In theatre the bladder was deflated and uterine rupture into the bladder was discovered. C-section was performed successfully but there was excessive bleeding. Hysterectomy was not performed as patient had given no consent. No blood was prepared nor could any be found to be given intra-operatively. The bladder and uterus were sutured and the patient was given cross-matched blood post-operatively and antibiotic prophylaxis. However post-operatively she was urinating into the vagina and a vesico vaginal fistula was noted. A catheter was passed and the patient instructed to keep it for 14 days to aid healing. The baby died in neonatal care aged 5 days. She was discharged and referred to the fistula ward at Khartoum Teaching hospital with no contact details recorded. Her file was sent for quality control.

She was an illiterate lady from southern Sudan living in the district of Jabra in West Khartoum. She spoke little Arabic and was accompanied by her sister. She had a past obstetrical history of 2 neonatal deaths. She had not received any ANC for this pregnancy.

Issues contributing to maternal mortality and morbidity were identified from the case study, and questions were formulated in order to explore the context of this case. The questions were then grouped into themes, and a Participatory Rapid Appraisal (PRA) was conducted to answer them. PRA is a methodology first developed by Lincolin and Guba in 1985,[9] in which themes to be explored are identified and a series of sampling methods are employed, each one building on initial information obtained, until all relevant information has been obtained. Each theme is explored using more than one sampling method in order to reduce bias. Table (1) identifies the key themes and the sampling methods employed to explore them.

Table 1: Methodological coverage of key themes

Themes covered	**Key person interview**	**Small sample semi-structured Interviews**	**Direct Observation**	**Secondary data**
In-hospital obstetric facilities	-	House officers	Inventory checklist	-
Obstetric staff training and job satisfaction	Senior midwife	House officers, Medical Officer	-	-
Management of Obstetric Emergencies	Consultant, Blood bank directors	House officers	Discussions on obstetric wards	Sudan FMoH guidelines
Management of Normal Labour and Delivery	House officer	-	Observation of normal labour with checklist	-
Patient Health Education Needs	Supervising Medical Officer at Health Centre, Community Medicine Specialist	Patient Interviews	-	-

Checklists and patient questionnaires were based on WHO and UNICEF recommendations for best practice in antenatal care and normal delivery[1,2]. Staff semi-structured interviews were based on a questionnaire developed for health system managers to diagnose management problems[3].

Results and discussion

The data obtained is grouped here according to ten elements of care identified in a recently developed framework for the evaluation of quality of care in maternity services, developed for use in developing countries and based on international recommendations[10]. The situation in the hospital is compared to the recommendations developed within the framework.

Physical resources

According to the checklists the equipment and resources available were adequate for the management of normal labour and obstetric emergencies. However the main difficulty was in the area of delivery of blood in emergencies. According to house officers 1 out of 5 unreported in-hospital maternal deaths in 2006 was due to a failure to deliver blood on time in an emergency. The senior midwife identified bleeding as the main cause of maternal mortality in the hospital.

Blood for transfusion in the hospital is usually obtained from relatives of patients undergoing elective surgery and exchanged with blood from the Khartoum central blood bank in order to keep a balanced supply of blood types within the hospital at any one time. (Central blood bank receives blood from other hospitals and has a donor recruitment policy that involves getting blood from volunteers in the community including universities and schools.)

However, in emergencies, if there is no suitable blood found in the hospital a member of staff must go to Khartoum hospital or central blood bank to exchange some, or a relative must be found as soon as possible for a 10-minute rapid test that does not involve proper screening (and which carries a risk of infection due to low sensitivity). Consultants, house officers and the blood bank director reported lack of understanding and communication between house officers and laboratory technicians when blood is needed. Also,

there was a consistent lack of blood donations in the central blood bank for negative blood groups particularly O^{-ve} and B^{-ve}. Blood donation in Sudan is viewed with suspicion, and the general population lacks awareness about the value of blood donation. Therefore greater publicity in order to recruit donors is needed.

Human resources

According to official rotas coverage of trained staff at any one time was appropriate. Midwives and doctors had all undertaken appropriate diplomas or degree courses and junior doctors were in abundance. However the main areas of difficulty identified by all parties were poor supervision, low salary with subsequent low motivation at work, and lack of training facilities.

Staff discussed specific cases of maternal mortality in 2006 which along with the case study illustrated staff negligence in terms of supervision. Night time supervision is a particular problem. This is linked in people's minds to low salary and low motivation. The majority of staff interviewed (senior midwife, medical officers and house officers) reported dissatisfaction with salary, including receiving no salary at all and working voluntarily because a paid job could not be found. House officers reported having faced periods of unemployment of an average duration of 1 year, due to delays in the certification process which is the responsibility of the training University, and the lack of jobs in areas where living standards are deemed high enough. (House officers may be posted to rural areas by the government but in most cases these will be men, leaving all female graduates (who may comprise more than 50% of graduates) to work in the cities where there are not enough jobs for all graduates.) Having obtained a job in Khartoum a typical salary for a house officer is $2,000 per year with accommodation provided. There is a tendency for highly trained staff to leave government hospitals and work in the private sector or abroad.

Problems with training included lack of postgraduate input from seniors with little official teaching. Some junior staff suggested consultant-led case reviews held at regular interviews for medical officers, house officers and medical graduates to keep up their knowledge as there is no formal teaching programme

for house officers. Recommendations state that effective systems for staff appraisal linked to personal and professional development opportunities such as the availability of courses and in-service training are key to maintaining the quality of the human resource base, and that staff operate more effectively where there are clear management structures and clear lines of accountability[10].

There were also particular problems identified with doctors doing mandatory national service. Doctors doing national service are paid equal to or sometimes more than house officers. However there is no legal responsibility shouldered by a national service doctor due to the fact that he is not fully certified by the medical council. The doctor may therefore feel hopeless as he/she is not been able to progress in his/her career. Thirdly the national service period of training is often deficient in academic teaching. This may lead to unsuccessful attempts to pass postgraduate exams.

Maternity Information systems

In the hospital there is a filing system for all patients who stay more than 24 hours in the hospital including patients undergoing normal deliveries. A proportion of these notes are sent to the ministry of Health for quality control. Also, there are statistics for all surgical procedures including the number of C-sections, but not the indications for them. Unfortunately, files of patients staying for less than 24 hours are not kept and no official records of maternal deaths with causes were available. The framework recommends that basic registers in facilities are designed to record data that is sufficient to monitor and evaluate activities effectively[10].Thisstudy was designed to evaluate activities within maternity services, however no data on maternal mortality and morbidity could be found in hospital records. Therefore, a deficit was identified in this respect.

Internationally recognised good practice-normal labour

One birth was observed in details from admission to delivery, with additional questioning about normal practice. It is to be noted that this method of obtaining information about normal practice in labour is limited by 'best-behaviour bias'[10], but is more reliable than simply questioning service providers about

normal practice. During the process, appropriate observations were recorded throughout labour and most protocols followed. Each birth is under the supervision of a midwife, a house officer and a senior on-call. On admission, each woman has her blood pressure, pulse and temperature recorded, blood is taken for a full blood count and blood group, urine is dip-sticked and an ultrasound scan is performed. The hospital does not possess dopplers or CTGs however pinards and partograms were in use. This demonstrates good practice in these areas which is optimal for assessing the wellbeing of mother and baby within the limits of resources.

However certain omissions were noted and certain practices were employed with no proven benefit to the patient. These were as follows; during the observed birth, the foetal heart was not recorded with the recommended regularity (every 15 minutes in the first stage of labour and before and after each contraction). Routine i.v. prescriptions were also in use as was syntocinon for all primagravidas. However routine use of eitherprescriptions is not supported by evidence and may restrict a woman's ability to move around in labour as well as possibly causing hyperinsulinism in the baby[(10)]. The patient observed was refused water with the rationale that she may then vomit it back up or she may end up needing to have a C-section, neither of which is an indication for withholding oral fluids, and may in fact lead to dehydration and even ketosis[5]. (The Federal Ministry of Health protocol for normal labour states that 'good hydration is essential especially for primagravidas')[(4)]. The patient was also not offered analgesia also contrary to the Federal Ministry of Health protocol[(4)]. Vaginal examinations were performed with gloves but without hand-washing or wiping the perineum, contrary to WHO guidelines[(1)]. Their beds set aside for routine delivery force the women into a supine position, contrary to recommendations that in the absence of a complication women should be free to adopt whatever position feels comfortable for delivery[(5)]. Lastly, 95% of women in Sudan undergo female genital mutilation according to estimates in 2004, despite the fact that it is officially illegal[(11)]. Reinfibulation after delivery is also illegal, however the midwife was observed performing this, saying 'like this I found it like this I

leave it' and also that the wound created by deinfibulation needs repair. However it is recommended to suture the labia majora separately in a way which will stop bleeding[11].Notably episiotomy was not routine as it is in many parts of the world, which is in line with recommendations[5].

Management of Emergencies

Protocols for use in Sudan for the management of obstetric emergencies were available free to all house officers. These were followed carefully with two exceptions. One exception was the routine use of diazepam in eclampsia instead of magnesium sulphate, with the reason that it is too expensive to monitor magnesium sulphate. Another is that C-sections are often delayed until there is an emergency because in all non-emergency surgery fee-paying patients (90%) have to pay cost of surgery whereas in emergencies they only have to pay for fluids and drugs received. Consultants and house officers identified a need to have set protocols to follow. The case study shows appropriate management of obstructed labour and uterine rupture, however the key issue is the delay in proceeding to C-section which resulted in the formation of an obstetric fistula and may have resulted in death of the baby 5 days later.

Patient experience of care

The framework used recommends good communication, respect, dignity, equity and emotional support as key principles of patient care in order to achieve patient satisfaction with their hospital experience.

In the birth observed, relatives were not allowed to accompany the patient during the first stage of labour as the midwife didn't want them 'in the way'. The patient however was frequently left alone during this period whilst the midwife sat outside reading a newspaper. Also the midwife spoke aggressively to the patient several times when the patient either did not understand or did not comply with her instructions, and even hit the patient's legs during these outbursts. The patient repeatedly asked for water but this request was ignored and the reasons for withholding it were not explained. This treatment displays poor communication and poor emotional support. Evidence shows that if a woman is unhappy with the psycho-social support she receives

during delivery, she and her family may prefer that she delivers at home for any future pregnancy[12].This will have implications for maternal mortality and morbidity in increasing the likelihood of obstetric emergencies presenting late, possibly with serious consequences as illustrated in the case study. It is worth noting that staffs who feel isolated, unmotivated and undervalued have been shown to provide suboptimal clinical and interpersonal care in maternity services in similar settings[13].

Most patients interviewed in the hospital reported that not all procedures had been explained to them and that no advice had been given to them about post-partum danger signs, breastfeeding or family planning. It is essential that women are aware of symptoms that may signal a post-natal complication such as fever or foul-smelling discharge, and that advice is given on breastfeeding and post-natal contraception[14].

Conclusion

Many areas have been highlighted in which change may contribute to reducing in hospital maternal mortality and morbidity. The main ones in order of importance in the light of known cases of maternal mortality and morbidity were;

- Physical resources need for better delivery of blood in emergencies including the need for more donor recruitment drives by central blood bank, and better communication between house officers and lab technicians.
- Human resources need for greater government investment in healthcare so as to increase salaries and hence motivation for health workers
- Maternity information systems need for audit of practice, for which details of management for all patients entering the hospital should be recorded.
- Good practice in labourneed for adherence to international recommendations for good practice throughout labour including asepsis, non-routine use of i.v. fluids and oxytocin, freedom of movement, good hydration and not reinfibulating.
- Treatment of and communication with patients need for better communication and emotional

support of patients, and more in-hospital patient education. Staff training and support may increase interpersonal care given.

- Management of Obstetric Emergencies need for consistent protocols for management of obstetric emergencies, need for greater staff supervision and training opportunities for junior staff.

Recommendations

Recommendations based on the literature and the situation included inaugurating a voluntary blood donation scheme, ensuring knowledge of blood transfusion system for all house officers, training midwives to run in-hospital antenatal classes and holding regular consultant-led case review workshops for junior staff.

Some of the changes recommended here would require long-term change at national level. Some, however, would cost little to address in terms of finances and labour. The methods and framework used here would be applicable to any hospital and may be used to identify specific areas in which to promote constructive change to maximise care for mothers in resource-poor settings.

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