Health in Women of Reproductive Age

A Survey in Rural Zimbabwe

BY

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ABSTRACT

General and reproductive health and reproductive outcome were described in rural women of childbearing age (15-44 years) during 1992-93 in a cross-sectional study in Zimbabwe. Through a two-stage sampling procedure twelve villages were selected at random, and 79% of the women in the villages accepted to participate (n=1213). In a structured interview women’s self-reported morbidity, socio-economic conditions, use of health care and fertility regulation methods, reproductive outcome and infertility problems were assessed. The prevalence rates of anaemia, malaria and syphilis were investigated. Retrospectively, HIV serology was anonymously assessed and associations with socio-economic conditions and morbidity were analysed.

The mean age was 28 years. Family planning was currently used by 37%. Primary and secondary infertility was reported by 0.9% and 4.4%, respectively. The perinatal mortality rate for all completed pregnancies (n=3601) was 23/1000. During the latest completed pregnancy 94% had attended antenatal care and 85% had delivered in hospitals or clinics. The self-reported complications during delivery seemed to have been cared for within the health care system.

Women perceived their health as being generally good. Mean haemoglobin (Hb) was 13.5 g/dl and only 3.4% were anaemic (Hb ≤11.0 g/dl). Malaria prevalence was 5.4%, but a positive malaria test was not associated with anaemia. Syphilis prevalence was 2.2%, and a positive syphilis test increased the risk of being HIV positive three-fold (OR=3.0; 95% CI: 1.4-6.2).

The prevalence of HIV was high (22%). Women aged 15-19 had the lowest prevalence (7.6%), while the highest was found in married women aged 20-29 years (30%). The differences in HIV prevalence between the villages ranged between 8.4% and 33%. HIV positive women reported no more morbidity than HIV negative women. The low morbidity found at the time of the study indicates a fairly short duration of the HIV epidemic.

Keywords: Cross-sectional, developing country, women, reproduction, self-reported morbidity, anthropometric measurements, anaemia, malaria, syphilis, HIV.

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To the rural women who generously shared their time and life experience with us
ORIGINAL PAPERS

This thesis is based on the following papers, which will be referred to in the text by their Roman numerals:


    Submitted.

    Submitted.


V  Nilses C, Nyström L, Munjanja S, Lindmark G. Symptoms and findings related to HIV in women in rural Gutu District, Zimbabwe.
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## CONTENTS

**INTRODUCTION** ............................................................................................................................7

**BACKGROUND** ...........................................................................................................................7

- Poverty ........................................................................................................................................8
- Gender aspects and women’s health ..........................................................................................8
- Women’s burden of disease .......................................................................................................9
- Women’s health - maternal health - reproductive health............................................................10
- Methodological problems in studies of maternal and reproductive health in developing countries .......................................................................................................................... 10
- Reproduction ............................................................................................................................11
- Major health problems influencing reproductive health and/or reproductive outcomes ........14
- Zimbabwe ......................................................................................................................................17

**AIMS** ........................................................................................................................................18

**SUBJECTS AND METHODS** .......................................................................................................18

- Study area ..................................................................................................................................18
- Health services ............................................................................................................................20
- Study design ...............................................................................................................................21
- Study population .......................................................................................................................21
- Follow-up of non-participants .................................................................................................21
- Sampling method .......................................................................................................................21
- Pilot study ....................................................................................................................................22
- Study period ................................................................................................................................22
- Measure instruments .................................................................................................................23
- Handling of blood samples .........................................................................................................26
- Fieldwork .....................................................................................................................................26
- Statistical methods .....................................................................................................................27
- Ethical considerations ..................................................................................................................27

**RESULTS** ..................................................................................................................................28

- Background characteristics ......................................................................................................28
- Reproduction ..............................................................................................................................29
- Anaemia ......................................................................................................................................33
- Malaria .......................................................................................................................................35
- Syphilis .......................................................................................................................................35
- HIV ............................................................................................................................................35

**DISCUSSION** ..............................................................................................................................36

- Methodological aspects ..............................................................................................................36
- Illness - disease - health ..............................................................................................................38
- Perceived health and ill health ...................................................................................................38
- Anaemia .......................................................................................................................................39
- STD - HIV ..................................................................................................................................40
- Women and HIV .........................................................................................................................41
- Reproduction ..............................................................................................................................42
- Fertility regulation ......................................................................................................................43
- Antenatal care and maternity care .............................................................................................45
- Research findings and suggestions for further research ............................................................46

**CONCLUSIONS** ..........................................................................................................................47

**ACKNOWLEDGEMENTS** ............................................................................................................48

**REFERENCES** ............................................................................................................................50
ABBREVIATIONS

AIDS Acquired Immuno Deficiency Syndrome
ANC Antenatal Care
BMI Body Mass Index
CBD Community Based Distributor
CDW Community Development Worker
CI Confidence Interval
C/S Caesarean Section
DALK Disability Adjusted Life Years
DHS Demographic Health Survey
EOC Emergency Obstetric Care
FBC Full Blood Count
FP Family Planning
GNP Gross National Product
HIV Human Immunodeficiency Virus
IUGR Intrauterine Growth Retardation
LBW Low Birth Weight
MCH Maternal and Child Health
MMR Maternal Mortality Rate
MoH Ministry of Health
OC Oral Contraception
OR Odds ratio
PMD Provincial Medical Director
RHC Rural Health Centre
RPR Rapid Plasma Reagin
SAP Structural Adjustment Program
SMI Safe Motherhood Initiative
STD Sexually Transmitted Diseases
TFR Total Fertility Rate
TPHA Treponema Pallidum
UNICEF United Nations Children’s Fund
UNDP United Nations Development Program
VIDCO Village Development Committee
WFS World Fertility Survey
WHO World Health Organization

DEFINITIONS

Body Mass Index (Syn: Quetelet’s index) Anthropometric measure, defined as weight in kilograms divided by the square of height in metres

Contraceptive prevalence rate The percentage of married women of childbearing age who are using or whose husbands are using any form of contraception, whether modern or traditional (Source:UNICEF)

Infant mortality rate A measure of the yearly rate of deaths in children less than one year old. The denominator is the number of live births in the same year

Maternal mortality rate Number of deaths arising during pregnancy or from puerperal causes during one year per number of live births during the same period

Perinatal mortality rate Total number of stillbirths after 28 weeks of pregnancy and deaths during first 7 days of life /1000 total births

Primary infertility rate The percentage of couples who have never conceived

Positive predictive value The probability that a person with a positive test is a true positive (i.e. does have the disease)

Secondary infertility rate The percentage of couples who have not conceived within a defined period of time after a previous pregnancy or childbirth

Sensitivity The proportion of truly diseased persons in the screened population who are identified as diseased by the screening test

Specificity The proportion of truly non-diseased persons who are so identified by the screening test

Total fertility rate The average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates
INTRODUCTION

Studies on women’s health are often performed during short periods of a woman’s life and often during pregnancy. The studies may be related to specific situations, such as visits to family planning (FP) clinics or STD clinics. As many women in developing countries do not regularly use these resources, studies do not include them. Health interventions intended to improve women’s reproductive health must also be based on knowledge about women’s own perceptions of relevant health problems.

My own interest in reproductive health started in the mid-1980s when I worked as a gynaecologist in a district hospital in Zimbabwe. In my work I was often struck by the strength of these women and I admired their ability to show their joy in living when I saw all their hardships. Their inventiveness in supporting their families with next to no money showed no limits. In spite of gender inequalities they were not oppressed. The documented knowledge concerning women’s reproductive health problems was very limited. An interest in research with practical implications took me back to Zimbabwe some years later. I was fortunate to become part of a research collaboration that was already underway between the University of Zimbabwe and the Universities of Uppsala and Umeå. This study is one of the projects within that framework and has assessed women’s reproductive health problems through interviews, physical examination and investigation of diseases that are related to women’s reproductive health and reproductive outcome. The study was planned and carried out in close collaboration with the late Provincial Medical Director of Masvingo Province, Dr Peter Nhindiri, as well as the Gutu District Medical Officer and the staff at Gutu District Hospital.

BACKGROUND

The neglect of women’s health needs was highlighted in 1985 when Rosenfield and Maine, in their article “Where is the M in MCH?”, called for action against the silent but vast problem of women dying in pregnancy and childbirth (Rosenfield & Maine 1985). They pointed out that maternal and child health (MCH) programs were addressing mainly the needs of the child and were overlooking the mother. In 1987 a Safe Motherhood Conference was held in Nairobi, Kenya, which was the starting point for the Safe Motherhood Initiative (SMI). Awareness campaigns and meetings were started in developing countries in order to mobilise governments and policy-makers to take action against the long neglected problem of women dying in pregnancy and childbirth. In order to assess the magnitude of the problem, maternal mortality studies were performed in many countries. It was realised that many deaths occurred in silence and were never reported (Campbell & Graham 1991).
Most women have uneventful pregnancies and deliveries. However, if a complication arises the woman must be able to reach functioning health facilities. A maternal death can seldom be predicted. The most glaring omission is the lack of interventions aimed directly at preventing maternal death (Maine 1997). After the World Summit for Children in 1990 that was arranged by UNICEF, a plan of action got underway. Guidelines were developed for monitoring interventions aimed at reducing maternal mortality. Some measurements have been suggested such as: Emergency Obstetric Care (EOC) facilities, the number of women delivered by health professionals and the proportion of women with obstetric complications who were treated in EOC facilities (Maine et al 1997).

But maternal mortality constitutes only the tip of the iceberg with respect to maternal morbidity. For every maternal death it is estimated that one hundred women suffer from acute obstetrical complications (Koblinsky 1995). Information on women’s morbidity in developing countries is scarce and fragmented. This limited information and the comparatively low priority accorded to women’s health are mutually reinforcing (Graham & Campbell 1991).

**Poverty**

“Two out of three women in the world suffer from poverty, the most debilitating disease known to humanity“ (Jacobson 1993). The gap in living standards between developed and developing countries has widened and is now in the range of 30-fold (Harrison 1997). In terms of GNP per capita the countries of the world fall into four classes, and in 1950 there were 24 countries in the poorest class. By 1997 this figure had increased to 47, 29 of which were in sub-Saharan Africa (Harrison 1997). The Structural Adjustment Programs, which were introduced during the 1980’, caused severe cuts in public spending within the health sector, with serious implications for women’s reproductive health. In 1995 a Caesarean Section (C/S) in one of the main cities in Nigeria cost the equivalent of an average nine-month salary. From 1987 to 1994 maternal mortality had increased from 6 to 18% in mothers who had not attended ANC (Harrison 1995).

**Gender aspects and women’s health**

The discrimination against women in the developing world starts in childhood. ”Son preference” limits girls’ access to food, education and health care (Alcalá 1994). If parents cannot afford to educate all their children, they prefer to send their sons to school. The Demographic Health Survey (DHS) in Zimbabwe indicated that school enrolment was similar in terms of gender, but at the secondary school level the number of girls was much lower (Zimbabwe Demographic and Health Survey 1995). Women outnumber men by two to one among the
world’s illiterate population (France 1998), and 70% of those who are poor are women (UNDP 1995). Nevertheless, diminishing poverty does not necessarily mean that the status of women is improved.

Lack of economic power also makes women dependent in their decision making. Many women have to wait for consent from the family elders or their husband before seeking care for a health problem (Kowalewski et al 2000). The status of individuals within a society influences their physical, social and mental well being. Many women cope with crises by putting their needs last. This subordination is also a prerequisite for physical as well as mental violence, which has severe implications for maternal mortality as well as morbidity, and may be the least recognised human rights abuse in the world (Heise et al 1994).

There is also a gender bias in the area of research (Graham & Campbell 1991). The situation of women needs to be more accurately reflected in routinely collected health statistics (France 1998). Clinical and epidemiological studies on the contribution of gender to the aetiology and development of many major diseases are lacking (Graham & Campbell 1991). As an example, most of the major studies on coronary heart disease in the developed world have been done on men only (Freedman & Maine 1993). The exclusion of women has often been justified on the grounds that the hormonal changes they undergo make the results difficult to interpret (France 1998).

**Women’s burden of disease**

Global estimates of the magnitude of reproductive ill health have previously been based only on mortality. From 1993 and onwards World Development Report has used DALY (disability-adjusted life years) as a measure of the overall burden of disease. One DALY is one lost year of healthy life. The DALY expresses both time lost because of premature death and time lived with disability, physical as well as mental (Murray & Acharya 1997). The use of this methodology adds another dimension to reproductive ill health. Whereas reproductive causes of death in sub-Saharan Africa in 1990 contributed to 18% of the mortality in women of reproductive age, 26% of the disease burden for women expressed in DALY was reproductive health related (Murray & Lopez 1998).

In developing countries, in 1990, reproductive ill health accounted for 36% of the total disease burden among women of reproductive age (15-44 years), as compared to only 12% in men. For women, the three groups of conditions included in reproductive ill health are pregnancy-related deaths and disabilities and sexually transmitted diseases including HIV/AIDS (AbouZahr 1999).
Women's health - maternal health - reproductive health

There is a high degree of overlap between the three concepts (Graham & Campbell 1991). Women’s health is often equated with the clinical specialities of obstetrics and gynaecology. However, it also includes communicable and non-communicable diseases not specific to women, and as a concept it is the widest of three. Maternal health relates to the time period from the beginning of pregnancy to the end of puerperium. However, this is not an isolated period. It is intimately related to the woman’s general health status when she is not pregnant. Reproductive health is related to all aspects of reproduction and also includes men. According to definitions used by WHO as well as in international declarations and conventions, it constitutes the state of complete physical, mental and social well-being in all matters related to reproduction. Men and women should have the ability to reproduce, and the freedom to decide if, when and how often to do so. They should have the ability to avoid diseases and to be free from violence related to sexuality and reproduction. Also, women must have access to health care for safe pregnancy and childbirth.

The International Conference on Population and Development (ICPD) in Cairo in 1994, as well as the Fourth World Conference on Women (FWCW) in Beijing in 1995, brought the neglect of reproductive and sexual health into focus as the root of many problems. A Program of Action was agreed upon in which sexual and reproductive rights were recognised as human rights and cornerstones for development.

Methodological problems in studies of maternal and reproductive health in developing countries

Reproductive health studies tend to be focused on specific occurrences and limited time periods, and numerous studies have been performed during antenatal care (ANC) (Axemo 1995, Berhane 2000, Wessel 1998). In order to capture the burden of disease, hospital-based studies are used. However, they are limited in their coverage, and rural areas are not proportionally represented. Also, they are rarely population or area based. Prospective studies have problems with follow-up, especially in developing countries. Further, they are not suitable for studying the prevalence of disease as there is a mandate to treat identified morbidities which changes the prevalence (Fortney & Smith 1999).

Cross-sectional studies in a defined area are presently the most feasible option for the study of maternal morbidity in developing countries (Bhatia 1995). This method is ideal for chronic conditions that can be identified on examination. To assess obstetric morbidity many studies have used retrospective questions about a recent pregnancy. This was done in India when women
who had delivered within the last five years were interviewed about their pregnancy and pregnancy complications (Bhatia & Cleland 1996). This approach will register symptoms rather than conditions, and is dependent upon the women’s perception of morbidity. Recall also becomes a major issue (Fortney & Smith 1999). Some studies on gynaecological morbidity have combined the interview with a clinical examination. This was done in a small but often cited study in India (Bang et al 1989), as well as in a study in Egypt (Younis et al 1993). However, it is sometimes the case that a large proportion of the study subjects refuses to undergo a gynaecological examination. In India 41% were unwilling to be examined as compared to a figure of 9% in Egypt.

The need for continuous registration of births and deaths in order to generate data on fertility was the starting point for ”field laboratories” in some developing countries. They can provide useful information about vital events and they can also constitute a platform for health intervention studies. A database which was started 14 years ago was used for a study on women’s health in Ethiopia (Berhane 2000). Matlab, a field station in Bangladesh, was started as early as 1963 with the aim of integrating programs in maternal and child health and FP (Fauveau 1994).

Reproduction

Fertility

Globally, women’s childbearing patterns are influenced by their ages at menarche and marriage. In sub-Saharan Africa, age at menarche is generally two to three years higher than in developed countries. In two studies from Zimbabwe, 14 years (Rusakaniko et al 1997) and 15 years (Barnett et al 1999) were reported.

Women in sub-Saharan Africa marry early. This is most evident in Moslem-dominated countries and in many countries in East and Central Africa, where the median age at marriage is less than 18 years (Acsadi & Johnson-Acsadi 1990). A higher level of education increases age at marriage and decreases total fertility rate (TFR). In Nigeria the level of education had a very clear impact on mean parity and the number of surviving children increased (Harrison 1985).

The demographic transition theory departs from the historical pattern of change in mortality and fertility. In Europe a decline in child mortality was followed by a decline in fertility. In Africa there was a delay in the reduction of fertility. Child survival was improved by means of interventions, but at the same time fertility levels remained high (Egerö 1994). By the beginning of 1990 a decline in fertility was apparent in many of the sub-Saharan countries. In Zimbabwe TFR decreased from 5.5 births in 1988 to 4.3 lifetime births in 1994 (Zimbabwe Demographic and Health Survey 1995). TFR usually relates to women’s childbirth. However, a study in
Gambia found it to be much higher for men, with 12 for men and 6.8 for women (Ratcliffe et al 2000).

A change in fertility takes place with or without access to modern contraception. Not until people perceive a need to limit the size of the family will contraception be accepted and appreciated by the people concerned. Once it has been accepted, a transition in fertility can take place rapidly (Egerö 1994).

Infertility
A long-term consequence of genital infections and sexually transmitted diseases (STD) is infertility. A WHO world-wide study concluded that in sub-Saharan Africa, infections, either from STDs or after childbirth or abortions, were the major cause of infertility (Cates et al 1985). Clamydia, a common cause of infertility, was found in 13% of pregnant women in Cap Verde (Wessel et al 1998). Co-infections with gonorrhoea are common, and both of them are often without symptoms in women, which further increases the risk for long-term complications.

Through the DHS and the World Fertility Survey (WFS) we now have demographic estimates of infertility rates (women without FP who had not conceived within five years). Based on these surveys (1988) the rates in at least half of the surveyed countries in sub-Saharan Africa clustered around 13 to 16%. Zimbabwe was among the countries in the highest quartile (17%). However, the level of primary infertility (women aged 44-49 years without a child) was below 4% in many of the surveyed countries (Ericksen & Brunette 1996). A study in Gambia found even lower rates of primary and secondary infertility (3% and 6%, respectively), in this study defined as the inability to conceive within one year and three years, respectively (Sundby et al 1998).

Perinatal mortality
The mother and the newborn infant are a dyad. What affects the mother also affects the foetus and the newborn infant. Perinatal deaths are associated with maternal complications during pregnancy and poor management practices at delivery but even more strongly with the mother’s health and nutritional status (Koblinsky 1995). Low birth weight (LBW), which at term is a proxy indicator for intrauterine growth retardation, largely determines perinatal mortality in developing countries. In a large Nigerian study, 40% of the stillbirths and 50% of the neonatal deaths were of LBW (≤2500 g) (Harrison 1985). In a Zimbabwean study, 25% of the perinatal mortality in a district was associated with low birth weight (≤2000 g) (De Muylde 1989).

Since perinatal mortality includes both foetal deaths and deaths during the first week after birth, the concept avoids conflicting judgements as to whether a foetus was born alive or not and whether its death should be counted. Perinatal mortality is thus a useful measure of reproductive
loss for comparisons within and between countries. In sub-Saharan Africa the perinatal mortality rate (PMR) in 1996 varied from 25 to 35/1000 births in Botswana and Cap Verde, respectively, up to 100-120 in Ethiopia, Mozambique and Somalia (WHO 1996).

**Fertility regulation**

Family planning is one of the basic and most important preventive health care services for women. In sub-Saharan Africa it started during the 1970s on a small scale with organized FP services available for elite groups in urban areas (Arkutu 1995). In the majority of countries, development has been slow. Until the beginning of the last decade there were laws in the French-speaking countries prohibiting advertising or distribution of FP measures (Arkutu 1995). Induced abortion on request is, with few exceptions, forbidden in developing countries. Complications due to abortion are one of the main causes of maternal deaths. In 1990 one third of the world’s abortion-related deaths occurred in sub-Saharan Africa (Berkley 1998).

Today two-thirds of the sub-Saharan countries have FP programs. Prevalence rates for contraceptive use range from nearly 50% among married women in some African countries down to less than 3% in countries like Ethiopia and Burundi (Barnett et al 1999). Among the unmarried adolescents in sub-Saharan Africa, prevalence rates for contraceptive use are virtually nil because young people often do not have access to family FP services due to cultural obstacles.

The FP program in Zimbabwe started in 1965 with the establishment of the Family Planning Association (FPA). Initially, services were provided in the maternal and child health (MCH) clinics and only medical personnel were allowed to prescribe hormonal contraceptives. In 1976 the Ministry of Health (MoH) granted permission for “field educators” to re-supply clients with oral contraceptives (OC) and condoms. In 1985 the Zimbabwe National Family Planning Council was created, which is a subsidiary state organisation under the MoH. Its mandate is to promote FP through provision of information and services to all sectors of the community. Services are provided at the health clinics and through a community-based distribution system that covers approximately 29% of the rural population (Schwartz et al 1999).

**Antenatal care and maternity care**

Antenatal care and maternity care are of utmost importance for reproductive health and reproductive outcome. Through regular antenatal visits the aim is to discover pathological symptoms and signs which can be a threat to the mother or the foetus. The documented benefits of risk screening have not been impressive in either industrialised or developing countries (Berglund & Lindmark 1999, Hall et al 1980, Wessel et al 1996). Compliance with advice is also poor in developing countries. Many women do not follow recommendations due to financial constraints, long distances to referral centres, or their awareness of limited resources at the
referral centres (Kowalewski et al 2000). It is important to detect and treat diseases such as severe anaemia, malaria and syphilis in early pregnancy. Consequently, it is important that the women come early, which is not a tradition in many countries. An effort to change this pattern was made in Zimbabwe, but failed (Munjanja et al 1996).

In sub-Saharan Africa, antenatal care is widely used as part of the primary health care (WHO 1997). However, less attention has been paid to the content and quality of care. Further, the widespread coverage is not present with respect to care during delivery. Lack of resources for dealing with emergencies, negative attitudes on the part of the staff, and transportation difficulties are some of the reasons why women do not come for delivery (Fawcus et al 1996). However, there are large geographical variations within the African continent. Women in South Africa are delivered in a health institution in 80% of cases, which was also found to be true in Zimbabwe (Nhindiri et al 1996, van den Heuvel et al 1999). In Ethiopia less than 10% deliver in health facilities (WHO 1997).

Major health problems influencing reproductive health and/or reproductive outcomes

In sub-Saharan Africa many women have a poor nutritional status and anaemia is a major public health problem. Malaria kills more people than any other disease. Bilharzia, another parasitic disorder, is also endemic. Its existence, evidenced as blood in the urine, is so common that it is hardly recognised as a disease, even though it contributes to anaemia and has severe late sequelae such as renal and liver failure. Soil-transmitted helminth infections and their impact on malnutrition and severe anaemia have been well documented. By the beginning of last decade the HIV epidemic had started. The high prevalence of STD has strongly contributed to the rapid development of the epidemic, which is presently without parallel anywhere else in the world.

A woman’s general health status is intimately related to her health during pregnancy and is of major importance for her reproductive outcome. It is therefore of interest to study the most common conditions that are known to have an impact on reproduction in this part of the world.

Malnutrition

Maternal nutritional status has an impact on pregnancy outcome. It is estimated that a woman in sub-Saharan Africa spends 42% of her reproductive life either pregnant or lactating (Gurney 1995). As a consequence, most women will spend a quarter or more of their reproductive life span under extra nutritional stress. Poor nutritional status increases the risk of Intrauterine Growth Retardation (IUGR) and Low Birth Weight (LBW), which contribute strongly to perinatal mortality and infant mortality in developing countries.
By the age of 15, one out of six girls in Africa is already married (Bali 1995). Teenage pregnancy increases the nutritional burden for girls who have themselves not finished growing. Further, the risks of childbirth in adolescence are well known.

**Anaemia**

Anaemia is a major public health concern in developing countries. Mild to moderate chronic anaemia (7 g/dl to 10 g/dl) results in fatigue and affects work capacity adversely. During pregnancy severe anaemia (<7 g/dl) is associated with an increased risk of maternal and foetal morbidity and mortality. Anaemia increases the risk of IUGR but it also decreases the capacity to withstand haemorrhagic complications and infections in pregnancy. In 1992 the Mother Care project presented all available data since 1979 on anaemia in developing countries (Sloan & Jordan 1992). Globally the highest rates were found in Africa, the Caribbean and Middle South Asia. In Southern Africa the prevalence ranged from 17% to 33% in pregnant women, while for non-pregnant women the information was scarce (Sloan & Jordan 1992). In the WHO statistics from 1998, the prevalence of anaemia during pregnancy in Africa was 50% (ACC/SCN 2000).

**Malaria**

Malaria is by far the world’s most important tropical parasitic disease. More than 90% of all malaria is contracted in sub-Saharan Africa. Pregnant women, especially primiparous women, are very susceptible to placental malaria, which also decreases birth weight. In addition, malaria can cause abortion or premature delivery, and it also increases the risk of anaemia. Severe anaemia, exacerbated by malaria, is often the attributable cause of death in areas with intense malaria transmission.

**Sexually transmitted diseases (STDs)**

STDs constitute a major area of reproductive health. These infections are chief contributors to debilitating, sometimes also life-threatening conditions such as cervical cancer, the leading cause of death from cancer among women in developing countries today (Boyle et al 2000).

For many reasons women are more vulnerable than men to STDs. There is a greater likelihood that an infected man will transmit a chlamydia or gonorrhoea infection to a woman than vice versa (Rowley & Berkley 1998). Also, awareness of a possible sexual disease is often low in women, so symptoms of an STD may not be recognised as such (van Dam 1995). The social stigma associated with genital symptoms also hampers women from seeking care (van Dam 1995). The consequences of STDs regarding women’s health (pelvic inflammatory disease, infertility, chronic pain and also cervical cancer) are serious. Further, an STD infection in pregnancy also affects pregnancy outcome (spontaneous abortion, stillbirth, prematurity and congenital infections).
Maternal syphilis is a serious condition with a dramatic effect on pregnancy and, if untreated, 60% will experience adverse outcomes (Jenniskens et al 1995). These negative outcomes include the whole range from abortion, stillbirth, and perinatal death to neonatal and infant death. Several studies in Africa have reported high prevalence rates among pregnant women as well as in the general populations (Brabin et al 1995, Liljestrand et al 1985, Rutgers 1993). Most African countries advocate a policy of syphilis screening in pregnancy, but in reality only a few countries actually implement these policies due to budgetary and logistic constraints (Kambarami et al 1998, Jenniskens et al 1995).

**HIV**

In 1992, the estimated number of infected people in the world was eight million and the forecast for the end of the century was 25-30 million (Miotti et al 1992). World-wide during 1999, another 5.6 million got infected, and 70% of the new infections occurred in sub-Saharan Africa (World HIV & AIDS 1999). In December 1999 it was estimated that 33.6 million people were currently living with HIV/AIDS (World HIV & AIDS 1999).

**HIV in Africa**

Although the age and origin of HIV-1 is not known, the infection seems to have existed for the longest time on the African continent, since all of the ten known genotypes are found on this continent in comparison to only 2-3 on the other continents (Britton 1999). In Africa the disease was first recognised in 1982 among fishermen and traders in a district in Uganda (Serwadda et al 1985). What actually caused the rapid epidemic course, particularly in Africa, is not known, but several issues have been mentioned such as the changes that took place in society with migration of labour to urban areas, unemployment and separation of families (Britton 1999).

At an early stage, epidemiological studies focused on Eastern Africa as a region with a high prevalence of HIV, which is still rising (the prevalence in urban areas is 15-25%) (Kerkhoven 1998). However, there are reports from Uganda about a decreasing infection rate (Mulder et al 1995). In southern Africa a rapid increase is continuously reported. In 1998 the prevalence in women in ANC in rural South Africa varied from 10 to 30% (UNAIDS 2000). Due to a long period of political instability, development of the epidemic has been slower in Mozambique. The reported prevalence rates at present vary from 5% to 18% (UNAIDS 2000).

**Women and HIV**

After the initial focus on HIV/AIDS as a disease affecting homosexual men, a heterosexual transmission pattern was found to be dominant in Africa. Female prostitutes were blamed as being the dangerous vector of the AIDS epidemic (Bassett & Mhloyi 1991), (few studies have been done on the men who use their services). The development of the epidemic has been
monitored continuously in many countries through surveillance in ANC, which keeps women in focus.

Women, as compared to men, are at increased risk as a result of many factors. Due to inequities in society, which are very obvious in Africa, they have little power to protect themselves. Biologically they are at increased risk as well. Male-to-female transmission is presumed to be more efficient than female-to-male transmission (Shah & Bradbeer 2000). Once a woman has got the diagnosis of HIV, she faces a plethora of consequences, and because of her gender, they are greater than for an HIV-positive male. If she is pregnant, she carries the risk of vertical transmission to the child. Although there is now effective treatment that can decrease the transmission risk, it is not within the reach of rural African women. Having an STD is a social stigma which puts the woman in a difficult dilemma as to whether or not to inform her husband, since she might be blamed. Only 37% of HIV positive women in Kenya with no symptoms who were informed of their diagnosis told their husbands (Temmerman et al 1990).

Zimbabwe

Zimbabwe gained its independence in 1980 after a long war for liberation. At the time of independence, Zimbabwe had an infrastructure that was well developed, especially as compared to surrounding countries. After independence, resources that previously were earmarked for the white population and a minority of the black population were now to be shared by all. Education and primary health care for all was given priority, and schools and clinics were built in the rural areas. In 1987 there were 106 government hospitals and 755 rural clinics. Statistically there was 1 doctor per 7321 inhabitants (1990). However, nearly all of them worked in the cities, except for expatriate doctors who were posted to the mission hospitals. During the first decade of independence socialistic ideals were officially proclaimed. By the beginning of 1990, a market economy was introduced which resulted in unemployment and inflation when food subsidies were gradually removed. Fees for medical care, antenatal and delivery care were also introduced.

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<thead>
<tr>
<th>Population (1994)</th>
<th>11.2 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual population growth (1990-98)</td>
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</tr>
<tr>
<td>Urban/rural population (1992)</td>
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</tr>
<tr>
<td>Proportion who can read and write</td>
<td>67% (World Development Report 1992)</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>males 58 years, females 62 years (1992)</td>
</tr>
<tr>
<td>Total fertility rate</td>
<td>4.3 children (DHS 1994)</td>
</tr>
<tr>
<td>Maternal mortality rate (1990)</td>
<td>urban 84/100,000, rural 162/100,000</td>
</tr>
<tr>
<td>Maternal mortality rate (1998)</td>
<td>1470/100,000</td>
</tr>
<tr>
<td>Perinatal mortality rate</td>
<td>40/1000 births (WHO 1996)</td>
</tr>
</tbody>
</table>
AIMS

Overall aims
To describe general and reproductive health and reproductive outcome in women of childbearing age in a geographically defined rural area in Zimbabwe.

Specific aims
In women in a rural area in Zimbabwe:
• To assess reproductive indicators as related to socio-economic conditions (Paper I)

• To assess the level of primary and secondary infertility (Paper I)

• To assess self-reported morbidity during pregnancy as related to pregnancy outcome and to use of maternity care (Paper II)

• To assess the prevalence of anaemia (Paper III)

In retrospect:
• To assess HIV prevalence as related to socio-economic factors (Paper IV)

• To assess self-reported morbidity, clinical findings, use of care and reproductive outcome related to HIV prevalence (Paper V)

SUBJECTS AND METHODS

Study area
Zimbabwe has ten provinces. Masvingo province, situated in the southeastern part of the country, had a population of 1,222,581 in 1992 (1992 census). At that time life expectancy at birth in Masvingo province was 59 years (1992 census). Forty-nine percent of the population were children below 15 years of age and 4% were over 65 years of age. The province had recently been the subject of a maternal mortality study and was found to have an infrastructure suitable for research. The province includes seven districts, and Gutu District is situated in the northernmost part of the province.

Gutu District in Masvingo province was chosen for the study as it is a rural district with mainly communal farming. The District Hospital, situated in the centre, is the referral hospital for the
Aims, Subjects and Methods

Gutu district with the twelve surveyed wards
rural clinics. In 1992 the population in Gutu District was 195,802. Only three percent of the population lived in urban areas.

Each district is divided into administrative units called wards. Gutu District has 43 wards, 38 of which are located in communal farming areas and five in commercial farming areas. Communal farming involves small-scale farming where most of the production is needed for the family, who also have a few cattle. Any surplus may be sold after harvesting. Land can be inherited by family members but not sold. A councillor serves as head of each ward. The ward is further divided into five to six "administrative villages", which are headed by a VIDCO-chairman (Village Development Committee). Each village has one CDW (Community Development Worker), a woman with a few months of training in preventive health care, who lives in the village. Within each administrative village there are 3 to 4 "traditional" villages, with headmen as local leaders. In these villages the houses are grouped together and cattle is herded on land that is allocated to the village. At this time, unemployment in Zimbabwe as a whole was high. Of the "economically active" population in Masvingo province, 30% were unemployed. However, this 30% did not include communal farm-workers, and many of them were actively seeking jobs. If they were to be counted, the unemployment rate would be as high as 48% (1992 census).

Rural women are responsible for bringing up the children in the family, and for household chores of both a light and heavy nature. They also do most of the farming. A few women have other sources of income from selling handicraft or farm products. Many have husbands who work away from home, but the financial support they provide their families varies.

**Health services**

The majority of health services in both urban and rural areas in Zimbabwe are presently provided by the public sector, comprised of the Ministry of Health and Child Welfare and Local Government authorities. In 1992 health care was free of charge for people earning less than 400 Z-dollars a month, and they comprised the majority of the population.

Health care in the province is headed by the Provincial Medical Director (PMD). Masvingo Hospital is the provincial hospital, situated 120 km from Gutu town and 130 km from Gutu District Hospital, which is a mission hospital run by the Dutch Reform Church. Rural Health Centres (RHC) constitute the lowest level of health facilities, and Gutu District has 24 such centres. The RHC staff include state-certified nurses, midwives and environmental health technicians. Complicated cases are referred to the Gutu District Hospital, which has doctors and nurses, an operating theatre and a laboratory. Most doctors in the District Hospital are expatriates who work on a contract basis for a few years. During some periods of time the
hospital is left without doctors, and women in need of C/S then have to be referred to Masvingo.

Antenatal care is mainly provided by the RHC, which also have a few beds for low risk mothers in labour. The number of deliveries in the rural clinics varies from 4 to 20 per month. Some of the clinics also have maternity waiting facilities. Out of 24 RHC in Gutu District, eleven have telephones and an additional five have radio communication. The mean distance between an RHC and Gutu Mission Hospital is 40 km (range 1-117 km) on gravel roads.

**Study design**

An area-based cross-sectional study.

**Study population**

Rural women of childbearing age (15-44 years) constitute the target population. Via the District Administration Office in Gutu we wrote a letter about the study to the Councillor of each ward. The VIDCO chairman and the CDW of each village were also contacted, and they informed the women about the study. All women aged 15-44 years who permanently lived in the village were invited to participate. This was defined as having spent at least six out of the 12 last months in the village, and rarely one or two women did not fulfil that criteria. In total 1543 women were listed and 1213 women participated, which gives an overall participation rate of 79% (range between villages 57% to 87%).

**Follow-up of non-participants**

In order to see if non-participating women deviated from the participants in any crucial aspect, a follow-up study was performed in one randomly selected village (ward 6, village 5). The initial list consisted of 189 women, of whom 134 women came. After we had finished the data collection the study team went from house to house to record the non-attenders. Twenty-five more women were willing to participate who had been out of the area or who had missed the interview as they had been busy. Still another 30 listed women were not interviewed. Fourteen of them were not in the area at this time (due to staying elsewhere with their husbands, or working or attending school in another place), 14 refused, mainly for religious reasons, one had moved and one turned out to be too old.

**Sampling method**

Cluster sampling was the only feasible sampling method due to lack of a sampling frame. Based on an estimation on the expected prevalence of diseases we intended to investigate (anaemia,
malaria, syphilis), we aimed at a study sample of 1000 to 1200 women. We were informed that the number of women per village would be around 100, and 12 villages were therefore selected. The five wards with mainly commercial farming were not included, as their living conditions differ from those in communal farming areas. To begin with, six wards were randomly selected from the thirty-eight wards. Secondly, in order to minimise travel costs, the ward located directly east of each initially selected ward was chosen, for a total of twelve wards. Thereafter one of the six villages in each of the twelve wards was selected at random.

**Pilot study**

In January 1992 the pilot study was performed in one village in Murewa District, Mashonaland West Province. We found that the questionnaire was generally well understood and the approach to the community accepted. Some minor changes regarding the wording of questions were made.

**Study period**

*Phase I. March to May 1992*

The main study started in March 1992. During phase I the study team consisted of one midwife, one nurse, one laboratory technician and a driver. The principal investigator, myself, joined the study team for periods of time during the data collection.

We approached the village after contact with the councillor of the ward and the CDW. A meeting place for the study was announced. A list of the eligible women was prepared by the CDW while interviews were being done or after we had been in the village. Initially, fieldwork progressed smoothly. Women seemed to be happy about the attention they received and they were willing to participate. However, we gradually realised that the lists were not complete and that some women were listed by a different name than that in the study protocol, which made it difficult to know which women had attended. As time went on, data collection also advanced at a much slower rate due to a serious drought. After two months only 230 women had been interviewed. It was difficult to motivate women to come as their main concern was to find food, and they had to walk long distances to fetch water. Other activities such as food for work-programmes also interfered with data collection. In addition, we could foresee that the effects of the drought on nutritional status would increase until new rains could be expected which would be about six months later. Fieldwork stopped in June 1992, after the first six villages had been visited and 351 women had been interviewed.
Phase II. March to December 1993

The second phase of the study started after the rains, in March 1993. As a consequence of previous experiences improvements were made in the preparatory work. Meetings were held with the VIDCO chairman, the village leaders, and the CDW. This time the lists of eligible women in the study villages were prepared before we started the interviews. The VIDCO chairman, the VIDCO secretary or the CDW assisted us in this work. The listing of the women often took many days, as those assisting us sometimes had to walk from house to house. When the women came for the interview their names were first identified on the list. We also made sure that the CDW could be present when we performed the interviews in "her” village. For the second phase of the study a second midwife, who lived in Gutu, also joined the study team. She was well respected by both the authorities and the women in the area.

Analysis of results from the first study period also indicated that many young women (15-19 years of age) did not take part in the study. They were often at school while we were in the village. Therefore, specific permission was given by the headmaster for visits at their respective schools.

Measure instruments

Women of reproductive age were interviewed and underwent clinical examination, and samples of blood and urine were collected and tested.

Interviews

Data was collected in the structured interviews regarding socio-economic status and living conditions (housing, water and sanitation). Perceived health was investigated through general questions but also through prompted enquiries. Specific symptoms were mentioned which the women could either deny or confirm. The women’s reproductive history was registered with the following variables: total number of pregnancies, living children, perinatal deaths, early abortions and late abortions. We dealt with their latest completed pregnancy in more detail: their first visit to antenatal care, morbidity during pregnancy, complications during or after delivery, and place of delivery. Information regarding use of FP as well as infertility problems was also collected. The interviews were done by the midwives in the local language Shona, but the answers were entered in English on the interview form. The two midwives performing the interviews had both about twenty years of work experience and also considerable experience of research projects.

Examination

After the interview the women were examined for clinical signs of anaemia and infection that could be assessed under prevailing circumstances such as pallor of the conjunctivae or the oral
mucosa, oedema, dyspnea and enlarged lymph glands in four locations (neck, submandibular, supraclavicular and axillary).

**Measurements**

*Height and weight.* A balance scale was used which could measure both height and weight. The scale was placed on a hard board, and weight and height were registered with normal clothing on except for shoes. Weight was recorded in kilograms to the nearest tenth, and height in centimetres to the nearest half centimetre.

*Arm circumference* was measured on the widest part of right upper arm and recorded to the nearest half centimetre.

*Blood pressure* was measured with the woman in a sitting position after resting for 5 minutes. An automatic blood pressure machine was used (Umedico, Sweden). It had an accuracy of ±3 mm Hg.

*Haemoglobin.* The Hemocue method was used, which is a modified azide methemoglobin reaction (HemoCue AB, Angelholm, Sweden). Minilancettes were utilised to get a standardised prick on the tip of the third or fourth finger, and it was stressed that blood should not be squeezed from the finger. The first drop was wiped off, then the cuvette was filled all at once to prevent air bubbles in the cuvette, which could give a false value. If the haemoglobin was found to be below 12.0 g/dl a second sample was taken and the mean of the two was registered. If the haemoglobin was ≤11.0 g/dl during the first study phase, and ≤12.0 g/dl during the second study phase, a venous sample was also collected. This change depended on the low prevalence of anaemia during phase I. If a woman was found with anaemia, Full Blood Count (FBC) and S-Folate (Serum Folate) levels were analysed during phase I, and FBC, S-Folate and E-Folate (Erythrocyte Folate) during phase II. Ferritin and B₁₂ levels were obtained for all women.

*Full blood count.* During phase I a venous sample for FBC was sent from Gutu Hospital to Masvingo Provincial Hospital. However, as results were often lost, in phase II a laboratory in Harare was utilised instead. Women in need of further investigations were asked to come for blood tests during the last field day of the week, usually on Thursdays. Then the specimens could reach the laboratory in Harare on the following day for analysis within 24 hours (MD8 Coulter, Novateck (Pvt) Ltd, Pharmanova Building, 93 Highfield Road, Southerton, Harare). In order to validate our field Hb tests we also sampled blood for FBC from women with normal Hb (>12.0 g/dl) during the last field day. FBC was analysed in 210 women, 70 women with an Hb ≤12.0 g/dl, and 140 women with Hb >12.0 g/dl who were controls.
Subjects and Methods

Red Cell Folate, Serum Folate, Cobalamin and Serum Ferritin. Cobalamin (Vit B\textsubscript{12}) and S–Ferritin were assessed for all the women, but E-folate and S-folate levels were only obtained in women with anaemia. E-folate, S-folate, Vitamin B\textsubscript{12} and S-ferritin were all determined using a Chemoluminacence technique with the CIBA Corning Magic Lite analyser II (CIBA Corning Diagnostics Corp, 63 North Street, Medfield, Massachusetts, USA). The kits for the determination of these analytes were obtained from CIBA Corning Diagnostics Corp, which also provided controls used to assess the reliability of the assay. Analyses were done at the Department of Chemical Pathology, University of Zimbabwe. For E-folate, whole blood was kept frozen in an EDTA-tube at Gutu District Hospital, and transported to Harare for analysis. Serum was used for the other investigations.

Malaria. In the field, a thick and a thin blood film were prepared and put on two separate glasses, which were left to dry in open air. In the evening the thick film was fixed for one minute in methanol. Staining of both the thick and the thin film (10% Giemsa solution), as well as analysis, was done at the Department of Medical Microbiology at the University of Zimbabwe.

Syphilis. For syphilis testing, non-treponemal Rapid Plasma Reagin (Immutrep-RPR) was used. The RPR-test is a screening test, and false positive reactions have been reported for other diseases such as leprosy, malaria, lupus erythematosus as well as in specimens with bacterial contamination. For diagnosis of an active syphilis, a positive RPR was confirmed with the Treponema Pallidum Haemagglutination Antibody test (TPHA).

Urine testing. Rediatest (Boehringer), a dip slide method for haematuria, proteinuria and glucosuria was used, but not if the woman was menstruating. The test was quantified from 0 to +3.

HIV. Assessment of HIV status in frozen serum samples was performed during 1995. The first test used was the Cambridge Biothech Elisa, third generation with a sensitivity and a specificity of 99.6 and 99.7, respectively. For the first 700 samples, 136 out of 145 positive Elisa tests were confirmed with Cambridge or Ancoscreen Western Blot (WB) and four were found to be negative (2.9%). Due to financial limitations the remaining positive HIV-tests were not confirmed. Further, for the first 437 samples, 66 out of 315 negative Elisa tests were selected at random and checked with WB, and 58 were clearly negative. Eight indeterminate samples were further tested with two other Elisa tests (Capillus Slide Immunoassay and Rapid test Device) and all were confirmed negative. Therefore no further confirmation of Elisa negative samples was done.
Handling of blood samples

During fieldwork, blood samples were kept in a cooler-box and processed in the evening at Gutu Mission Hospital. The clotted specimens were centrifuged at 1000 R.P.M. for five minutes. Two separate serum pots were prepared and stored at -20°C Celsius at the hospital. Whenever convenient, they were transported frozen to the Department of Chemical Pathology, and to the Department of Microbiology at the University of Zimbabwe and stored at -70°C Celsius. The EDTA-specimens were also divided into two separate tubes, of which one was initially kept frozen in Gutu, and later taken for E-folate analysis at the Department of Chemical Pathology. The other sample was taken to Harare for FBC analysis.

Fieldwork

The study team resided in Gutu Mission Hospital and went out on a daily basis. The CDW assisted in organising an adequate number of interviews each day. Initially one of the midwives informed the women as a group about the study aims, the content of the interview, the medical examination, and the sampling of blood and urine. Since there were no treatment facilities, advice regarding medical issues was given by the study team. In cases in which a medical problem was found, a referral letter was written to the nearest clinic or hospital. Refreshments were served to the women while they waited. During phase II we decided to provide a small incentive instead in order to cover transportation costs and loss of income.

The study team faced many problems in the field. Elderly women were sometimes unsure of their age. However, that could usually be resolved fairly accurately when we inquired about their age at marriage and the ages of their children. Travelling daily on rough roads to the different villages took time. Distances to the villages we visited varied from 10 up to about 80 kilometres. The car broke down numerous times and women could thus come to a meeting point at which the study team never turned up. It also happened that the study team arrived but no women showed up. During 1992 women sometimes left the area due to the drought. In addition, in the case of a death in their village or in a neighbouring village the women had sometimes left to support the mourners and to prepare for the funeral.

Some women accepted being interviewed but not having blood tests done. In some cases venipuncture was unsuccessful. A total of 23 blood samples were missing for the latter two reasons. A rack of blood samples (n=34) were lost at the laboratory. Urine tests were missing for 23 women.
Subjects and Methods

Statistical methods

Data entry was done partly in the field and partly in Harare by the field co-ordinator. The principal investigator coded the information from the open-ended questions after all interviews were completed. For data entry and part of the statistical analysis we used the epidemiological and statistical software QUEST, which was also used for analyses of risks expressed as odds ratios (OR). The precision of the estimate is presented as a 95% confidence interval (CI).

Mostly the data was analysed using a case-referent approach to be able to express differences in the outcome variable with respect to background characteristics as risks, OR and 95% CI. E.g. risk factors for HIV were analysed using the HIV positives as the cases and HIV negatives as the controls. Student’s t-test was used to study differences in prevalence between groups. To study the association between two continuous variables, Pearson’s correlation coefficient was used. For the final statistical analyses the data was later exported to an SPSS-file (SPSS INC. Chicago, IL, USA).

Ethical considerations

Informed consent was obtained from the women before the interviews and examinations were performed.

The structured interview protocol was pre-tested to make sure that questions were acceptable and understandable to the women. All women were informed about the purpose of the study. Some women did not want to have blood tests done and were only interviewed and examined clinically and urine was tested. Immediate abnormal findings were used as the reason for referral for investigation and treatment. At data entry, only serial numbers were used as identification.

When planning the study in 1989-90, the focus was on socio-economic factors and reproductive health in relation to reproductive outcome. After the fieldwork was completed, the problem of the HIV epidemic was acknowledged in Zimbabwe. Therefore, HIV status was retrospectively assessed after removing identification labels from the samples but keeping serial numbers in order to analyse associations with characteristics like age, parity and area of living, as well as other findings in the study.

Scientific and ethical approval for the study as well as for using retrospective confidential HIV analysis data was given by the Medical Research Council in Zimbabwe, and the study was also approved by the Ethics Committee of the Medical Faculty, Uppsala University, Sweden.
RESULTS

The results constitute a summary of the papers except for the section on FP, which is only presented here.

Background characteristics

The mean age was 28 years. Two out of three women were married, 9% in polygamous marriages. The mean age at marriage was 19 years, and this figure has been between 19 and 20 during recent decades as calculated for women in different age groups above 20 years who were presently or previously married at the time of the study. Paraous women had on average four children. Women aged 40-44 years, who can be considered to have completed their child bearing, had on average 6.6 children (range 1-12). Regarding religious denominations, 70% were Christians (paper I).

The women constituted a very homogeneous group. Only 3% of the women were skilled workers (running a small business) or professionals (teachers, nurses). Two out of three women (64%) were married, 28% were single and 8% were divorced or widowed. The majority (95%) of the houses were constructed of bricks. Sixty-five percent had a protected water source, but piped water was rare (2%). Sixty percent had a Blair toilet (a Zimbabwean type of outdoor toilet), 11% had a pit latrine while 29% had no toilet facilities.

Only a few (4%) had a regular income. Twelve percent got some income from selling handicrafts or farm products on a seasonal basis. The majority (84%) of women had no income. The women depended on what they could produce from their farming land or on their husband’s income. Half of the husbands had an income and was working outside the home but the share the family received varied. In half of the cases where the husband had a salary, the wife did not know what he earned. When the wife knew what the salary was, it was found that the husband kept half of it himself.

Three percent of the women had never gone to school. Out of those who had finished school, 62% had reached grade 4-7. Regarding level of education, there was an obvious trend according age. Women under the age of 25 years and those 35 years and over had reached upper secondary school (more than 9 years in school) in 13% and 1% of cases, respectively. In addition, one out of five in the youngest age group was still in school.
General health status

The mean height was 160 cm and the mean weight was 58.5 kg. The prevalence of underweight (BMI <18.5) and overweight (BMI >30.0) was 6.8% and 3.5%, respectively. Arm circumference less than 23 cm as an indicator of underweight was found in 7.1%. Thus, these two ways of assessing underweight gave similar results.

The women were generally healthy. Twenty-eight women were on regular medication for conditions such as high blood pressure or heart disease (12), asthma (6), or epilepsy or a psychiatric condition (7). In response to general questions about their health, 7.9% said that they did not feel healthy. Their main complaints involved body pain (back, legs, abdomen) or a general feeling of weakness. As specific symptoms (experienced weekly or daily), headache was mentioned by 8.3%, abdominal pains by 4.0% and cough by 2.5%. Heavy or irregular periods were mentioned by 4.5% and 1.8%, respectively, and discharge by 1.8%. Urine incontinence, which was rare, was reported by less than one percent of the women.

Blood pressure

Mean systolic and diastolic blood pressure was 117 mm and 70 mm, respectively. Systolic blood pressure $\geq 140$ and diastolic blood pressure $\geq 90$ was registered for 7.0% and 6.8%, respectively.

Urine testing

Specimens were analysed for 1061 women (not menstruating). Thirty-four percent were positive for haematuria (+1 to +3), out of which 18% (n=192) were +3. Mean Hb for women with haematuria (+3) was the same as for the total population, 13.5 g/dl. Proteinuria (+1 to +3) was found in 6.3%, but less than one percent was +3. Less than one percent had a positive urine test for glucose.

Availability of medical care

The nearest clinic was within 10 km for eight of the villages (78% of the women), and for the remaining villages the distances were 11 to 30 km. Seventy-eight percent had no transport, and for 22% of the women public transportation (buses) was available during the daytime. Thirty-eight percent had visited the clinic within the last three months and 50% within the last 12 months (paper V).

Reproduction

Menarche

The reported age at menarche was associated with the age of the woman. In the age group 25-44 years, women reported their first menstruation at 15.1 years on average, compared to the age
groups 20-24 years and 15-19 years where the mean age was 14.9 and 14.7, respectively. Twenty-six percent of the women aged 40-44 years did not know their age at menarche.

**Fertility**

A higher level of education was associated with an older age at marriage. Nevertheless, compared to European norms women married early. By the age of 25 years, 96% were living or had lived in a marital relationship. A higher level of education and an older age at marriage were also factors associated with fewer children. From 25 years of age, the mean number of children for all age groups was generally one child less if the women were educated above primary school level (Fig 1). Women who had married at 20 years or later also had fewer children (Fig 2).

**Figure 1.** Mean number of children in women 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 years by educational level (<=7 years, >=8 years).

**Figure 2.** Mean number of children in women 15-19, 20-24, 25-29, 30-34, 35-39, 40-44 years by age at marriage (<=19 years, >=20 years).
**Infertility**

Out of the women who were currently or previously living in a marital relationship, 47 had a problem with infertility for one year or more. Eight of them had never been pregnant (primary infertility: 0.9%) and two had been pregnant but had experienced a miscarriage. For 28 of the 37 women with children and for the 10 women without children, the fact that they did not get pregnant was a serious problem. Out of the 39 women with a secondary infertility problem (4.4%), fourteen had three children or more. None of the women aged 40 and above was left without a child.

Twenty-one women were married but not yet pregnant. None of them was using FP to postpone the first pregnancy. After only a few months some regarded the fact that they were not pregnant as a problem. Seven out of 21 had waited for more than one year. In phase II (n=862), women were asked about infertility problems among their sisters. Out of 1611 biological sisters (with the same parents) who had been "exposed to pregnancy" for more than two years, 29 (1.9%) and 22 (1.5%), respectively, had primary and secondary infertility problems.

**Fertility regulation**

Among the non-pregnant women (n=1116), family planning was currently used by 37% (n=413), and 84% (n=344) used oral contraceptives (OC) (Table 1). Low dose gestagen tablets were utilised as often as the combined pill (oestrogen + gestagen). Other reliable methods (intra-uterine device, injectables or tubal ligation) were used by 10% (n=42). Three percent (n=11) reported that they used condoms. There were great discrepancies in contraceptive use related to

<table>
<thead>
<tr>
<th>Table 1. Family planning (FP) use by level of education</th>
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<tr>
<td><strong>Use of FP</strong></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Current</td>
</tr>
<tr>
<td>Oral contraceptives</td>
</tr>
<tr>
<td>Other reliable methods</td>
</tr>
<tr>
<td>Condoms</td>
</tr>
<tr>
<td>Other methods</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Not using</td>
</tr>
<tr>
<td>Number of women</td>
</tr>
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age. The highest contraceptive prevalence rate (CPR > 50%) was found in women 25-34 years. However, it decreased with age, and 36% of women aged 40-44 years used FP. Seven percent of women aged 15-19 years used FP, but of women in that age group who were single only one used FP.

Marital status influenced utilisation. Only 3% (n=11) of single women used FP as compared to married (n=368) and divorced (n=30) women, of whom 48% and 30%, respectively, used FP. However, use of FP was not related to the number of children a woman had.

Ever having used FP was also related to level of education. Thirty-six percent of women with primary school education had never used FP compared to 54% of women who had gone to school for more than 7 years. None of the girls still in school reported ever having used FP.

The main reason for not using FP differed according to age. For women below 25 years, the main reason was few or infrequent sexual contacts in 92% of cases (15-19 years) and in 63% of cases (20-24 years). For women 25 years and above, more than 50% did not want to use FP. A negative attitude to FP on the part of the husband was rarely given as a reason for non-use (less than 15% in all age groups).

Reproductive history (paper II)

Few women gave a history of spontaneous abortions (5% of all pregnancies) (Table 2). The perinatal mortality rate (PMR) for the women’s completed pregnancies (n=3601) was 23/1000 total births. When we compared outcomes for the first and the latest pregnancy for women who

<table>
<thead>
<tr>
<th>Total number</th>
<th>Number of cases</th>
<th>Median</th>
<th>Range</th>
<th>Rate per 1000</th>
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<tr>
<td>Pregnancies</td>
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<td>4.0</td>
<td>0-13</td>
<td></td>
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<tr>
<td>Children born alive</td>
<td>3454</td>
<td>3.0</td>
<td>0-12</td>
<td></td>
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<td>Living children</td>
<td>3244</td>
<td>3.0</td>
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<tr>
<td>Early abortions (1-3 months)</td>
<td>112</td>
<td>0-4</td>
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<td>Late abortions (4-7 months)</td>
<td>61</td>
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<td>16.5*</td>
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<tr>
<td>Perinatal deaths</td>
<td>82</td>
<td>0-5</td>
<td></td>
<td>23.3**</td>
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<tr>
<td>Infant deaths</td>
<td>125</td>
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<td>36.2***</td>
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<td>Deaths &lt;5 years</td>
<td>67</td>
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<td>55.6***</td>
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</table>

* = per 1000 pregnancies
** = per 1000 births
*** = per 1000 live births
had completed at least two pregnancies (n=718), a decrease in PMR from 25 to 8.4/1000 total births was noted (Chi-square test with continuity correction, \( p=0.035 \)).

**Antenatal care, complications and outcome of latest pregnancy (paper II)**

At the time of the interview 889 women had been pregnant, 97 of them were pregnant at the time of the study, 22 for the first time, and 324 women had never been pregnant. Seventy-seven percent had had their latest completed pregnancy within the last four years, 17% 5 to 9 years previously, and for 6% it had been 10 years ago or more (range 10-22 years) (Fig 3).

Antenatal care attendance was high (94%) during the latest completed pregnancy and the women had booked on average at 4.6 months. For women who had delivered within the last four years, 70% had booked within the first five months as compared to 57% of the women who had delivered 5 to 9 years previously (t-test for percentage, \( p=0.007 \)).

Eleven percent reported a complication had occurred during the first half of pregnancy (before foetal movements were felt). When the women experienced a complication they mostly went to the hospital. Only a few reported that they had consulted a traditional healer. Four percent of the pregnancies ended in abortion. During the second half of pregnancy an elevated blood pressure was the most common complication, and as a delivery complication a prolonged labour (more than 24 hours) was most often reported (5.5%). A non-cephalic presentation occurred in 2.8% of cases. Ninety-three percent of the women whose latest pregnancy did not end in abortion had a normal vaginal delivery. The rate of C/S was 6.3%. Fifty-eight percent of the women had hospital deliveries, 27% had clinic deliveries, and 15% of the women delivered at home.

**Anaemia**

**Anaemia and nutritional indicators (paper III)**

The mean haemoglobin value was 13.5 g/dl. Hb ≤12.0 g/dl was found in 11%, ≤11.0 g/dl in 3.4% and ≤10.0 g/dl in 1.4%. The reliability of the Hb measurements in the field was tested by comparing haemoglobin in capillary samples with venous samples (n=210) from anaemic (70) and non-anaemic (140) samples. Pearson’s correlation coefficient was high (\( r=0.80 \)). Pregnant women (n=97) had a significantly lower haemoglobin (Mean Hb=12.7 g/dl; \( p<0.005 \)). Out of the 41 women with a Hb of ≤11.0 g/dl, six were pregnant in their second or third trimester. Women who were using hormonal contraceptives had significantly higher Hb (\( p=0.01 \)). In spite of the drought in 1992, there was no difference in haemoglobin values between the two periods of fieldwork.
Figure 3. Flow chart for the pregnancy histories of 1213 women in the Gutu study.
Low serum ferritin ($\leq 15 \mu g/l$) indicates low iron stores and was present in 154 women (13%), 45 (29%) of whom were anaemic. Among the 41 women with Hb values of $\leq 11.0$ g/dl, 23 (56%) had a low S-ferritin level. Out of the women who were pregnant in their second or third trimester 23% had low iron stores, which was significantly ($p=0.017$) fewer than in non-pregnant women. Vitamin $B_{12}$ was also analysed in 1179 women and 24% had low levels ($\leq 240$ pg/ml), but the occurrence of anaemia was not related to low $B_{12}$ levels. S-folate and E-folate were measured in 80 and 36 women with Hb $\leq 12.0$ g/dl and 20% and 22%, respectively, had decreased levels ($\leq 3.6$ ng/ml and $\leq 120$ ng/ml)

**Malaria**

During the drought period in 1992 no women with positive malaria test were found, but in 1993 malaria prevalence was 7.2%.

**Syphilis**

The prevalence of syphilis was 2.2%. Women with positive confirmation tests were informed through their clinic and asked to come for treatment.

**HIV**

*HIV prevalence as related to socio-economic factors (paper IV)*

The overall prevalence of HIV was 22%, 26% during phase I and 20% during phase II. There were no significant differences in prevalence between the two study periods after standardisation for age ($p=0.06$). Therefore the two periods have been merged in the analysis. There were large discrepancies in HIV prevalence related to age, with the lowest prevalence for girls 15-19 years of age. In all other age groups, (20-24, 25-29, 30-34 and 35-39 years) the prevalence was two to three times higher than for the adolescent group except for women aged 40 years and above. Widowed and divorced women had a more than doubled risk to be HIV positive compared to single women. The multivariate logistic regression analysis confirmed the findings of a significantly increased risk for women in the age groups 20-24, 25-29, 30-34 and 35-39 years as compared to women 15-19 years, and for women who were separated, divorced or widowed as compared with single women. Women who had been married less than five years or whose husbands earned more than 500 Z-dollar per month had an increased risk to be HIV positive in the bivariate analysis which did not persist in the multivariate analysis.

*HIV-status related to area of living*

The prevalence of HIV ranged from 8.4 to 33% in the wards with the lowest and highest rates. The distance from the different villages to Gutu centre varies from 15 km to 80 km, but distance was not related to HIV prevalence in the village. The disparities were small among the villages
with respect to communication facilities. Multivariate analysis confirmed that the villages were similar regarding socio-economic conditions and obstetric history risk factors.

**HIV-status related to symptoms and care-seeking behaviour (paper V)**

Cough symptoms were mentioned significantly more often (OR=2.3; CI 1.1-4.8) by women who were HIV positive. They had also sought care for a disturbing cough more often within the last six months (OR=1.8; CI 1.1-3.2). General symptoms of illness were more common among HIV positive compared to HIV negative women (11% and 7.4%, respectively) but the difference was not significant.

**HIV-status related to clinical and laboratory findings**

HIV status was not associated with underweight (BMI <18.5). No woman with obvious clinical AIDS was found, although we did not assess all symptoms according to WHO criteria. Palpable lymph nodes significantly increased the risk of being HIV-positive, and the risk increased in accordance with the number of locations where glands were palpated (test for trend in OR, p<0.0005).

A positive syphilis test increased the risk of being HIV positive significantly (OR=3.0; 95% CI: 1.4-6.2). The prevalence of anaemia (Hb ≤11.0 g/dl) was significantly (p<0.0001) higher in HIV positive women as compared to HIV negative women (5.7% and 2.6%, respectively). They also had significantly (p<0.005) lower mean Hb values compared to HIV negative women (13.2 g/dl and 13.6 g/dl, respectively), although the clinical differences were small.

**DISCUSSION**

The overall aim of this study was to describe the general and reproductive health and reproductive outcome of women in rural Zimbabwe. It was only possible to cover a limited number of aspects of reproductive health. In large epidemiological studies focusing on the most important aspects as well as choosing appropriate variables that are good indicators of these outcomes is always a problem. The challenge is to focus the investigation on areas where new knowledge will benefit the people it concerns. To the best of my knowledge, no similar cross-sectional study conducted in sub-Saharan Africa has previously been published.

**Methodological aspects**

The study area can be considered to represent rural Zimbabwe relatively well. The country is heterogeneous with drought-affected areas in the south, and farming areas that are more developed than in Gutu in other sections of the country. However, when we compared nutrition
Discussion

and socio-economic conditions (nutritional status, level of education, standard of living) in Gutu with rural Zimbabwe in general (Zimbabwe Demographic and Health Survey 1995), the conditions in Gutu were similar to the average for rural Zimbabwe.

We were dependent on community leaders to prepare the lists of women and to invite them to come. However, many of the villages were scattered over a vast area and people in the outskirts might never have been informed. According to our lists we have estimated that on average four out of five women were included. We have no reason to believe that women in general did not want to attend. Women often expressed their appreciation for our interest in their conditions. Some women refused however for religious reasons, but, the main reasons for non-attendance were that women were busy with other obligations and that they were not in the area. As every second woman had a husband working away from home, travelling was a common event. One can assume that the people who travel belong to the healthier group. The follow-up study performed in one of the villages also indicated that we had not missed women who were ill.

The structured questionnaire that was used as a research tool limited our possibilities to go into more depth concerning the women’s own perceptions. The interviews were done in Shona, but the questionnaire and data entry was in English. It is likely that some information was lost through this procedure. However, both research midwives were fluent in English and Shona, which should have minimized language problems. The questionnaire was piloted and the questions were found to be valid towards our research questions and well understood by the women. The questionnaire had been used in a previous study on reproductive health in Somalia (Omar 1994), but was modified for prevailing conditions. The same two midwives did all the interviews after they had been thoroughly trained. I myself joined the study team for certain periods of time and in between I kept in contact with the interviewers.

A major problem with morbidity surveys is the validation of self-reported information. Further, the outcome will also have an impact on how earlier events are reported. It is likely that the low rate of abortions was affected by underreporting, even though we specifically asked about them. Either the women were not aware of many early pregnancies or they experienced them as a failure, which they had then repressed. This phenomenon, women not reporting miscarriages or perinatal losses, has also been observed by other researchers (Liskin 1992, Hansson 1996, Berhane 2000).

What is an acceptable recall period for interviews about pregnancy-related events? There is considerable disagreement on this issue. A Philippine study showed that women’s recall was reasonably accurate for major reproductive events within four years after the event (Stewart & Festin 1995). In an American study on pregnancy-related events the mean recall period was 32
years. Nevertheless, many pregnancy-related events were relatively accurately reported (Tomeo et al 1999). Both the Philippine study and the American long-term recall study were done on a selected group of women who had delivered in hospital. Nearly every second woman in Gutu had delivered in a rural clinic or at home, and it is likely that less dramatic complications were underreported. However, events related to childbirth are of central importance to women and would therefore be affected less by recall bias.

In addition to the questionnaire, a qualitative study would have been valuable in order to broaden the understanding of women’s perception of their health. It is to be expected that some important aspects of reproductive morbidity such as domestic violence and sexual abuse will only be communicated during an interview conducted under favourable conditions and in strict confidentiality. Also, in-depth interviews could have indicated other aspects of health care seeking behaviour that were never discussed, such as the role of traditional medicine.

**Illness - disease - health**

Illness complaints are the learnt behaviour that people share when they share culture, and diseases are the pathological processes that are recognised by professionals. Cultural norms are formed through people’s experiences. These norms are depending on the frequency of occurrence and will have an impact on the perception of illness and disease (Sachs & Krantz 1991). As an example, one out of five women in the study population had haematuria (symptom of bilharzia), but no woman reported it as an illness or disease. What the women report will depend upon their concept of health or ill health, which is culturally influenced but also unique to the individual (Sholkamy 1996).

In the African context an individual is never seen in isolation and a disease is perceived as being caused by disruption in relationships with the environment (Sachs & Krantz 1991). Western medicine exists in parallel with traditional medicine. The extent to which women are conscious of the different health concepts is difficult to know. Therefore the findings in our study must be interpreted with caution and awareness about existing cultural barriers.

**Perceived health and ill health**

The women’s perceived health was relatively good in comparison with similar studies from other regions. In a community based study in India, more than every second woman had gynaecological complaints (Bang et al 1989), and in another large Indian study (3600 women) one third of the women reported at least one current symptom which most often was related to anaemia (Bhatia & Cleland 1995). Also, in a rural study in Egypt both the reported number of symptoms as well as findings on examination were high (Younis et al 1993).
It is likely that our study would have found a higher morbidity rate if a gynaecological examination had been performed, but we did not find this to be feasible. In the studies in India and Egypt, nearly all women had one or more diseases or pathological findings (Bang et al 1989, Younis 1993). In the Egyptian study more than half of the women were reported to have a prolapse on examination, but only one out of three of them had symptoms. It is unlikely that the alarming finding that every second woman in Egypt had prolapse was clinically relevant. If a clinical finding gives no symptoms and there is no available or necessary treatment (for example, discharge without infection, cervical erosion, prolapse without symptoms), the woman has little benefit from such diagnoses.

One way to validate women’s reports on obstetric morbidity is to compare them with hospital or clinic records, as has been done previously in two studies (Ronsmans et al 1997, Stewart & Festin 1995). This was not feasible in Gutu, as many women had delivered either in clinics with limited recording of events or else at home. This does however not make the women’s reports less valuable. Self-reported morbidity and observed morbidity measure different aspects of reproductive health. In particular, self-reporting can estimate the impact and the context of reproductive morbidity (Bhatia & Cleland 1995, Sadana 2000). Therefore the women’s reports are valuable as a measure of disease burden and perceived health.

**Anaemia**

Anaemia was a rare condition in Gutu, including during pregnancy. Studies from other sub-Saharan countries give a different picture. In Tanzania the prevalence of anaemia is high, both in the general population and in pregnant women (Kitange et al 1993, Bergsjö et al 1996, Massawe et al 1996). Studies from Mozambique also indicated a high rate of anaemia in pregnant women (Liljestrand et al 1986). Earlier published research in Zimbabwe on pregnant women indicated a low prevalence (Knottenbelt 1973). In 1997 the Ministry of Health performed an anaemia study in four provinces and found a prevalence that was twice as high in a neighbouring province as it was in Gutu (Sikosana et al 1998). The low anaemia prevalence in Gutu could have many explanations. Few women suffered from malnutrition, the prevalence of malaria was low, and relatively few women reported menstrual problems. The contraceptive prevalence rate was high and hormonal contraception had a positive effect on Hb levels. HIV infection has an independent effect on Hb concentration (van den Broek & Letsky 2000), but due to the early phase of the HIV epidemic, anaemia was also rare among HIV infected women.

Ferritin levels were normal in nine out of ten women, possibly indicating an adequate intake of iron. In many areas of Zimbabwe the intake is actually too high, and iron overload causes cirrhoses and cancer of the liver. The prevalence of iron overload in sub-Saharan Africa is the highest in the world (Saungweme et al 1999). It is known that the locally produced beer has a
high iron content (Moyo et al 1997, Saungweme et al 1999), and beer drinking is an important social activity. Culturally, it is not acceptable for women to drink, but reality might be different. The few samples of beer that we analysed were not so rich in iron. Previous research has focused on drinking and iron overload. To my knowledge, no research has been done on anaemia prevention and beer drinking.

Much concern in antenatal care is devoted towards detecting and treating anaemia in order to prevent complications during delivery and to improve perinatal outcome. The risk of a maternal death is greatly increased with severe anaemia. But there is little if any increased risk associated with mild or moderate anaemia (Rush 2000). The existing goals for haemoglobin concentration during pregnancy seem to be based on the maximal haemoglobin that can be achieved with supplementation in well-nourished women. Goals should be set which are based on functional criteria (health of infant and/or mother) (Beaton 2000). In resource-weak countries it is even more important to assess the specific needs in the region, and then to set priorities based on these findings. Due to the low prevalence of anaemia found in the present study, whether it is necessary to screen for anaemia and to routinely give prophylactic iron supplementation could be a matter for discussion.

STD - HIV

In Zimbabwe, sexually transmitted diseases are highly prevalent (Zimbabwe Demographic and Health Survey 1995). Sexually transmitted diseases are also a marker of the extent of multiple or casual sexual contacts. It is likely that the high rates of STD contribute to the high rate of heterosexual transmission of HIV in Africa (Mbizvo & Bassett 1996). Most studies on STD are hospital-based (Tswana et al 1995). A medical audit in 1991 of antenatal care in Zimbabwe revealed that 14% of pregnant women had a positive syphilis test but less than half of these pregnant women were adequately treated (Rutgers 1993). In Gutu it was also found that a positive syphilis test increased the risk of HIV threefold. Health education and adequate treatment can decrease the risk of HIV transmission (Grosskurth et al 1995). Actions must be taken to make women more aware of symptoms of STD and to stress the importance of adequate treatment.

The HIV epidemic has had a very fast progression during the last decade. According to official statistics for 1990 from Zimbabwe, 4362 people suffered from AIDS. However, during the five-year period from 1990 to 1995, HIV prevalence figures regarding urban pregnant women nearly doubled (from 18% to 30%) (Mahomed et al 1991, Mbizvo et al 1996). A high prevalence was also recorded in rural antenatal clinics (Gregson et al 1995), which was similar to what we found in Gutu. There were large discrepancies related to geographical area, both within Manicaland (Gregson et al 1995) and within Gutu. Analysis of mortality statistics indicates a
pattern that is consistent with a young (5-10 years) and rapidly developing HIV epidemic. The men are generally infected first, frequently during spells of labour migration to towns or commercial areas, and they then pass on the infection to their regular female partners, who are based in the rural areas (Gregson et al 1997).

Our findings indicate the same situation: a large difference in prevalence between teenagers and recently married women, a high prevalence in women aged 20-24 years with one child, and an increased risk when the husband had a relatively high income. However, the study was performed during the beginning of the epidemic, and thus far HIV status had had little impact on the women’s health status and self-perceived morbidity.

**Women and HIV**

Women are at risk mainly through premarital partners, multiple partners following a divorce and, and for women in stable unions, infection via the woman's regular partner (Gregson et al 1998). Women marry on average when they are 20 years of age, while men are on average 26 years of age at marriage (Zimbabwe Demographic and Health Survey 1995). The higher age for men at the time of marriage means that they have been sexually active for many years. The HIV prevalence rose 2-fold for each year of age in young men in a study of male factory workers (Bassett et al 1996). Data from the same study revealed that every second person who sero-converted was between 18 and 24 years of age (Ray et al 1998). Therefore men are more likely to be HIV-positive at marriage. It has been reported that one out of four women does not know that a healthy looking person can be infected (Zimbabwe Demographic and Health Survey 1995). The many years during which a person can be infected without having symptoms is a problem from a public health point of view (Bassett & Mhloyi 1991).

In the Shona culture it is strictly against tradition for women to have extramarital relations (Gregson et al 1998). However, for men this seems to be a different issue. When men were needed in the labour force in towns, family separation became an accepted feature of life, and this changed traditional rules and sexual relationships outside of marriage (Mbizvo & Bassett 1996). It seems as if women are more aware of these risks than men. The DHS interviewed couples about their perception of the risks of contracting HIV, and the women considered the risk to be moderate or high twice as often as their husbands. As a reason for this, three out of four currently married women said it was due to their husband’s extramarital relations, whereas only one percent of the husbands had the same suspicion about their wives (Zimbabwe Demographic and Health Survey 1995).

The subordinate position of women in the family limits their possibilities to act. As many men live away from home, women have no control over the sexual behaviour of their male partners.
When the men come home, women do not have a strong enough position to be able to demand condom use. The use of condoms has also been difficult to promote for cultural reasons (Ntozi & Kirunga 1998). Despite a high level of awareness about AIDS, limited information is available to show the impact of increased awareness on the course of the epidemic (Mbizvo et al. 1997). Few program activities have been developed that address men as a critical core group (Mbizvo 1996). New creative ways to reach young boys, in particular, with information must be tested.

Reproduction

Level of education had a strong impact on fertility patterns in Nigeria (Harrison 1985). Data from DHS and WFS in sub-Saharan Africa also indicated that a higher level of education increases age at marriage and age at first birth (Westoff 1992). Women in Gutu with a higher level of education also married later and had fewer children compared to women with less education, but the differences were small. Very few women had a profession or a regular income. Although the younger generation had completed secondary school and probably had had other dreams in life, the women followed the cultural norms, married at the age of 19 years, and gave birth to their first child soon after marriage. This might be one reason for the small discrepancies in family size and age at marriage as related to education.

The definition of infertility varies in different studies. WHO defines couples as infertile if they have not conceived after one year. A demographic study used the databases from DHS and WFS and defined a woman who had not conceived within seven years after marriage or five years after the last delivery as being infertile. With that definition the primary infertility rate for Zimbabwe was estimated at 2% and secondary infertility at 14% (Larsen 2000).

It is generally said that rates of infertility are high in Africa. However, this was not confirmed in Gambia (Sundby et al. 1998). In Gutu only two of the ten women without a child had waited for more than 7 years, and half of the women (n=18) with a secondary infertility problem had waited for more than 5 years. One possible explanation for the low rates could be that these women had married before they contracted an STD, and therefore infertility was a problem for relatively few. Another reason could be that the infertile women had left the area due to divorce and financial constraints, but this was not confirmed when the sisterhood method was used.

Perinatal mortality is a major indicator of public health, especially for international comparisons, as it reflects health status as a function of socio-economic conditions as well as standards of obstetric and paediatric care. Perinatal mortality rates can therefore also be seen as indicators of socio-economic development (WHO 1996). The perinatal mortality in Gutu (23/1000) was calculated for the total number of births in the cohort of women and spans over a 25-year period. There was a clear trend towards a lower PMR for the most recent pregnancy (8.4/1000).
Other studies in the same community have also reported similar perinatal mortality rates (Nhindiri et al 1996, van den Heuvel et al 1999). The official national statistics (WHO 1996) as well as regional statistics (Gutu Mission Hospital 1994) based on institutional deliveries report however much higher rates, 40 to 45/1000 births. Institutional statistics concerning the PMR are faltering, as women who deliver at home are not included. However, a community-based assessment is much more resource demanding. We interpret the relatively low perinatal mortality rate as an indicator of a generally well-developed referral system in combination with a generally good health status among the women.

**Fertility regulation**

The contraceptive prevalence rate was similar in Gutu as compared to Zimbabwe in the DHS in 1994. With increasing age fewer women use FP, which may indicate that it is mainly utilised to space pregnancies and to a lesser extent to limit the number of children. The Women’s Studies Project (WSP) also found that utilisation of FP started after the first birth and remained high up to the fourth birth, after which it declined. Women wanted to have a child soon after marriage and no one used FP during that period, a reflection of the cultural expectation that a woman must prove her fertility soon after marriage (Barnett et al 1999).

There has been a dramatic downward trend in the number of children born per woman (TFR; total fertility rate) in Zimbabwe, from 5.5 in 1988 to 4.3 in 1994. To what extent FP has had an impact on the decline in the TFR seems controversial. An analysis of the decline in the TFR in Zimbabwe during the 1980s did not indicate that it was related to the use of FP (Udjo 1996). In Kenya it was concluded that "modernisation" of society together with access to modern contraception was the reason for the fertility decline (Egerö 1994). Zimbabwe is likely to be quite similar, but our study does not allow any conclusions concerning effects of FP on number of children born. The infant mortality rate has not improved since 1985 (Zimbabwe Demographic and Health Survey 1995) and cannot explain the decline in fertility. It is most probable that there are other contributing factors such as increased migration or worry about the future in a declining economy.

Contraceptive services do not seem to be of benefit to adolescents. One out of ten in the adolescent group were married, and it was only them, who used family planning. Similar findings were also reported in the DHS. This is alarming, as studies indicate that more than every second adolescent in many of the sub-Saharan African countries is sexually experienced at that age (Blanc & Way 1998). Family planning in rural areas in Zimbabwe is organized through community based distributors. They do not provide FP for teenagers, and at the local clinic these young people do not feel accepted. A study on the impact of FP on women’s lives showed
that teenagers in Zimbabwe have to rely on mothers, sisters or friends for information (Barnett et al 1999). To educate teenagers in school can have an impact on both knowledge and behaviour (Rusakaniko et al 1997). Therefore the Zimbabwean schools need to take their responsibility and educate the younger generation concerning these extremely important matters of how to prevent STD as well as unwanted pregnancies. But there is also great resistance in the community, as it is generally believed that education stimulates premarital sexual activity and "loose moral" (Gage & Meekers 1994).

The FP distribution system favours use of oral contraceptives (OC). Safe methods other than OC, such as intrauterine devices, injectables or tubal ligation, were used by only 10% of the women in Gutu. Low-dose gestagen pills were used as frequently as combined OC. The risk of method failure with gestagen pills must be assumed to be high in a developing country setting. Studies have indicated that contraceptive side effects are a serious concern for many women, (Barnett et al 1999). One in five family planning users in the DHS in Zimbabwe stopped their contraceptive method within 12 months after starting (Zimbabwe Demographic and Health Survey 1995). The use of injectables was low as compared to Bangladesh (Fauveau & Chakraborty 1994). Since this method often is preferred by multiparous women, an increased availability would be of benefit to them.

Another worrisome aspect was the low use of condoms. Similar findings were obtained in 1994 in the DHS, and in the Mother and Child Health Survey (1997) including all eight provinces in Zimbabwe (Schwartz et al 1999). Even though much effort has been expended during the last decade to promote condom use, little has changed. Condom use also had the highest discontinuation rate of all methods in Zimbabwe (Zimbabwe Demographic and Health Survey 1995). It is difficult for women to influence the use of condoms. Their low level of use in stable relationships has been confirmed (Mbizvo et al 1994). Increasing men’s knowledge and attitudes about family planning and the prevention of STDs is a matter of urgency.

Women in Gutu with a higher level of education used less FP, which is contradictory to other research findings. In the DHS it was found that one out of four married women without education used modern methods, and for married women with secondary education this figure was doubled. Education was again the main determinant for utilisation of modern contraceptives in a study in five countries in East, Central and Southern Africa (Frederick et al 1996). None of the girls in Gutu who were still in school admitted using FP, which could be expected given the strict moral expectations regarding unmarried young girls in this society.

FP in rural areas was available to women, and no one mentioned lack of availability as a reason for non-use. Nevertheless, nearly one out of two women had never used FP. Only a minority mentioned their husbands as the reason for this. While women perceive numerous benefits from
family planning, there must be other factors that discourage them from taking control over their fertility. There is a need for appropriate studies of the real needs for fertility regulation.

**Antenatal care and maternity care**

Zimbabwe is among the countries in sub-Saharan Africa where more than nine out of ten women register for ANC (WHO 1997). Two other studies in Gutu District have also confirmed our high attendance (Nhindiri et al 1996, van den Heuvel et al 1999). Evidently, women have great trust in what ANC can accomplish. The reported gestational age at booking was lower than in urban Harare (Munjanja et al 1996). Women reported only rarely that a traditional healer was consulted when problems occurred during pregnancy. Traditional medicine in Zimbabwe is used in parallel with Western medicine, but seems not to be in conflict with it (van den Heuvel et al 1999). Interview studies in rural Zimbabwe also have shown the interaction between traditional medicine and modern medicine, with women using both in their preparations for childbirth (Hansson 1996). Contacts with traditional medicine were probably underreported.

The rate of reported complications during delivery in Gutu was similar to that found in the study conducted in Egypt (Zurayk et al 1993) as was the rate of complications (15%) which can be expected to occur in pregnant women (Maine et al 1997). The Indian cross-sectional study reported fewer complications during delivery but a high rate of complications (one out of four women) after delivery (Bhatia & Cleland 1996), which was also reported in Egypt (Zurayk et al 1993). As "during delivery" and "after delivery" is a continuum, some overlapping in how this was registered is likely. We did not specifically inquire about the postpartum period, and therefore problems during this period were probably underreported.

We registered the complications as the women perceived them, which will be different from diagnoses in a hospital register. Also, it is common to have more than one complication. As only the main one was registered, others might have been overlooked. That could be the reason that some complications were fewer in number than expected, (infections, severe pre-eclampsia). A combination of questions for a specific complication would probably have increased the sensitivity, as was found in a retrospective study of obstetric complications in the Philippines (Stewart & Festin 1995). How the problem of recall affected the reported number of complications must also be considered.

Availability of essential obstetric care facilities can be evaluated through the rate of C/S (Maine et al 1997). It is assumed that as a minimum, 5% of deliveries will require C/S (Nordberg 1984). In Gutu, 6% of the women’s latest deliveries were by C/S. The high rate of institutional deliveries (85%), women’s reports on the care they received for their complications, the C/S rate, and the low perinatal morbidity fit a general picture of a community where the resources were
relatively good and women understood the need to use them in an adequate way. However, a maternal mortality study performed in the district a few years earlier indicated that many of the mothers who died had never reached any health facility (Fawcus et al 1996). Long distances to get care and lack of transport were also obvious problems in our study and need attention.

**Research findings and suggestions for further research**

In order to investigate reproductive health, cross-sectional area-based studies are useful as they also cover women who deliver at home and women who never seek care for their symptoms. However, to obtain a broader perspective, qualitative study methods are needed. There are many dimensions of reproductive health and ill health for which the perspectives of other fields, such as social science and anthropology, are essential in order to understand where the obstacles lie that hinder women from gaining better control of their lives.

Women perceived their health as being generally good. This was confirmed by our findings regarding adequate nutritional status, low anaemia prevalence and low rate of infertility. The study was performed during an early phase of the HIV epidemic, before the serious health consequences were obvious. At the time of the data collection, the high HIV prevalence that was later demonstrated was totally unexpected in a rural population of seemingly healthy women.

From the perspective of a developing country, the use of fertility regulation was at a high level. The women reported that family planning services were available to them. However, nearly every second woman had never used FP. Studies are needed to investigate unmet needs and how they can be addressed, especially among adolescents.

ANC coverage was high, and the proportion of institutional deliveries was greater than for Zimbabwe in general, as indicated by official statistics. The PMR was low compared to official statistics, and showed a trend towards lower mortality for the more recent pregnancies. The serious complications reported by the women had been cared for within the health care system, although the problem of recall concerning less severe complications must be considered. The rate of C/S also indicated that essential obstetric care was available at the time of the study.

The prevalence of anaemia was low, which could have many possible explanations. Nutritional status was satisfactory, and the burden of infections from malaria and from syphilis was also relatively low compared to previous research findings from the area. As anaemia is rare, whether iron supplementation should routinely be given to pregnant women can be questioned.
The most alarming finding was the relatively high HIV prevalence found in the adolescent group, with a rapid increase with age and the highest risk of being HIV positive during the period of life when most women give birth. Since the study was performed, socio-economic conditions in general have deteriorated in Zimbabwe. The maternal mortality rate has more than doubled. The results from this study could be a platform for future research on how changes in socio-economic conditions and the HIV epidemic have influenced women’s reproductive health.

**CONCLUSIONS**

From an African perspective the morbidity among women of childbearing age was relatively low and reproductive outcome had improved over the last two decades.

Women’s fertility pattern was uniform and age at marriage and the desire to give birth soon after marriage was similar irrespective of age and level of education.

Primary infertility as well as secondary infertility were rare despite a high exposure to sexually transmitted diseases as indicated by a high syphilis prevalence and a high HIV prevalence.

ANC attendance during the most recent pregnancy was high. Most women delivered in health institutions in which facilities and the possibilities for referral seemed to be adequate. This conclusion is based on the relatively low PMR, the high proportion of complications that had been referred and a C/S rate above the minimum level.

The prevalence of anaemia in both pregnant and non-pregnant women was low, indicating good nutritional status, adequate iron intake and a low level of chronic infections.

The high HIV prevalence in combination with the low morbidity indicated that the epidemic was at an early stage at the time of the study.

The high HIV prevalence in young married women of reproductive age as compared to the prevalence before marriage indicates that they are infected soon after marriage. The risk behaviour of young men needs to be addressed.
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QUESTIONNAIRE CONTENTS

FORM No  

Date of interview: ………………..

Socio-economic status
Ward no
Number of years lived in the area
Name
Date of birth
Religion
Marital status, if presently married: year of marriage
Level of schooling achieved
Time spent in urban area during the last 12 months

Occupation
Other work for income
Income per month
Head of the household’s occupation
Head of the household’s income per month
How much can be spent per month for yourself and for the family
Relation of the interviewee to head of the household

Number of people living in the household
Number of rooms
Type of housing
Source of water
Type of toilet
Electricity

Access to a field or a garden for cultivation
Access to water for cultivation throughout the year
Enough production for the household
Number of bags of grain sold last year by the household
Things owned by the family: bicycle, functioning radio, tractor or car, scotch cart, wheel barrow, goats, chickens

Number of heads of cattle
Who does most of the work in the household work
Distance to nearest health centre
   Transport available, if yes: type of transport
Distance to nearest maternity unit
   Transport available, if yes: type of transport

Health factors
Presence of (diagnose given by medical person)
   Diabetes
   Hypertension
   Heart disease
   Epilepsy
   Other chronic disease, specified
Regular intake of any medicine, if yes: type of medicine
Presence of physical disability, if yes: describe
Presence of:
   Dyspnoea
   Cough
   Headache
   Abdominal pains
   Abnormal discharge
   Heavy menstrual periods
   Irregular bleeding
   Leakage of urine between micturations
   Stress incontinence
   VVF-RVF symptoms
List of complaints if not feeling healthy
Persisting health problems related to previous pregnancies or deliveries
Time since last visit to a health centre/hospital/private doctor (not MCH)
   Main complaint

Pregnancy outcome
Age of menarche
Year of first marriage
Year at first completed pregnancy
Appendix

List of all pregnancies including
  Pregnancy number
  Year
  Duration of pregnancy in month
  Mode of delivery
  Outcome
  Foetal abnormality
  If dead, at what age

Lastest pregnancy
  Year
  Child alive, if no: when did it die
  Month for ANC booking

Problems during first half (before the child started kicking), if yes: specify
  Cause
  Action taken
  Who's advice
  Miscarriage

Problems during second half, if yes: specify
  Cause
  Action taken
  Who's advice

Complications during labour-delivery or after delivery
  Mode of delivery
  Place of delivery

Ongoing pregnancy, if yes: which month
  If no: do you want to get pregnant now
  If yes: for how long time have you been trying to get pregnant
  Is it a serious problem to you that you don't fall pregnant

Method of family planning ever used
Present method of family planning
Type of family planning mainly used
For how long time
Reason for not using family planning
Satisfaction with number of children, if no: reason

No of sister
No of sisters still alive
No of sisters (alive or dead) with children
No of sisters (alive or dead) exposed to pregnancy >2 years
No of sisters with primary infertility
No of sisters with secondary infertility
EXAMINATION FORM

Date: …………………………… Form No: ……………

Name: ……………………………

Pallor of conjunctivae
Pallor of tongue
Enlarged lymphnodes
    Submand
    Neck
    Supraclav
    Axillary
Dyspnoea at rest
Oedema of lower limbs

Height
Weight

Arm circumference

Blood pressure

Hb
HCT
S/U haematuria, proteinuria, glucosuria