IDENTIFYING STRATEGIES TO CONTROL ANAEMIA AMONG WOMEN OF REPRODUCTIVE AGE IN BOBO-DIOULASSO, BURKINA FASO: AN IN-DEPTH STUDY

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Contents

1. INTRODUCTION

This report presents the findings from a study of anaemia among women of reproductive age, conducted in Bobo-Dioulasso, Burkina Faso between February and July 1993. The aim of the study was to provide information which would assist in the development of an effective and acceptable programme to control anaemia among women of reproductive age in Burkina Faso.

1.1. The definition of anaemia

Anaemia may be broadly defined as a reduction in the haemoglobin (Hb) concentration below that which is normal for a given individual (WHO, 1972). For operational purposes, the World Health Organization (WHO) has proposed the use of the cut-off points presented in Table 1.1. These cut-off points indicate the concentrations of haemoglobin in the blood below which an individual should be considered anaemic.

Table 1.1 Haemoglobin levels below which an individual should be considered anaemic (World Health Organization, 1972)

Population sub-group	Haemoglobin level
- Pregnant women	11g/100 ml
- Lactating women	12g/100 ml
- Women neither pregnant nor lactating	12g/100 ml
- Adult males	13g/100 ml
- Children aged 6 to 14 years	12g/100 ml
- Children aged 6 months to 5 years	11g/100 ml

Among pregnant women, a haemoglobin level of between 7.0 and 10.9 g/100 ml is considered to constitute "moderate" anaemia while a level below 7.0 g/100ml is considered

"severe" (WHO, 1989). It has been suggested that 9 g/100ml represents a safety threshold below which maternal health is threatened (Riono et al., 1993). There is, however, a lack of reliable evidence on the nature and prevalence of the adverse effects of anaemia among women of reproductive age in developing countries.

1.2. The causes of anaemia

The three general mechanisms through which anaemia can arise are; excessive blood loss, rapid destruction of red blood cells (haemolysis), and inadequate production of red blood cells (erthyropoesis).

1.2.1. Excessive blood loss

Chronic blood loss due to parasitic infections such as hookworm and schistosomiasis may lead to anaemia in any section of the population. In addition, women of reproductive age are at increased risk of anaemia through blood loss in three ways:

(a) menstrual blood loss, which results, on average, in the loss of 1.6 to 2 mg of iron per day (such blood loss may be increased in women using intrauterine contraceptive devices);

(b) "normal" blood loss at the time of delivery;

(c) antepartum or post partum haemorrhage.

1.2.2. Rapid destruction of red blood cells

Two important causes of haemolysis are common in tropical environments, including Africa; malaria and the haemoglobinopathies. Among women living in endemic areas, susceptability to malaria is increased during their first and, to a lesser extent, second pregnancies, due to a reduction in acquired immunity.

1.2.3. Inadequate red cell production

Deficiencies in iron, folic acid or vitamin B12 are the most important causes of inadequate red cell production, with anaemia due to iron deficiency generally considered to be the most common nutritional deficiency in the world (Buetler, 1980; Whitney, 1987). The risk of iron deficiency anaemia is increased during pregnancy by the requirements of

the foetus and the placenta for iron, and during lactation by the demands of breast milk production.

1.3. The consequences of anaemia

Anaemia may lead to a reduction in physical work capacity, in intellectual performance, and in resistance to infections (Fleming, 1987; Hercberg, 1990). However, the most serious consequences of anaemia are probably those which affect the health of mothers, of the unborn child, and eventually the child itself. Severe anaemia is considered to increase the risk of maternal death in the event of obstetric haemorrhage or infection (Fleming, 1989a; Kampikaho & Irvig, 1991; Ogunniyi & Faleyimu, 1991; Thonneau et al., 1992). Moderate anaemia in pregnant women has been associated with an increased risk of low birthweight and increased risk of perinatal mortality (Brabin et al., 1990; Klebanoff et al., 1991). In addition, certain congenital malformations, notably of the neural tube, have been attributed to folate deficiency at the beginning of pregnancy (Tchernia et al., 1982; Hercberg, 1990).

1.4. The public health importance of anaemia

As we have already stated, anaemia is the most common nutritional deficiency in the world (Buetler, 1980). The most vulnerable groups are women of reproductive age, and children undergoing a period of rapid growth. Data available for the Africa reveal a high prevalence (greater than 40%) of anaemia among women of reproductive age; these data suggest that, on average, half of all women of reproductive age are likely to be anaemic at any one time (DeMaeyer & Adiels-Tegman, 1985). Among pregnant women the prevalence is likely to be even higher, between 50 and 60%, with some 10% of these women being severely anaemic (WHO, 1989).

Given this situation, the World Health Organization, has identified as a priority in Africa, the need for studies of the prevalence and aetiology of anaemia among women of reproductive age and particularly pregnant women, to enable appropriate and effective anaemia control programmes to be developed (WHO, 1989).

2. STUDY SITE

2.1. Burkina Faso

Burkina Faso is a landlocked country of some 9½ million people, situated at the southern edge of the Sahel Desert in West Africa. Conventional indicators rank it as one of the poorest countries in the world, with an estimated gross national product (GNP) of $290 per capita in 1991 (World Bank, 1993). Maternal and infant mortality in Burkina Faso rank among the highest in the world, with an estimated maternal mortality ratio of about 810 per 100,000 live births and an infant mortality rate of 133 per 1000 live births (World Bank, 1993). A crude birth rate of 47 per 1000 population and a total fertility rate of 6.5 also rank among the highest in the world (World Bank, 1993).

2.2. Bobo-Dioulasso

The study was performed in Bobo-Dioulasso, the second largest town in Burkina Faso, which is situated in the south-west of the country in a savannah zone. Like other towns in West Africa, Bobo-Dioulasso is expanding rapidly, with an estimated annual population growth rate 6.7% and in 1993 the population of the town is estimated at some 370,000 people (Ministère de la Santé, de l'Action Sociale, et de la Famille, 1991). Much of this growth is due to rural to urban migration as agriculture, especially in the dryer northern zones of the country, becomes less profitable. Many of the inhabitants of the town retain close contacts with their villages of origin.

There are some sixty ethnic groups in Burkina Faso, all of which are represented in Bobo-Dioulasso, and at least another thirty ethnic groups from all over Africa have been recorded. The original populations, the Bobo and the Dioula, gave the town its name. The Mossi, from the central and northern regions of the country, form another important group. The most numerous groups after the Mossi and the Bobo are the Samo, the Senoufo, the Dagari, the Toussian and the Peulh. While each group has its own language, Dioula, the language of commerce, is spoken in the markets and, to a greater or lesser degree, by most women. The majority of the inhabitants of Bobo-Dioulasso are muslim but there is also a substantial christian minority. While most of the population hold themselves to be muslim or christian, animist beliefs are also widely prevalent.

The French colonial legacy is visible in the grid layout of the streets of Bobo-

Dioulasso, wide avenues lined with mango and kapok trees separating residential blocks which are divided into compounds. Mud architecture still prevails. Each compound usually has several buildings set around a central, earth-floored yard. The compound may house one extended family, or many families who pay rent to the owner of the courtyard. About one third of compounds have a tap in the yard while another third fetch or have water brought from a standpipe. The final third of the population rely on private or communal wells. About thirty percent of households have mains electricity.

Climatically, the year in Bobo-Dioulasso may be crudely divided into three seasons: the dry season from October to February is a period of relatively low temperatures and of much dust, carried on the winds from the Sahel; the hot season from March to May, when the winds and dust subside and the temperature mounts; the rainy season from June to September, when the high temperatures of the hot season are cooled by the rain, during which farming takes place. This latter season is the "hungry" season when food supplies are at their lowest before the new harvest and when malaria transmission is at its highest. The fieldwork for this study was performed in April and May, the hot season.

Situated at "the crossroads of West Africa", with routes leading to Ouagadougou, the capital of Burkina Faso, to Cote d'Ivoire and Abidjan, and to Mali, Bobo-Dioulasso is an important commercial centre. The town also has a light industrial sector, production including tyres, soaps and detergents, cigarettes, fertilisers, cotton fabric, canned produce and motorcycles. Unemployment is, nevertheless, rife.

2.3. Health services in Bobo-Dioulasso

A variety of approaches to health care and healing exist in the town and many options for treatment are available. These include approaches which derive from local traditions and schools of thought and approaches imported more recently, commonly referred to as "the medicine of the whites". Bobo has an association of "local" healers, the Cellule Pharmacopée, and some 180 are registered with the Direction Provinciale de la Santé (DPS).

In the "white" sector there are 26 health facilities, 13 of which are government run, and 13 private. These facilities include mother and child health clinics, dispensaries, maternity homes and school and company-run clinics. Bobo-Dioulasso is the site of one of

two "National Hospitals" in the country, the "Centre Hospitalier National Sanou Souro" (CHNSS). The hospital acts as the referral centre for the west and south-west of the country. In addition to the hospital there are seven fixed government health facilities which offer maternal and child health services (SMI), including antenatal care, and 5 mobile clinics which cover the peripheral areas of the town. Delivery services are provided by the maternity ward at the hospital, by another two government maternity hospitals, and by four private clinics.

The Ministry of Health recommends that women receive three antenatal care consultations. In theory, at a typical antenatal consultation the woman is weighed and her height is measured, indeed antenatal consultations are often called "weighings" by the women. The woman is then examined by a midwife for conjunctival pallor and oedema of the lower limbs. If the pregnancy has reached the second trimester symphisis-fundal height is measured, foetal heartbeat is monitored using an obstetric stethoscope and cervical status assessed. A blood pressure measurement is then taken and a urine sample tested for proteinuria with a dipstick. If the woman is not currently vaccinated against tetanus she is vaccinated free of charge. The women may also be given a referral note for a test for blood group and syphilis (for which she will have to pay). If the woman has pale conjunctiva a course of iron is prescribed for which the woman will have to pay about $3.50. A prophylactic course of chloroquine is routinely prescribed. This will cost the woman about $1.50 for a course lasting seven weeks. This prescription will not last most woman up to the time of their next antenatal consultation. If the urine test is positive or another complication is identified the woman is referred to a doctor.

In addition to the above, at her first attendance, a woman is invited to attend a health education session at which breastfeeding, immunization and food hygiene are discussed.

In practice, the clinics at which these consultations take place may be lacking a set of functioning scales, a tape measure, a sphygmanometer, or urine dipsticks and referral and prescribing criteria may not be adhered to.

2.4. The position of women in Bobo-Dioulasso

The vast majority of the ethnic groups represented in Bobo-Dioulasso practice patrilineal, polygamous systems of organization. Only three groups from the south-west still follow, in a limited way, matrilineal systems. In the patrilineal systems, the woman has no say in the formation and organization of family groups. In this way the woman is excluded from the sharing out of material possessions, even though she constitutes a very important member of the work force.

A girl is considered as a "loss" to the family, to be "used" until her eventual departure. Little is invested in her, which explains to a large extent the low level of literacy among women. Her role is (confined to) that of assisting her mother in domestic and farm work, in preparation for the time when she herself will be a wife and mother.

The usual age of marriage is between about 16 and 19, and the young woman is often "used" to seal an alliance between two families. While the value and composition of the marriage dowry vary from group to group, the dowry remains a symbol which authenticates the union and legalizes the transfer of rights over the woman from her parents to her husband and his family.

Few women perform work which carries a regular wage or salary (about 20% of state employees are women). In Bobo-Dioulasso, the principal income-generating activities of women consist of selling - fruit, vegetables, prepared food, or other small items. Despite the typically modest nature of this income, women contribute substantially to the support of the family.

The power of decision rests with the man. One way in which this power is manifested is by the patrilocal residence of the couple. Outside her traditional role as domestic servant and mother, all a woman's undertakings, including seeking health care, must be approved by her husband. In theory, she must inform her husband (or the person who "coifs" her) of any need and it is he who will decide upon the appropriate course of action. However, attendance at health education sessions, antenatal consultations, etc., are considered to be part of a woman's role of "looking after the child" and, as such, a request to the husband to attend is largely a matter of form, of warning the husband of an impending absence from the home. Similarly, meetings of women's groups and associations form an accepted part of a woman's life.

3. POLICY RELEVANCE OF THE STUDY

Maternal and child mortality rates in Burkina Faso are among the highest in the world (World Bank, 1993). Reducing this excessive mortality is regarded as a high priority by both health policy makers and health professionals. Thus, in the five-year plan for the development of health 1991-1995, the reduction of maternal and child morbidity and mortality is the number one objective (Ministère de la Santé, de l'Action Sociale et de la Famille, 1991). The contribution of anaemia to this high maternal mortality is probably substantial, since obstetric haemorrhage is the second most common cause of maternal death after sepsis (Ouedraogo, 1989). However, no studies of the prevalence of anaemia among women of reproductive age in Burkina Faso have ever been published.

The Direction Provinciale de la Santé for Houet (DPS), based in Bobo-Dioulasso is working towards the objective of reducing maternal morbidity and mortality. Among the numerous problems affecting the health of women (and children) in Bobo-Dioulasso, the DPS attaches a particular importance to nutritional problems and anaemia is expected to be the most prevalent nutritional deficiency. At present, anaemia control activities consist of an examination of the conjunctiva of pregnant women attending health facilities for antenatal care. The prescription of iron and folate supplements is uncommon and "compliance" with such supplementation has never been evaluated in Burkina Faso. Anaemia among women of reproductive age and interventions for its control represent, therefore, an area of research judged to be of high importance by the provincial health authority.

The information needed to identify and develop an effective public health control strategy consists essentially of the following: a knowledge of the magnitude and consequences of the problem (anaemia) (in medical, social and economic terms); a knowledge of its aetiology; a knowledge of the available preventive and control measures, their medical and cost-effectiveness and, above all, their acceptablity to the population. The principal approaches available for anaemia prevention and control among women of reproductive age are the following:

- supplementation with a combination of iron, folic acid and perhaps vitamin C tablets;
- nutritional advice to encourage women to follow a diet containing an adequate quantity of absorbable iron;
- fortification with iron of widely consumed foodstuffs;
- prevention and treatment of parasitic infections such as malaria;
- family planning.

A key factor to consider in the development of a control programme is the context in which it is to be launched, upon which may depend greatly the acceptability and uptake of the services offered. Any public health measure whose intention is the control of anaemia among women of reproductive age must be suited to and acceptable to the target population and must take into account the cultural context and knowledge of the population (WHO, 1990; Rooney, 1992).

Intervention trials against anaemia have been performed in both the developed and the developing world. Certain authors have proposed that all pregnant women should receive supplements of iron (Hallberg, 1988; Fricker, 1990); others suggest that in "well-nourished western populations" the value of iron and folate supplemenation is doubtful (Mahomed & Hytten, 1989). A recent analysis of the prevalence of anaemia among women of reproductive age concluded that, although iron supplementation is haematologically efficacious, iron supplementation programmes have produced disappointing results (WHO, 1990). A number of factors may explain this state of affairs:

- iron supplementation programmes have, traditionally, been aimed at pregnant women (Kuizon et al., 1979; DeMaeyer, 1989) even though high prevalences of anaemia are observed among all women of reproductive age; supplementation during the relatively short period of pregnancy may be insufficient to correct the underlying deficiency, and supplementation outside of pregnancy is being increasingly advocated (Rooney, 1992);
- "non-compliance" of women with the supplementation schedule has also been suggested as a reason for the failure of iron supplementation programmes (WHO, 1990); this "non-compliance" may be linked partly to

the side-effects of treatment, often exaggerated during pregnancy and partly to a failure to ensure that the programme is adapted to its context (Valyasevi, 1988);

- the aetiology of anaemia in some regions is dominated by parasitic infections, the haemoglobinopathies and folate deficiency (Fleming, 1989b), and in such a context it is not surprising that iron supplementation alone has little impact on the prevalence of anaemia.

In the light of these problems, it is clearly essential that any intervention for the control of anaemia must be based upon a sound knowledge of the population, in particular of the present social and economic realities, of the knowledge, perceptions and beliefs of the population with regard to anaemia, and of the current behaviour of the population in the face of anaemia.

This study in Bobo-Dioulasso combines qualitative research methods taken from the social sciences with quantitative methods drawn from epidemiology to provide information which will aid the development of an appropriate and effective programme for the control of anaemia among women of reproductive age in Burkina Faso. This report presents the results obtained and discusses their implications for the development of an effective programme for anaemia control in Bobo-Dioulasso.

4. OBJECTIVES OF THE RESEARCH

The overall aim of the research was to provide information which would assist in the development of an acceptable and effective programme to control anaemia among women of reproductive age in Burkina Faso.

The specific objectives of the research were the following:

1. to determine the prevalence of anaemia in women of reproductive age (both pregnant and non-pregnant) in Bobo-Dioulasso;
2. to identify when, where and why women of reproductive age have contact with existing health services in Bobo-Dioulasso;
3. to describe local perceptions of health, illness and healing in Bobo-Dioulasso, in particular among and concerning pregnant and lactating women;
4. to identify beliefs and behaviours which influence women's health during pregnancy and lactation;
5. to explore the acceptability to women of different approaches to the control of anaemia.

5. STUDY DESIGN AND DATA COLLECTION METHODS

The study combined both qualitative and quantitative research techniques. Objectives 1 and 2 were addressed primarily through a cross-sectional survey of women of reproductive age (15 to 49 years). Objectives 3, 4 and 5 were met through a series of semi-structured, key informant interviews with women of reproductive age, with local herbalists, and with government health workers.

5.1. Sampling methods

For the quantitative component of the study a cross-sectional survey using cluster sampling was conducted. In the absence of an up-to-date and reasonably comprehensive sampling frame this approach was more practical than attempting to select a simple random sample of women. Women aged 15 to 49 years, who had been resident in Bobo-Dioulasso for a period of at least one year, were eligible for recruitment. Women were enrolled in clusters of (approximately) ten, since this was the number of women who could be interviewed in a single day by a pair of fieldworkers. It was decided to recruit twenty-five such clusters (250 women in total). This sample size was chosen with the aim of providing the study with a precision of at ±10%, or better, in the estimate of the prevalence of anaemia in the population, making allowance for possible intra-cluster correlation of haemoglobin levels.

The twenty-five clusters were selected in the following way. Bobo-Dioulasso is divided into 25 administrative sectors. Using population data on these sectors provided by the DPS, the number of clusters to be recruited per sector was determined using the method of probability proportional to size (Cochran, 1977). The precise location of the clusters within each sector was then identified using data from a previous study of childhood diarrhoea, during the course of which almost 3000 compounds distributed throughout the town had been visited. Within each sector compounds equal in number to the number of clusters to be recruited in that sector were selected at random from this list. These compounds then served as the starting point for each cluster.

The women to be recruited were then identified as follows. The fieldworker stood in front of the entrance of the compound identified as the starting point for the cluster, as though about to leave. She then turned left and sought the next compound on her left.

Upon arriving in this compound, the fieldworker identified all resident women of reproductive age. If only one woman of reproductive age lived in the compound then this woman was to be recruited. If more than one woman of reproductive age inhabited the compound, the fieldworker was instructed to recruit the woman who was or had been most recently pregnant. Upon completion of recruitment the fieldworker again turned left out of the compound and sought the next compound on her left. This process was repeated until ten women had been recruited. In the event that a woman eligible for recruitment was not present at the time of the fieldworker's visit, a message was left and the fieldworker returned later in the day.

5.2. Informed consent

Verbal informed consent was obtained from each woman before her recruitment into the study. The purpose of the study was explained to the woman in Dioula, a widely-spoken local language, and the woman was asked if she was prepared to answer some questions and provide a drop of blood which would then be tested on the spot for anaemia. An English translation of the explanation given to the women is attached as Annexe 1.

5.3. Data collection methods

The collection of data during the cross-sectional survey was performed largely by three female interviewers trained as "agents itinérants de santé". These interviewers came from three different ethnic groups; Mossi, Senoufo and Bissa. Two of these interviewers had substantial experience of data collection in the field having worked for 15 months as interviewers on a study of childhood diarrhoea. Training of the fieldworkers in the administration of the questionnaire, in the collection of anthropometric data, in the assessment of conjunctival pallor, and in the use of the HemoCue (for the measurement of Hb) was performed between 22nd March and 2nd April. The cross-sectional survey itself lasted approximately five weeks. Day-to-day supervision of the work in the field was performed by a final year, male medical student of Mossi origin.

5.3.1. Questionnaire interview

With the consent of the woman a questionnaire was administered in Dioula. Information was gathered on the following broad areas:

- the woman's demographic characteristics; her age, ethnic origin, religion, education, occupation, marital status,
- the socio-economic position of the family,
- the woman's reproductive history, her use of health facilities, and knowledge of and utilization of contraceptive methods,
- diet in the past 24 hours.

The questionnaire was pre-tested in a pilot study of 30 women and modified in the light of the problems encountered. A French translation of the final version of the questionnaire used in the study is attached as Annexe 2.

5.3.2. Assessment of anthropometric status

At the end of the interview each woman was weighed, and her height and mid-upper arm circumference measured. The weighing was performed using an ordinary set of bathroom scales and the weight to the nearest kg recorded. Height was measured by standing the woman barefoot against a wall or other vertical surface, marking her height on the surface, and using a 2 m tape measure. The height was recorded to the nearest cm. Mid-upper arm circumference was measured using a tape measure, with the arm relaxed and the elbow forming a right angle, and recorded to the nearest cm. The measurements of height and weight were used to calculate the body-mass index (BMI) for each woman. Body-mass index is the ratio of the person's weight (in kg) to their height (in cms) squared, and is the indicator currently recommended by the World Health Organization for describing the nutritional status of a population (WHO, 1991). BMIs between 19.0 and 22.9 are considered normal. Below 19 an individual is considered to be underweight for her height; at 23 or above she is overweight; individuals with BMIs of 29 or more are considered obese. Because a woman's weight is liable to change during pregnancy, mid-upper arm circumference is the indicator recommended for assessing the nutritional status of woman during pregnancy, since this measure remains relatively stable (WHO, 1991).

5.3.3. Assessment of conjunctival pallor and clinical status

The fieldworkers examined the coloration of the conjunctiva of all women. The training of the fieldworkers in the performance of this examination was performed in the maternity ward of the town's hospital by the principal investigator, using women hospitalized with severe anaemia, and non-anaemic women attending for delivery or other reasons. The fieldworkers were instructed to pull down gently the lower lids of both eyes, to look at the colour of the conjunctiva adjacent to the orbit of the eye, and record whether or not it was pale. In addition the fieldworker recorded whether they were sure or unsure of their assessment. The fieldworkers showed good agreement with the principal investigator in the hospital setting. Pregnant women were also asked about illness during the pregnancy; vomiting, bleeding and fever.

5.3.4. Assessment of haemoglobin (Hb) status

Following the assessment of anthropometric and clinical status of the woman, her haemoglobin status was measured using the Hemocue B-Haemoglobin System, manufactured by HemoCue AB of Sweden. The HemoCue is a portable, battery-powered device which measures haemoglobin using the azide methaemoglobin method. The HemoCue was used according to the following protocol:

(1) the woman was seated, the middle finger of one hand was cleaned with a swab of alcohol, and the last joint of the finger massaged to ensure a good flow of blood to the sampling area;

(2) the tip of the finger was then pricked using a disposable lancet, the first drops of blood wiped away with a clean swab of cotton;

(3) a drop of blood was then collected by placing the tip of the microcuvette in the middle of the next drop of blood, the blood being drawn into the microcuvette by capillary action;

(4) the microcuvette was then placed in the HemoCue which gives a digital readout of the haemoglobin level within 60 seconds.

The calibration of the HemoCue was verified each morning using a control microcuvette supplied with the machine. The accuracy of the HemoCue in this setting was

also confirmed by a small validation study of fourteen women attending the maternity ward of the town's hospital. The haemoglobin levels of these women were assessed simultaneously using the above method and by taking a venous blood sample which was then enumerated using the hospital's Coulter Counter. The results of this study are presented in Table 5.3.4.1. They indicate a very close correlation between the two methods with no evidence of any systematic bias in one direction or the other.

Table 5.3.4.1 Comparison of results obtained with the HemoCue with those obtained from a Coulter Counter

Obs	HemoCue	Coulter Counter	Difference
1	14.1	14.4	-0.3
2	10.3	9.9	0.4
3	14.5	13.9	0.6
4	5.3	5.8	-0.5
5	10.6	11.3	-0.7
6	15.3	14.6	0.7
7	10.4	10.3	0.1
8	14.1	14.0	0.1
9	7.7	8.0	-0.3
10	10.3	10.6	-0.3
11	14.6	14.5	0.1
12	9.0	9.4	-0.4
13	9.8	10.9	-1.1
14	10.1	9.8	0.3
Mean	11.15	11.24	-0.09

Correlation co-efficient = 0.99

Paired t-test = 0.68 on 13 degrees of freedom, $p > 0.30$

5.3.5. Key informant interviews

A total of 37 individual key informant interviews were performed. Twenty-two of these interviews were conducted with women enrolled into the cross-sectional survey. The women to be interviewed in this way were identified by the fieldworkers, the main criterion for selection being an apparent openness and willingness to participate in discussion. Similar interviews were conducted with 5 "fra bo la", local healers who use the

roots and leaves of plants; the President of the "Cellule Pharmacopée" of the Province of Houet, and another four "fra bo la" recommended by him. From the state sector, three midwives, one "infirmière brevetée" (a nurse with 10 years of schooling) and one "infirmier d'état" (a nurse with 13 years of education) were interviewed.

The question guides for these interviews were developed by the project sociologist (B Kanki) in conjunction with Dr Melissa Parker, an anthropologist from the London School of Hygiene and Tropical Medicine, who visited Bobo-Dioulasso for a period of two weeks in April. Copies of the guides are attached as Annexe 3. They were pre- tested on 2 women, 1 government health worker and 1 "fra bo la". The interviews themselves were performed by the project sociologist, a Gourounsi, with assistance in note-taking from one of the fieldworkers. The "interne en médecine" attached to the study assisted at the interviews with the government health workers. The women and three of the "fra bo la" were interviewed at home, while 2 of the "fra bo la" were interviewed at a meeting of traditional healers, and the government health workers at their place of work. The interviews with the women and with four of the "fra bo la" were performed in a local language, Dioula, while the interviews with the state health workers and with the President of the "Cellule Pharmacopée" were conducted in French. The general themes tackled in the interviews included; explanations for illness, particularly illnesses of the blood; dietary preferences and restrictions; therapeutic responses to ill-health. The interviews with the women focused on; their experiences of motherhood (pregnancy, delivery and the problems associated with these events); their experiences of illness (knowledge and treatment of those illnesses considered most common); the importance of nutrition; dietary practices, preferences and restrictions; experience and acceptability of iron supplementation. The interviews with the government health workers and with the "fra bo la" explored the importance of different health problems, in particular anaemia, their experiences in treating these ailments and their suggestions on how anaemia might be controlled.

5.4. **Data entry and analysis**

Data from the cross-sectional survey were double-entered onto microcomputer in Bobo-Dioulasso, after manual checks for errors and inconsistencies. The majority of the analyses performed were descriptive (estimation of means, prevalences, etc.). These

analyses were performed using the software package Epi-Info 5. Confidence intervals around the estimates of the prevalence of anaemia, the proportion of women using health services, etc. were calculated using the method described by Bennett et al. (1991) to allow for the cluster sampling method used. Conditional logistic regression (Breslow and Day, 1980) was used to investigate potential indicators of risk of anaemia, whilst allowing for the cluster sampling.

The notes taken at the key-informant interviews were collated following the interview, and when necessary translated into French. "Content" analyses of these data were performed by the project sociologist. The major stages in this process were: typing the interviews onto the microcomputer; reading and correcting the typed data; compilation of the responses to each question; creation of a "matrix" of data; reduction of the matrix to the scale of the themes addressed; interpretation.

6. RESULTS FROM THE KEY INFORMANT INTERVIEWS

Twenty-two women participated in the key informant interviews, of whom 3 (14%) were aged 15 to 19 years, 9 (41%) 20 to 29 years, 9 (41%) 30 to 39 years, and 1 (5%) 40 to 49 years. Nine (41%) had received no formal schooling, 3 (14%) had completed between 1 and 5 years, and 10 (45%) had completed 6 years or more. Eight women were Mossi, two were Bobo and two Peulh. The remainder were drawn from a range of different ethnic groups. One (pregnant) woman had not previously delivered, 8 women had previously been pregnant between one and three times and 13 women had completed four or more pregnancies.

The five "fra bo la" interviewed were all males, ranging in age from 37 to 71 years old. All had been taught by male relatives (four by fathers, one by a grandfather), while one had also been taught by his mother. The youngest had been practising since 1978 while the other four all had at least 30 years experience of healing.

The five government health workers interviewed ranged in age from 32 to 50 years. Four were female, one male. All had at least eight years experience.

The length of the interviews varied. For the women the average duration was about one-and-a-half hours, for the "fra bo la" two hours or more, for the government health workers about 45 minutes.

6.1. General perceptions of health, illness and healing in Bobo-Dioulasso

6.1.1. Health

A local adage states that "health and longevity are the two most precious possessions" of an individual. Thus, when health is at stake, no stone is to be left unturned, no effort to be spared. Illness is perceived as a constant threat, something to be ever feared. It is this fear which forms the basis of the respect, fear and trust placed in healers but which, at the same time, exposes them to criticism and attack should their therapy fail.

While the preservation of health (the avoidance of ill health) is a daily concern, it is a subject which is often not discussed openly. To talk or even think about illness, may be to tempt fate, to call "da djougou", the evil mouth, or "nya djougou", the evil eye,

supernatural forces which work sometimes with and sometimes without human assistance. "Ni i mirira fén djougou ra a bi soro" - if you think about bad things they will happen.

One way in which this concern manifests itself, however, is in the care and attention lavished on the newborn child, a fragile and natural being. The newborn receives intensive care, these caring practices generally occurring at the moments when the infant is bathed. Decoctions are prepared by boiling plants with a wide variety of virtues, and used for bathing the child. Herbal infusions are given to the child to drink and are used as enemas. A body massage with shea butter forms part of the daily care administered. In addition, scarification and the wearing of amulets and beads around the neck and waist are commonplace. All these "treatments" aim to protect the newborn against those illnesses which are widely perceived as an unavoidable obstacle for the child: "kolobo" ("teething" diarrhoea), "soumaya" (see below), "konodja" (constipation), "konodimi djala" (stomachache), "sogo sogo" (cough), "moura" (cold) and "femiseni" (see below).

6.1.2. Illness

The illness of an individual is something which is experienced by the group. When someone is ill the whole family is concerned, morally and often financially. Each morning the sick person must be visited, their progress enquired after, advice and help offered. Failure to perform this duty represents a grave breach of etiquette. This experience remains in the collective memory. The knowledge of the population with regards to illness is an empirical knowledge based upon this experience. In the event of illness, a diagnosis is established with regard to signs previously presented by other individuals. Signs frequently encountered can be readily accepted, they are normal, unsurprising if unwelcome; signs never before encountered herald a new disease, an additional cause for apprehension. A new disease thus constitutes a double rupture of the equilibrium - first the illness itself, second its novelty and ·nce its unpredictability.

Several women commented ne seasonal nature of some illnesses. They explain this "hat hing" of illness at certain ·s of the year by one or more characteristics of the season. Thus the hot season (February- May), during which the fieldwork for this study was performed, is feared because "there are too many illnesses". It is, above all, the season of high temperatures, of gusts of wind and dust which can carry "bana kisè", the seeds of illness. It is also the mango season, the time of these "too sweet" fruits which are

said to cause "soumaya" and to give children diarrhoea. The wet season (June-September) also favours "soumaya" because of its dampness and the ready availability of shea (another sweet fruit).

Categories of illness

When women were asked to cite illnesses ("bana") with which they were familiar, they drew first of all the distinction between "denmisen bana", illnesses of children ("den" = child), and "mogo koro ba bana", illnesses of adults.

Denmisen bana

When talking of children, one "never stops talking of illness". Childhood diseases are considered commonplace and humdrum but, at the same time, they are feared. This fear stems from the fragility of the young child. They are humdrum because infancy is considered as a period when an individual must harden themselves against everything. A child who is frequently ill in early life is seen as a strong adult in the future, over whom no illness will have a hold. "Kotigue" (anal fissures), "soumaya", "sogo sogo" (cough), "moura" (cold), "konodimi djala" (stomachache), "konoboli" (diarrhoea), and "femiseni" are those childhood illnesses reported by mothers to be most common.

All the mothers we spoke to cited "femiseni" (meaning literally "little things", and used to describe a rash, usually measles) as the most serious illness of early childhood. They recognize "femiseni" by four signs; the child's body is hot, the inside of the mouth is irritated and inflamed, the child's eyes are red and sticky, the child refuses to eat. Other signs - diarrhoea, vomiting, coughing - were mentioned by some mothers. The diagnosis is confirmed by the appearance of a rash on the body of the child. The mothers state that "femiseni" is common in the dry season due to the wind and the dust. Measles epidemics have often been recorded in this season.

For all mothers, "femiseni" is the major hurdle that a child must overcome to become strong. Thus the Mossi have a saying that "until your child has had "femiseni", s/he does not belong to you". It is a much feared illness surrounded by many restrictions. As soon as "femiseni" is suspected, it is forbidden to wash the child, to give her meat to eat or milk to drink. S/he is given instead tamarind juice or locally brewed alcohol which can cure internal wounds. According to local perceptions, the inflammation/irritation of the mouth is a sign of an internal irritation. "Local" and "white" remedies are used together as treatments.

Mogo koro ba bana

Women draw a further distinction within "mogo koro ba bana"; "bana mi ka teli", everyday, ordinary illnesses, those that occur all the time; "bana djougou", less common but more serious illnesses.

Bana mi ka teli

These are those illnesses whose signs and treatments (both "local" and "white") are known to everyone. These illnesses may be discussed openly because the causes can be talked about without fear or restraint. They form part of everyday life. Recovery is assured. "Sickness of the body" is talked of, in the sense that the body suffers but life is not in danger. These are passing illnesses which generally affect a particular organ or part of the body; headache, stomachache, backache.

The illness in this class most commonly mentioned by the women was "soumaya" (literally "state of coldness" or "state of dampness"), often crudely equated with malaria. All women are familiar with and suffer from "soumaya". The signs of "soumaya" are "aching all over", or "a hot body" in the presence of other signs - headache, dizziness, bilious vomiting, joint pains. According to the women, "soumaya" is common all the time, but with periods of increased intensity, the rainy season and the mango season. While more and more women have heard that mosquitoes can transmit malaria, they continue to assert that eating too many sweet foods (notably mangoes and sheas), or oily foods, can cause "soumaya".

Bana djougou

Among the illnesses in this category the most commonly mentioned was "kandja bana" ("illness of stiff neck", usually meningitis), followed by "laworo" ("bedridden six days", usually chickenpox), "cholera", "sogo sogo gbè" ("white cough", describing the sputum associated with tuberculosis), "dousou koun dimi" ("heart pain", used to describe chest pains in general), "tension" (hypo/hypertension), and "SIDA" (AIDS). What entitles these illnesses to the description "djougou" (bad/spiteful) is their abrupt or conversely chronic nature, and the associated high risk of death.

Of these illnesses little appears to be known, and the little that is known is not always disclosed. We noted a certain reserve among the women when these illnesses were discussed. This reticence might be due to lack of knowledge, excessive fear, or an inability to explain the illness.

To the women, these illnesses seem unnatural. They are unnatural because the observable signs cannot alone justify the seriousness of the illness. Thus while "kandja bana" is seen as often in children as adults, it is "bana djougou" rather than "denmisen bana". It is unnatural and therefore not to be associated with a child, a natural, innocent being. In the event of "bana djougou" the character of the patient, and to some extent that of her family, are called into question. What norm has she transgressed? What oath has she broken? The "circumstances" in which the illness arises then determine the cure.

Rare is the woman who admits to experiencing these illnesses. Generally she has only heard about them. The women talk of them in an impersonal way, as though reciting an anecdote. Thus for "kandja bana" we heard several stories: "it seems that the person becomes stiff, that she is tense...."; "they say that people go deaf, become paralysed, become idiots after 'kandja bana'". Similarly for AIDS: "it starts like "soumaya", the person has diarrhoea until s/he dies"; "I have heard it said that the person can have all illnesses".

6.1.3 Healing

In Bobo-Dioulasso, a system of health care based on "white" medicine, co-habits with a pre-existing, "local" system. In the event of illness, several therapeutic options are available to the sick individual:

- the state system based on "white" medicine,
- healers using local methods including: "marabouts", whose healing capacities are based on their ability to foil the curse or spell which underlies the illness; "fra bo la" whose healing powers are based upon a knowledge of plants.
- self-medication: many women know of the virtues of plants and/or seek advice from older, more informed members of the community.

The choice of course of action is determined by the acute or chronic nature of the illness and by the relative ease of access to the different systems of care, but characteristically involves a coming and going between the different systems. The women are pragmatists, not ideologues. If the first treatment does not work then try another. For example, "soumaya" is often initially treated by self-medication, commonly using a

combination of "local" and "white" medicines. All the mothers interviewed reported that when they fall ill with "soumaya" they begin by treating themselves, using quinine-based drugs and/or drinking infusions and bathing in decoctions prepared from plants. They only seek specialist help when self-treatment does not lead to any improvement in health.

6.2. Perceptions of health and illness in women

In terms of illness, women are perceived to lie between men, who are said to be "rarely ill", and children in connection with whom "one never stops talking of illnesses".

6.2.1. The pregnant woman

Traditionally a women is only complete when she maintains an intimate relationship with a child, either through carrying it in her belly or through breast feeding. This privileged relationship makes a woman a "precious" being because she controls absolutely the life of the child. The health of a woman during pregnancy, her eating habits, her cleanliness, the respect which she gives to tradition and custom, determine the moral and physical well-being of the child.

The beginning of pregnancy is a moment of which women are apprehensive. While the women in this study were unanimous in saying that all pregnancies are different, they were also unanimous in saying that the beginning of pregnancy is very difficult. Nausea, vomiting, "soumaya", fatigue, anorexia, dizziness are the principal problems that the women spoke of experiencing in the first months of pregnancy. Backache, stomach problems, palpitations and above all general tiredness are common signs throughout pregnancy. When pregnant a woman will refrain from self-medication, preferring to follow the advice of better informed people. Certain old women are well known for their knowledge of plants which can "lighten" the problems linked with pregnancy.

Although women declare themselves to feel very tired during pregnancy, and although the health of the mother determines that of the baby, little mention is made of rest for pregnant women. Rest for a person who is on her feet is associated with laziness. Those rare women who do stop working during pregnancy only do so under medical advice, and then only up to a point. The remainder continuing working because, in any case, they have no-one to help them, let alone replace them. Moreover, several anecdotes tell of the relative ease of delivery in women who lead an active life throughout

pregnancy. In certain groups, as soon as a woman feels the first contractions she must pound millet to accelerate the labour. This recommendation has a practical aspect, since it enables the woman to prepare a reserve of flour for the preparation of meals after the delivery, a period when rest is permitted, indeed enforced, by a prohibition against leaving the house for seven days.

6.2.2. The parturient woman

The newly delivered woman is the object of much attention as she is someone considered to have been made fragile by the pregnancy, by the ordeal of labour, for whom the sequellae to confinement are to be feared. The care given to the parturient aims to heal the wounds in the belly, to drain off the clotted blood remaining there while avoiding haemorrhage, to encourage the production of milk, and to replace the blood lost during delivery.

6.3. Dietary habits and restrictions during pregnancy and lactation

6.3.1. Habits

Bobo-Dioulasso is a town "at the crossroads" of francophone West Africa, where representatives of more than sixty different ethnic groups are to be found, and where "our food" forms an important part of the group identity. Thus, according to ethnic group membership, women say "our food is tô made with millet, and baobab sauce", or " our food is couscous" or "our food is fonio", etc.. In the women's eyes, food is important in staying alive (several women cited examples seen on the television of people who died because of a lack of food). An individual must eat to live, to grow, to develop, to have strength, to have blood, and thus to be healthy. To feed one's self is to support the organism, and to give it strength, blood and (a notion increasingly encountered) "vitamines". Thus, traditionally, one must eat heavy, substantial foods - tô, beans, couscous, fonio, rice - to have the physical strength for hard work. One must also eat "rich" foods which "get into the marrow" - meat, fish, liver - to have blood. As two "fra bo la" said, "health is in the blood, if you have lots of blood you are healthy"; "strength, blood, are health".

"Our food" contains the ingredients which provide strength and blood. Fruits and

other foods which do not form part of "our food" do not, in general, possess this quality. These foods are called "negèla fèen" or "things of pleasure/desire", foods that one eats for pleasure, because they taste good. Contact with the "white" health sector has introduced a new but poorly understood notion. "Vitamines", a term probably picked up from health workers in the "white" sector, is used increasingly widely to designate the good "contents" of some sort or another of a food. For the women, many of the foods (e.g. eggs, milk, fruits, salads) recommended by health workers are a source of "vitamines". However, although woman were often able to tell us that such foods contain "vitamines" the importance of "vitamines" appears to be poorly understood. The only woman who could offer an explanation said that "vitamines are good for the body, the skin".

6.3.2. Dietary restrictions and recommendations during pregnancy

Pregnancy is characterized by extreme likes and dislikes. The majority of the women we spoke to said that they could not stand rice and certain other foods (e.g. meat, fish) during pregnancy. Tô (a solid porridge made from millet or maize flour) accompanied by sauces, often of little nutritive value, and fruits are better tolerated. To these dietary constraints linked to the state of pregnancy are added restrictions imposed by the culture. There are many dietary restrictions concerning pregnant women. Certain foods are forbidden because their consumption may cause a bad outcome of pregnancy. Honey is feared, particularly during the first month of pregnancy, because it can cause an abortion. All the women interviewed mentioned this restriction although some professed not to believe in it. Several reasons for such a restriction were related to us. A "fra bo la" revealed that honey cleans out foreign bodies which get into the stomach. At the beginning of pregnancy there is a risk that the embryo (still a stranger) will be expelled. Another told us that honey cleans the blood and removes impurities; the embryo, considered at that point as a "clot" of blood, could be expelled. Another version, given to us as hearsay, states that honey is the preferred food of the spirits and that these can punish the pregnant woman who dares to compare herself with them by "removing the pregnancy". A similar version has been reported by Bonnet (1988).

Other dietary restrictions aim to preserve the health of the child. The illnesses of the mother are supposed to be passed to the foetus by the umbilicus which links them. Mangoes and sweet foods which can cause "soumaya" are forbidden to pregnant women.

Coffee is forbidden because it "dries out" the blood. Aubergines and "pois sucres" give the baby (but not the mother) dermatitis.

Other forbidden foods are those which have the capacity to transmit their properties to the baby. Thus the consumption of rat meat ("rat voleur") can cause the child to be born a thief. The consumption of the meat of a pregnant wild animal carries the risk that the child will be born resembling the animal. According to hearsay, eating eggs makes the child a thief. Bonnet (1988) has asserted that eggs are forbidden because they are linked with reproduction.

Certain other restrictions have the character of warnings or recommendations rather than taboos. Pregnant women are advised to avoid eating butter, milk, sweet potatoes, salt, and eggs, foods which contain lots of "vitamines", and which make the baby grow large, thus making the delivery more difficult. Similarly, acidic foods (lemons, oranges, green mangoes, other unripe fruits) are held to increase the amniotic fluid and make labour longer, "because all the liquid must run out before the baby comes out". We were also told (by two "fra bo la") that lemons have the property of contracting and drying everything they touch; they dry the skin of the baby and contract the vagina of the mother, making the delivery difficult.

6.3.3. Dietary restrictions and recommendations during parturition and lactation

Both post-partum haemorrhage and post-partum retention of blood are feared. The primary explanations given to us of these fears are that haemorrhage empties a woman of her blood (leading to "djoliban", see below) while retention causes stomach pains because clotted blood remains in the belly. The remedies for these concerns are to be found in the quality of the foods absorbed by the woman, and above all in the notion of "gwanima" (heat). "Gwanima" has a healing capacity and is essential for the proper flow of blood. The parturient must be in constant contact with "gwanima". She must wash with hot water, eat hot foods, and above all drink hot liquids. Hot water, hot "bouillie" (porridge) made from millet flour, hot meat and fish soup, and hot tô are indispensible elements in the diet of the parturient. They help in the healing of the wounds in the belly, they enable the blood to flow, encourage lactation and give the woman blood and strength. In contrast with the pregnant woman, the diet of the parturient must be rich. A woman who does not gain weight after delivery is considered to be malnourished. Dietary restrictions among

lactating women concern foods which "spoil" the milk, or which cause illness in the breast feeding child. Thus, sweet fruits (mangoes, sheas) and those which are acid are supposed to change the taste of the milk and cause diarrhoea in the young baby. Beans, "poids", sweet potatoes and eggs cause abdominal distension in the child.

6.3.4. Attitudes towards dietary restrictions and advice

The degree of respect accorded to the restrictions described above depends somewhat upon the milieu in which the woman has been raised, upon her level of education and upon her personal experience. Half of the women interviewed said that they had eaten, or knew a woman who had eaten, forbidden foods during pregnancy. One woman, pregnant at the time of interview, reported that she had eaten honey at the beginning of the pregnancy without aborting. At the same time, she reported that a friend who had done the same had aborted as a result of eating the honey. Another women cited the example of a neighbour who had tried, in vain, to provoke an abortion by eating honey.

Women make a clear connection between the eating of certain foods ("aliments-vitamines") and the size of the baby. All the women who "had had stitches" at the time of delivery said that the baby was "too big" because they had eaten such-and-such a food. Four women said that they had eaten foods which are not recommended during pregnancy and that they had had to live with the consequences - namely difficulties at delivery. Two women, comparing their last delivery with previous deliveries asserted that the labour had dragged on because they had consumed too many acid foods.

While the logic underlying some of the taboos described above seems to escape the women, the fear of these dietary restrictions is real enough. Even the women who asserted (from experience) that the restrictions are not well-founded, said that "it depends on the woman" or that "you must be wary of what people say". Few women dare to infringe these "laws" even if they say that they do not believe in them. Wisely they say "one does not lose much in not eating honey, one loses a lot in losing one's child".

In health centres women are advised by health workers to eat such foods as milk, eggs, fresh fruits and vegetables, for the proteins, vitamins and other micronutrients they contain. Many of these foods recommended by the "white" health sector are the same foods which are traditionally forbidden or discouraged among women during pregnancy or

lactation. Health workers are aware of these many of these traditional restrictions. They attribute women's failure to eat the foods they recommend, in large measure, to ignorance".

The women themselves see things rather differently. For them, following the nutritional advice of health workers represents, above all, "a lot of work" and means acquiring a new habit. Advising a woman to eat salads when "her food" is to accompanied by a sauce demands of her not only an additional financial outlay but also extra time and effort in preparing the recommended foods. This additional work is unavoidable since the recommended foods do not form part of "our food", a foundation of group identity which must form the basis of any meal. They may be eaten alongside "our food", but they cannot replace it. Thus, while the women we spoke to all recognize that financial constraints play a role, only one considered cost to be the major obstacle in following health workers recommendations. Others cited the inability to tolerate the recommended foods during pregnancy, and fear of traditional caveats (that these foods make the baby grow large and make the delivery difficult). Above all, however, among the obstacles came "habit".

"Djoliban"

Blood, in popular conception, is the essence of life. The life of an individual, her strength, her capacity and ability to work are determined by the quantity and quality of blood in her body. "If you don't have (enough) blood in your body, your life is in danger. But an excess of blood is harmful, as is poor quality blood".

Several local terms are employed to describe a state akin to anaemia; "djoliban" (djoli=blood, ban=finished), "djolidja" (dja=dried out), "djolitania" (tania=lack), "djolidèsè" (dèsè=rupture). These terms translate the idea of a reduction in blood relative to the volume judged necessary for the proper functioning of the organism. However, while all the women we spoke to were familiar with the concept of "djoliban", not all women had encountered these particular terms.

The signs of "djoliban" cited by women and by the "fra bo la" are; pale eyes (conjunctiva), pale palms of the hands and soles of the feet, weight loss, tiredness, dizziness, weakness, and a feeling of "pain all over the body". Other signs mentioned by the "fra bo la" are; insomnia, anxiety, and a high risk of nervous depression. These signs correspond closely to the recognized signs of anaemia.

Given the importance of blood to the individual, "djoliban" is a very serious condition, "on which life depends". Various possible causes of this reduction in blood are perceived, both by the women and the "fra bo la". These causes may be grouped into four categories.

1. Blood loss at delivery and through heavy menstrual bleeding was cited by several individuals. "If a woman has just delivered one can understand that she doesn't have enough blood, because she has lost it during the delivery."
2. Work was also frequently implicated, particularly work under the sun or close to a fire. "In my opinion it ('djoliban') is due to work. Women work too much, and under the sun. The sun saps physical strength and drinks the blood."
3. The state of "djoliban" may arise from another physical illness, or from psychological or emotional problems. "I think it is because I am often ill. I often have "soumaya", and it is that which makes me lack blood." "In my view it is due to emotional problems; since the beginning of this pregnancy I have had problems."
4. Diet was also commonly cited, usually in very general terms, and often as hearsay. "In my view it is the lack of food." "I have heard it said that it is due to the fact that the person does not eat well." "They say it is because she does not eat well, she does not have 'vitamines'". According to two "fra bo la", lack of appetite and vomiting at the beginning of pregnancy explain why pregnant women often suffer "djoliban".

6.4.1. The treatment of "djoliban"

The "fra bo la" interviwed all maintain that there are a number of different plants which are effective in the treatment of "djoliban" and they cite examples of successful treatments. The therapies based on plants are administered in two ways:

- as a potion to be drunk or a powder to be added to "bouillie",
- as decoctions for bathing in.

In addition, two "fra bo la" give dietary advice, while two emphasized the need to consider the psychological side of the problem. As one told us, "(a woman) came to see me saying that she was always dizzy and tired. She had pale eyes and her body was pale....I gave her a large pot of plants and powder for a week's treatment. At the end of the week the dizziness had gone and she felt less tired. As it seemed to be working I gave her another stock so that she could continue the treatment. In addition, I advised her to eat well, and to eat cow's liver often because that gives lots of blood".

While claiming success in the treatment of "djoliban", the "fra bo la" seemed impressed by the power of "white" medicine in this area, in particular the efficacity of blood transfusions. One told us that "we cannot perform a transfusion like you", while another said "if a person does not have blood it is a sign that something is close; if the person is not transfused she will die". A third reported that "if I see a patient who is too tired, I prefer to refer her to the hospital".

The women appeared more impressed with "white" medicine than "local" medicine for the treatment of "djoliban". This may reflect, at least in part, that the interviewers were perceived as representatives of "white" medicine. When asked what a woman can do in case of "djoliban", the majority who were able to answer suggested recourse to "white" medicine "where they give you tablets" or "they transfuse the person". The women appeared less impressed with local treatments. "The traditional healers don't know this disease, they confuse it with jaundice." "She must go to the hospital. There is no traditional therapy which can put blood back in the body." "Plants don't work, you must go to the hospital". It is noteworthy that among all the women interviwed, a substantial number of whom had implicated diet in the aetiology of "djoliban", only one mentioned diet as a possible therapeutic approach, and this only as hearsay. "At the hospital ... they advise you to eat meat, fresh foods, soup."

The health workers report that, for the treatment of "djoliban" women prefer a prescription for tablets to dietary advice. "We notice that the women are not very interested in nutritional advice, each time they ask us to prescribe medicines. They see themselves as ill and think that food cannot cure an illness. They prefer medicines." While women know that eating meat (for example) "gives blood", and accept the plausibility of the notion that not eating enough meat could lead to a lack of blood, they cannot accept that this could cause **them** to lack blood since, in one way or other, they eat meat. The

idea of a threshold level of food intake necessary to maintain a good nutritional status is difficult to apprehend, especially in a town where, relative to the rural areas, one prides one's self on eating well. Even while understanding that a lack of food, a famine, can lead to emaciation and even death, the link between a nutritional deficiency in the absence of famine and "illness" is not obvious. Some women perceive health as being dependent upon the goodwill of superior forces: "eating good food is not enough to maintain an individual in good health, illness and health come from God"; "some people are sickly, some people are healthy, food has nothing to do with it. It is important to eat to live, but eating doesn't determine one's state of health"

In this situation it is perhaps not surprising that health workers report that women do not believe that an adequate diet alone can solve the problem of "djoliban" and "prefer to be given a prescription with which to buy medicines", since in popular conception all illnesses require a medicine. When talking of nutritional recuperation the mother of a child who had died from malnutrition said "if the child was in good health I think that food could have helped him, but the child was sick...". Food only helps an organism in good health. Without the aid of a medicine the effect of food on a sick person is nullified (perhaps by the illness).

6.5. Experience of and acceptability of iron supplementation

Some women who had already taken iron tablets or had heard about them knew the "properties" of iron. Others, on the other hand, had taken the tablets without knowing why they had been prescribed. Some of the latter women had left over tablets, evidence that they had not completed the course. Only four of the twenty-two women had not heard of iron tablets before our visit.

In general, the women reported that the smell of the iron is unpleasant and that "when one burps the smell comes back up". Two women mentioned the colour of the faeces. Among the women who were aware of the "properties" of iron, all had continued with the treatment in spite of the smell. The health workers interviewed reported that vomiting is rare and they believed that generally the treatment is well followed. Ten of the women we spoke to had been given iron tablets by the fieldworker when they were recruited into the cross-sectional survey. Key informant interviews with these women were performed between 2 and 7 days later. They had been warned of the possible side-effects.

Three had not noticed any change (after 2, 3 and 5 days). The remaining seven said that they had noticed a change after about 4 or 5 days. The first sign of improvement noted was the feeling "of being less tired" and of being "more active". The women noted that dizziness persisted.

7. RESULTS FROM THE CROSS-SECTIONAL SURVEY

During the cross-sectional survey a total of 259 eligible women were identified in the 25 clusters. Of these, 251 (97%) consented to take part in the study. The reasons given for refusal were: fear of giving a blood sample, lack of interest in the study, and shortage of time.

7.1. General description of the sample

7.1.1. Background characteristics

Table 7.1.1 presents the distribution of the women consenting to participate in the survey with regard to various background characteristics. Half of the women recruited were aged 20 to 29 years. Only a small number of women were in the age range 40 to 49 (15 women = 6%). Some of this excess of younger women relative to older women may be due to recent in-migration to Bobo-Dioulasso of younger women, and part may be due to mortality. It seems unlikely that these effects can explain all of the excess. A third explanation for the imbalance is probably to be found in the rules for recruitment of women. The fieldworkers were instructed that, in compounds with more than one eligible woman, the woman most recently pregnant should be recruited. This selection procedure may have favoured women in the age range 20 to 29 years relative to those aged 40 to 49, for example.

Our sampling procedure will also have tended to favour the inclusion of high fertility women. Nevertheless, pregnancy is clearly frequent in this population. Despite the fact that less than one third of our sample was aged 30 years or more, over half the women in our sample had already completed 3 or more pregnancies while almost a quarter were pregnant at the time of recruitment. The highest gravidity reported was 15, by a 45 year-old woman who had last delivered 8 months prior to interview. Two-thirds of those women not pregnant at the time of interview were currently breast feeding a child. (Note. In this society breast feeding is proscribed for pregnant women. Thus while some women may continue breast feeding during the early stages of a subsequent pregnancy they would certainly not recount this to a stranger. Thus, in our data the states "pregnant" and "breast feeding" are mutually exclusive.)

Table 7.1.1 Distribution of 251 women of childbearing age, Bobo- Dioulasso, Burkina Faso, with regard to various demographic, reproductive and socio-economic factors

Factor	Level	Number (%) of women
Age in years	15 - 19	48 (19)
	20 - 24	62 (25)
	25 - 29	64 (25)
	30 - 34	34 (14)
	35 - 39	28 (11)
	40 - 44	9 (4)
	45 - 49	6 (2)
Gravidity	0	35 (14)
	1	50 (20)
	2 to 4	98 (38)
	5 or more	68 (27)
Present reproductive status	Pregnant	56 (22)
	Breast feeding	123 (49)
	Neither pregnant nor breastfeeding	72 (29)
Religion	Islam	187 (75)
	Christianity	60 (24)
	Animism	4 (2)
Ethnicity	Bobo	69 (27)
	Mossi	62 (25)
	Mandé group	68 (27)
	Other	52 (21)
Marital status	Single/divorced/widowed	70 (28)
	Monogamous marriage	127 (51)
	Polygamous marriage	54 (22)
Education	None	153 (61)
	One to five years	35 (14)
	Six or more	63 (25)
Electricity in the home	Yes	99 (39)
	No	152 (61)
Water supply	Piped supply in the yard	90 (38)
	Other	161 (62)

The majority of women in the sample (75%) were muslims, the single largest ethnic group being the Bobo (a group with local origins) closely followed by the Mossi, a group with origins in the area to the east of Bobo-Dioulasso. Women belonging to ethnic groups of Mandé origin (from the area north of Bobo-Dioulasso) constituted a quarter of the total. The majority of women were married (or co-habiting with a man), some 30% of these marriages being polygamous. Over half of the women in the sample had received no formal education. Just over a third of women lived in homes with an electrical connection while a similar number had access to a piped water supply into the courtyard.

7.1.2. Anthropometric status and diet

A summary of the anthropometric status of the women (excluding pregnant women for weight and body mass index (BMI)) is shown in Table 7.1.2. These data are not suggestive of a poorly nourished population. Around 20% might be considered underweight according to their BMI while almost 40% might be considered overweight. Only 21 women (8%) had mid-upper arm circumferences of less than 24 cm, regarded as the cut-off for evidence of wasting. Thirty-four non-pregnant women (17%) had weights below 50kg.

Women were asked to list the foods they had eaten the previous day and at what time. The most common meal times were early morning (84% of women), midday (94%), and the evening (96%). The most common food eaten at breakfast was "bouillie", a porridge/gruel prepared from millet, maize or sorghum (94 women), followed by tô, a solid porridge made from the same ingredients and usually eaten with a sauce (73 women). The midday meal was most commonly based on tô (140 women) followed by rice (85 women). The evening meal followed a similar pattern with 161 women reporting eating tô and 49 women reporting eating rice. Overall, 120 women (48%) reported eating meat at least once during the day while 144 (57%) reported eating "salad" (usually composed of lettuce with any or all of the following; cucumber, tomato, avocado). While some women report being unable to eat meat during pregnancy, our data suggest that meat eating was only slightly less common among pregnant women (19 out of 56 = 34%, chi-squared = 2.76).

Table 7.1.2 Anthropometric status of 251 women of child-bearing age, Bobo-Dioulasso, Burkina Faso

Measure	Mean (±SD)	Number (%) of women
Weight in kgs*	60.2 (±12.3)	
Height in cms	161.8 (± 5.7)	
Mid-upper arm circumference (cms)	27.5 (± 3.4)	
Body mass index* (kg/m^2)	22.9 (± 4.3)	
Body mass index*		
< 19 ("underweight")		35 (18)
19.0 - 22.9 ("normal")		86 (44)
23.0 - 28.9 ("overweight")		57 (29)
29.0 + ("obese")		17 (9)

* Based on 195 non-pregnant women

7.2. Haemoglobin levels and the prevalence of anaemia

A summary of the haemoglobin levels of the women recruited during the cross-sectional survey, and of the prevalence of anaemia according to reproductive status, is presented in Table 7.2.1. The distributions of haemoglobin levels are presented in more detail in Figures 7.2.1 to 7.2.4.

Over half of all the women tested had haemoglobin levels below the recognized international cut-off points for anaemia. The prevalence of anaemia was highest among pregnant women, being almost twice as high in this group as in those women neither pregnant nor breast feeding. The majority of anaemic women (87%) had haemoglobin levels of 9 g/dl or higher. Nineteen women (8% of the whole sample) had haemoglobin levels below 9 g/dl, of whom 3 (1% of the sample) had levels below 7 g/dl (severe anaemia). Thirteen (68%) of the women with levels below 9 g/dl were pregnant, giving a prevalence of this degree of anaemia in this group of 23% (95% c.i. 9% to 37%).

Table 7.2.1 Distribution of haemoglobin levels and of the prevalence of anaemia among 251 women of childbearing age, Bobo-Dioulasso, Burkina Faso.

Group	Number of women	Mean haemoglobin (g/dl) (±SD)	Prevalence of anaemia (95% c.i.)
All	251	11.4 (± 1.7)	58.6% (51.3,65.8)
Pregnant	56	10.1 (± 1.6)	71.4% (55.9,86.9)
Breast feeding	123	11.6 (± 1.6)	64.2% (55.2,73.2)
Neither pregnant nor breast feeding	72	12.2 (± 1.4)	38.9% (32.3,45.5)

Descriptions of the three women with severe anaemia are given below:

- Case 1 was a woman of 36 years who had delivered 5 weeks prior to recruitment and was breastfeeding. Her haemoglobin level was 5.6 g/dl. The most recent pregnancy was her sixth. She weighed 60 kg, was 171 cm tall, with a mid-upper arm circumference of 29cm and a body-mass index of 20.5.
- Case 2 was a woman of 23 years, 8 months pregnant with a haemoglobin level of 6.3 g/dl. She had been pregnant twice previously having delivered most recently almost 3 years ago. She weighed 60kg, was 156 cm tall, with a mid-upper arm circumference of 28cm.
- Case 3 was a woman of 35 years, 6 months pregnant, with a haemoglobin level of 6.9 g/dl. She had been pregnant 5 times previously, having delivered most recently 3 years ago. She weighed 54 kg, was 159 cm tall, with a mid-upper arm circumference of 25 cm.

7.2.1. Anaemia in pregnant women

The prevalence of anaemia was highest among pregnant women (71.4%, n = 56). We therefore performed some further analyses of Hb levels in these women. It should be borne in mind, however, that the study was designed to estimate the overall prevalence of anaemia among women of child bearing age. Analyses of subgroups have little statistical power and should, therefore, be interpreted with caution.

The distribution of haemoglobin levels in pregnant women by trimester is presented in Table 7.2.2. During the first trimester the prevalence of anaemia (40%) was similar to that among women neither pregnant nor breastfeeding (38%). None of these women had Hb levels below 9 g/dl. Between the first and second trimesters Hb levels appear to fall by a substantial amount (1.4 g/dl; p = 0.03). Much of this fall will be due to haemodilution during this period of pregnancy. Almost a quarter of women in the second trimester of pregnancy had Hb levels below 9 g/dl (24%; 95% c.i. 1% to 48%). Between the 2nd and 3rd trimester there appears to be little further drop in mean levels of Hb. The proportion of women in the third trimester with levels below 9 g/dl was 33% (95% c.i. 14% to 53%).

Table 7.2.2 Distribution of haemoglobin levels among 54 pregnant women according to stage of the pregnancy

Stage of pregnancy	Number of women	Mean Hb (± SD)	Number (%) of women with Hb >=11	9-10.9	< 9
1st trim.	10	11.24 (±1.42)	6 (60)	4 (40)	0 (0)
2nd trim.	17	9.83 (±1.36)	2 (12)	11 (65)	4 (24)
3rd trim.	27	9.75 (±1.50)	7 (26)	11 (41)	9 (33)

The distribution of Hb levels among pregnant women according to the number of previous pregnancies was also examined (Table 7.2.3). Haemoglobin levels do not appear to vary greatly according to the number of previous pregnancies.

Table 7.2.3 Distribution of haemoglobin levels among 56 pregnant women according to the number of previous pregnancies

Number of pregnancies	Number of women	Mean Hb (± SD)	Number (%) of women with Hb >= 11.0	9.0 - 10.9	< 9
None	15	10.57 (±1.26)	7 (47)	6 (40)	2 (13)
One	5	9.70 (±1.20)	0 (0)	3 (60)	2 (40)
Two to four	24	10.06 (±1.75)	7 (29)	11 (46)	6 (25)
Five or more	12	9.66 (±1.35)	2 (17)	7 (58)	3 (25)

7.2.2. Anaemia in women following pregnancy

Given the apparent increase in the prevalence of anaemia during the latter part of pregnancy, we also looked at the distribution in haemoglobin levels in women who were not pregnant at the time of recruitment but whose most recent pregnancy resulted in a live birth, and this within the past five years. One hundred and fifty-nine women such women were identified. Only one woman had most recently delivered a stillborn baby and only one woman reported that her most recent pregnancy had aborted, which suggests underreporting of such negative outcomes. Of the children born to the 159 women only 5 had died. This again suggests under-reporting of live births of children who had since died. Of the remaining 154, 122 mothers (79%) were still breast feeding. Table 7.2.4 presents the distribution of haemoglobin levels among these women according to time elapsed since most recent delivery. These data suggest a fairly rapid recovery in haemoglobin levels after pregnancy with mean level of 11.10 g/dl among women within three months of delivery, compared with a level of 9.75 g/dl among women in the last trimester of pregnancy. This pattern is to be expected as the effects of haemo-dilution during pregnancy are corrected. Thereafter, there appears to be a relatively small increase (if any) in mean Hb levels.

Table 7.2.4 Distribution of haemoglobin levels among 159 non-pregnant, parous women according to time elapsed since last delivery

Time elapsed	Number of women	Mean Hb (± SD)	Number (%) of women with Hb >= 12.0	9.0 - 10.9	< 9
< 3 months	26	11.10 (±1.95)	8 (31)	16 (62)	2 (8)
3-5 months	26	12.17 (±1.29)	13 (50)	13 (50)	0 (0)
6-8 months	25	11.50 (±1.85)	11 (44)	11 (44)	3 (12)
9-11 months	11	11.66 (±1.75)	3 (27)	8 (73)	0 (0)
12-14 months	13	11.15 (±1.13)	2 (15)	11 (85)	0 (0)
15-17 months	15	11.77 (±1.85)	6 (40)	8 (53)	1 (7)
18-20 months	10	11.52 (±1.25)	4 (40)	6 (60)	0 (0)
21-23 months	3	11.40 (±0.62)	1 (33)	2 (67)	0 (0)
24 months or more	30	11.99 (±1.54)	16 (53)	14 (47)	0 (0)

7.3. **Utilization of health services**

The women in our sample reported high utilization rates of government health facilities. Almost all (91%, 95% c.i. 85% to 96%) of the 215 women who had completed at least one pregnancy had attended at least once for antenatal care during the most recently completed pregnancy, while over half (58%; 95% c.i. 50% to 66%) had completed three or more antenatal care visits. (Most women first attend for antenatal care during the second trimester of pregnancy.) The majority (72%; 95% c.i. 64% to 79%)) had

most recently delivered in one of the three state maternity facilities in the town. A further 29 (13%) had delivered in a private maternity facility. Only 26 women (12%) reported delivering at home. Of those women who had attended for antenatal care at least once, only 22 (11%; 95% c.i. 5% to 18%) reported having taken iron tablets. Chloroquine use was, apparently, much more common, with 86 women (44% of those attending for antenatal care; 95% c.i. 35% to 53%) reporting having taken it regularly as prophylaxis, and another 52 (27%) having taken it at some time during the pregnancy.

In addition to questions concerning health service utilization during the most recently completed pregnancy, women were also asked about their use of health services since the 1st January 1993. This fixed date was used because it was felt that it would be easier for women to recall accurately than a "vaguer" specification of "during the last 3 months", for example. Given that the interviews were conducted in April and May this corresponds roughly to a recall period of 4 months. Table 7.3.1 summarizes utilization of government health services during the recall period.

These data confirm a high rate of utilization of government health services, with half of all the women having been to a government health facility for some reason during the preceding three to four months (95% c.i. 42% to 58%). Among the more anaemic women (those with Hb < 9 g/dl) utilization rates appear as high or higher, largely because the majority of these women were pregnant and users of antenatal services. Almost 80% of these women (95% c.i. 56% to 99%) had had a contact with a government health service in the preceding 3 to 4 months. Rates of contact were almost as high among women pregnant at the time of recruitment, just over 70% of whom had had at least one contact in the preceding 3 to 4 months (95% c.i. 60% to 83%). All three of the women with severe anaemia had had at least one contact with a government health service in the period since 1st January, all three having antenatal care contacts and one having also had two contacts for curative care.

A small number of women (12 = 5%) had had contact with private medical services ("modern"). Only two had visited a "marabout" in the period since 1st January, while 27 (11%; 95% c.i. 6% to 16%) had visited a "fra bo la" (herbalist).

Table 7.3.1 Utilization of government health services since 1st January 1993 among 251 women of reproductive age, Bobo-Dioulasso, Burkina Faso

Number of visits	Number (%) all women (n=251)	Number (%) with Hb<9 g/dl (n=19)	Number(%) of pregnant women (n=56)
For antenatal care			
None	201 (80)	6 (32)	20 (36)
One	23 (10)	7 (37)	18 (32)
Two or more	26 (10)	6 (32)	18 (32)
For curative care (SMI)			
None	223 (89)	15 (79)	46 (82)
One	17 (7)	2 (11)	8 (14)
Two or more	11 (4)	2 (11)	2 (4)
For child health (SMI)			
None	172 (73)	14 (78)	49 (88)
One	34 (14)	1 (6)	4 (7)
Two or more	31 (12)	3 (17)	3 (5)
Hospital (other than ANC)			
None	233 (93)	16 (84)	53 (95)
One	13 (5)	2 (11)	2 (4)
Two or more	5 (2)	1 (5)	1 (2)
Any of the above			
None	126 (50)	4 (21)	16 (29)
One	49 (20)	3 (16)	14 (25)
Two or more	76 (30)	12 (63)	26 (46)

7.4. The effectiveness of conjunctival examination for the detection of anaemia

The results of the examination of the conjunctiva of women in the sample according to haemoglobin status are presented in Table 7.4.1. Twenty-seven women (11%) were judged to have pale conjunctiva, of whom 24 were anaemic according to the international definition (positive predictive value = 89%). The overall sensitivity of the examination was poor (16%). The conjunctival examination was rather better at detecting women with Hb levels below 9 g/dl (12 out of 19 = 63%). All three women with severe anaemia were identified by the examination

Table 7.4.1 Presence or absence of conjunctival pallor according to haemoglobin level

Hb level (g/dl)	Conjunctival pallor Absent	Present	Total
Not anaemic	101	3	104
Anaemic but 9.0 or above	116	12	128
7.0 - 8.9	7	9	16
Less than 7.0	0	3	3
Total	224	27	251

7.5 Indicators of anaemia risk

Conditional logistic regression was used to try to identify proxy indicators of women at high risk of anaemia which might be used in health facilities in addition to the examination for conjunctival pallor. Once again, it should be remembered that the study was not designed with this objective in mind and therefore our analyses have little power. The results of these analyses are presented in Table 7.5.1.

The prevalence of anaemia appeared to increase with the age of the woman but this trend was not statistically significant ($p = 0.14$). There also appeared to be a tendency for the prevalence of anaemia to increase with gravidity and with the number of deliveries in the last five years. However, neither trend was statistically significant ($p = 0.07$ and $p = 0.08$ respectively). Among gravid women, anaemia was more common among those who had attended fewer than three antenatal consultations during the previous pregnancy ($p = 0.03$). Pica, the practice of eating earth, was reported by over one third of the women interviewed and was associated with an increased risk of anaemia ($p = 0.04$). While anaemia appeared more common among women with mid-upper arm circumferences of less than 24 cm ($p = 0.07$), none of the women with Hb < 9 g/dl fell into this category. None of these indicators, therefore, look especially promising for identifying women with anaemia. Their positive predictive values are all lower than that of the examination for conjunctival pallor. The sensitivities of "earth eating", mid-upper arm circumference, and

number of antenatal consultations during the previous pregnancy in detecting women with Hb < 9 g/dl are also lower than the sensitivity of the conjunctival examination (47%, 0%, 41% respectively versus 63%). Cut-off points with reasonable specificities for age, number of previous pregnancies and deliveries in the last 5 years also yield lower sensitivities.

Table 7.5.1 Results of an analysis of possible proxy indicators of the risk of anaemia

Indicator	Number of women	Number(%) anaemic	Odds ratio (95% c.i.)	Number of women<9g/dl
Age				
< 20 years	48	23 (48)	1.0 ---	2
20 - 34 years	160	98 (61)	1.7 (0.8,3.6)	13
35 years or more	43	26 (60)	1.9 (0.8,4.9)	4
Number of previous pregnancies				
None	35	15 (43)	1.0 ---	2
One	50	29 (58)	1.4 (0.6,3.6)	3
Two to four	98	58 (59)	1.5 (0.7,3.6)	8
Five or more	68	45 (66)	2.3 (0.9,5.8)	6
Number of deliveries in the last 5 years				
None	52	20 (38)	1.0 ---	3
One	124	80 (65)	2.4 (1.2,5.0)	12
Two or more	75	47 (63)	2.2 (1.1,4.9)	4
Number of antenatal consultations during the preceding pregnancy				
≥ 3	126	72 (57)	1.0 ---	10
< 3	90	60 (67)	1.9 (1.1,3.8)	7
"Earth eating"				
No	154	81 (53)	1.0 ---	10
Yes	97	66 (68)	1.8 (1.1,3.3)	9
Mid-upper arm circumference				
≥ 24 cm	230	131 (57)	1.0 ---	19
< 24 cm	21	16 (76)	2.7 (0.9,8.0)	0

Distribution of haemoglobin levels among 251 women of reproductive age, Bobo-Dioulasso, Burkina Faso

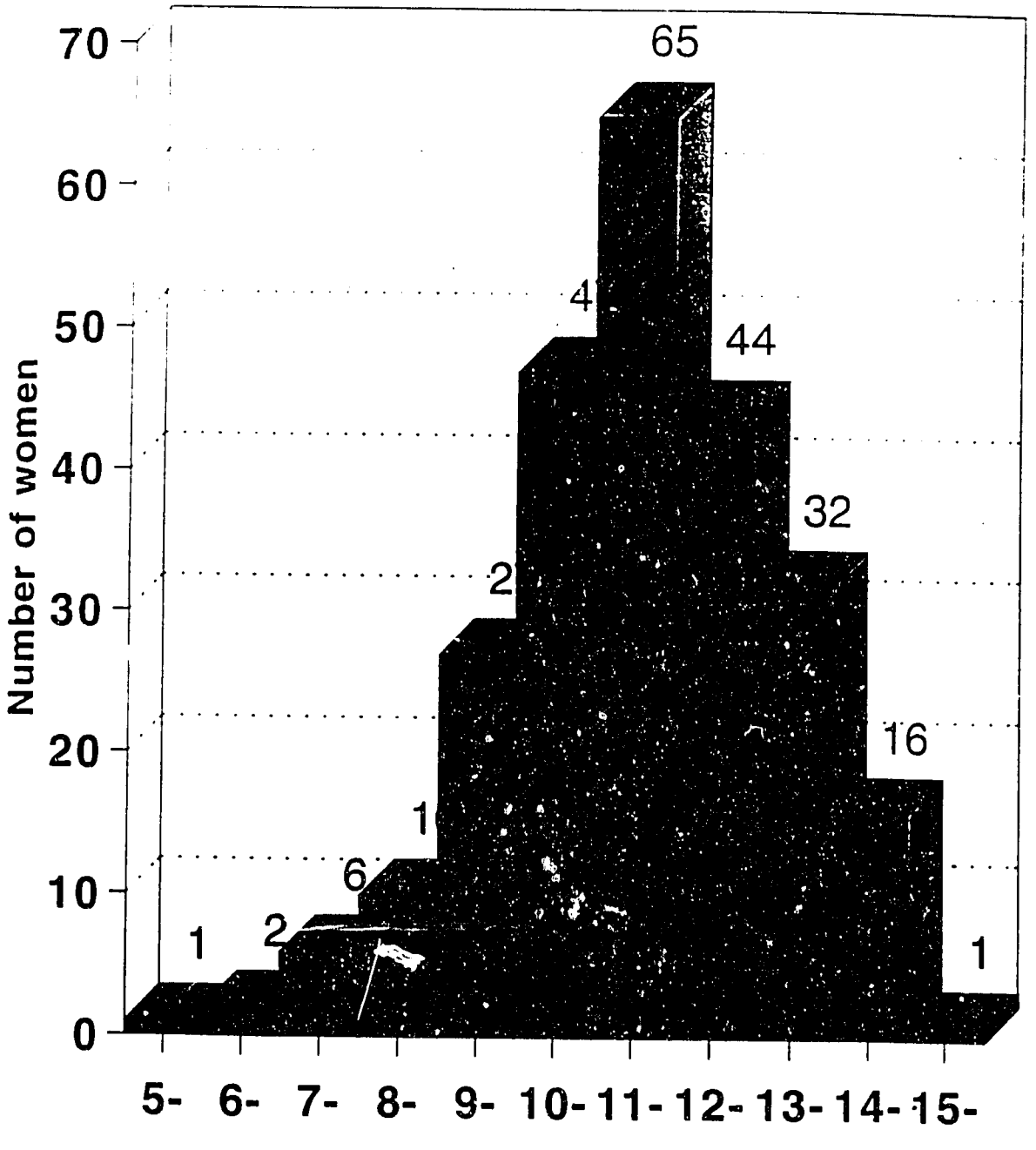

Figure 7.2.1

Distribution of haemoglobin levels among 56 pregnant women, Bobo-Dioulasso, Burkina Faso

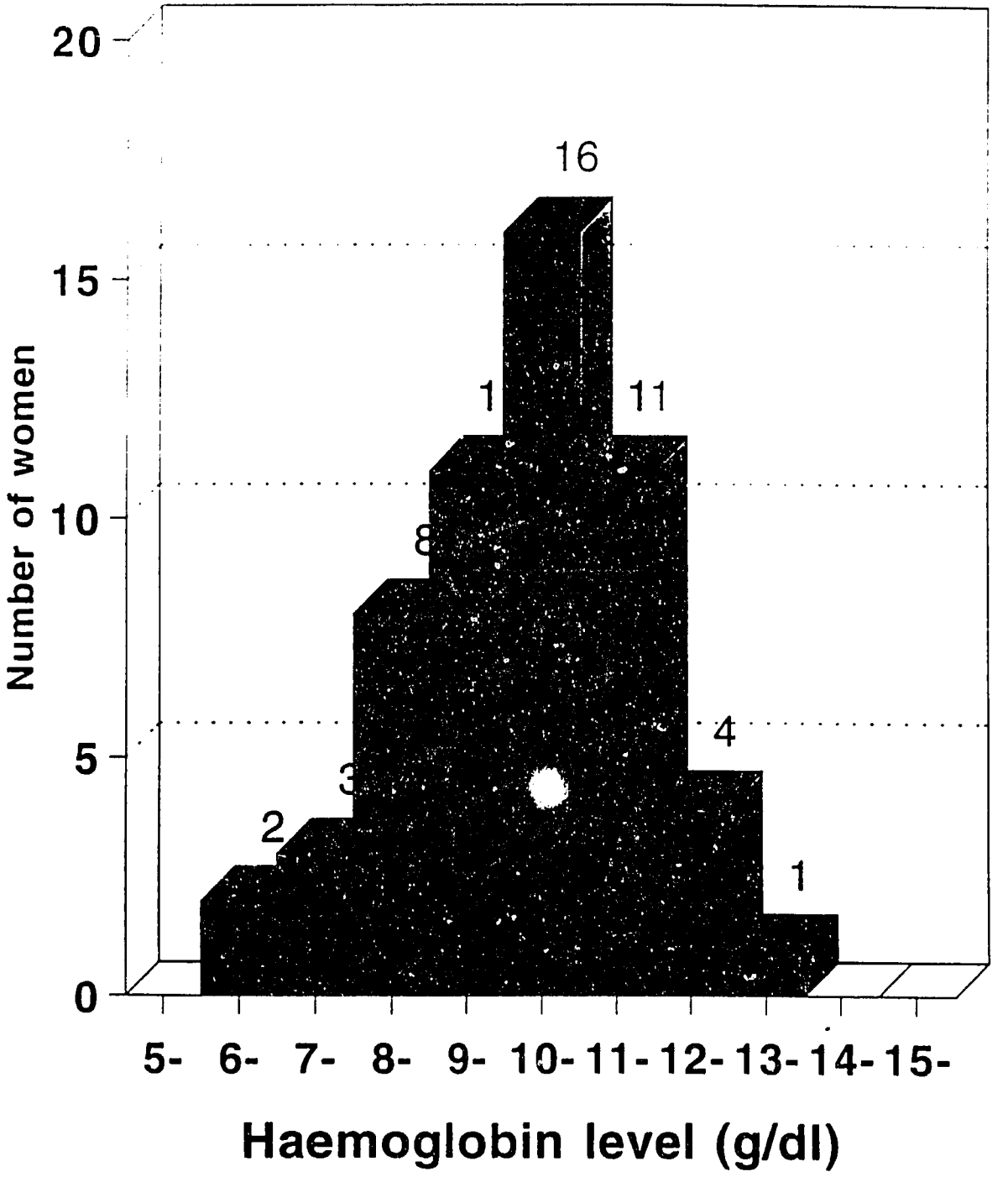

Figure 7.2.2

Distribution of haemoglobin levels among 123 breast feeding women, Bobo-Dioulasso, Burkina Faso

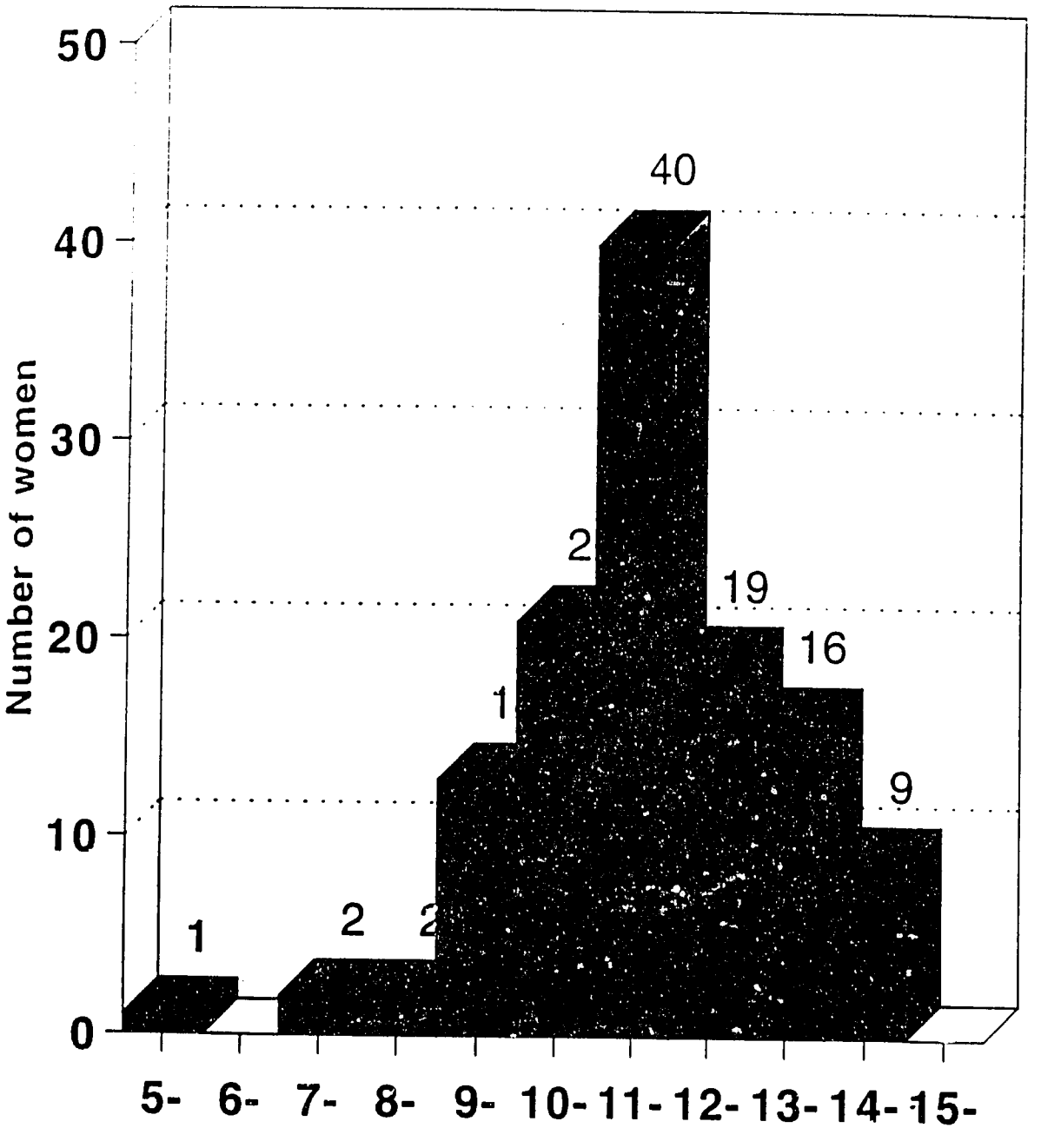

Figure 7.2.3

Distribution of haemoglobin levels among 72 non-pregnant, non-breast feeding women, Bobo-Dioulasso, Burkina Faso

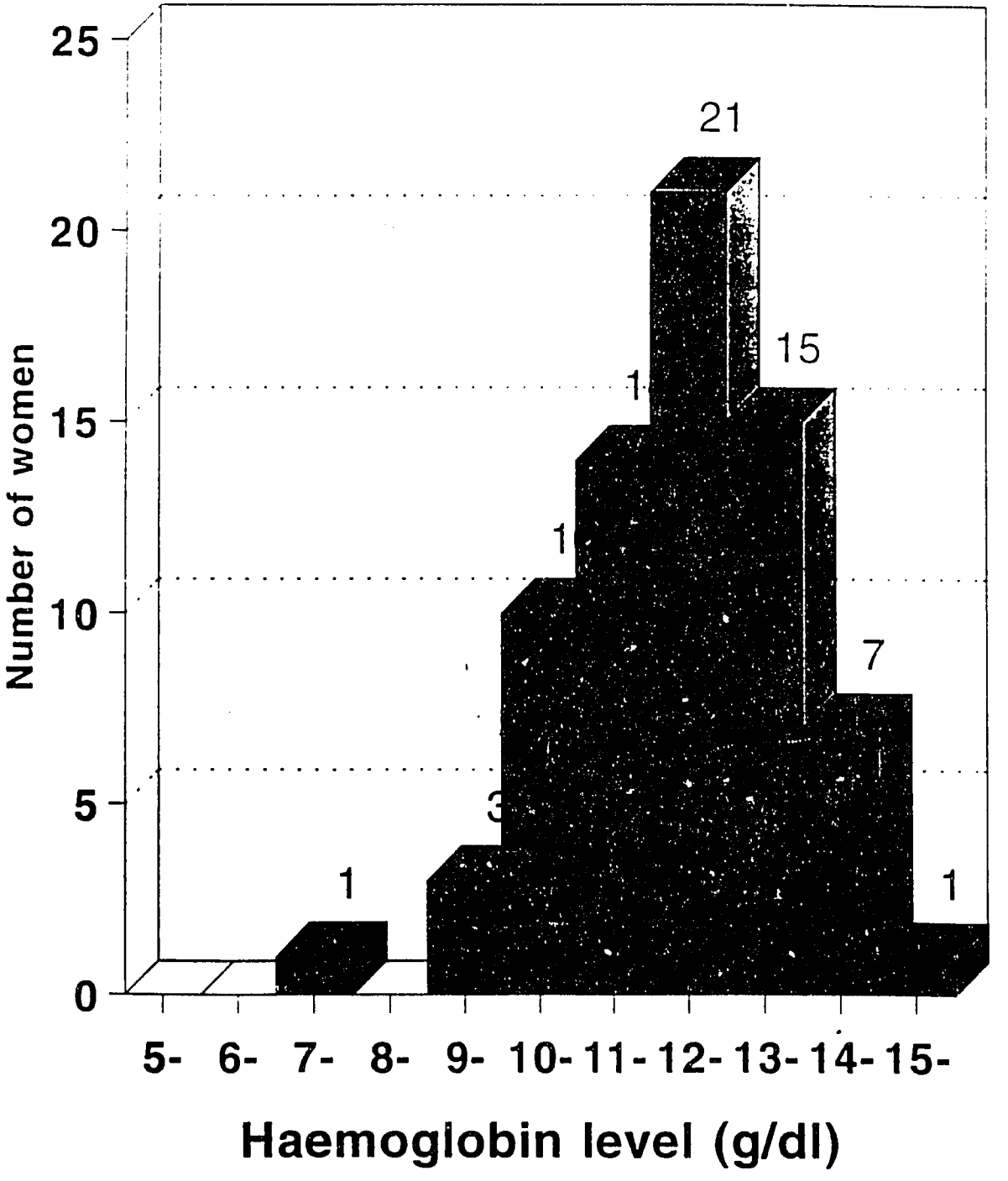

Figure 7.2.4

8. CONCLUSIONS AND RECOMMENDATIONS

It has been estimated that in Africa two-thirds of pregnant women and half of non-pregnant women may be anaemic (Winikoff, 1988). Serious anaemia in pregnant women has been associated with multiple adverse effects, including increased risk of maternal death (Winikoff, 1988; Danforth, 1982) and excess fetal pathology (Garn et al., 1981). In a recent review of the effectiveness of antenatal care, Rooney (1992) concluded that the prevention and treatment of anaemia should be a priority and that routine iron (and folate) supplementation is probably warranted in areas where the prevalence of anaemia and iron deficiency is high.

Burkina Faso, West Africa is one of the poorest countries in the world with one of the highest maternal mortality ratios (810 per 100,000 live births) (World Bank, 1993). Anaemia may well play an important role in this high level of maternal mortality since obstetric haemorrhage has been identified as the second most common cause of maternal death in Burkina Faso (Ouedraogo, 1989). Staff at the maternity ward of the Centre Hospitalier Sanou Souro, Bobo-Dioulasso consider severe anaemia among pregnant women to be a serious problem (Meda, personal communication). Yet, no studies of the prevalence of anaemia among women of reproductive age in Burkina Faso have so far been published.

This report presents the findings of a study carried out in Bobo-Dioulasso to determine the prevalence of anaemia among women of reproductive age. In addition, the study explored local perceptions of health, illness and healing, particularly among women during pregnancy and lactation, investigated when, where and why women of reproductive age have contact with existing health services, and looked into the acceptability of supplemenatation as an approach to the control of anaemia. We now examine some of the conclusions which may be drawn from the findings of the study.

First, it is clear that the maintenance of and the recovery to good health is considered very important by people in Bobo-Dioulasso and merits substantial effort by the individual concerned and their family. Furthermore, health is perceived to be intimately linked with, indeed depends upon, the quantity and quality of blood in the body. The concept that someone may be "lacking in blood" ("djoliban") appears to be universally understood (although the different local terms used to describe this state are not

universally recognized). The signs and symptoms of this condition correspond closely to those associated with anaemia. This condition ("djoliban") is regarded as very serious and potentially fatal. The women interviewed in this study identified four groups of causes of "djoliban": blood loss (heavy menstruation, blood loss at delivery, antepartum & postpartum haemorrhage); hard (excessive) work; another illness; poor diet. Diet is linked with "djoliban" in so far as some foods (meat, fish) "give blood". However, since everybody eats these foods to one degree or another poor diet alone is not considered to be a sufficient cause of "djoliban".

There are numerous dietary restrictions and recommendations directed towards pregnant and lactating women. In addition to these cultural restrictions, there are a number of other foods which women find difficult to eat/keep down, especially during the first months of pregnancy. Among the restrictions, perhaps the one that may be most closely linked with anaemia is that forbidding the consumption of acid foods (oranges, lemons, etc.) during pregnancy. Women also commonly reported being physically unable to eat meat during pregnancy, especially early on. This restriction on acid foods, if followed, in conjunction with non-consumption of meat and fish during pregnancy, could lead to low levels of iron absorption, particularly in a diet based largely on milled cereals.

The prevalence of anaemia is high (> 50%) overall in this population of women and is very high among pregnant women (> 70%). The vast majority of anaemic women have moderate anaemia (Hb > 7.0 g/dl). However, as many as a third of women in the latter stages of pregnancy may have haemoglobin levels below 9 g/dl. Utilization of government health services is very high in this urban population, with the vast majority of women using antenatal care services and three-quarters using government delivery services. Eighty percent of women with Hb levels below 9 g/dl had had contact with government health services in the 3 to 4 months prior to interview. All three women with severe anaemia had had contacts during this period.

Anaemia control at present is based on an assessment of conjunctival pallor at antenatal consultations. The overall sensitivity of this method for detecting anaemic women was very low (16%). The sensitivity for the detection of Hb levels below 9 g/dl was rather better (around 60%). The HemoCue provides a highly acceptable method for detecting anaemia in this population. The refusal rate among women surveyed in the community was very low (less than 3%) and would probably be even lower among

women coming to health facilities for antenatal or other care. The use of a HemoCue might even improve compliance with, for example, iron supplementation by anaemic women, since the HemoCue provides "proof" that they are ill. As one woman said, "some time ago I noticed that the soles of my feet had become pale, and I said to myself that it was because I didn't have blood. I didn't tell anyone because I was afraid they would think me a liar, but now you have come and confirmed it."

An anaemia control programme based on existing health service contacts has the potential to reach the majority of women at risk of anaemia, particularly if all contacts are utilized. The content of such a programme remains to be determined. While it is often assumed that the most important cause of anaemia is iron deficiency, Fleming (1969) reporting from elsewhere in West Africa (Ibadan, Nigeria) found that only 2 out 248 anaemic women were iron deficient. Haemolysis due to malaria infection, and folate deficiency were more common causes of anaemia. The aetiology of anaemia in Bobo-Dioulasso needs to be determined before a successful control programme can be introduced. This is one of the objectives of a second phase of research which is due to commence in Bobo-Dioulasso in late 1993.

Some preliminary inferences may be drawn about possible approaches to anaemia control. Dietary advice alone is likely to have little impact on anaemia. First, many pregnant women find food sources rich in iron, such as meat and fish, difficult to "keep down" and, in any case, these foods represent something of a luxury. Traditional beliefs counsel pregnant women against eating fruits rich in ascorbic acid (vitamin C). Furthermore, local perceptions of "djoliban" do not admit that diet alone can explain a "lack of blood". Dietary changes alone cannot, therefore, cure such a state. A medicine is perceived to be needed to cure a state such as "djoliban". Woman tested with the HemoCue and found to be anaemic appeared to find iron supplementation acceptable, at least over the first few days, when their anaemia was explained to them using local concepts and the possible side-effects of iron tablets described. If iron deficiency is the major cause of anaemia among women of reproductive age, then a control programme based on iron supplements delivered at existing health service contacts could, potentially, be very effective. In such circumstances consideration should be given to combining the iron supplements with vitamin C supplementation, to combat the effects of a diet based on cereals and a traditional restriction on the consumption of vitamin C rich fruits during

pregnancy. Attention should be given not only to pregnant women but also, in particular, to those in the postpartum period and the control programme should be integrated with postnatal care services including child immunization and family planning. Dietary advice given in conjunction with a "medicine" may be better accepted and followed than dietary advice alone.

Limitations and problems

The researcher asks herself many questions concerning anaemia. What does the population know of the problem? How does the population experience the problem? What can the population do about it?

As researchers, we began with a knowledge of anaemia founded on (amongst other things) haematology, biochemistry and clinical medicine. We began by asking women about "doliban bana" - an "illness". When talking to the women, we very quickly noticed that, when asked, many women replied that they had never heard of this "illness". However, when the question was rephrased as "have you ever heard of women who do not have enough blood in their body?" the response was almost invariably positive. The "confusion" seems to have stemmed from our initial failure to realize that "a lack of blood" is seen as a "state" which leads to illness rather than as an illness itself. Thus, somewhat paradoxically perhaps, a lack of blood is not an illness, but someone who lacks blood is ill.

We had hoped, through our key informant interviews with a small number of women, to draw on the experiences of a greater number of women by asking about the experiences of relatives, neighbours and friends. After four interviews we had to abandon these questions as we noticed that the women avoided talking about others who were not present. The most "courteous" replied in an evasive manner; two replied along the following lines: "I know about what touches me, but I don't know for others". It should be noted that in Africa a woman rarely reveals a pregnancy to others. As long as the pregnancy is not visible it is not spoken of.

The selection for women to participate in the key informant interviews was based largely upon their openness and willingness to participate. It may be that this selection criterion led us to interview women open to new ideas, and led to a relative homogeneity in the responses of the women.

9. ACKNOWLEDGEMENTS

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Annexe 1. English translation of the explanation of study given to study participants in Dioula

We are studying "djoliban" among women of reproductive age in the town of Bobo-Dioulasso. We have noticed that many women who come to deliver in the town's maternity wards have a lack of blood, and this has harmful consequences; abortion, stillbirth, small babies and even the death of the mother. We would like to know what causes "djoliban" in order to avoid these bad consequences. Would you help us to find a solution to this problem by answering some questions? At the end of the interview we shall take a small sample of blood which we shall analyze on the spot in order to know whether you have enough blood. If you lack blood we shall give tablets of iron to combat this "djoliban".

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Annexe 2. Questionnaire used in cross-sectional survey

QUESTIONNAIRE: ETUDE DES ANEMIES

SECTION 1 Identification

1.1 Numéro d'identification: |__|__|__|__| IDENTIF

1.2 Numéro de grappe: |__|__| GRAPPE

1.3 Nom de la femme:_____ NOMMERE

1.4 La femme a-t-elle une carte d'identité ou autre document avec sa date de naissance? Oui= 1. Non= 2. 9. CIDOC

1.5 Age de la femme (en années révolues): 99. |__|__| AGE

1.6 Ethnie de la femme:
Bwaba= 01. Bobo-fing= 02. Bobo-Dioula= 03. Mossi= 04.
Dioula= 05. Samo/Dafing/Marka= 06. Samogo= 07. Peulh= 08.
Bissa= 09. Toussian/Sambla/Tiéfo/Siamou/Vigue = 10.
Senoufo/Turka/Gouin/Karaboro/Dogossié/Bamana/Tagua = 11.
Dagara/Djan/Birifor/Lobi/Gan/Pougouli = 12.
Gourounsi/Nounouma/Lelé/Léla/Kasena/Ko/Wala = 13.
Gourmatche/Yana/Djerma= 14. Etrangères/autres =15.
precisez..... 99. ETHNIE

1.7 Secteur de résidence: 01. 02. 03. 04. 05. 06. 07. 08. 09. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 99. BOBOSEC

1.8 Date de l'entretien (jj/mm/aa): |__|__|/|__|__|/|__|__| DATEX

1.9 Nom et numero de l'enquêteur.....|__|__| NOMENQ

SECTION 2 Critères de selection

2.1 Depuis combien d'années habitez-vous à Bobo? (années révolues)

Née à Bobo= 88. 99.|__|__| HABBOBO

Si la femme habite Bobo depuis moins d'une année, la remercier et selectionner encore une femme.

Lire à la femme l'explication de l'étude et lui demander son consentement.

2.2 La femme, consent-elle à participer: Oui = 1. Non = 2. CONSENT

2.3 Si non: raison du non-consentement: .....

SECTION 3 Caracteristiques socio-économiques et culturelles

3.1 Religion de la femme:
Musulmane =1. Chrétienne= 2. Animiste= 3. Aucune= 4. 9. RELIGION

3.2 La femme, est-elle scolarisée? A quel niveau?

	Prim	Sec	Sup			
ans				Total		99.

SCOLAR

3.3 La femme, sait-elle lire?
Non = 1. Langue nationale = 2. Francais = 3. Autre = 4. 9. LETTRE

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3.4 Quelle est l'activité économique principale de la femme?

.....

Salariée: fonctionnaire = 01. employée du privé = 02.
Non-salariée: secteur formel = 03. secteur informel = 04.
commerce = 05. artisanat = 06. agriculteur eleveur= 07.
service = 08.
Sans emploi: menagère = 09. retraite = 10. chomeur= 11. étudiante=12.
99. MERECON

3.5 Statut marital de la femme
mariée (concubin regulier) oui =1. non =2. 9. MARIEE

si oui, nombre de coépouse(s): 0. 1. 2. 3. 4. 5+ 9. COEPOUS
si non, celibataire= 1. divorcee= 2. veuve= 3. 9. SITMAT

3.6 Qui prend la femme en charge ?
mari/concubin = 1. frère= 2. père= 3. mere= 4. oncle= 5.
beau-père= 6. elle-même = 7. autres = 8. 9. CHARGE

.....

3.7 3.6, sait-il (elle) lire?
Oui = 1. Non = 2. Ne sait pas = 3. 9. LETTREP

3.8 Quelle est l'activité économique principale de 3.6?

.....

Salariée: fonctionnaire = 01. employée du privé = 02.
Non-salariée: secteur formel = 03. secteur informel = 04.
commerce = 05. artisanat = 06. agriculteur eleveur= 07.
service = 08.
Sans emploi: menagère = 09. retraite = 10. chomeur= 11. étudiante=12.
99. ECONOP

3.9 Combien de ménages y a-t-il dans la cour où habite la femme?
1. 2. 3. 4+. 9. COUR

3.10 Y a-t-il une télévision dans la cour? Oui =1. Non =2. 9. TELE

3.11 La femme, où cherche-t-elle l'eau?
robinet dans la maison = 1. robinet dans la cour = 2.
puits dans la cour = 3. hors la cour = 4. 9. SOUREAU

3.12 Y a-t-il électricité à la maison? Oui =1. Non =2. 9. ELECTR

Les questions suivantes se réfèrent à la maison où habite la femme, pas la cour.

3.13 Y a-t-il:

Radio	Oui = 1. Non = 2.	9.	RADIO
TV	Oui = 1. Non = 2.	9.	TV
Réfrigérateur/congélateur	Oui = 1. Non = 2.	9.	REFRIG
Armoire	Oui = 1. Non = 2.	9.	ARMOI
Mobylette	Oui = 1. Non = 2.	9.	MOBY
Cuisinière	Oui = 1. Non = 2.	9.	CUIS

SECTION 4 Antecedents obstetricaux maternels

4.1 La femme est-elle enceinte? Oui = 1. Non = 2. 9. ENCEINTE

Si oui, la grossesse a combien de mois? ___ ___ 99. MOIS
Si non, allaite-elle un enfant? Oui = 1. Non = 2. 9. ALLAIT
retour de couches ou régles à la date de la visite
Oui = 1. Non = 2. 9. REGLES

date de la réapparition des régles après le dernier accouchement (jj/mm/aa) (Date de commencement des régles pour les femmes qui n'ont jamais été enceinte)
___/___/___ DATREG

ses regles durent combien
de jours d'habitude? |__|__| 99. DURREG

Combien de fois la femme a-t-elle été enceinte? (grossesse actuelle exclus)
00.01.02.03.04.05.06.07.08.09.10.11.12.13.14.15. 99. NOGROSS

Lieu de l'issue de la grossesse précédente?
Maternité de l'état = 1. Maternité privée = 2. Domicile = 3.
Domicile/Taxi/Maternité= 4. Autre lieu = 5. 9. LIEUPREC

Pendant la grossesse précédente, combien de fois la femme est-elle allée au CPN?
0. 1. 2. 3. 4. 5+. 9. CPNPREC

Pendant la grossesse precedente, la femme a-t-elle pris la chloroquine?
Non = 1. Oui, comme cure = 2. Oui, comme prophylaxie irreguliere = 3.
Oui, comme prophylaxie reguliere = 4. 9. CHLORO

Pendant la grossesse precedente, la femme a-t-elle pris le fer?
Oui = 1. Non = 2. 9. FER

Histoire obstetricale des 5 dernieres annees
(Commencer avec la grossesse la plus recente.)

			Si né vivant				
Issue de la grossesse 1=né viv 2=mort-né 3=avort.	Date de l'issue de la grossesse jj/mm/aa	Si avortement ou mort-né, durée de la grossesse (mois)	Sexe 1=M 2=F	Vivant /mort 1=viv. 2=mort	Si mort, âge à la mort (mois)	Allaité au sein 1=oui 2=non	Si allaité au sein, jusqu'a quel âge (mois) 88=tjrs
ISSUE 9.	DATE 09/09/09	DUREE 9.	SEXE 9.	VIVANT 9.	AGEMORT 99.	SEIN 9.	SEVRE 99.
1							
2							
3							
4							
5							

SECTION 5 Utilisation des services de santé

5.1 Depuis le dernier accouchement d'un enfant vivant, la femme a-t-elle visité:
SMI/disp. pour C.I (pas CREN) Oui = 1. Non = 2. 9. ENFD
(C.I = Consultation infantile)
SMI/disp pour CREN Oui = 1. Non = 2. 9. CREND

5.2 Depuis la fête de janvier, combien de fois la femme a-t-elle visité:

PSP/SMI/dispensaire pour CPN 0. 1. 2. 3. 4. 5. 6. 9. PRENAT3

PSP/SMI/disp. pour C.C (elle-même) 0. 1. 2. 3. 4. 5. 6. 9. CURAT3
(C.C = Consultation curative)

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PSP/SMI/disp. pour C.I (pas CREN) (C.I = Consultation infantile)	0. 1. 2. 3. 4. 5. 6. 9.	ENF3
Hôpital Sanou Souro	0. 1. 2. 3. 4. 5. 6. 9.	HOP3
Préciser le motif:.....		MOTIFSS
Cabinet de soins privé	0. 1. 2. 3. 4. 5. 6. 9.	PRIV3
Marabout	0. 1. 2. 3. 4. 5. 6. 9.	MAR3
Preciser le motif:.....		MOTIFM
Tradi-praticien	0. 1. 2. 3. 4. 5. 6. 9.	TRAD3
Préciser le motif:.....		MOTIFTP

SECTION 6 Alimentation

6.1 Repas d'hier

Repas	Oui=1 Non=2 9.	Aliments mangés 9.
Au réveil		
Au retour du marché (10h)		
Repas de midi		
Après midi (15h-17h)		
Repas du soir		
Autre		

6.2 Pendant les sept derniers jours, combien de jours la femme a-t-elle mangé la sauce de feuilles de baobab?

0. 1. 2. 3. 4. 5. 6. 7. 9. BAOBAB

6.3 La femme, a-t-elle déjà mangé la terre, le kaolin ou l'argile?
Oui = 1. Non = 2. 9. TERRE

Préciser: _____ PRECITER

SECTION 7 Utilisation de contraceptifs

7.1 La femme desire-t-elle utiliser un contraceptif? (si elle est en grossesse, après l'accouchement) Oui = 1. Non = 2. 9. PILULE

7.2 La femme a-t-elle déjà utilisé des contraceptifs?
Oui = 1. Non = 2. 9. CONTRA

Préciser:_____ PRECICON

7.3 Si la femme n'est pas en grossesse, utilise-t-elle un contraceptif actuellement?

Non = 1. Pilule = 2. Injectable = 3. DIU = 4. Condom/diaphragme/spermicide = 5. Rythme/retrait = 6. ceinture de chasteté = 7. autre = 8. _____ 9. CONTACT

7.4 Si la femme est enceinte, a-t-elle utilisé un contraceptif avant cette grossesse?

Non = 1. Pilule = 2. Injectable = 3. DIU = 4. Condom/diaphragme/spermicide = 5. Rythme/retrait = 6. ceinture de chasteté = 7. autre = 8. _____ 9. CONTRAV

7.5 Raison pour laquelle aucun contraceptif n'est utilisé:

utilise contraceptif = 01. grossesse désirée = 02. pas de relation reguliere = 03. opposition du mari/famille = 04. ignorance = 05. pas disponible = 06. trop cher = 07. peur des effets secondaires = 08. contraire à sa morale religieuse/sociale = 09. amenorhée de nourisse/vient d'accoucher = 10. autre = 11.

..... 99. RAISON

7.6 Provenance du contraceptif utilisé:

n'utilise pas de contraceptif = 01. sans objet (rythme etc) = 02. SMI/Hopital = 03. cabinet prive = 04. pharmacie/boutique = 05. ABBEF = 06. tablier = 07. chez une voisine = 08. autre = 09.

_____ 99. PROVEN

SECTION 8 Statut anthropométrique de la femme

8.1	Poids de la mère	999. |__|__|__|	Kg	POIDMER
8.2	Taille de la mère	999. |__|__|__|	Cm	TAILLEM
8.3	Périmètre brachial de la mère	99. |__|__|	Cm	PEBRA

SECTION 9 Examen clinique de la femme

9.1 Coloration des conjonctives: Normales = 1. Pâles =2. 9. PALLOR

Certitude: Sûr = 1. Pas sûr = 2. 9. SUR

9.2 Si la femme est enceinte, a-t-elle vomi pendant la grossesse?
Oui = 1. Non = 2. 9. VOMIS

Si oui, pendant combien de temps (semaines)? |___|___| 99. VOMDUR

9.3 Si la femme est enceinte, a-t-elle saigné pendant la grossesse?
Oui = 1. Non = 2. 9. SAIGN

Si oui, préciser le nombre d'épisodes et la durée de chaque épisode:

_____ SAIGNAUT

9.4 Si la femme est enceinte, a-t-elle fait une fièvre pendant la grossesse? Oui = 1. Non = 2. 9. FIEVR

Si oui, préciser le nombre d'épisodes et la durée de chaque épisode:

_____ 9. FIEVRPRES

9.5 Taux d'hémoglobine: |___|___|.|___| 99.9 HEMOG

Annexe 3. Key informant interview guides

DRAFT GUIDE FOR IN-DEPTH INTERVIEWS AMONG WOMEN IN THEIR REPRODUCTIVE YEARS

IDENTIFICATION

1 Name

2 Age

3 Father's ethnic group

4 Husband's ethnic group (if relevant)

5 Level of education

6 Currently pregnant?

7 Date of last birth

8 Parity: 0 1 2 3 4 5 or more

9 Iron tablet use:
* never used
* used in previous pregnancy
* used this pregnancy

With the exception of number 4 and 9, the above information can be filled in before the interview from information previously collected by a questionnaire. It is simply to acquaint the interviewer with some of the experiences which will inform the interviewees response to the questions.

INTRODUCTION

I am Bernadette Kanki and I live in Bobo-Dioulasso. ..... provide some personal information and say a little about the organisation that you work for and the type of work that you have been doing. Also explain your current interest and the reason you have returned to a small number of women to ask them some more questions. If she is prepared to spend a considerable amount of time talking to you, enquire about the following:

Attitudes towards pregnancy and childbirth:

I would like to ask you some questions about pregnancy and childbirth. I am particularly interested to hear about your own experiences and the experiences of your relatives and friends.

1. In general, how do you feel during this (or previous pregnancy)?

2. Did you notice any changes in your health during this (or previous) pregnancy? What changes?

3. Have you had to change your daily activities in any way because of your health during this pregnancy? How?

4. Are you taking any medicines, herbal remedies or other things especially for your pregnancy? What? Why?

5. Are there any particular foods that you do and/or do not eat when you are pregnant? Why?

6. Are there any particular foods that you do and/or do not eat when you are breastfeeding?

7. If the woman has had one or more children, ask: I am interested to hear about what happened when you gave birth to your last child ... can you describe to me what happened (where? who was present? how was your health? did you have any complications? did you take any medicines/remedies to help you become strong?)

8. I am also interested to learn about the experiences of some of your friends and relatives who have had children. Have any of your friends and relatives had any problems with their health while they have been pregnant? After they have given birth?

9. What types of problems have they had?

10. What did they do about them?

11. What advice did they receive?

Illness, health and therapy

I am interested to learn about the different type of illnesses which women in this part of Bobo suffer from.

12. Can you tell me the names of the illnesses which people suffer from frequently? (list these)

13. Can you tell me the names of illnesses which people suffer from occasionaly but which are considered to be serious? (list these)

It may be necessary to prompt as the list will probably be long. Useful phrases may be: Some women in this area told me about ... (mention the particular illness) .. Have you heard of this illness? Are there any other words which people use to describe this illness?

14. Which of these illnesses, if any, do pregnant women commonly suffer from? (Repeat the question for women who have recently delivered and/or are breastfeeding)

15. You have told me the names of many illnesses. Can you describe to me the symptoms, signs and causes of each of these illnesses?

(There may be multiple explanations for the cause of some illnesses so document these where it is appropriate)

16. We have talked about illness in a general way. Have you been ill recently?

If yes, elicit an account of the signs and symptoms of the illness, the remedies she took, the healers she visited, the people she talked to about her illness, the things she did not do but would have liked to do.

17. If she has not had any illnesses recently, ask: do you know any women who have had (name one of the above mentioned illnesses)? Can you tell me about her ... as I would like to learn about the things that happened to her.

Elicit a narrative.

Illnesses of the blood

I am particularly interested to learn about illnesses of the blood.

18. Have you heard about or do you know any women who do not have enough blood? If yes, what do you call this condition?

19. Are there any other conditions to do with too little blood? If yes, what do you call these conditions?

For each condition ask:

20. What are the signs and symptoms of (name)?

21. How is a womans daily life affected by (name)? (Difficult to work? short tempered? sleeps a lot? does not perform household tasks? etc)

22. Can you tell me all the different things that women in this area can do (medicines, herbal remedies, healers consulted) if they suffer from (name)?

    Elicit case histories and, where appropriate, draw upon the womans own experiences.

23. Why do you think some women suffer from (name)? (bad food? too little money? sorcery? poisoning? etc)

Illnesses associated with weakness, dizziness and fever

Some of the illnesses you mentioned at the beginning of the interview were associated with weakness, dizziness and/or fever ... name these.

24. Can you think of any other conditions associated with (specify symptom)?

    For each condition, ask:

25. How is a womans daily life affected by (name)? (Difficult to work? short tempered? sleeps a lot? does not perform household tasks? etc)

26. Can you tell me all the different things that women in this area can do (medicines, herbal remedies, healers consulted) if they suffer from (name)?

    Elicit case histories and, where appropriate, draw upon the womans own experiences.

27. Why do you think some women suffer from (name)? (bad food? too little money? sorcery? poisoning? etc)

Dietary preferences and restrictions

I would like to ask you some questions about the different types of food that women in this area eat. I am particularly interested to learn about the different sorts of food that women eat when they are pregnant and shortly after they have given birth.

28. Can you tell me whether there are any particular foods that women in this area eat when they are pregnant? Why?

29. Do you think every woman tries to eat these foods when she is pregnant? Can you tell me some of the reasons why some of the women in this area do not eat these foods?

30. Can you tell me whether there are any particular foods that women in this area avoid when they are pregnant? Why do they avoid them?

31. Can you tell me some of the things that could happen to them?

32. Are there any foods that women in this area should try and eat while they are breastfeeding? Why (probe about the importance of eating these foods)?

33. Are there any foods that women in this area should avoid while they are breastfeeding? Why?

34. Can you tell me some of the things that could happen to them?

Diet, health and illness

You have told me about good foods for pregnant and lactating women. I would like to know about other foods which are not special to these women but are eaten by everyone and said to be good

35. Can you tell me the names of all the foods which you think are good?

36. Are there any other foods which are thought to be good?

37. For each food, ask: What is it about (name food) which is thought to be good?

Where appropriate, specify the qualities associated with "goodness" (gives blood, strength, improves the quality of skin / complection or lengthens life etc). This will enable perceived links between eating good foods and being healthy to be explored.

39. For each of the following foods, ask: what does (name food) do for your body?

Tow
Rice
Fonio
Haricot
Igname
Viande
Poisson
Feuilles (green leaves)
Fruit (oranges, mangoes, bananes)

40. Are there any foods which should not be eaten as they cause ill-health?

Experience and acceptability of iron and folate supplementation

Some pregnant women take iron tablets during their pregnancy.

41. Have you ever heard of pregnant women taking iron tablets?

42. Do you know why they take them?

43. Have you taken them?

44. How did you/they find it ..... were there any problems which you/they had because of the tablets?

45. What type of problems?

If no response, say: some women have told me that they have not liked the tablets because they associate them with:
constipation,
diarrhoea
change in colour and consistency of stool
vomiting
nausea
dizzyness
bad taste
abdominal pain

46. Did you/they have any of these problems?

47. Is there anything about the tablet which makes it difficult or unpleasant to take?

Probe: size, taste, difficulty swallowing, colour

48. Did you/they notice any changes in your health once you/they had taken them? How long had you/they been taking them for?

DRAFT INTERVIEW SCHEDULE FOR TRADI-PRATICIENS

IDENTIFICATION

Name

Age

Sex

Ethnic group

Number of years practising

Area covered in his/her practise

Supplementary occupations

Signs and symptoms of illness presented by women

1. Do many women come to see you about their health?

2. What type of women come to see you (if necessary, probe: age, occupation, from Bobo, villages, other countries)?

3. What type of problems do they come to see you about?

4. A lot of the problems you mention are to do with health. Can you tell me some of the most common signs and symptoms of ill-health which they tell you about?

5. Can you think of any other signs and symptoms that they tell you about?

6. Are some of these signs and symptoms associated with particular illnesses or diseases? (Record these)

Illnesses of the blood

I am particularly interested to learn about illnesses of the blood.

7. Are there many illnesses associated with the blood?

8. What are they? (List these)

9. Some of the women I have spoken to tell me they suffer from djoliban. Do many of the women that you talk to mention djoliban as a problem?

10. How do you decide if a woman has djoliban?

11. How is a womans daily life affected by djoliban? (Difficult to work? short tempered? sleeps a lot? does not perform hoousehold tasks? cries a lot?)

12. Can you tell me about some of the women that have come to see you recently who suffered from djoliban ... What did they say? What is their personal history? How did you decide if they had djoliban? What treatments did you give?

    Elicit case histories.

13. How do you explain the fact that some women suffer from djoliban? (bad food? too little money? poisoning? fate? bad luck? sorcery?)

14. You have told me about some of the remedies that you give to women suffering from djoliban ... can you think of any others?

15. Can you tell me about some of your experiences of treating women for djoliban? Elicit several case histories.

    REPEAT QUESTIONS 9-15 FOR EACH ILLNESS THAT IS ASSOCIATED WITH BLOOD.

Illnesses associated with weakness, dizziness and fever

Some of the illnesses you mentioned at the beginning of the interview were associated with weaknesss, dizziness and/or fever. ... name these

16. Can you think of any other illnesses associated with these symptoms?

For each illness ask the following:

17. Do many of the women that you talk to mention it as a problem?

18. Can you tell me about some of the women that have come to see you recently who suffered from this illness ... What did they say? What is their personal history? How did you decide that they were suffering from this? What treatments did you give?

Elicit case histories.

19. How do you explain the fact that some women become ill with (name illness) whereas other women do not?

20. You have told me about some of the treatments that you give to women suffering from (name illness) ... can you think of any other treatments that you might give her?

Repeat questions 17-20 for each illness that is associated with weakness, dizziness and fever.

Diet

I would now like to ask you some questions about food.

21. Do you think there are any foods that a woman should not eat when she is breastfeeding? pregnant? Why?

22. Are there any foods which she should try to eat when she is breastfeeding? pregnant? why?

23. Are there any foods that a pregnant woman can eat to give her a lot of blood? strength?

If yes record these foods.
If no, ask: what gives a woman a lot of blood? strength? why?

24. Are there any foods that a woman who breastfeeding can eat to give her a lot of blood? strength?

If yes record these foods.
If no, ask: what gives a woman a lot of blood? strength? why?

25. I am also interested to hear about other women, and even men(!), ... are there any foods or medicines that they can take to give them a lot of blood? strength?

If yes, record these foods.

You have helped me a great deal. Do you have any questions you would like to ask me?

DRAFT INTERVIEW SCHEDULE FOR AGENT DE SANTE

Introduction: explain the rationale for the study, the study design and the different types of people that you are interviewing. Explain your role in the research and say a little about your background.

IDENTIFICATION

Name

Age

Sex

Father's ethnic group

Husband's ethnic group (if relevant)

Level of education

Type of training completed

Name of Health Centre

Number of years employed at Health Centre

Supplementary sources of income

Resources provided at health centre

Perceptions of anaemia as a public health problem

1. Do you think many of the women that you see who are in their childbearing years are suffering from anaemia?

2. How do you diagnose anaemia? What are the difficulties you face when you diagnose anaemia?

3. What proportion of these women are seriously anaemic?

4. Do you think anaemia is a serious problem for women coming to SMI in Bobo-Dioulasso?

5. Why do you think some women suffer from anaemia and other women do not?

6. Are there any other problems which you often see among women in their childbearing years which are more serious than anaemia? If yes, what are they?

Interpretations of female experiences of ill-health

- You spend a lot of time talking to women about their health. Can you tell me some of the most common signs and symptoms of ill-health which they tell you about?

- Can you think of any other signs and symptoms that they tell you about?

- Do you know how the women interpret these signs and symptoms?

- Are some of them associated with particular illnesses or diseases? (Record the different words and phrases which are used to describe these illnesses)

11. Do many of the women that you talk to mention djoliban (lack of blood) as a problem?

12. How do they explain the fact that some women suffer from djoliban whereas other women do not?

13. What type of treatments do they like to take for djoliban?

Experiences of treating anaemia

14. What medicines do you prescribe to a woman suffering from anaemia?

15. How much does it cost to treat a woman for anaemia with iron tablets?

16. Can you tell me about some of your experiences of treating women for anaemia? Elicit several case histories.

Once you have a sense of the perceived issues, difficulties and rewards of treating women for anaemia inquire about the following in more detail (if relevant!): why women do not always take the prescribed tablets; why they take them irregularly or stop taking them half way through; the type of relationship health care workers have with the women concerned etc

Suggestions for reducing the incidence of anaemia

17. You have told me a great deal about your experiences of prescribing women with iron tablets. I have heard some people say that it is insufficient to prescribe these tablets as it does not prevent women from becoming anaemic; and they say the best way is to encourage women to eat more foods with a high iron content. What do you think?

18. What type of foods do you think women should eat to ensure they do not become anaemic?

19. Why do you think women do not eat these foods on a regular basis?

    Probe: availability of these foods in the markets; seasonal variations; cost; access to land to cultivate these foods; beliefs about the goodness of these foods; insufficient health and nutritional education etc

20. Are there any foods which women do not eat while they are pregnant? What are they?

21. Do you know why they do not eat them?

22. Do you have any other suggestions about the most effective way to reduce the prevalence of anaemia?

You have helped me a great deal. Do you have any questions you would like to ask me?