Self referral of women in labour at Chris Hani Baragwanath Hospital after the introduction of a triage down-referral system

Research Report for MMed

(Obstetrics & Gynaecology)

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DECLARATION

I, Welekazi Fuziwe Dlakavu, declare that this research is my own work. It is being submitted to the University of the Witwatersrand in the fulfilment for the degree of MMed in Obstetrics and Gynaecology (Wits). It has not been submitted before for any other degree or examination at this or any other university.

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Dr WF Dlakavu

30 April 2012

DEDICATION

I wish to thank my heavenly father for His un-ending grace and mercy. I would like to dedicate my research report to my family. My mother Nontando Joy Dlakavu for raising me to be a strong and independent woman and for the encouragement and support you have always given me. For the sacrifices you made to ensure that we received the best education. My womb mate Fungiwe, thank you. You continue to inspire me and push me to do my very best in all that I do. Bheki, my Yang, thank you for your unwavering support and your love and to my beautiful daughter Sibabalwe – you are a true blessing and miracle.

ACKNOWLEDGMENTS

I wish to thank my supervisor Prof E J Buchmann for his assistance and support in making this all come together, for believing in me and being a source of encouragement and inspiration when the chips were down, ukusukela emazantsi enhliziyo yam ndiyabulela (From the bottom of my heart I thank you).

I am also grateful to the staff in the Chris Hani Baragwanath Hospital maternity records room, for allowing me access to the patients' files.

ABSTRACT

Background and objectives

There has been a steady annual increase in the number of deliveries performed at Chris Hani Baragwanath Hospital in recent years. A 2004 audit found that approximately one third of deliveries conducted at the hospital were of women who had referred themselves and were low risk and as such did not require delivery at a specialist centre. A triage down-referral system back to midwife obstetric units was implemented in 2008 to address the problem of low-risk self-referrals at the hospital. This study was conducted after the establishment of the triage system to find out whether the establishment of the triage system had been accompanied by a decrease in the proportion of self-referred women presenting to Chris Hani Baragwanath Hospital in labour, and to assess delivery outcomes in these patients.

Literature review

The literature review was conducted using Pubmed and MDConsult using the key words self referral, triage, gatekeeper, low-risk pregnancy, maternity / labour and referral systems. Relevant references were accessed via the University of the Witwatersrand eJournal portal. Appropriate articles cited by other authors were also reviewed. Appropriate websites were also used and referenced.

Methods

This was a retrospective descriptive study which included all women presenting in labour to the hospital maternity admissions area. The study population was clinical case-files of all births that were admitted in labour from 1 May to 31 May 2010. A simple random sample of these files was drawn.

Results

One hundred and eighty two intra-partum admissions were sampled. Thirty-five (19%) of these women were self-referred. Seven out of the 35 (20%) required caesarean sections. Five more (14%) needed oxytocin augmentation of labour, and one more (3%) had a vacuum delivery. Twenty women (57%) did not develop any complications during labour and could have been delivered at their midwife obstetrics units. During the month of the study, the triage down-referral system attended to 171 women and down-referred 83 (49%).

Conclusion

The establishment of a triage down- referral system has been accompanied by a curtailment in the number of low-risk pregnancies presenting self-referred at the referral hospital labour ward, compared with the audit in 2004.

INTRODUCTION AND LITERATURE REVIEW

Background

Following democratic elections in 1994, the South African government, through its Department of Health, laid new emphasis on a primary care approach, with the purpose of providing and improving access to health for disadvantaged communities. As part of its plans to correct apartheid-related social injustices and inequitable health care provision, the government provided free antenatal and intrapartum care for all pregnant women and for children under the age of 6 years at all its public service hospitals. A district health system model has also been adopted for the South African government health services, based on a World Health Organisation (WHO) model [1]. The major focus is on primary health care whose core components are community health centres, fixed or mobile clinics, traditional practitioners, non-governmental organizations (NGOs) and district hospitals. This forms the base of the health care pyramid. The second tier is formed by the regional or provincial hospitals and the apex by the national or tertiary hospitals which provide specialised care [2]. These different levels of care are able to interact with each other through referral systems which are largely protocol-driven [3]. Users of the health service are referred, whenever necessary, from basic to more specialised levels of care. This is considered to be fundamental to an integrated, functional health care system [4].

The Safe Motherhood Initiative (SMI) was implemented by the WHO in 1989 in order to reduce the number of mothers dying worldwide from pregnancy-related complications and associated diseases. Related to implementation of the SMI, various models of care have been developed to describe different obstetric services which define where women give birth and who performs the delivery [5].

Tiered risk-based referral systems

Primary maternity care services are provided by midwives who independently care for low-risk, uncomplicated pregnancies and provide antenatal, intrapartum, postnatal and neonatal care. At secondary (level 2 or regional) and tertiary (level 3) facilities midwives work in a team with doctors, providing care to high-risk pregnancies. The most well-developed and well-described primary care obstetric service in South Africa is the Peninsula Maternity and Neonatal Service that runs in the Western Cape Province [6]. The system is historically organized into geographical units. The first tier of care is formed by midwife obstetric units (MOUs) which are run completely by midwives with the support of a doctor who visits once a week. The second tier is formed by the secondary level hospitals which is the point of transfer or referral from the MOUs. The third tier is formed by the tertiary hospital which solely manages high-risk patients [6,7,8].

High-risk pregnant patients may be defined in many ways. In a 'modernisation of tertiary services meeting' in 2008, facilitated by the South African national health department, a speciality focus group in Obstetrics and Gynaecology which comprised heads of department in obstetrics from the various academic institutions in the country, provided a list of conditions which should be referred and managed in a specialist setting [9].

These included:

- Medical disorders (e.g. including insulin dependent diabetics, cardiac patients and endocrine, psychiatric disorders)
- Severe disease with organ dysfunction
- At-risk baby (including potential delivery of all neonates <1.5 kg) The "cut-off" weight needed further discussion and comment
- Prenatal diagnosis

- Preconception clinics
- Repeated preterm labour
- Poor obstetrical history
- Patients with recurrent pregnancy loss (including mid-trimester abortions)
- Late termination of pregnancy with congenital abnormalities.

A list of medical disorders specified to be tertiary included:

- Insulin-dependent diabetes mellitus
- Cardiac disease
- Previous early-onset pre-eclampsia
- Pre-eclampsia
- Chronic hypertension on multi-drug treatment
- Thyroid disease
- Collagen vascular disorders
- Bleeding disorders
- Previous or current thromboembolism
- Renal disease
- Epilepsy
- Kyphoscoliosis
- Anaemia unresponsive to iron therapy
- Complicated HIV infection
- Reproductive failure
- All suspected fetal anomalies
- Rhesus disease

This list is but one of several, with similar lists being available as referral criteria for clinics and MOUs, from national guidelines and in local protocols [4, 10].

The main aim of a referral system is that patients receive the appropriate level of care and are managed efficiently and cost effectively.

Murray et al described an effective referral system as one which has:

- An adequately resourced referral centre
- Communications and feedback systems
- Designated transport
- Agreed setting-specific protocols for the identification of complications
- Personnel trained in their use
- Teamwork between referral levels
- A unified records system
- Mechanisms to ensure that patients do not bypass a level of the referral system i.e. good patient information and structured fee and exemption systems [11].

It is therefore important that referral criteria be clear to health care professionals, who are in the front line, as they are gatekeepers to more sophisticated care and thus ensure that patients are referred for appropriate care when the need arises.

Self-referral to higher levels of care

The profile and sophistication of referral centres may result in patients bypassing lower levels of care and present themselves to higher levels irrespective of the triviality or seriousness of their medical complaint. Up to 82% of maternity hospital users in African studies have been found to be self-referrals [12]. No formal studies have looked at the reasons for self-referrals

in this country. Education seems to play a role but even those with higher education have a poor knowledge of referral channels in the health care system. Many patients do not necessarily know the difference between the different levels of care. Patients may also lack confidence in the quality of care available at primary health care level and may perceive hospitals as providing better care, with doctors deemed more capable than nurses or midwives at managing their medical problems efficiently and effectively.

High numbers of self-referrals amongst the obstetric population highlight women's own perception of risk, and the inappropriate use or over-utilisation of higher level hospitals may be seen to help ease patients' anxiety [11]. Self referrals result in lower levels of care being under-utilised, and hospitals being over-utilised, congested and overburdened, leading to an escalation of healthcare costs. Due to large patient loads human and physical resources are stretched to capacity which results in hospitals compromising the care that they provide to patients, who genuinely and correctly deserve to be managed in a specialised care setting [12, 13].

Tanzania has a national referral system in place for the management of obstetric complications however patients often bypass referring facilities in favour of higher level hospitals. A study was done in Kilimanjaro Christian Medical Centre (KCMC) to compare caesarean section rates among formally referred women versus those who were self referred. From a registry of approximately 21000 births, 80% were self referrals and 20 % were formally referred. The secondary outcome of this study was the assessment of risk of both maternal and neonatal outcomes after caesarean section according to referral status. Not surprisingly, formally referred patients had a higher caesarean section rate and they suffered more adverse outcomes such as low birth weight, low Apgar scores and neonatal admissions. Of interest, it was noted that those patients who referred themselves had a higher level of

education and were thus able to afford being delivered in the tertiary hospital as patients were required to also contribute towards their hospital accounts [14].

Triage

A well-known method of efficiently managing large numbers of patients of varying grades of risk and priority is ‘triage’. The word ‘triage’ is derived from the French word ‘trier’ which means to sort or classify. Historically, the word was used to describe the sorting of agricultural products but it has since evolved and is now used exclusively in medicine [15].

Triage is by definition the process by which the priority of treatment of patients is determined based on the extent of their severity of their condition. This concept was originally conceived in the First World War as a way to determine treatment priorities on the battlefield in an efficient way, to ensure the best use of limited resources with improved outcomes. Triage was later refined in the Second World War and introduced in the emergency departments in the United States of America in the 1950s and 1960s [16]. Emergency departments saw an increase in the number of patients seeking care whilst the number of inpatient beds was on the decline and staff shortages prevalent. The conditions for the requirements of triage in emergency practice are:

1. At least modest scarcity of resources exists.
2. A health care worker (a ‘triage officer’ assess each patient’s medical needs based on brief examination.
3. The triage officer uses an established system or plan, usually based on an algorithm or a set of criteria to determine a specific treatment or treatment priority for each patient [15].

Triage incorporates the following steps:

- Rapid assessment of the patient or client
- Identification of problem(s)
- Determination of acuteness
- Deployment of personnel and equipment to meet needs.

The goals of triage are threefold: 1) to identify emergent or life-threatening problems; 2) to regulate the flow of traffic through a service; and 3) to use resources and space efficiently.

In modern medical practice, the principles of triage have been implemented in a range of settings other than the emergency department to create more efficient health care systems. [13,16]. The use of triage has grown in recent decades and it has evolved to form an integral part of health services globally in order to alleviate congestion in busy academic centres. The concept of triage is well documented in the literature, and a number of triage systems have been developed. One such system is the Manchester Triage System (MTS). Introduced in 1997, the MTS uses six general discriminators (life threat, pain, haemorrhage, conscious level, temperature and acuteness) to stratify patients and prioritise them into immediate, very urgent, urgent, standard and non urgent categories [17]. In North America the Canadian Triage and Acuity Scale (CTAS) and the Emergency Severity Index (ESI) were introduced and for the developing world the WHO developed Emergency Triage, Assessment and Treatment (ETAT) [18].

Triage in obstetrics

Triage has since filtered to maternity care, and triage units have been integrated into maternity services with success. With the introduction of triage in maternity wards, there is better use of hospital beds, a lower turnover of undelivered women in the labour ward, and

patients spend less time waiting to be assessed by the midwife or doctor. Triage serves as a gatekeeper for patients in labour and it allows for the delivery of efficient and proper care to those who truly need it [13, 19]. In addition triage may significantly reduce expenses as evidenced by experience at Saint Joseph Hospital in Denver, USA [20]. This hospital ran a busy obstetric unit which had to close regularly due to the unit being full. This problem has now largely been solved by developing a triage unit in the obstetric unit. Financially, obstetric triage proved to be a step in the positive direction, with one midwife post being cut from the labour ward as there were less patients being delivered and the hospital was able to eliminate obstetric diversions.

In another study conducted in 2006 a tertiary hospital in the US introduced obstetric triage as a result of an increase in the number of patients being delivered, the misuse of labour ward beds, reduced financial resources and staff dissatisfaction. Triage proved to be a success in a reduction of workload, patient satisfaction and an improvement in staff involvement in patient care in the triage process [21].

Ethical concerns around triage and self-referral

Consumers or patients may argue that they have a right to choose where they seek medical care. In a country such as South Africa, whose health care system is confronted with numerous challenges in providing access to basic good and decent healthcare to all its citizens equitably [22], the 4 principles of biomedical ethics, developed by Beauchamp and Childress [23], need to be looked at more closely. The principle of respect for autonomy addresses the right of patients to make choices regarding their own health care. The principle of non-maleficence can be described as ‘do no harm’, and the principle of beneficence is the obligation to do good. Importantly, the principle of distributive justice requires that where resources are poor, they should be allocated in a just and fair manner that will do greater

good. Hence, in an environment overloaded with patients, with financial constraints and scarce human resources, health care managers and policy makers are compelled to introduce policy and enforce protocol that will ensure best utilisation of the limited resources at hand to ensure the best outcomes.

In terms of biomedical ethics, triage is therefore an application of the principle of distributive justice. Ascharya et al attempted to assess triage systems in emergency care settings in an ethical manner in order to realise the optimal use of scarce resources in a practical and just way. The authors concluded that a sound triage system is one that employs a multidisciplinary team that incorporates clinical and ethical processes, which require support from hospital management, triage officers, nursing staff, public representatives and a hospital ethics committee [24].

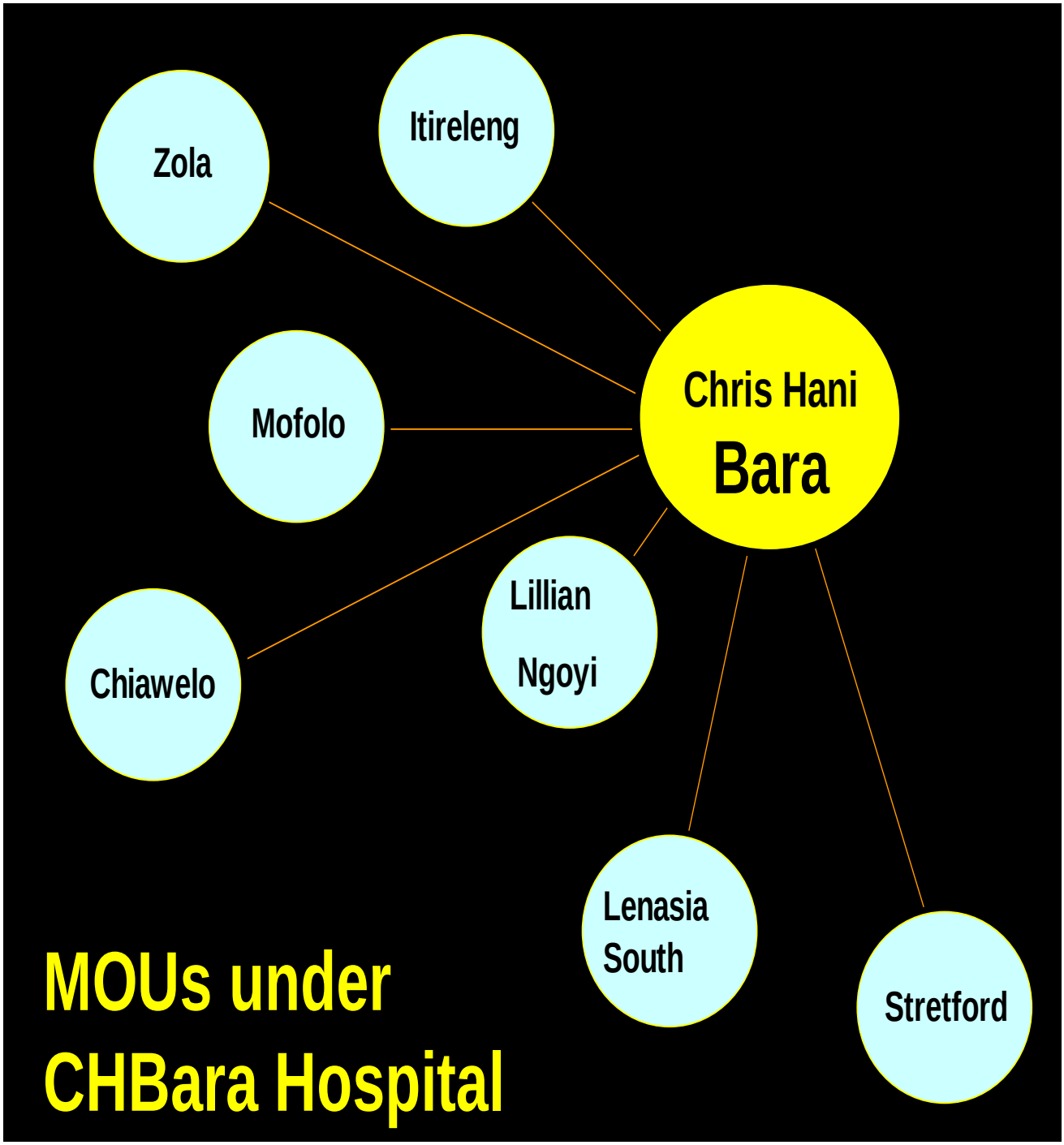
As stated previously, gate-keeping has been found to reduce health expenditure and improved health care utilisation. However, a systematic review found that those benefits may be limited and that the effect on patient-related outcomes is inconclusive [25]. Further research is needed to assess patient outcomes, patient satisfaction and quality of care in the implementation of such a system in health care, including maternity care.

The Soweto maternity service and Chris Hani Baragwanath Hospital

Soweto has a similar district health system for maternity care as exists in the Western Cape. However, in Soweto, there are no designated secondary (regional or level 2) hospitals because Chris Hani Baragwanath Hospital performs both secondary and tertiary functions, being the only government hospital for Greater Soweto, Orange Farm and Lenasia.

This area is populated by about two million people. Chris Hani Baragwanath (CHB) hospital with 2964 beds is said to be the largest hospital in the Southern hemisphere [26].

The maternity unit has 336 maternal beds and, being referral hospital, is a referral centre for 7 MOUs within and around Soweto.



The hospital is a tertiary referral centre for secondary (level 2) or regional hospitals elsewhere in southern Gauteng and in south-eastern Northwest Province. The number of deliveries conducted at this unit has increased steadily in recent years. In 1999, 16695 deliveries were

conducted with a caesarean section rate of 24.9%. In 2008, a record 23566 deliveries were conducted with the caesarean section rate at 31.2%.

This overwhelming increase in patient numbers, with no significant increase in facilities or staff, has put pressure on service delivery at Chris Hani Baragwanath Hospital. An audit conducted in 2004 evaluated the maternity referral system, with emphasis on intrapartum care and referral [27]. The audit found that approximately one-third of deliveries conducted at Chris Hani Baragwanath Hospital were of women who were self-referred in labour.

These women had no risk factors at the onset of labour and were scheduled for delivery at MOUs, but presented to Chris Hani Baragwanath when they went into labour. The majority of this group of women went on to have normal births at the hospital, with a caesarean rate of 8%, much less than the 45% caesarean section rate observed for women who had been referred by clinics for hospital labour and delivery. These results suggested a trend to an increasing proportion of self-referrals, because a community-based study conducted in 1995 in one part of Soweto (Chiawelo district) found that only 10% of women presenting in labour from that district had self-referred [3].

Introduction of obstetric triage at Chris Hani Baragwanath Hospital

MOUs are furnished with protocols which categorise a list of obstetric conditions which should be referred to Chris Hani Baragwanath Hospital for delivery, thus ensuring the appropriate referral of high-risk pregnant women [10]. It was therefore intuitive to formulate a strategy which would curb the number of self-referred low-risk deliveries taking place at Chris Hani Baragwanath Hospital. A triage programme was implemented in July 2008, resulting from a joint initiative between the provincial health department, the hospital, and the district health services which manage the MOUs. The main objective was to ensure that the ‘correct’ women would give birth at Chris Hani Baragwanath Hospital.

The triage unit was staffed with two midwives and placed near the main patients' entrance in the maternity section of the hospital. The unit has been in place for over two years, starting first as an office hours-only service, but eventually running 24 hours each day, 7 days a week. Self-referred women, who have no risk factors noted on their antenatal cards, are sent by maternity admission clerks (assisted at times by a midwife) to the triage unit to be assessed by a midwife and an intern. The women are rescreened for risk factors by the triage unit staff, and undergo an obstetric physical examination.

A check-list is used to ensure that appropriate risk factors are identified (Table 1). Women who are subsequently assessed as low-risk and in labour with the cervix less than 6 cm dilated are then transferred using a hospital ambulance to the MOU nearest to their homes for care in labour. Low-risk women who are found not be in labour are discharged home. Those women found to have risk factors or to be in advanced labour are sent to the hospital labour ward admissions area, for formal medical assessment and probable admission. Women transferred out to their MOUs do not undergo any admission procedure at the hospital. The check-list described above is the essential obstetric record, and it includes the name of the woman, date and time of arrival to the unit, as well as the presenting complaint and the intra-partum findings (blood pressure, cervical dilatation).

Table 1. Check-list for risk factors and clinical findings in the triage unit for use in women who self-refer in labour

Age is more than 15 and less than 40 years
Parity is less than 5
She is not a primigravida of age 35 years or more
There are no previous peri-natal deaths (stillbirths, early neonatal deaths)
There are not more than two previous miscarriages
There is no previous caesarean section, or surgery to the uterus or cervix
There is no previous vacuum or forceps delivery
There is no previous baby with birth defects or birth trauma
There is no history of previous postpartum haemorrhage requiring transfusion
There is no heart disease, diabetes, kidney disease, thyroid disease or epilepsy
There is no current tuberculosis or uncontrolled asthma
There is no history of mental illness
There is no obvious spinal, pelvic or lower limb deformity
The pregnancy is more than 35 and less than 42 weeks by best estimate
There is no history of antepartum haemorrhage
Fetal movements are felt and normal
The last antenatal haemoglobin level was 10 g/dL or more
There is no evidence of Rhesus isoimmunisation (Rh negative with antibodies)
There is no fetal abnormality on ultrasound scan
The level of consciousness is normal
The height is 150 cm or more
The weight is less than 120 kg
The blood pressure is normal (reading……)
The heart rate is normal (……)
The symphysis-fundal measurement is more than 31 and less than 40 cm

The presentation is cephalic
There is one fetus – by palpation or ultrasound
The fetal heart rate before and after contractions is between 110 and 160 bpm
There are no large obstructive vulval warts
There is no evidence of an old third-degree tear
No fresh blood or clots are observed on vaginal examination
The cervix is less than 6 cm dilated (…….)
If membranes have ruptured there is no meconium stained or offensive liquor

Following implementation of obstetric triage, the number of deliveries at Chris Hani Baragwanath Hospital decreased from 23566 in 2008 to 22818 in 2009. The number of clinic deliveries showed a proportionate increase from 9590 to 11415 during that same period [28]. This provided early evidence of a desired effect to reduce deliveries at Chris Hani Baragwanath Hospital. However, by mid-2009, the proportion of self-referred women had not decreased again. It was hoped that, in line with the decrease in numbers of deliveries, there should also be a decrease in the number of self-referrals. This would give clearer evidence of a real effect of the triage intervention.

Audit and feedback has been shown in trials to improve practice, especially where compliance with expected standards is poor [29]. This study was done to close the audit loop and provide evidence that the audit exercise initiated in 2004, with the feedback to the province, hospital and district, and the subsequent intervention (triage), had resulted in the desired outcome of fewer self-referrals.

STUDY OBJECTIVES

The purpose of this study was to perform a preliminary evaluation of the efficiency of the triage system as employed in the maternity unit at Chris Hani Baragwanath Hospital to ascertain whether this referral institution was still admitting and delivering a large number of self-referred obstetric patients.

The specific objectives were:

- To determine the proportion of low-risk self referred women admitted to Chris Hani Baragwanath Hospital in labour
- To describe the obstetric outcomes of low-risk self referred women, in terms of intrapartum, postpartum and fetal/neonatal complications.
- To compare the results with the findings of the previous audit done in 2004.

METHODS

Study design and study population

This was a retrospective descriptive study, using the same methodology as the 2004 study [27]. The study population was all women admitted in labour to the Chris Hani Baragwanath Hospital labour ward. Women attended to at the triage unit and discharged home or down-referred to their local clinic were excluded because they were not admitted. Those seen at the triage unit and admitted in labour were included, along with all other women admitted in labour. Collectively, the study population comprised three categories of women: 1) self-referrals; 2) those patients who by virtue of their antenatal risk factors were planned Chris Hani Baragwanath Hospital deliveries; and 3) those patients who as a result of intrapartum complications were referrals from MOUs or other hospitals.

Self-referrals were defined as women who bypassed MOUs or other primary care levels and presented themselves at Chris Hani Baragwanath Hospital, despite not being planned for hospital delivery, irrespective of their presenting complaint in labour. This information was available from the antenatal clinic cards, which indicated risk status and need for hospital delivery as determined by the antenatal clinic midwives at MOUs and clinics.

Sampling and sample size

The whole month of May 2010 was sampled. This month was chosen because there were no long holidays (Christmas or Easter) and the FIFA World Cup 2010 (which threatened to interfere with routine patient care at Chris Hani Baragwanath Hospital) had not yet started. The sampling frame was files of all deliveries following admission in labour at Chris Hani Baragwanath Hospital, drawn from the records in the maternity records room. Each day, a number was given to each file of all eligible women that had been discharged on the previous

day. Using a random number list, 6 women were chosen each day. A sample of about 180 was expected to provide 95% confidence intervals of ±7.5% around reported frequencies. For example, with a sample size of 180, if a frequency of 40% was found for a particular outcome, this would have a 95% confidence interval of approximately 32.5% to 47.5%.

Data collection

Hospital files of discharged women were drawn from the hospital records room as determined by the random sampling method mentioned above. Data was collected from each of the files, which included information from the hand-held antenatal clinic card which every booked pregnant woman attending antenatal clinic is issued, as well as the in-patient record.

Data included the following:

- Vital demographic and obstetric data – age, parity, gravidity
- The presence of antepartum risk factors – these are conditions for which the woman is screened for during the antenatal period and these would then be used to stratify patients into low or high risk, based on the local protocol [10]. This would indicate the type of antenatal care, as well as place and mode of delivery required. Antenatal risk factors included previous caesarean section, previous uterine surgery, cardiac conditions, multiple pregnancy (twins, triplets) and so on. Some antenatal risk factors, for example successfully treated anaemia and HIV infection, were not reasons for planned labour or delivery in hospital.
- Whether or not a plan of delivery as well as the place of delivery was indicated on the antenatal card of a booked patient.
- Reasons for referral or admission and time of admission. After-hours admissions were those which occurred between 16:00 and 08:00 on weekdays, and all admissions

from 16:00 on Fridays to 08:00 on Mondays. The one public holiday in May (1 May) fell on a weekend.

- Intrapartum risk factors. These were risk factors that arose during labour and were not present during antenatal care [10]. Poor progress in labour was defined as labour crossing the transfer (2-hour action line) on the partogram; big baby was defined as a baby with an estimated fetal weight of greater than 4 kg, according to any clinician; cephalopelvic disproportion was defined as caesarean section for that indication. These were patients who failed to progress despite adequate contractions and developed signs of obstructed labour (caput and moulding). Patients presenting in labour before 37 completed gestation weeks were said to be in preterm labour. Fetal heart rate abnormalities included bradycardia (less than 110 beats per minute), tachycardia (heart rate greater than 160 beats per minute) and any decelerations.

- Mode of delivery

- Neonatal outcomes

The complete list of data collected is attached as the data sheet (Appendix A).

In addition, the triage unit's statistics for May 2010 were collected from that unit.

Data analysis

All data was entered onto Microsoft Excel software from which it was exported to Epi-Info software for analysis. Descriptive statistical techniques included statements of proportions and percentages, means ± standard deviations, and medians with ranges and interquartile ranges. Comparisons of proportions for probability were made using the Chi-squared test or, where necessary, Fisher's exact test. Comparisons of frequency distributions were done using Student's t-test for normal distributions, and the Mann-Whitney non-parametric test for

skewed distributions. For all statistical tests, statistical significance was accepted at a P value less than 0.05.

Ethics

The study was submitted to the University of the Witwatersrand's Human Research Ethics Committee (Medical) for approval. The clearance certificate M10807 attached (appendix B). All records were obtained from files after the women were discharged. To ensure anonymity of the data, the women's hospital names and numbers were not entered onto the data sheets.

Funding

The entire cost of the study which included printing costs was borne by the researcher. Data capture was conducted by the researcher and statistical analysis by the supervisor at no extra cost.

RESULTS

One hundred and eighty-two intrapartum admissions were sampled. The mean age was 25.2±6.1 years, with 31 women under the age of 20 years, and 16 aged 35 years or more. Ninety-four women (51%) were nulliparous, with the parity range being 0 to 7.

Antenatal care was not accessed (these women were 'unbooked') by 10 women (5%). Among the women that attended antenatal clinic (n=172), the median number of antenatal visits was 3 (range 1 to 6; interquartile range 2 to 4). A plan for place of delivery (clinic or hospital) was inserted on the antenatal cards of 135 of the women who attended antenatal clinic (79%). Antenatal risks factors were present in 87 women (48%), but not all of these women necessarily had a plan for delivery in hospital. Antenatal care details are shown in Table 2.

Table 2. Antenatal care details (n=182)

Women not attending antenatal clinic (unbooked)	10 (5%)
Median number of antenatal care visits (range) (n=172)	3 (1-6)
Note made on plan for clinic or hospital delivery (n=172)	135 (78%)
Plan for clinic delivery	111 (65%)
Plan for hospital delivery	24 (14%)
Number of antenatal risk factors:	
None	95 (52%)
1	64 (35%)
2	21 (12%)
≥3	2 (1%)

The most frequent antenatal risk factors were HIV seropositivity (n=46), hypertensive disorders (n=21), anaemia (haemoglobin level <10 g/dL) (n=17), and previous caesarean section (n=13).

On presenting in labour, 35 women were self-referred (19%), 110 (60%) were transferred during labour from a clinic (60%), 9 (5%) were transferred during labour from another hospital, and 28 (15%) presented in labour at Chris Hani Baragwanath in accordance with their delivery plans. Approximately 63% of admissions occurred after hours. One hundred and nine women had risk factors arising during labour, the most frequent being poor progress in labour, and preterm labour (Table 3). Fetal heart rate abnormalities were found in 29 labours (16%). Oxytocin augmentation was required in 25 women (14%).

Table 3. Risk factors arising during labour (the predominant risk factor in each case) (n=182).

No risk factors	73 (40%)
Poor progress in labour	37 (20%)
Preterm labour	23 (13%)
Prelabour rupture of the membranes	14 (8%)
Suspected fetal macrosomia – 'big baby'	8 (4%)
Antepartum haemorrhage	7 (4%)
Malpresentation	7 (4%)
Thick meconium-staining of the liquor	6 (3%)
Cephalopelvic disproportion	5 (3%)

Forty-five women required caesarean sections (25%), and 4 (2%) had assisted vaginal deliveries. There were two twin pregnancies. The mean birth weight of the 184 newborns was 2930±590 g, with a range of 750 g to 4195 g. Thirty-three babies had birth weights under 2500 g, and one weighed less than 1000 g. The median Apgar score was 10 (interquartile range 9-10), with 7 live-born infants having 5-minute Apgar scores less than 7. There were three macerated stillbirths, and no early neonatal deaths. Five newborns were admitted to the neonatal intensive care unit.

The self-referred women (n=35) were compared with hospital-referred women (those for planned hospital deliveries or who were referred in labour from clinics or other hospitals (n=147). Self-referred women did not differ from the hospital-referred group in age and parity (Table 4). Self-referred women more frequently had no antenatal care (14%) than hospital-referred women (3%) (P=0.01), but did not differ significantly in numbers of antenatal care visits or in delivery plans being made on the antenatal cards. There was no difference in after-hours presentation between the self-referral group and hospital delivery group. Self-referred women more frequently had no antenatal risk factors (77%) than hospital-referred women (46%) (P=0.001).

Comparison of intrapartum events is shown in Table 5. Risk factors arising in labour were less frequent in the self-referred women, and this difference was accounted for by women with poor progress, cephalopelvic disproportion and suspected big baby. There were 49 such women (33%) in the hospital-referred group, of which 44 (90%) were referred by clinics during labour, and 3 (9%) in the self-referred group (P=0.002). There were no differences in frequencies of antepartum haemorrhage, preterm labour, prelabour rupture of the membranes, thick meconium-staining of the liquor, malpresentation, fetal heart rate abnormalities and need for oxytocin augmentation of labour. The caesarean section and assisted vaginal delivery rates also did not differ significantly between the two groups.

Table 4. Comparison of self-referred and hospital-referred women: demographic details and antenatal care

	Self-referrals (n=35)	**Hospital referrals (n=147)**	**P value**
Mean age in years	24.7±5.9	25.4±6.2	0.58
Median parity (IQR)	0 (0-2)	0 (0-1)	0.76
Did not attend antenatal clinic	5 (14%)	5 (3%)	0.01
Median number of antenatal care visits (IQR) (n=172)	2 (1-3)	3 (2-4)	0.13
Note made on plan for clinic or hospital delivery (n=172)	22 (73%)	24 (83%)	0.20
After-hours admissions	24 (69%)	90 (61%)	0.42
No antenatal risk factors	27 (77%)	68 (46%)	0.001

The mean birth weights did not differ between self-referred and hospital-referred women (2887 g v. 2940 g respectively) (P=0.48). Five-minute Apgar scores less than 7 were recorded for 1 of the newborns in the self-referred group, and 6 in the hospital-referred group (P=1.0). There were 2 macerated stillbirths in the self-referred group and there was 1 in the hospital-referred group of women.

Inspection of the obstetric histories of each of the 35 self-referred women found that 20 of these women did not develop risk factors during labour and could have had their confinements completed at clinics. The remaining 15 developed risk factors in labour that would have necessitated referral to or back to Chris Hani Baragwanath Hospital had these women presented at clinics in labour. Seven of these women required caesarean sections, and one had an assisted delivery. Another 4 gave birth to infants weighing less than 2000 g. Three women, one with malpresentation, one with prelabour rupture of the membranes, and one with antepartum haemorrhage, made up the remainder.

There is no data available on whether any of the 35 self-referrals were triaged and admitted on the basis of risk factors detected in the triage unit.

Table 5. Comparison of self-referred and hospital-referred women: intrapartum risk factors and care

	Self-referrals (n=35)	**Hospital referrals (n=147)**	**P value**
No risk factors arising in labour	20 (57%)	53 (36%)	0.02
Poor progress, CPD or suspected big baby	3 (9%)	49 (33%)	0.002
Antepartum haemorrhage	2 (6%)	5 (3%)	0.40
Preterm labour	6 (17%)	17 (12%)	0.37
Prelabour rupture of the membranes	2 (6%)	12 (8%)	0.47
Thick meconium-staining of the liquor	0 (0%)	6 (4%)	0.27
Malpresentation	2 (6%)	5 (3%)	0.40
Fetal heart rate abnormalities	6 (17%)	23 (16%)	0.83
Augmentation of labour with oxytocin	5 (14%)	20 (14%)	0.92
Caesarean section	7 (20%)	38 (26%)	0.94
Assisted vaginal delivery	1 (3%)	3 (2%)	0.58

CPD=cephalopelvic disproportion

During May 2010, the triage unit attended to 171 self-referred women. Eighty-three of these women (49%) were down-referred, 70 (41%) were admitted at Chris Hani Baragwanath Hospital, either because of the presence of a risk factor or because of advanced labour, and 18 (11%) were discharged home because they were not in labour.

DISCUSSION

This study has shown a decrease in the proportion of self-referred women presenting in labour at Chris Hani Baragwanath Hospital (19%), compared with the findings of a similar study in 2004 (32%) [27]. It is likely that this decrease occurred as a result of the triage system. This is supported by the fact that the triage unit down-referred 49% of self-referred women during May 2010. The other important significant difference between the two sets of results is that in this study, the caesarean section rate in the self-referral group was no different from that in the planned hospital delivery group. This would appear to reflect the screening or filtering process of self-referrals that occurs in the triage unit. Unlike in 2002, when self-referrals were overwhelmingly low-risk, this group had more risk factors. The findings of the two studies are shown in Table 6.

Table 6. Significant differences between this study and the study done in 2004 [27].

	2004 study [25]	**2010 study**
Self-referrals	32%	19%
Age and parity	Self-referrals younger with lower parity	No differences in age or parity
Most common indications for referral	Poor progress, fetal heart rate abnormalities, hypertension	Poor progress, preterm labour
Intrapartum events	Fewer intrapartum events in self-referred group	No difference in frequencies of intrapartum events
Caesarean section rates	Self-referred group 8% Clinic-referral group 45%	Self-referral group 20% Clinic-referral group 26%

The table reflects how triage may have helped in reducing the number of low-risk self-referred women who deliver at Chris Hani Baragwanath Hospital. Upon closer scrutiny of the obstetric histories of the 35 self-referred women, 15 had or developed risk factors and needed to be delivered at the hospital and the other 20 did not, and could have completed their entire confinements at MOUs.

The caesarean section rate in this study of the self referral group and the clinic referral group is roughly the same, 20% and 26% respectively. This could be because the sample size was small and an appreciable difference not detectable or it could be that triage was successful in triaging patients that needed to be there. The self referrals that subsequently delivered at CHB were filtered correctly and thus required delivery in a high risk facility. This argument seems to hold true if one considers the 2004 study where triage did not exist where the self referral group had an 8% caesarean section rate compared to the clinic referral group which had a rate of 45%.

A limitation of this study was its inability to detect which of the self-referred women had been through the triage process before being admitted. Passage through the triage unit is not normally documented in the case-notes and thus this information was not included as part of the data information sheet. Ideally, all of the self-referred women should have been triaged, with only those who had risk factors or in advanced labour being admitted. The 20 women without any risk factors should have been sent to MOUs for delivery, but instead seem to have passed through, or bypassed, the triage system. It is possible that they were in advanced labour and thus, in accordance with triage protocol, could not be down-referred to the nearest MOU. It is also possible that some self-referred women were not sent to the triage unit by the admission clerks, or that the triage unit was not able to screen women effectively and in time due to staff shortages. Data in the in-patient files did not include any records of triage, even if

it was done, so this information was not available for this study. This deficiency in the records system should be corrected by the hospital.

The efficiency of the triage unit can also be measured by analysing the outcomes of patients (maternal and fetal) who were assessed as low risk in the triage unit and then down-referred to the local MOU. It would also be of help to know how many of the down referrals were sent back to CHB as they had subsequently developed intrapartum risk factors and thus needed delivery in a high risk setting. Buchmann et al analysed triage unit data over a 15 month period. 47% patients of patients seen in the triage unit were down referred to the local MOU. Of those down referred 18% were referred back to CHB [28]. This figure represents a significant number of patients who were classified as low risk by the triage unit who perhaps were not truly low risk. However these patients may have been low risk and then subsequently developed intra partum risk factors which made them unsuitable for delivery in the MOU. It is important to take cognisance of the fact that labour is a dynamic process and a low risk patient may develop complications which may later categorise them as high risk. Unfortunately in this study there is no data on patients originally classified as low risk and down referred only to be referred back to CHB for their deliveries.

From the triage unit statistics, it appears that the triage unit was active during May 2010, and down-referred about half of the self-referrals attended to. Because this study only considered a sample of admissions during the month, it is not possible to link the triage unit data (which included all women seen in the month) to the sample. This deficiency limits this study only to admissions to the labour ward, excluding also self-referrals not in labour and discharged. The total number of self-referrals in May (to the triage unit (n=171) and bypassing the triage unit to the admissions area (n=unknown) is unknown.

A limitation in interpreting of the data in comparison with 2004 was the choice of a single month rather than a broader spread of months. This was necessitated by filing difficulties in the records room at Chris Hani Baragwanath Hospital. During early 2010, retrieval of records greater than about one month old was extremely difficult owing to filing space shortages. It is possible that patient admissions data from a single month may not provide a representative picture of, for instance, a year of admissions.

Despite these limitations, the finding of a decrease in self-referrals admitted to hospital, using a similar methodology to the study done in 2004, provides encouraging results, for one month at least, to suggest that triage has reduced the number of self-referrals seen in the labour ward admissions area. The finding is especially pleasing in view of the perception that self-referral was on the increase, and may represent a critical reversal of an unwelcome local trend in obstetric referral patterns.

Self-referred women were more likely to have received no antenatal care. Antenatal care at the MOUs includes information on where to give birth, and it is likely that these women did not know where to go when labour started. The absence of antenatal care can therefore be considered a contributory factor to self-referral, with the hospital being the easiest option for women who have not received advice on where to deliver. Adequate antenatal care not only includes booking at antenatal clinic but requires that the antenatal card be completed correctly and that includes the formulation and documentation of a delivery plan. In 22% of our study patients this delivery plan was not documented. This lack of planning is concerning and may have caused confusion and doubt as to where to go once patients were in labour. Women in the self-referral group were also less likely to have any antenatal risk factors. This was expected because if they did have risk factors, they would have been referred specifically to hospital. The reasons for self-referral are unclear, and no studies could be found to explain why some women self-refer. Until the reasons become clear, one may

assume that the quality of antenatal care, and the impression it gives of the services at MOUs, would influence women's thinking on whether to accept labour at an MOU or to self-refer to hospital. It was notable also that women who self-referred had a lower number of median visits than those who were referred to hospital for labour. It is tempting to conclude that quality antenatal care would reduce self-referral significantly and eliminate the need for a triage system.

Another limitation of the study is that it is a retrospective study and as such lacks the ability to provide answers as to why women self refer. Further prospective research using a patient questionnaire or qualitative in-depth interviews may provide such answers.

A district hospital is an integral part of a well-functioning district health system. Chris Hani Baragwanath Hospital is unique in that it does not have the back-up support of district (level 1) or secondary-level hospitals in Soweto and surrounding areas. One of the key factors seen to impact on patient health-seeking behaviour is the absence of a secondary-level centre in the area where the tertiary hospital is situated [30]. Strategies, such as the triage system, aim to reduce the number of self- referrals in tertiary-level (and also secondary-level) hospitals. Perhaps efforts to strengthen the Greater Soweto referral system could include the provision of secondary-level hospitals. The Cape Town referral model of MOUs and hospitals could then more easily be replicated here.

CONCLUSION

This preliminary retrospective evaluation of the triage system has shown that obstetric triage appears to have played a role in reducing the number of low-risk patients who deliver at Chris Hani Baragwanath Hospital. Triage has the potential to maintain the integrity of a referral system by providing a mechanism for decanting of low-risk patients to the appropriate level of care. The study has highlighted how collaboration between all service providers (health care workers including obstetricians and midwives, policy makers, government and emergency transport services) can address a specific problem, leading to the implementation of a solution to promote equitable access of maternity health care in the Greater Soweto area.

Further prospective research should investigate:

1. Total numbers of self-referrals, triages, down-referrals, and admissions at Chris Hani Baragwanath Hospital and the MOUs during a specified time frame
2. The reasons why women self-refer to hospital when MOUs are available
3. Women's views on being down-referred to MOUs
4. The effect of obstetric triage on maternal and neonatal outcomes
5. If obstetric triage is viable in secondary hospital and rural environments
6. Cost-effectiveness of obstetric triage in a South African setting

Such research, if it delivers favourable results, would provide data to allow the introduction of obstetric triage throughout this country and elsewhere.

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Appendix A

Data sheet

Triage evaluation study

Chris Hani Baragwanath admissions / deliveries

Study number ..... Date of admission .....

Time of admission.....

Age ☐ **Parity** ☐ **Gravidity** ☐

Booked **CHB** ☐ **Clinic** ☐

Other hospital ☐

Unbooked ☐

Antenatal visits number ☐

Antenatal delivery plan **YES** ☐ **Clinic** ☐

CHB ☐

NO ☐

Antenatal Risk factors

HPT disorders	**Cardiac**	**Diabetes**	**Anaemia**	**Asthma**
Epilepsy	**HIV**	**Poor Obs Hx**	**Multiple pregnancy**	**Rhesus neg**
Previous SB	**Previous PPH**	**Previous C/S**	**Prev PTL**	**Other**

Labour & delivery

BBA	**Clinic referral**	**Hospital referral**
Self referral	**Clinic delivery**	**CHB delivery**

Risk factors

APH	**PTL**	**PROM**
MSL	**Poor Progress**	**Mal-presentation**
Cord prolapsed	**CPD**	**Big baby**

Fetal Heart Rate abnormalities

YES ☐ **Action taken** **NIL** ☐

CFM ☐

C/ S ☐

NO ☐

Date of delivery **Time of delivery**

Mode of delivery

NVD	**Assisted delivery**	**C/S**

Neonatal outcome

Birth weight **Alive** ☐ **Stillbirth** ☐

NICU: **YES** ☐ **NO** ☐

Other Interventions/ management

Induction of labour	**Augmentation of labour**	**Blood transfusion**
Evacuation of uterus	**Laparotomy/hysterectomy**	**ICU admission**

Date of discharge

Appendix B

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 21 September 2010

TITLE OF PROJECT:

Self-referral at CHB after the introduction of the triage down referral system

UNIVERSITY: Witwatersrand

Principal Investigator: Dr W F Dlakavu

Department: Obstetrics and Gynaecology

Supervisor (If relevant): Prof E Buchmann

Permission Head Department (where research conducted) Yes

The Medical Advisory Committee recommends/ ~~does not recommend~~ that the said research be conducted at Chris Hani Baragwanath Hospital. The CEO /management of Chris Hani Baragwanath Hospital is accordingly informed and subject to:-

- Permission having been granted by the Committee for Research on Human Subjects of the University of the Witwatersrand.
- the Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- the MAC will be informed of any serious adverse events as soon as they occur
- permission is granted for the duration of the Ethics Committee approval.

.....

Recommended/~~Not Recommended~~

(On behalf of the MAC)

Date: 21/9/2010

PROF JOHN PETTIFOR
MMED, FCP (S.A.)
CHIEF PAEDIATRICIAN

.....

Approved/~~Not Approved~~

Hospital Management

Date: 22 SEPT 2010

Appendix C

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
14/49 Dr Welekazi F Dlakavu

CLEARANCE CERTIFICATE	M10807
PROJECT	Self Referral at CH Baragwanath Hospital After the Introduction of the Triage Down Referral System
INVESTIGATORS	Dr Welekazi F Dlakavu
DEPARTMENT	Department of Obstetrics & Gynaecology
DATE CONSIDERED	27/08/2010
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 01/09/2010 CHAIRPERSON .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Prof E Buchmann

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. I agree to a completion of a yearly progress report.
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...