FACTORS INFLUENCING PRE-ECLAMPSIA/ECLAMPSIA OUTCOMES IN HIGH-RISK PATIENTS IN ZIMBABWE

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Abbreviations:
BP - blood pressure
CI - confidence interval
DIC - disseminated intravascular coagulopathy
DBP - diastolic blood pressure
g/dl - gram per decilitre
Hb - haemoglobin
HELLP (syndrome) - haemolysis (H), elevated liver (EL) enzymes and low platelet (LP) count
MCRH - Mpilo Central Referral Hospital
mm Hg - millimeter mercury (used in relation to blood pressure readings)
MMR - maternal mortality ratio
MOH - Ministry of Health
NAAOG - Nurses' Association of American College of Obstetricians and Gynaecologists
SSA – Sub-Sahara Africa
UK - United Kingdom
USA - United States of America
WHO - World Health Organization

SUMMARY

Severe pre-eclampsia/eclampsia remains one of the major causes of maternal mortality in Zimbabwe. Based on this problem, factors associated with maternal mortality due to severe pre-eclampsia/eclampsia were investigated in an effort to improve pregnancy outcomes in Zimbabwe. Cases and controls were selected from 318 obstetric records of patients with severe pre-eclampsia/eclampsia to conduct a retrospective case-control study. (Cases referred to patients who were diagnosed with severe pre-eclampsia/eclampsia and who died from these conditions while controls survived these conditions). No significant factors could be identified which influenced maternal deaths among women suffering from severe pre-eclampsia/eclampsia. Magnesium sulphate was not routinely administered, as recommended internationally. Cases apparently received better reported care than controls. Recommendations based on this research report include improved midwifery education and in-service training, regular audits of patients' records and changed policies for managing these conditions more effectively in Zimbabwe.

OPSOMMING

Ernstige pre-eklampsie/eklampsie bly een van die hoofoorsake van moederlike sterftes in Zimbabwe. Gebaseer op die probleem is faktore wat verband hou met moederlike sterftes as gevolg van ernstige pre-eklampsie/eklampsie ondersoek, in 'n poging om die swangerskapsuitkomstes in Zimbabwe te verbeter. Gevalle en kontroles is geselekteer uit 318 ernstige pre-eklampsie/eklampsie obstetriese rekords ten einde 'n retrospektiewe gevalle-kontrolestudie uit te voer. Geen beduidende faktore was identifiseerbaar wat moederlike sterftes onder vrouens met ernstige pre-eklampsie/eklampsie beïnvloed het nie. Magnesiumsulfaat was nie as roetine, teenstrydig met internasionale aanbevelings, toegedien nie. Volgens verslae het gevalle klaarblyklik beter sorg gekry as kontroles. (Gevalle is gedefinieer as pasiënte wat met pre-eklampsie/eklampsie gediagnoseer was en daaraan beswyk het terwyl kontroles die toestande oorleef het). Aanbevelings wat op die navorsingsverslag gegrond is, sluit in dat vroedvroue se onderrig en indiensopleiding verbeter moet word, pasiënte se rekords aan gereelde ouditering onderwerp moet word, en dat beleid verander moet word om die toestande in Zimbabwe meer effektief te beheer.

INTRODUCTION

"Pre-eclampsia is a multisystem disorder that is usually associated with raised blood pressure and proteinuria but, when severe, may cause pathology of the women's liver, kidneys, clotting system, and brain. The placenta is also involved with increased risk or poor growth and early delivery for the baby. It is a relatively common complication of pregnancy, and can occur at any time during the second half of pregnancy or the first few weeks after delivery… Eclampsia, defined as the occurrence of one or more convulsions (fits) in association with the syndrome of pre-eclampsia, is a rare but serious complication" (Duley, Gulmezoglu & Henderson-Smart, 2000:1). Eclampsia is a condition peculiar to pregnant or newly delivered patients. It is characterised by convulsions, which occur as a result of raised blood pressure associated with pregnancy (WHO, 1996:14). At the hospital where this research was conducted no distinction was made between eclampsia and pre-eclampsia. Consequently this research used the term severe pre-eclampsia/ eclampsia as indicating the total range of women affected by this condition. The diagnoses in the patients' records were accepted as indicating whether or not any specific woman suffered from severe pre-eclampsia/eclampsia.

The high maternal mortality ratio (MMR), calculated as the number of maternal deaths divided by the number of live births (WHO, 1996:99) in developing countries, remains a major global concern. Every year 600 000 women die from causes associated with pregnancy and childbirth (WHO, 1999:1). Almost 90.0 percent of these global maternal deaths occur in Sub-Sahara Africa (SSA) and Asia (Starrs, 1997:1). While women in Northern Europe have a 1:4 000 chance of dying from pregnancy related complications, those in Africa have a 1:16 chance (Starrs, 1997:1). This scenario depicts maternal mortality as a sensitive indicator of inequality in socio-economic status and the disparities between the developed countries and Africa. Bennett and Brown (1999:692) define maternal mortality as a death that occurs as a result of pregnancy or childbirth complications or as a consequence of pregnancy within 42 days after delivery or abortion.

A Zimbabwean study by Ashworth (1990:211) indicates that abortion, severe pre-eclampsia/eclampsia, obstetric (including ante-, intra- and post-partum) haemorrhage, obstructed labour and puerperal sepsis are the leading causes of maternal deaths. Post-abortion complications and severe pre-eclampsia/eclampsia account for the majority of the global obstetric deaths (WHO, 1999:13). Severe pre-eclampsia/eclampsia accounts for 10 to 15 percent of the total maternal deaths in developing countries (AbouZahr & Royston, 1991:8). According to Duley *et al.* (2000:2) pre-eclampsia/eclampsia complicates one in 100 deliveries in developing countries and accounts for approximately 10 percent of direct maternal deaths globally. In Zimbabwe, at Mpilo Central Referral Hospital (MCRH) in Bulawayo, out of 116 reported obstetric deaths, 24 (20.7 percent) of these deaths were due to severe pre-eclampsia/eclampsia (MCRH Obstetric Records 1994-1997). In the same period puerperal sepsis accounted

for 12.9 percent, haemorrhage for 12.1 percent and other obstetric complications for 14.6 percent of obstetric deaths. Thus investigating factors contributing to maternal deaths among women suffering from severe pre-eclampsia/eclampsia would also address factors contributing to large numbers of maternal deaths, and ultimately help to reduce these numbers.

According to a United Kingdom (UK) report (Department of Health, 1994:iv) on confidential enquiries into maternal mortalities in the UK, women often died when the care they received was substandard. The fact that some high-risk women died and others survived was the reason why this study was conducted, in order to identify factors discriminating between non-surviving (cases) and surviving (controls) women hospitalised at MCRH with severe pre-eclampsia/eclampsia. The study intended to establish whether the quality of care those women received influenced their chances of surviving obstetric complications. The purpose of the study was to identify factors associated with maternal mortality among non-surviving (cases) and surviving (controls) women hospitalised for severe pre-eclampsia/eclampsia at MCRH from 1 January 1995 until 31 December 1997.

The research questions, which guided this research, were:

- Is there a difference in selected physiological factors associated with maternal mortality due to severe pre-eclampsia/eclampsia between non-surviving (cases) and surviving (controls) women hospitalised at MCRH during 1995, 1996 and 1997?
- Is there a difference in selected aspects of the standard of maternity care received by non-surviving (cases) and surviving (controls) women hospitalised for severe pre-eclampsia/eclampsia at MCRH during 1995, 1996 and 1997?

The following hypotheses were advanced for this study:

- There is a difference in selected physiological factors associated with maternal mortality due to severe pre-eclampsia/eclampsia between non-surviving (cases) and surviving (controls) women hospitalised at the MCRH during 1995, 1996 and 1997.
- There is a difference in selected aspects of standard of maternity care received by non-surviving (cases) and surviving (controls) women hospitalised for severe pre-eclampsia/eclampsia at MCRH during 1995, 1996 and 1997.

LITERATURE REVIEW

Studies of maternal mortality show that every year over half a million women world-wide die in and around childbirth and that 99.0 percent of these deaths occur in the developing countries (AbouZahr & Royston, 1991:1; WHO, 1995:1). For every woman who dies, a further 10 to 16 are handicapped or suffer from serious chronic illnesses subsequent to the delivery of their babies. Some women eventually die from these chronic conditions (Downe, 1991:33; Paul, 1993:745). It is estimated that 55 percent of the world's maternal deaths occur in Asia and Africa (WHO, 1995:2). About 150 000 deaths occur annually in SSA, with extremely high ratios (over 1000 per 100 000 live births) in the Eastern and Western regions of Africa (Howson, Harrison, Hotra & Law, 1996:85; WHO, 1995:2).

The Nurses' Association of American College of Obstetricians and Gynaecologists (NAAOG) refers to quality as a "… state of agreed-upon excellence" (NAAOG, 1990:2). Definitions of quality emphasise characteristic features of excellence and clinical standards. Effectiveness reflects the degree of achieved desired effects such as a reduction in mortality and morbidity rates. On the other hand, efficacy as an outcome of care, refers to benefits received by individual consumers of health care (Abramson, 1990:49).

Two important factors for assessing the quality of care are standards and criteria and their vital role in clinical practice for achieving desired maternity care outcomes. As the NAAOG (1990:20) states "… standards are a consensus agreement regarding the level of excellence of care." They also possess a legal aspect, which imposes binding responsibilities for which care-providers have to be accountable (Lindberg, Hunter & Kruszewski, 1994:53).

Bennett and Brown (1999:117) propose a clinical audit, which involves evaluating patients' records concur

rently with treatment or retrospectively after discharge. The emphasis is on systematic evaluation of the care rendered to patients based on what is written in their records. The underlying assumption is that care recorded reflects care rendered, and care not recorded reflects care not rendered. This study relied on records for information about aspects of care, associated with maternal mortality or survival due to severe pre-eclampsia/eclampsia, by means of using a retrospective case-control design, in an effort to identify factors influencing the quality of nursing care rendered to these patients.

A retrospective obstetric audit can identify deficiencies in care delivery and in the documentation system. Lack of standardisation of what should be recorded in the obstetric records and poor documentation are some of the limiting factors in auditing care rendered to patients. The structure, process and outcome, as the three broad criteria proposed by Donabedian (1986:100), can be utilised to judge the quality of health care. As Abramson (1990:480) states, "… the quality of health care may be judged from information about effects (outcome evaluation), about the performance of activities (process evaluation), or about facilities and setting (structure evaluation)."

Hypertensive disorders of pregnancy

In medical terminology "blood pressure" describes the pressure of blood in the aorta and the large arteries that branch from it (Schauf, Moffett & Moffett, 1990:338). Two measurements (systolic and diastolic pressures) indicate the two values of the blood pressure. The systolic pressure refers to the ejection phase of the cardiac cycle while the diastolic pressure is the minimum value of the ventricular diastole (Schauf *et al.* 1990:338).

Hypertensive disorders of pregnancy are characterised by abnormally high blood pressure. "Once blood pressure rises above a certain level, however, there is a risk of direct damage to the blood vessel wall, regardless of what caused the rise. This level is usually taken to be at least 170 mm Hg systolic blood pressure or 110 mm Hg diastolic. Risks of the mother related to such high blood pressures include kidney failure, liver failure and cerebrovascular haemorrhage (stroke). For the baby, risks include fetal distress due to vasoconstriciton reducing the blood supply across the placenta, and placental abruption…" (Duley & Henderson-Smart, 2000a:2).

According to Wallenburg (1989:382) raised blood pressure may appear for the first time during pregnancy or pre-exist before pregnancy, and in both instances, the woman may develop superimposed severe pre-eclampsia/eclampsia. Severe pre-eclampsia/eclampsia accounts for 10 to 15 percent of the total maternal deaths in developing countries (AbouZahr & Royston, 1991:8), as documented by a number of studies covering a time span of twenty years. A study of 58 maternal deaths in rural Bangladesh, conducted from 1982 to 1983, showed that 20.0 percent of all the deaths were eclampsia-related (Khan, Jahan & Begum, 1986:11). In South Africa, hypertensive disorders accounted for 30 percent of 660 maternal deaths, which occurred between January 1980 and December 1982 (Boes, 1987:161). Similarly, in Zimbabwe, Ashworth (1990:211) reported hypertensive disorders of pregnancy to be one of the major causes of maternal deaths.

According to Surratt (1993:501), uncontrolled severe pre-eclampsia/eclampsia often results in a multisystem vasospasm and endothelial damage. This results in widespread ischaemic lesions in the vital organs with resultant death. The major final cause of death due to hypertension in pregnancy (in South Africa) was reportedly intracranial haemorrhage, followed by rupture of the liver and post-partum haemorrhage (Moodley, 1998:29). The multisystem condition referred to as the HELLP syndrome is characterised by haemolysis (H), elevated liver (EL) enzymes and low platelet (LP) count (Poole, 1995:557; Sibai, Ramadan, Usta, Salam, Mercer & Friedman, 1993:1000). What has been found to be challenging about the HELLP syndrome is that it exhibits features resembling those of disseminated intravascular coagulopathy (DIC). The differential diagnosis requires an evaluation of the woman's coagulation factors (prothrombin time, partial thromboplastin time, and bleeding time). Whilst in women with the HELLP syndrome these factors are normal, the reverse is true in women with DIC. Cavanagh, Woods and O'Connor (1978:14) describe DIC as "...a state of hypercoagulability which eventually consumes platelets, fibrinogen, and factors V, VII and XII, sometimes to the point of total depletion." The difficulties created for care-providers by the two phenomena are that of mak

ing a differential diagnosis. It is only those care-providers with a sound knowledge base and relevant experience who might be able to reach a correct differential diagnosis, if they have the necessary laboratory facilities to conduct the required analyses rapidly. However, despite the differences in their pathophysiology, both conditions cause serious threats to women's lives and only timely appropriate obstetric interventions may reduce the risk of maternal deaths associated with both these conditions.

Treatment for hypertensive disorders of pregnancy

Treatment for women with severe pre-eclampsia/eclampsia complicated by the HELLP syndrome and/or DIC require frequent assessment and careful monitoring of each intervention. This means that nurses and midwives play a vital role in detecting any signs of deterioration and in obtaining the required medical assistance. Drug treatments are influenced by the pathophysiology of each condition. For women with severe pre-eclampsia/eclampsia complicated with HELLP syndrome, immediate delivery is recommended (Lloyd & Lewis, 1999:322). Coupled with this intervention is the use of anti-convulsant drug therapy, of which magnesium sulphate is the drug of choice in many countries following the WHO collaborative eclampsia trial of 1680 women in 1991 (WHO, 1995:20). This trial involved centres in Argentina, Brazil, Colombia, Ghana, India, Uganda, Venezuela, Zimbabwe and the Republic of South Africa (RSA). In the study, the effects of magnesium sulphate and diazepam were compared in 905 women in 23 centres. Magnesium sulphate and phenytoin were compared in over 775 women treated at four other centres. The findings showed that magnesium sulphate was more effective in reducing and preventing eclamptic convulsions than either diazepam or phenytoin - demonstrating magnesium sulphate's superiority as treatment of choice (WHO, 1995:13). Magnesium sulphate is reportedly the drug of choice in the United States of America (USA) and an estimated 60 percent of clinicians used magnesium sulphate in the UK (Duley & Henderson-Smart, 2000a:1-2). Magnesium sulphate can be administered both intravenously and intramuscularly and could thus be administered by nurses even in outlying clinics. "Magnesium sulphate is cheap and relatively easy to produce, and so making it readily available for the care of women with eclampsia in both developed and developing countries should be a high priority" (Duley & Henderson-Smart, 2000b:4).

However, nurses and midwives must be alert because magnesium sulphate can cause toxicity (Lloyd & Lewis, 1999:324). Magnesium sulphate is known to induce loss of patellar reflexes, while lethargy and respiratory depression are observed above eight (8) mEq/L, and cardiac arrest may appear at levels above 12 m/Eq/L (Kaplan & Repke, 1994:574).

For women with DIC, treatment essentially focuses on correcting clotting factors by giving frozen plasma, fresh blood or platelet concentrates (Craft, 1999:267). Women suspected to be suffering from both HELLP syndrome and DIC might benefit from combined treatments, in addition to supportive therapy in terms of assessment and surveillance.

Quality obstetric care can reduce the pathophysiological impact on all the systems including those caused by DIC. The development of DIC sets up a cascade, which significantly contributes to maternal death due to obstetric (including ante-, intra- and post-partum) haemorrhage. Royston and Armstrong (1989:85) state that a woman with antepartum haemorrhage roughly lives for about 12 hours while one with postpartum haemorrhage has only two hours to live without appropriate interventions. Thus early intervention is even more vital for maternal survival in cases of post-partum haemorrhage than in cases of ante-partum haemorrhage, emphasising the risk DIC poses to any pregnant woman's life.

To be effective in reducing maternal mortality levels, risk factors associated with women dying from pregnancy related complications, such as severe pre-eclampsia/eclampsia must be examined.

RESEARCH METHODOLOGY

Research Design

A retrospective unmatched case-control design was used to compare two groups (cases who died and controls who survived) of women admitted at the MCRH from 1 January 1995 to 31 December 1997, with severe pre-eclampsia/eclampsia. The population comprised

173 admissions for severe pre-eclampsia/eclampsia. There were 24 recorded maternal deaths associated with severe pre-eclampsia/eclampsia.

Sample size and sampling technique

The sample was drawn from hospital obstetric records of women who were admitted with severe pre-eclampsia/eclampsia. Twenty-four severe pre-eclampsia/eclampsia maternal deaths were identified, making it the second most important cause (superceded only by post-abortion complications) of maternal deaths during the research period at MCRH. From this population of 24 maternal deaths due to severe pre-eclampsia/eclampsia, 21 (87.5 percent) patients' records could be retrieved from MCRH's filing system. For each case (a woman who died from severe pre-eclampsia/eclampsia), records of two controls (women who survived this condition) were retrieved, as discussed under the data collection.

Research setting

The study site was MCRH in Bulawayo, which is the second largest city in Zimbabwe, lying in the western part of the country. The hospital is one of the two large central referral centres for high-risk patients in Zimbabwe (MOH, Zimbabwe, 1981:45). The hospital has a bed capacity of 1038 of which 233 beds are reserved for maternity patients. The 233 maternity beds, included 27 beds in the antenatal ward, 16 in the labour ward, 128 in the postnatal ward and 62 neonatal cots.

Two operating theatres with five recovery/high dependency beds (three adult beds and two incubators) form additional physical structures attached to the maternity unit. In 1995 and 1996, the bed occupancy rates were 99.9 and 84.5 percent respectively (MCRH Annual Report, Zimbabwe, 1996:9). The average length of stay was 3.9 days. The maternity unit's labour ward, delivers, on average, 12 000 babies annually, or about 1 000 babies per month, or more than 30 babies daily (MCRH Health Information Unit, 1995-1997).

The census conducted to provide background information to this study, revealed that there were, over the three-year period, 135 maternal deaths recorded of which 116 (85.9 percent) were maternal deaths due to obstetric complications. The majority of the obstetric deaths were due to abortion (39.6 percent) and severe pre-eclampsia/eclampsia (20.7 percent). Other causes accounting for the remaining 19 (14.1 percent) deaths included anaemia (one), anoxia (one), ectopic pregnancy (six), HIV/AIDS (seven), malaria (three) and molar pregnancy (one). The MMRs, calculated per 100 000 live births, were reportedly 407 for 1995, 481.9 for 1996 and 275.5 for 1997, according to the records at MCRH. (The reason for the apparent decline in MMRs reported for 1997 could not be explained from the data available from the patients' records. However, in spite of the apparent decline in 1997, pregnancy outcomes remained unfavourable for women admitted to MCRH).

Research instruments

The hospital obstetrics census form and an obstetric record audit form were used to collect data. The hospital obstetrics census form collected data about the background information required to contextualise the research results of the study. The obstetric record audit form was used to obtain data required from the pre-eclampsia/eclampsia cases and controls. An experienced masters prepared midwifery lecturer, two statisticians from the University of Zimbabwe, and two nurse researchers from the University of South Africa, assessed the face validity of the items included in the obstetric record audit form. Modifications were made following the recommendations based on the first review. The format was then re-submitted to these experts for further reviews until there was more than 80 percent agreement on the relevancy of the items contained in the audit form (Talbot, 1995:282). The instrument was pre-tested with the obstetric records of five cases and ten controls admitted with severe pre-eclampsia/eclampsia at MCRH during 1994. (These records were excluded from the survey which covered the period 1 January 1995 to 31 December 1997).
Pretesting of the checklists indicated that more specific categories should be created and that spaces should be provided for writing down additional information. This was done prior to embarking on the actual data collection phase.

The census data included information on annual admissions, deliveries, live births and maternal deaths obtained from the 1995, 1996 and 1997 MCRH registers. The obstetric records audit form captured data from the severe pre-eclampsia/eclampsia cases and

controls focusing on socio-demographic factors (residence, age, marital status, educational level and occupation), physiological factors (Hb level, BP level and temperature level) and obstetric/gynaecological factors (gravidity, gestational age and type of severe pre-eclampsia/eclampsia). Severe pre-eclampsia/eclampsia criteria for measurement of the standard of care included antenatal care booking status (booked or unbooked), emergency care (summoning medical assistance, quarter to half hourly observations of BP, temperature, respiration and pulse), fluid intake and output recording, anti-hypertensive and/or anti-convulsant drug treatment, follow-up care (hourly to four hourly observations of BP, temperature, respiration and pulse), type of delivery (vaginal delivery or caesarean section), evidence of medical reviews and documentation or omission of documentation of care provided. The standard care for severe pre-eclampsia/eclampsia was adopted and adapted from the WHO Safe Motherhood Midwifery Education Eclampsia Module 96.5 (WHO, 1996) for the management of patients presenting with severe pre-eclampsia/eclampsia.

Ethical issues

Approval for the research was requested from and granted by the Medical Research Council of Zimbabwe and the MCRH authorities. In this retrospective review of records, informed consent was not obtained from either the survivors (controls), or from the non-survivors' (cases') relatives. The study inflicted no harm on the subjects nor on their relatives as no names were disclosed at any stage to ensure confidentiality and anonymity. A coding system was used to ensure anonymity of patients and the data collected were used strictly for the purpose it was collected for. No specific person was mentioned in the discussion of the findings.

Data collection procedure

Data collection was carried out in phases addressing structure and process evaluation by means of the instruments developed to obtain the intended data. Information about the obstetric census variables was retrieved from the maternity unit's register for the period 1995, 1996 and 1997. The cases' and the controls' hospital numbers were identified from the admission and death registers. This information enabled the retrieval of the cases' and controls' obstetric records from the hospital medical records office. These records were subjected to thorough scrutiny in a separate office not accessible to anyone except the investigator and research assistant. Each case was given a code number, which it shared with its selected two controls to avoid using the same controls more than once (for example case = 1, controls = 1a and 1b). These codes served to ensure anonymity throughout the research process. The lack of access to specific patients' files made matching each case with two controls for age, parity, diagnosis and haemoglobin status impossible. After consultation with statisticians it was decided to compare the data from two groups (cases versus controls) rather than the initially planned comparison of each case with two specific controls. Thus the data obtained from all cases constituted one category of data to be compared to the data obtained from all controls. Attempts to randomly select controls had to be abandoned due to a large number of missing files which could not be traced. The only possibility which remained was to continue requesting the files of all possible controls until 42 such files were obtained, amounting to convenience sampling of the controls. Thus the number of cases amounted to 21 (n = 21) and the controls to 42 (n = 42).

Data analysis

The data was organised for analysis under severe pre-eclampsia/eclampsia cases and controls. Odds Ratio (OR) and 95 percent confidence interval (95% CI) were estimated according to the Mantel-Haenszel Chi-Square Test or Fischer's Exact Test (Kahn & Sempos, 1989:155). A separate analysis was performed using stepwise logistic regression to take into account the effect of potentially confounding variable of residence, age, marital status and occupation status. The OR was used to measure the impact of a possible risk factor. Possible categories for OR were greater than one or less than one (Kahn & Sempos, 1989:56). When the value of OR was greater than one, there was a significant increased risk between maternal mortality due to severe pre-eclampsia/eclampsia and the factor. On the other hand, when the OR was less than one the risk was reduced. This implied that there was no association between maternal death due to severe pre-eclampsia/eclampsia and the measured particular factor in cases where the OR was less than one (Kahn & Sempos, 1989:56).

Univariate descriptive statistics, defined by Polit and Hungler (1995:657) as statistical procedures for analysing a single variable for purposes of description, were used to analyse data from socio-demographic, physiological, obstetrical/gynaecological and health service factors (Jacobsen, 1997:30). Single table analyses utilised a combination of 95% CI for OR. The 95% CI and OR were calculated according to the Mantel-Haenszel Chi-Square Test or Fischer's Exact Test to determine significant variables and their association with risk of maternal deaths due to severe pre-eclampsia/eclampsia. Two-tailed tests for normal distribution for differences between proportions of cases and controls were used to allow comparative analysis to be reviewed, analysed and compared (Polit & Hungler, 1995:408). Stepwise logistic regression tests were used to identify any further significance of variables and to determine whether the association of factors with maternal deaths still held after controlling for confounding variables such as urban and rural residence, age, marital status, education, occupational status and gravidity (Munro, 1997:292).

RESEARCH RESULTS

The total sample comprised 21 pre-eclampsia/eclampsia cases and 42 controls, amounting to a total of 63 records which were analysed.

Socio-demographic factors

Variables categorised under socio-demographic factors included urban-rural residence, age, marital status, educational and employment status.

Urban-rural residence

In both cases and controls, the majority (95.2 and 90.5 percent respectively) were urban residents. The number of cases (95.2 percent) who were from the urban setting was almost similar in distribution to that of the controls (90.5 percent). The maternal mortality risk was not significantly increased by place of residence (p-value = 0.455, OR = 2.11, 95% CI = 0.19-3.85).

Age

The ages of both groups combined ranged from 15 to 49 years. The mean age was 24.9 for the cases and 25.7 for controls. Of the cases, 61.9 percent were between 20 and 29 years of age, while 38.1 percent of the controls were within the same age group. Only one (4.8 percent) case and four (7.1 percent) controls fell within the 40 to 49 year age group. The results showed no statistically significant difference between women whose age was below or above 25 years (p-value = 0.858, OR = 1.10, 95% CI= 0.33-3.66). The results suggested that women of all ages had the same chance of dying if they suffered from severe pre-eclampsia/eclampsia during pregnancy.

Marital status

The women who were married were equally distributed among cases (76.2) and controls (76.2 percent). Marital status did not contribute to the risk of maternal mortality due to severe pre-eclampsia/eclampsia (p-value = 0.715, OR = 1.00, 95% CI = 0.23-2.79).

Educational status

When the educational background of the cases and controls was compared, there was a slightly higher proportion (62.0 percent) of cases who received more than seven years of formal education than controls (52.4 percent). There were four patients in each group (cases and controls) whose education levels were not indicated on their records. The level of education was not significantly associated with the risk of maternal mortality due to severe pre-eclampsia/eclampsia in this sample (p-value = 0.189, OR = 2.36, 95% CI = 0.37-11.66). However, more cases (72.2 percent) compared to controls (57.9 percent) attained more than seven years' schooling indicating a higher literacy level among those women who died compared to those who survived.

Employment status

With respect to formal employment, 100.0 percent of the cases and 90.5 percent of the controls were not in formal employment suggesting that these women were possibly depending on their husbands or other family members for financial support.

Physiological factors

Table 1 demonstrates the variables (Hb level, DBP, mean DBP, gestational age) of the physiological factors that were considered for analysis with the Mantel-Haenszel Chi-Square Test or the Fisher's Exact Test. Hb level $\leq$ 11.00 g/dl, DBP $\geq$110 mmHg and mean DBP >120 mmHg were the exposure variables

Table 1: Distribution of selected physiological factors of cases and controls by haemoglobin and diastolic blood pressure and risk of maternal death due to severe pre-eclampsia/eclampsia: Mpilo Central Referral Hospital 1995-1997. OR and 95% CI (n = 63)

Physiological factors	Cases		Controls		Descriptive Statistics		
	n = 21		n = 42				
	Number	Percent	Number	Percent	OR	95% CI	P-value
Hb level (normal=11 g/dl)							
≤11	14	(66.7)	21	(50.0)	2.00	0.60-7.05	0.213
>11	7	(33.3)	21	(50.0)			
Highest DBP in mm Hg							
≥110	17	(81.0)	41	(97.6)	0.10	0.00-1.19	0.039*F*
<110	4	(19.0)	1	(2.4)			
Mean DBP in mm Hg							
≥120	5	(23.6)	23	(54.8)	0.26	0.06-0.93	0.021*
<120	16	(76.2)	19	(45.2)			

*Statistically significant p-values

*F=Fischer's exact test

considered under physiological factors for this study.

Haemoglobin level

Fourteen (66.7 percent) of the 21 cases had a haemoglobin level of ≤11 g/dl compared to 21 (50.0 percent) of the 42 controls indicating the prevalence of anaemia in both groups. The mean Hb level was 9.3 g/dl for the cases and 12.8 g/dl for the controls, with ranges from 3 to 14 for cases and 6 to 14 for controls. Thus, the cases apparently had a lower Hb than the controls. When the risk of maternal mortality was analysed according to Hb level, women who were anaemic (Hb = ≤11 g/dl) had the same chance of survival as those whose haemoglobin level was normal (Hb = >11) if they developed severe pre-eclampsia/ eclampsia (p-value = 0.213, OR = 2.00, 95% CI = 0.60-7.05). There were more cases (66.7 percent) than controls (50.0 percent) who were anaemic.

Blood pressure level

The DBP ranged from 82 to 150 mm Hg in the cases and from 100 to 170 mm Hg in the controls. The mean for the cases was 119.6 mm Hg and for the controls it was 126 mm Hg. However, the median was 120 mm Hg in both groups with modes of 110 mm Hg for the cases and 120 mm Hg for controls as shown in Table 4.10. These DBP values unexpectedly indicated that the controls had slightly higher DBPs than the cases, which could not be accounted for from the patients' record sheets. This study considered any woman who had a DBP ≥110 mm Hg to have developed severe pre-eclampsia/eclampsia. The results of the analysis showed that there was a significant association between maternal death and the DBP ≥110 mm Hg (p-value = 0.039, OR = 0.10, 95% CI = 0.00-1.19). However, a 95% CI 0.00-1.19 (including 1) suggests a weak risk of maternal mortality. This implies that further research

in this area is required. A review of women's obstetric records showed that more controls (97.6 percent) than cases (81.0 percent) had DBP ≥110 mm Hg. In terms of a mean DBP of 120 mm Hg, the results demonstrated that women with a mean DBP >120 mm Hg were less likely to die from severe pre-eclampsia/eclampsia than those whose mean DBP was <120 mm Hg (p-value = 0.021, OR = 0.26, 95% CI = 0.06-0.93). Extrapolating meaning from these two results the OR = 0.10 for women with a mean DBP >110 mm Hg compared with the OR=0.26 for women with a mean DBP <120 mm Hg, indicates that women's risk of dying from severe pre-eclampsia/eclampsia more than doubled when their DBP rose from 110 to 120 mm Hg. The implication of this finding is that health care workers must do everything in their power to keep these women's diastolic blood pressures below 120 mm Hg in order to enhance their chances of survival.

Obstetric factors

The two most important factors investigated under this heading were gravidity and gestational period.

Gravidity

Gravidity for both the cases and the controls showed that the most affected group was primigravidae (42.9 percent of cases, 54.8 percent of controls) and gravid ≥ four (43.3 percent of cases, 31.0 percent of controls) comprised the second largest group. The mean gravid for cases was 2.6, compared to the controls' mean of 2.5. There was no statistically significant difference in maternal mortality between women who were below or above gravida three (p-value = 0.847, OR = 0.89, 95% CI = 0.23-3.18).

Gestational period

The gestational period was considered in relation as to whether pregnancy was at term (40 weeks' gestation) or below term (preterm) up to 39 weeks' gestation. In cases, severe pre-eclampsia/eclampsia occurred more frequently at term than before term (57.1 percent) while 50.0 percent of the controls developed this condition at term and 50.0% percent before term. Out of the 21 cases, three (14.3 percent) developed the HELLP syndrome comprising of haemolysis (H); elevated liver enzymes (EL) and low platelet count (LP), indicating a further progression of the disease requiring treatments different from those advised for severe pre-eclampsia/eclampsia.

No statistical significant association was found between maternal mortality and gestational age of women with severe pre-eclampsia/eclampsia (p-value = 0.427, OR = 1.55, 95% CI = 0.47-5.28). However, there were more cases (61.9 percent) than controls (51.2 percent) who delivered at term. It could not be ascertained from the data available from patients' files whether or not women had a better chance of survival if the baby was delivered preterm but this possibility could not be refuted either.

Standard of maternity care rendered to patients with severe pre-eclampsia/eclampsia at MCRH

The standard of maternity care was evaluated by examining implemented interventions that were recorded as care received by the women suffering from severe pre-eclampsia/eclampsia at MCRH. Various descriptive words were used to record the presence or absence of specific interventions, including "given or not given," "administered or not administered," "done or not done," "recorded or not recorded," "complete or incomplete." The positive terms represented caring interventions implemented while the negative descriptive words depicted omissions of caring interventions. Some of the items were categorised under specific terms for rating and summation for analysis. The variables selected for analysis were as follows: antenatal care (booked or unbooked), emergency care (including summoning medical assistance, quarter to half hourly monitoring of BP, temperature, respiration, pulse, anti-hypertensive/anti-convulsant drug treatment, fluid intake and output recording, follow-up care, hourly to four hourly monitoring of BP, temperature, respiration and pulse, type of delivery and documentation of care provided). As all the women (all cases and all controls) were assessed daily by doctors, this aspect was excluded from the analysis as no differences would be detected.

Antenatal care

Out of 21 cases, 61.9 percent were booked for antenatal care compared to 50.0 percent of the 42 controls. When the antenatal care booking status of women was analysed, there was no significant association with increased maternal mortality risk (p-value = 0.375, OR = 0.62, 95% CI = 0.18-2.02)

Table 2: Distribution of cases and controls by standard of maternity care (as measured by selected implemented interventions) for severe pre-eclampsia/eclampsia care: Mpilo Central Referral Hospital 1995-1997. OR and 95% CI (n = 63)

Standard of maternity care	Cases (n = 21)		Controls (n = 42)				
	Number	Percent	Number	Percent	OR	95% CI	P-value
Antenatal care booking status							
Unbooked	8	(38.1)	21	(50.0)	0.62	0.18-2.02	0.375
Booked	13	(61.9)	21	(50.0)			
Emergency care							
Not given	4	(19.0)	19	(45.2)	0.28	0.96-1.10	0.043*
Given	17	(91.0)	23	(54.8)			
Anti-hypertensive/anti-convulsant drug treatment							
Not given	2	(9.5)	2	(4.8)	2.11	0.14-0.72	0.407 F*
Given	19	(90.5)	40	(95.2)			
Fluid intake and output recording							
Not recorded	3	(14.3)	26	(61.9)	0.10	0.02-45	0.0004*
Recorded	18	(85.7)	16	(38.1)			
Follow-up care							
Not given	6	(28.6)	30	(71.4)	0.16	0.04-0.16	0.001*
Given	15	(71.4)	12	(28.6)			
Type of delivery							
Caesarean section	19	(90.5)	39	(92.9)	0.73	0.08-9.49	0.545 F*
Vaginal delivery	2	(9.5)	3	(7.1)			
Documentation of care							

Incomplete	6	(28.6)	30	(71.4)	0.16	0.04-58.00	0.001*
Complete	15	(7I.4)	12	(28.6)			

*Statistically significant at 95% CI.

*F=Fischer's exact test

between the two groups. This finding indicated that women's survival was not affected by whether they were, or were not, booked for antenatal care. More cases (61.9 percent) than controls (50.0 percent) were in fact booked for antenatal care.

Emergency care

Analysis of emergency care showed that, of the 21 cases, 17 (81.0 percent) received adequate care compared to 23 (54.8 percent) in the control group. The emergency care (summoning medical assistance, quarter to half hourly monitoring of BP, temperature, respiration and pulse) was associated with the risk of maternal mortality. There was a statistically significant difference in maternal deaths between women who received and those who did not receive emergency care (p-value = 0.043). Paradoxically, the results suggest that women who were rendered emergency care for severe pre-eclampsia/eclampsia were more likely to die than those who were not given this care. However, a 95% CI = 0.96-1.10 (including one) suggests that the difference in chances of survival between the two groups might have occurred by chance. A greater number of cases (91.0 percent) than controls (54.8 percent) received emergency care. A possible confounding variable, namely the seriousness of patients' conditions on admission could not be accounted for from the available patients' records.

The administration of anti-hypertensive/ anti-convulsant drug treatment

The majority of both cases (90.5 percent) and controls (95.2 percent) were given anti-hypertensive/anti-convulsant drug treatment. The analysis revealed that there was no evidence of association between the risk of maternal death and the presence or absence of anti-hypertensive/anti-convulsant drug treatment (p-value = 0.407, OR = 2.11, 95% CI = 0.14-30.72. Both cases (90.5 percent) and controls (95.2 percent) received anti-hypertensive/anti-convulsant drug treatment. However, no records indicated that magnesium sulphate had been administered - neither to the cases nor to the controls.

Records of fluid intake/output

Three (14.3 percent) of the 21 cases had unrecorded fluid intakes and outputs compared to 61.9 percent of the controls. When the follow-up care was reviewed, 71.4 percent, of cases had received selected caring interventions for severe pre-eclampsia/eclampsia compared to 28.6 percent of the controls.

The risk of maternal mortality was analysed according to recorded fluid intake and output. The p-value = 0.0004 showed that there was a significant decreased risk to women if their fluid intakes and outputs were NOT recorded. The OR of 0.10 suggests that women who had incomplete records of their fluid intake and output were less likely to die than those who had complete records of their fluid intake and output. A 95% CI of 0.02-0.45, excluding 1, further supported the finding that women whose fluid intakes and outputs were not recorded were less likely to die from severe pre-eclampsia/eclampsia than those whose fluid intakes and outputs were documented. Possibly better records might have been kept of dying patients in expectation of audits to be done by the maternal mortality review committee on all records of all maternal mortalities.

The performance of caesarian sections

The majority of severe pre-eclampsia/eclampsia cases (90.5 percent) and controls (92.9 percent) underwent caesarean sections in accordance with policy guidelines of MCRH. This indicates a high rate (92.1 percent) of caesarean section births among patients presenting

with severe eclampsia/pre-eclampsia at MCRH. Type of delivery was analysed in terms of vaginal delivery or a caesarean birth. There was no significant association between the risk of maternal mortality and the type of delivery for a woman with severe pre-eclampsia/ eclampsia (p-value = 0.545, OR =0.73 95% CI = 0.05-9.49).

Completeness of patients' records

Fifteen (71.4 percent) of the cases had evidence of complete records of care provided compared to 28.6 percent of the controls. Documentation of care that was provided for women with severe pre-eclampsia/ eclampsia was dichotomised for analysis according to two variables of "complete" or "incomplete". The results showed that there was a statistically significant difference between women who had "complete" documentation of the care they received, with those who did not (p-value = 0.001) The OR of 0.16 suggests that women who had complete documentation of the care they received were more likely to die than those with incomplete records of care received. The 95% CI of 0.04-0.58 for the OR (excluding 1) further supports the statistical evidence that women who had "complete" documentation of the care they received, were more likely to die than those who had "incomplete" records.

Follow-up care

The follow-up care (one to four hourly monitoring of BP, temperature, respiration and pulse) was associated with increased risk of maternal mortality in women with severe pre-eclampsia/eclampsia. The p-value of 0.001 showed that there was a statistically significant difference in death due to severe pre-eclampsia/ eclampsia between women who were given follow-up care and those who did not receive this care. The OR of 0.16 suggests that women with severe pre-eclampsia/eclampsia who were given follow-up care were more likely to die than those who were not provided with this care. The 95% CI of 0.04-0.16 for the OR (excluding 1) confirms the suggestion that women who received follow-up care had less chances of surviving than those whose records showed omissions of such follow-up care.

DISCUSSION OF RESEARCH RESULTS IN TERMS OF HYPOTHESES TESTED

The two-tailed test for normal distributions was used to determine p-values for the differences between proportions of severe pre-eclampsia/eclampsia cases and controls. The analysis measured proportions by p-values on selected physiological and health service factors (standard of maternity care). The two-tailed test was set at 0.025 p–value within the 0.05 significance level range.

Comparison between severe pre-eclampsia/eclampsia cases and controls by diastolic blood pressure level, proportion and p-value

The variables for physiological factors included in the analysis were DBP and the mean DBP level >120 mm Hg were selected for the analysis. The DBP used to define severe pre-eclampsia/eclampsia, in this study, was ≥ 110 mm Hg.

Hypothesis 1: There is a difference in selected physiological factors associated with maternal mortality due to severe pre-eclampsia/eclampsia between non-surviving (cases) and surviving (controls) women hospitalised at the MCRH during 1995, 1996 and 1997. (Table 3 is on the next page.)

The two-tailed test for normal distribution was used to determine the differences in factors for proportions between cases and controls. The hypothesis was rejected for the variable of DBP ≥ 110 mm Hg and supported for a DBP above the mean DBP of 120 mm Hg. A two-tailed p-value of 0.039 (greater than p-value = 0.025) confirmed that there was no statistical difference in proportions between cases and controls for DBP ≥ 110 mm Hg. However, when the cases and controls were compared for a mean DBP of >120 mm Hg, the results showed a statistically significant difference in proportions (p-value =0.021). The findings indicated that the number of cases that had a mean DBP of >120 mm Hg was higher than the controls. This suggested that hypertension had progressed further in women who died.

Comparison between severe pre-eclampsia/eclampsia cases and controls by selected aspects of standard of maternity care factor, proportion and p-value

Table 3: Comparison between severe pre-eclampsia/eclampsia cases and controls by selected diastolic blood pressure level, proportion and p-value: Mpilo Central Referral Hospital 1995-1997 (n = 63)

DBP	Proportion of cases with characteristic	Proportion of controls with characteristic	Difference between proportions
	n = 21	n = 42	Normal distribution p-values
	Percent	Percent	
Highest DBP ≥11 0 mm Hg	81.0	97.6	0.039
DBP level above mean (120 mm Hg)	76.1	45.2	0.021*

** Statistically significant at 0.025 p-value*

The standard of maternity care factors were analysed using the two-tailed test for normal distribution for differences in proportions between cases and controls for health care factors.

Hypothesis 2: There is a difference in selected aspects of standard of maternity care received by non-surviving (cases) and surviving (controls) women hospitalised for severe pre-eclampsia/eclampsia at MCRH during 1995, 1996 and 1997 respectively.

Using the two-tailed test for the normal distribution for differences in proportions, the hypothesis was rejected for emergency care (p-value = 0.035) and anti-hypertensive/anti-convulsant drug treatment (p-value = 0.469). The p-values of > 0.025 confirm that there were no differences in proportions with respect to the aspects of care. However, in terms of clinical implications, the levels of cases who were provided with care were proportionally higher compared to that of the controls suggesting that the cases received better obstetric/maternity care for their condition, or that care rendered to cases was more accurately recorded than for the controls.

The hypothesis was supported for fluid intake and output recording, (p-value = 0.001) follow-up care (p-value = 0.001) and documentation of care (p-value = 0.001) variables. The two-tailed p-value >0.025, provides further evidence of the differences in proportions of the normal distribution test between cases and controls. The differences imply that a higher proportion of severe pre-eclampsia/eclampsia cases than controls were provided with these aspects of standard maternity care, or that such care was more accurately recorded for cases than for controls.

When the standard of maternity care was analysed regarding variables including emergency care, fluid intake and output recording, follow-up care and documentation of care given, it appeared as if women who died received better care than those who survived in relation to these aspects of care. When this risk was further investigated unexpected findings were revealed. Women with a DBP ≥ 110 mm Hg and a mean DPB >120 mm Hg, and with omission of emergency care, fluid intake and output recordings, follow-up care and documentation of care were less likely to die from severe pre-eclampsia/eclampsia. The variables of fluid intake and output recording, follow-up care and documentation of care remained significant after a stepwise regression test.

Evidence from this research revealed that pre-eclampsia/eclampsia was more common among primgravidae, confirming that the first pregnancy is a

Table 4: Comparison between severe pre-eclampsia/eclampsia cases and controls by selected aspects of standard of maternity care factor, proportion and p-value: Mpilo Central Referral Hospital 1995-1997 (n =63)

Standard of maternity care factor	Proportion of cases provided with care	Proportion of controls provided with care	Difference between proportions
	n= 21	n= 42	
	Percent	Percent	
Emergency care given	91.0	54.8	0.035
Anti-hypertensive/anti-convulsant drug treatment	90.5	95.2	0.469
Fluid intake and output recording	85.7	38.1	0.001*
Follow-up care given	71.4	28.6	0.001*
Documentation of care (complete records)	71.4	28.6	0.001*

**Statistically significant at 0.025 p-value*

Table 5: Significant factors associated with severe pre-eclampsia/eclampsia and risk of maternal death for cases and controls: Mpilo Central Referral Hospital 1995-1997. Adjusted OR and p-value (n = 63)

Factor	Adjusted OR	P-value
Emergency care	1.21	0.125
Fluid intake and output recording	1.53	0.000*
Follow-up care	1.41	0.004*
Documentation of care	2.10	0.001*

**Statistically significant at 95% CI*

risk factor for developing severe pre-eclampsia/ eclampsia, emphasising the need for close surveillance of this group of women. Anaemia was common among both cases and controls, with a higher proportion of anaemic cases than controls. Pregnancy aggravates anaemia and many other diseases. Antenatal care plays a vital role in improving maternal health by early detection of complications and by providing opportunities to identify and treat illnesses that might otherwise go unnoticed until it is too late to implement effective interventions (WHO, 1993:5).

In Zimbabwe, the majority of care-providers are nurses and midwives who can make major contributions towards reducing MMRs. They control how and what health information is communicated to women. They also decide what care should be provided to women who present with obstetric complications such as those related to severe pre-eclampsia/eclampsia.

The reason why women died, despite having been offered better recorded care than the survivors might be embodied in a number of determinant factors. Firstly,

each woman brings with her into the health care system personal factors influencing her responses to the care provided. Factors such as pre-existing debilitating undiagnosed diseases, such as HIV/AIDS (for which pregnant women are not routinely tested in Zimbabwe) and malaria (Bulawayo lies within a known geographical malaria area, but pregnant women were also not routinely tested for malaria), might have influenced women's chances of responding favourably to treatment or maternity care. Furthermore, although women who died reportedly received better documented care, physiologically women's responses to treatment might have been influenced by their resilience to complications of severe pre-eclampsia/eclampsia, influenced by their general state of health/illness. The controls were presumably not under threat, in terms of their physiological responses while those who died might have encountered further progression of their conditions. This could be neither confirmed nor denied from studying these patients' obstetric records. However these results appeared to be contrary to expectations. The reason for this could be that midwives normally make sure that records of dying patients are complete in view of the anticipated maternal mortality review committee investigations. Unfortunately, the assumption exists worldwide that midwifery/nursing records are not always true reflections of the care that was rendered to patients. A study in the USA demonstrated that nursing records did, in fact, not show a complete picture of the interventions provided or their effects (Hale, Thomas, Bond & Todd, 1997:213). Whether or not this was the case in Zimbabwe could neither be confirmed nor denied from the available data.

LIMITATIONS OF THE RESEARCH

The major limitation was that data were collected from one hospital because of limited time available and non-forthcoming permission from another health care institution with similar functions. The results, therefore, cannot be generalised. Another limitation was imposed by merely studying the records of cases and controls. More information could have been obtained by observing the care recorded and comparing these records with the actual care rendered.

CONCLUSION

Variables such as diastolic blood pressure (DBP), fluid intake and output recording, follow-up care (hourly to four hourly observation of blood pressure, temperature, respiration and pulse) and documentation of care, appeared to produce research results which could be regarded as being contradictory to expectations. These variables remained significant after the stepwise logistic regression. The reason for this could be that midwives ensure that records of dying patients are complete in expectation of the Maternal Mortality Review Committee's anticipated investigations.

While acknowledging that the causes of MMRs can be complex, the contribution of severe pre-eclampsia/eclampsia to maternal mortality remains unacceptably high in Zimbabwe. The critical issue remains that maternal mortality due to severe pre-eclampsia/eclampsia can either be prevented or reduced. The possibility of reduction is real if nurse-midwives respond to the women's needs timeously and provide good quality care during pregnancy and childbirth. As the WHO (1999:36) states "… good-quality care implies care that is client-oriented and sensitive to the needs of communities and individuals, that maintains high technical quality through adoption of sound norms and standards, and that avoids the use of inappropriate technologies and over 'medicalisation'."

The nurses' and midwives' potential in reducing maternal mortality can be realised through the process of health assessment to identify risk factors in every woman; by providing women with relevant information to promote self-care and ownership of health; through prompt appropriate treatment of detected disorders such as anaemia and malaria; through timely referral of women with detected high-risk pregnancy conditions for specialised care; and through appropriate use of the partogram to assist in detecting abnormal labour.

RECOMMENDATIONS

The retrospective obstetric records audit played a central role in providing insight into factors associated with maternal mortality, which is expected to strengthen strategies to reduce maternal mortalities from severe pre-eclampsia/eclampsia in Zimbabwe through regular auditing of care and surveillance. The results of such audits should be discussed at in-service education sessions.

As magnesium sulphate has been shown to reduce the severity of pre-eclampsia/eclampsia and as it was *not* administered to a single patient, Zimbabwe should urgently revise its policy guidelines to include the safe administration of magnesium sulphate to these patients. Nurses and midwives need to receive the required in-service education to do so safely and effectively. Midwives should be allowed to keep stocks of magnesium sulphate and to administer it to women with impending signs of pre-eclampsia/eclampsia prior to transferring them from clinics to hospitals.

Essential midwifery drugs, including oxytocics, antibiotics, antihypertensives and anti-convulsants (in addition to magnesium sulphate) should be available at all centres rendering midwifery services. Treatment protocols should clearly specify under which circumstances what dosages of these drugs could be administered and these protocols should be discussed during in-service education sessions.

Although the partograph is used to monitor the progress of labour throughout Zimbabwe, its action guidelines need to be researched and adapted to the unique situations in Zimbabwe. For example, critical points of unsatisfactory progress when the patient must be referred to more advanced levels of health care should be specified taking into account the number of hours the patient is likely to be in transit prior to reaching the secondary or tertiary health care facility. Although the research findings of this retrospective case control study could not substantiate the premise that late arrivals, during advanced stages of complications due to pre-eclampsia/eclampsia, adversely affected the women's chances of survival, this possibility needs to be addressed and accommodated in future policies.

All pregnant women with hyperpyrexia should be tested, and if necessary treated, for malaria in the Bulawayo area, and indeed in all areas where malaria is endemic in Africa.

Treatment of obstetric conditions could be enhanced if the women's HIV status could be known. Future antenatal care policies should investigate possibilities of offering these tests to pregnant women in Zimbabwe.

CONCLUSIVE REMARKS

Women need *not* die from high-risk pregnancy conditions such as severe pre-eclampsia/eclampsia if health care providers work consistently towards reducing maternal mortalities, audit each case and strive to prevent similar occurrences in future. "For obstetricians and midwives practising in developing countries, maternal mortality is not about statistics. It is about women, women who have names, women who have faces. Faces, which we have seen in the throes of agony, distress and despair. Faces which continue to live in our memories and continue to haunt our dreams. Not simply because these are women in the prime of their lives who die at a time of expectation and joy; not simply because a maternal death is one of the most terrible ways to die … but above all, because almost every maternal death is an event that could have been avoided, and should never have been allowed to happen" (Starrs, 1997:7).

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ILLNESS COGNITIONS, DOCTOR-PATIENT COMMUNICATION AND PRESCRIPTION ADHERENCE AMONG FIRST DIAGNOSED HYPERTENSIVE PATIENTS FROM A RURAL TEACHING HOSPITAL IN SOUTH AFRICA

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ABSTRACT

This study examines the relationship between illness cognitions, doctor-patient communication and the use of prescribed medication among patients first diagnosed with hypertension in the outpatient department of a rural South African teaching hospital. The sample included two men and 43 women, in the age range of 38 to 85 years, (M= 60.5 years, SD= 11.5 years); 14 (31%) were 65 years and above. Outcome measures included doctor-patient communication, recall interview, illness cognitions, and anthropometrical measurements. From the 45 patients studied 23 (51%) were not adherent with prescription medication. Major findings were that doctor-patient communication, most illness cognitions, and healthy behaviour of the patient were not associated with adherence behaviour. Perceived stress and the belief of incurability of hypertension were, however, related with adherence behaviour. Patients frequently mentioned mental and environmental stress as causative and management beliefs. On the contrary, the treating physicians did not allude to mental and environmental stress. Physicians gave little lifestyle health education. In instances where it was given, most patients seemed to practice it.

OPSOMMING

Hierdie studie ondersoek die verwantskap tussen siekte-kognisies, dokter-pasiënt kommunikasie en die gebruik van voorskrifmedisyne onder pasiënte wat die eerste keer met hipertensie gediagnoseer is, in die buitepasiënt-afdeling van 'n landelike Suid-Afrikaanse opleidingshospitaal. Die steekproef het twee mans en 43 vroue, binne die ouderdomsgroep 38-85 jaar ingesluit (M=60.5 jaar, S=11.5 jaar); 14 (31%) was 65 jaar en ouer. Uitkomsmetings het dokter-pasiënt-kommunikasie, herbesoek-onderhoude, siekte-kognisies, en antropometriese metings ingesluit. Van die 45 pasiënte wat bestudeer is, het 23 nie gehoor gegee aan hul voorskrifmedikasie nie. Die belangrikste