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Collaborating Agencies:

**Project HOPE - Malawi
London School of Hygiene and Tropical Medicine
College of Medicine, University of Malawi**

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EXECUTIVE SUMMARY

Background

This Technical Working Paper encompasses three separate surveys conducted during the Malawi Maternal Anemia Program (1995-1998) in Blantyre, Malawi. The MotherCare Project and its partners, Project HOPE, the London School of Hygiene and Tropical Medicine and the University of Malawi College of Medicine worked together to support a program to control maternal anemia in Thyolo District, Malawi.

The program targeted two tea estates and surrounding villages in the Thyolo District. The total target population was approximately 100,000, with 20,000 of these residing on two tea estate compounds (Central Africa Company and Nchima Estate) and 80,000 residing in the villages surrounding these estates. Rudimentary health services were provided on the estates by the tea companies, while residents in the surrounding villages received services from the Ministry of Health.

The program was implemented in two phases. Phase I involved formative research to identify the prevalence of anemia and contributing factors (etiologic, behavioral, and operational). Phase II consisted of a comprehensive intervention package based on the findings of the formative research. The project was implemented over a period of 33 months.

Project Goal and Objectives

Phase I objectives included identifying the:

1. prevalence of mild, moderate, and severe anemia and the utilization of antenatal care in the impact area by conducting a baseline survey;
2. relative contribution of the following factors to anemia in the study area: iron deficiency, malaria, hookworm, nutritional intake, or other factors, by conducting an etiology study;
3. constraints to using iron folate tablets (IFA), by conducting qualitative research and a drug supply study;
4. prices of key food items and the feasibility of making dietary recommendations, through a market study; and
5. impact of mild anemia on the productivity and economic welfare of women coffee pickers.

Phase II objectives included:

1. reducing the prevalence of mild/moderate anemia in pregnant and recently delivered women in the impact area by 50 percent and
2. reducing the prevalence of severe anemia in pregnant and recently-delivered women in the impact area by 30 percent.

Project Strategy and Interventions

Iron folate supplements were distributed to pregnant women and women within 30 days of delivery through antenatal and postpartum services. A total of 75 clinical officers, medical assistants, nurses, midwives, health assistants, and health surveillance assistants (HSAs) were trained on the importance of iron supplementation and the identification and management of side effects. Information, education and communication (IEC) messages were developed addressing the dangers of anemia, the importance of treatment, the identification and management of side effects, and the importance of early prenatal and postpartum care.

These IEC materials were developed locally and included reminder cards for pregnant women, bags for carrying the iron tablets, drama productions in the communities, and flip charts for health providers. Twenty-eight traditional birth attendants (TBAs) from villages were trained along with HSAs, in order to facilitate their support of the TBA activities. The training addressed the distribution of IFA through the TBAs working in the communities.

Project Outcomes

Key Findings: Midterm Evaluation/ Monitoring Survey

A monitoring survey took place during February 1998 and reported a number of positive results attributed to the program interventions at the community level. All of the District Health Officers (DHO) interviewed felt that the Maternal Anemia Program had contributed to the increased attendance of women at antenatal care clinics, due in part to the more regular supply of iron supplements which clients valued and perceived as a central feature of care during pregnancy.

Results from client exit interviews corroborated this assessment. *Seventy-two percent of women interviewed cited hospitals and health centers as the preferred site for antenatal care because of the availability of trained health providers who were equipped with IEC materials and adequate supplies* through the Maternal Anemia Program. The program-supported drama group made up of health personnel, school children, and community members was cited as a particular strength of the education intervention. The main recommendation of the monitoring report was to increase the number of performances in the community to meet the demand for this popular activity.

Women reported high compliance with consumption of iron supplements. Eighty-six percent of respondents stated that they took them as instructed. The vast majority of women were able to report possible solutions to help alleviate side effects of iron tablets, based on the IEC materials developed by the Maternal Anemia Program. Among clients and community members, the vast majority of the interviewed group felt that the

program was making an important contribution to the reduction of maternal anemia and that it should be sustained.

Key Findings: Final Survey

A final, community-based survey that collected data for hemoglobin estimates, and thus, the impact of the intervention, was carried out in June 1998. From the baseline survey to the final survey, prevalence of anemia decreased and hemoglobin levels increased for pregnant and recently-delivered women. (Among pregnant women, anemia declined from 66.7 percent to 59.5 percent and among recently-delivered women, it declined from 61 percent to 51 percent). These differences were only statistically significant for women who had delivered in the last 6 months ($p=.05$) and were mainly due to a reduction in moderate and severe anemia.

There was little difference in antenatal care (ANC) clinic attendance between the two surveys. However, the number of IFA tablets received significantly increased between the two surveys, as reported by both pregnant and recently-delivered women.

Key Lessons Learned

An evaluation of the intervention was carried out in September 1998. The integrated package for addressing anemia through iron folate distribution with training and IEC led to more thorough service delivery and wider acceptance of the intervention at both the health center and community levels. People reported that knowing how to manage side effects helped them continue taking the IFA tablets. Simple, locally-developed IEC materials that focused on behaviors (bags for the IFA tablets and reminder-to-take cards) and local dramas that community members found highly effective, were cited as helping to attach importance to taking the iron. The flip charts helped to remind providers of the main points to cover with respect to anemia.

Addressing anemia at both the community and health center levels led to improved availability and provider management of supplementation, as well as better distribution and reported improvements in compliance. The TBAs who were interviewed knew the protocols for anemia reduction and management of side effects, and had the confidence of their villages. Women interviewed in the final survey believed that TBAs were an appropriate level for iron distribution.

The intervention also increased multi-sectoral collaboration among partners and policy makers involved in anemia management. The development of an Advisory Committee brought the program to the attention of the government Ministry of Health and Population and later led to the formation of the National Anemia Task Force. The program also introduced antenatal clinic services in one of the two estates that did not have such services. The estate had a total of five established ANC clinics by the end of the project.

COMPARISON OF BASELINE AND FINAL EVALUATION SURVEYS

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Introduction

The overall objective of the project was to design, implement, and evaluate an intervention to reduce anaemia in women of reproductive age in Thyolo district in southern Malawi. This report includes findings of an evaluation of the intervention's impact.

The evaluation is based on the two community-based surveys conducted before the intervention (baseline) and exactly two years later, when the intervention had been in place for around 15 months. Two groups of women were targeted for each of the surveys: pregnant women and women who had delivered during the previous six months since it was expected that any effect of the intervention would be most obvious in these two groups of women. It was anticipated that the intervention would have little effect on anaemia in men, so they were included as controls to ascertain whether other factors had influenced anaemia over the two years between the surveys.

Methods

The data collection and processing procedures were identical for the two surveys and are described in the report of the baseline survey.

The statistical analysis tables were produced using Epi-Info version 6 and Stata 5. The calculation of confidence intervals, taking into account the cluster sampling scheme used, was done using CSAMPLE in Epi-Info. Differences in means or proportions between the two surveys were tested by calculating cluster means or proportions and then comparing them using a paired t-test or signrank test in Stata (matching on cluster). Where data were highly positively skewed (e.g. IFA received), geometric means were calculated. Finally, the prevalence of anaemia was compared between surveys, adjusting for age, parity, trimester (pregnant women only), and ownership of radio (as an indicator of socio-economic class). The adjusted Odds Ratio (OR) was estimated by fitting a logistic regression, including the factor representing survey as well as the other explanatory variables. Survey was then removed from the model and the predicted values used to calculate cluster statistics were adjusted for the explanatory variables. A paired t-test and signrank test were then used to compare these adjusted values between the two surveys.

Results

Haemoglobin and Anaemia

Table 1 shows the prevalence of anaemia (using WHO criteria to define anaemia from haemoglobin) for pregnant women, recently-delivered women, and men for the two surveys. Prevalence of anaemia decreased between the baseline to the final survey in all groups but was statistically significant only for recently delivered women.

Table 1. Comparison of Prevalence of Anaemia between Baseline and Final Surveys (Prevalence and P-values)

	Prevalence of anaemia (95% confidence intervals)		Difference	Odds Ratio and P (unadjusted analysis)	Odds Ratio and P (adjusted analysis) *
	Baseline	Final survey			
Pregnant women (n=210)	66.7% (59%, 74%)	59.5% (51%, 68%)	7.2%	0.74 P>0.1	0.73 P>0.1
Women delivered in the last 6 months (n=210)	61.0% (53%, 69%)	51.0% (44%, 58%)	10%	0.67 P=0.06	0.64 P=0.05
Men (n=315 baseline, n=303 final survey)	35.6% (30%, 41%)	31.0% (25%, 37%)	4.6%	0.82 P>0.1	n/a

* adjusted for age, parity, trimester (pregnant women), and ownership of radio

Table 2 shows that the reduction in anaemia prevalence among recently delivered women occurred mainly in moderately or severely anaemic women. Very little change was seen among mildly anaemic women. When the prevalence of moderate/severe anaemia was compared between surveys, the only significant reduction was among recently-delivered women (adjusted OR= 0.48 P=0.004).

Table 2. Prevalence of Mild, Moderate, and Severe Anaemia in the Two Surveys

	Severe anaemia	Moderate anaemia	Mild anaemia	Not anaemic
Pregnant women	hb < 7g/dl	7 ≤ hb < 9g/dl	9 ≤ hb < 11g/dl	hb ≥ 11g/dl
Baseline	7 3.3%	33 15.7%	100 47.6%	70 33.3%
Final	4 1.9%	31 14.8%	90 42.9%	85 40.5%
Women delivered in last 6 months	hb < 8g/dl	8 ≤ hb < 10g/dl	10 ≤ hb < 12g/dl	hb ≥ 12g/dl
Baseline	9 4.3%	33 15.7%	86 40.1%	82 39.0%
Final	5 2.4%	18 8.6%	84 40.0%	103 49.0%
Men	hb < 9g/dl	9 ≤ hb < 11g/dl	11 ≤ hb < 13g/dl	hb ≥ 13g/dl
Baseline	1 0.3%	21 6.7%	90 28.6%	203 64.4%
Final	4 1.3%	18 5.9%	72 23.8%	209 69.0%

Table 3 shows that haemoglobin levels increased during the study for all groups. The before and after difference approached significance for recently delivered women.

Table 3. Mean Haemoglobin Levels for the Two Surveys

	Mean haemoglobin level (g/dl) (95% confidence intervals)		Difference	P-value (unadjusted analysis)
	Baseline	Final survey		
Pregnant women (n=210)	10.37 (10.1,10.7)	10.49 (10.2, 10.7)	0.12	P > 0.1
Women delivered in the last 6	11.44 (11.1,	11.77 (11.5,	0.33	P = 0.08

months (n=210)	11.8)	12.0)		
Men (n=315 baseline, n=303 final survey)	13.63 (13.4, 13.9)	13.67 (13.4, 13.9)	0.04	P > 0.1

Antenatal Care Attendance

Among pregnant women there was no significant difference between the surveys in the gestational age at which they started attending ANC (mean gestational age at baseline = 5.30 vs. final = 5.15). The final survey found a slight decrease in the total number of ANC visits reported by recently delivered women. This difference was close to significance (mean visits baseline = 4.95 vs. final = 4.50; P=0.07). (Tables 4 and 5)

Table 4. Gestational Age ANC Started

Gestational age at which ANC started (pregnant women)	Baseline Survey (n=141)		Final Survey (n=142)	
1-3 months	13	9.2%	8	5.6%
4-6 months	107	75.9%	115	81.0%
7-8 months	21	14.9%	19	13.4%

Table 5. Total ANC Visits (reported by women who delivered in the last 6 months)

Total number of ANC visits (recently delivered women)	Baseline Survey (n=204)		Final Survey (n=209)	
1-3	60	29.4%	69	33.0%
4-6	111	54.4%	109	52.1%
7-9	24	11.8%	24	11.5%
10+	9	4.4%	7	3.3%

Iron Tablets Received

Tables 6, 7, and 8 show data relating to IFA tablets received. All three measures of IFA receipt were significantly higher at the final survey (P<0.01 for all).

Table 6. Number of IFA Received at Last ANC Visit (reported by pregnant women)

IFA received last ANC visit (pregnant women)	Baseline Survey (n=141)		Final Survey (n=145)	
0	69	48.9%	66	45.5%
1-6	24	17.0%	3	2.1%
7-13	40	28.4%	12	8.3%
14-20	6	4.3%	20	13.8%
21-27	2	1.4%	4	2.8%
28+	0	0%	40	27.6%

**Table 7. Total IFA Received
(reported by women who had delivered in the last 6 months)**

Total IFA received (recently delivered women)	Baseline Survey (n=204)		Final Survey (n=209)	
0	21	10.3%	11	5.3%
1-9	22	10.8%	3	1.4%
10-19	43	21.1%	6	2.9%
20-29	38	18.6%	16	7.7%
30-49	45	22.1%	35	16.7%
50-99	28	13.7%	91	43.5%
100-149	5	2.5%	23	11.0%
150-199	2	1.0%	19	9.1%
200+	0	0%	5	2.4%

**Table 8. IFA Received Since Delivery
(women who have delivered in the last 6 months)**

IFA received since delivery (recently delivered women)	Baseline Survey		Final Survey	
0	183	87.1%	115	55.3%
1-9	16	7.6%	11	5.3%
10-19	5	2.4%	15	7.2%
20-49	3	1.4%	66*	31.7%
40+	2	1.0%	1	0.5%

* 48 women reported receiving 30 tablets

Malaria Prophylaxis Received at ANC

The proportion of pregnant women who reported receiving malaria prophylaxis during ANC was significantly higher ($P=0.05$) during the final survey, but there was no significant difference for recently delivered women. (Table 9)

Table 9. Proportion of Women Receiving Malaria Prophylaxis at ANC

	Baseline Survey		Final Survey	
Pregnant women	79/140	56.4%	93/140	66.4%
Delivered in last 6 months	140/204	68.6%	159/209	76.1%

Anthropometric Data

Mean mid upper arm circumference (muac) for pregnant women was significantly lower in the final survey (baseline = 25.1 vs. final = 24.6; $P=0.02$), but there was no significant difference for recently delivered women (baseline =24.9 vs. final=24.6).

Discussion

Key findings of the analysis include:

- The intervention appears to have been successful in raising haemoglobin levels and decreasing the prevalence of anaemia, and this was statistically significant in women who had delivered within the previous six months.
- There was little difference in ANC attendance.
- The number of IFA tablets received significantly increased over the study period both during pregnancy and after delivery.
- The proportion of women reporting receiving malaria prophylaxis at ANC increased among pregnant and recently delivered women, but was only significant for pregnant women.
- Mean muac was significantly less at the final survey than at the baseline, for pregnant women, but not recently-delivered women.

The lack of a significant difference in anaemia prevalence among pregnant women could be due to their shorter exposure to the intervention, as compared to recently-delivered women, (who were exposed to it throughout their pregnancy and after delivery).

The slight improvements in anaemia prevalence and haemoglobin levels for men could have resulted from the nutrition education component of the intervention or other factors that changed over time.

The significant decrease in muac for pregnant women warrants further investigation.

**REDUCING IRON DEFICIENCY AND
ANAEMIA IN WOMEN OF REPRODUCTIVE AGE:
THYOLO DISTRICT, MALAWI**

QUALITATIVE STUDY REPORT

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SUMMARY OF THE QUALITATIVE STUDY

The objective of this study was to identify and describe constraints to reducing anaemia in women of reproductive age in Thyolo District, Malawi, and to make recommendations about how these constraints could be overcome.

Three interviewers (including two social scientists) conducted semi-structured interviews and group discussions over a three-week period. Three communities were chosen to represent different degrees of difficulty in access to health care and differing degrees of involvement with the tea estates. Twelve women in the first village and 10 in the compound were the focus of interviews, with 15 influential others interviewed in the village and 11 in the compound. In the second village, size of the discussion group ranged from 4 to 16. Key informant interviews were conducted with men, grocers, traditional birth attendants, and medical personnel involved in the healthcare of the three communities. Iron trials took place in one village and one estate compound. Ten women of reproductive age (1 pregnant) from the village and 20 women (8 pregnant) from the estate compound were interviewed. Four older women from the village were also interviewed.

Despite measures to avoid response bias, there were concerns about the validity of some of the data. Some respondents were nervous during interviews, and some were threatened by health personnel and warned not to tell us the number of iron tablets they were given.

In the poorer village with less access to health care and radio, "lack of blood" was seen primarily as a wasting disease. In the other communities causes, symptoms, and treatment of "lack of blood" corresponded more closely with those conventionally associated with anaemia. However, in these latter communities, there were more concerns about iron tablets because of fear of an illness called "too much blood", and because health messages had warned against taking medicine without a medical examination. High levels of compliance were apparent in the iron trials, with more women refusing to comply because of the above concerns than because of side effects.

Supply of iron tablets at antenatal classes, rather than difficulties with compliance, was given unanimously as the main reason women could not take more iron tablets. Women reported being given few tablets, if any, at each visit. Providers confirmed that iron tablets are popular in the area and that women do not get tablets at every visit. Supply or worries about sustainability of supply were cited by providers as the reason women were given so few tablets. There was also some evidence of leakage of drugs onto the market. Traditional birth attendants were incorporated into the formal health sector and were established suppliers of iron tablets to pregnant women.

Healthcare decisions involved relatives, husbands, and sometimes neighbours. Husbands control the finances for the purchase of health treatment, as well as food.

Recommendations include:

- research to determine reasons for the inadequate supply of iron tablets in the study area;
- which groups to target for the receipt of iron tablets, based on the adequacy supplies;
- advertisement and sale of iron tablets at a low price in local grocers' shops;
- communications for behavioural and knowledge change within the communities including, dispelling concerns about iron tablets, as well as generally increasing knowledge about maternal anaemia; and
- a more sympathetic approach by health care providers to teaching and counselling clients.

BACKGROUND

Anaemia, defined as a haemoglobin level less than 11 g/dl, is the most common nutritional deficiency in the world (Buetler, 1980; Whitney and Hamilton, 1987). High prevalence rates have been reported among women of reproductive age in developing countries throughout the world. In Africa, it has been estimated that two-thirds of pregnant 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 prevention and treatment of anaemia should be a priority and that, "routine supplementation with iron (and folate) is probably warranted where the prevalence of anaemia and iron deficiency is high," but how 'high' was not defined.

A recent review of the prevalence of maternal anaemia concluded that while iron supplementation is efficacious, population-based programmes have not been very successful and maternal anaemia continues to be a highly prevalent problem around the world (Sloan and Jordan, 1992). There are a number of possible reasons for this, one being that inadequate dietary iron is not the only cause of anaemia. In West Africa, folate deficiency is known to be common (Fleming et al, 1968) and malaria is endemic across sub-Saharan Africa. Hookworm infection and schistosomiasis are other possible causes of anaemia in developing countries. Fleming (1989), reporting on severe anaemia among pregnant women in Zambia, found that 84 percent had malaria (*P. falciparum*), 62 percent were folate deficient, and 35 percent were iron deficient. In such situations it would not be surprising that iron supplementation alone had little impact on the incidence of severe anaemia.

Another reason for the apparent failure of iron supplementation programmes is that although high prevalence rates of anaemia have been observed in both pregnant and non-pregnant women in developing countries, it is only the former group that has been the focus of research and action programmes. It may be, that oral iron supplementation during the relatively short period of pregnancy is insufficient, particularly to treat severely anaemic women. The idea of supplementation outside pregnancy is now beginning to receive attention.

The importance of supply in the failure of iron supplementation programs has also been recently documented (Galloway and McGuire, 1994). Strategies for ensuring adequate and sustainable supplies of iron tablets need to be developed.

A fourth reason for the apparent failure of iron supplementation programmes may be "non-compliance" (WHO, 1990). Non-compliance may be associated with the side effects of the treatment regime, often exaggerated during pregnancy, or may occur because the treatment regime is culturally unacceptable or inappropriate (WHO, 1990). Motivational strategies need to be developed to address barriers to compliance.

Paradigms for sickness and health have been described for Africa, generally (Cheetham & Griffiths, 1982), and Malawi, in particular (Chilivumbo, 1974; Morris, 1985; Morris 1986; Morris, 1989). Knowledge of herbal remedies is reported by Morris to be common in rural areas of Malawi, with a person visiting a specialist only if the case is difficult. These specialists may be midwives (*azamba*) or herbalists/diviners (*asinganga*). Herbalists are well organised in the country and there are at least two associations which promote good practice (Morris, 1982; Msonthi, 1986). The skills of a diviner are called upon when the illness is thought to be due either to breaking some social rule or observance or to witchcraft, in order to find out and rectify the underlying cause of the illness (Chilivumbo, 1974; Morris, 1986; Morris, 1989). These various healers, along with "western" style health facilities, are visited as deemed appropriate.

Little has been written about how anaemia is perceived within this mixture of causes of sickness and sources of treatment. Morris (1985), based on discussions with Malawian herbalists, says that the heart (*mtima*) and blood (*magazi*) are conceptualised as distinct. He says that the blood is seen as running through the body and is connected with overall strength. Anaemia is described as '*wochepa magazi*' (insufficient blood) and heart palpitations as '*mtima okugunda*'. He describes as common, medicines for increasing the 'amount of blood' (*kuonjezera magazi*).

The Ministry of Health Annual Report for Thyolo District for 1993 recorded 10,404 deliveries occurring in health facilities and 2,349 by trained traditional birth attendants. The number of deliveries by others (e.g. at home) in the district are, of course, unknown. The Demographic and Health Survey for Malawi (1992) reported that 55 percent of women in Malawi were delivered by a nurse/midwife or doctor, 18 percent were delivered by a traditional birth attendant (TBA), and 27 percent by someone else.

The Annual Report for Thyolo (1993) reported that 4,257 women had attended antenatal care at health facilities, whilst 2,349 received some antenatal care from trained TBAs. Comparing these figures with those for delivery suggests that antenatal care attendance in this district is substantially lower than the national average of 90 percent, as reported in the Demographic and Health Survey.

A joint Ministry of Health-UNICEF report on antenatal services related to prevention and control of anaemia presents results for 913 women from 15 randomly selected antenatal clinics throughout Malawi (two of which were close to the study area). Fifty-six percent of these women had haemoglobin levels less than 11g/dl, 31 percent had levels less than 10g/dl, and 2 percent had levels less than 7g/dl. Fifty-six percent of the 715 women attending antenatal care sessions reported receiving iron tablets regularly and 15 percent reported receiving iron tablets irregularly (regularly is not defined in the report). Of the 509 women who received iron tablets (regularly or irregularly), 22 percent reported experiencing side effects. All facilities reported giving talks on anaemia but none had any IEC material on the subject.

Women were also asked about malaria prophylaxis. Seventy-two percent of the antenatal women reported having received anti-malarial prophylaxis at least once.

OBJECTIVES

The overall objective of the study was to identify and describe constraints to reducing anaemia in women of reproductive age in Thyolo District, Malawi and to make recommendations about whether and how these constraints can be overcome.

Specifically, the study sought to:

1. outline beliefs and practices related to health, health care seeking behaviour, and nutrition, especially for women of reproductive age, to provide the context for the more detailed research on anaemia outlined below;
2. document knowledge, beliefs, and experiences of the community relating to anaemia, including symptoms, causes, effects, perceived seriousness of anaemia relative to other health problems, and perceptions of how anaemia affects birth outcomes;
3. document preferences and experiences related to treatment for anaemia including: health seeking behaviour, sources of supply, perceived effects of treatment, management of side effects, compliance, and different types of tablet/treatments available;
4. ascertain the relative acceptability of different channels for supplying iron folate tablets and the reasons why they are or are not acceptable, including opinions on financial cost;
5. document experiences and opinions of providers related to the supply, demand, cost, compliance, and side effects of anaemia treatment, as well as providers' opinions of different channels of supply for iron folate tablets; and

6. on the basis of the information obtained, identify constraints to the success of possible interventions for reducing anaemia and make recommendations about which constraints should be targeted and strategies for overcoming them, within the scope of the project.

METHODOLOGY

Personnel and Timing

Two social scientists from the London School of Hygiene and Tropical Medicine travelled to Malawi in October 1995. The Principal Investigator (Linda Williams) and a Malawian social scientist (Linda Semu) were present throughout the month-long preparation and fieldwork period, whilst Dominique Behague was present mainly for the start-up. Two research assistants were employed for the duration of the fieldwork and acted initially as interpreters for Dominique Behague and Linda Williams. After Ms. Behague left Malawi, one research assistant was considered competent to perform interviews independently, whilst the other continued as an interpreter for Ms. Williams.

A three-day introductory period was held before the fieldwork began. This involved team discussions and finalising sampling schemes, data collection methods, data collection instruments, and practical and logistical issues.

Sampling Scheme

Selection of Communities

Three communities were purposively selected for inclusion in the study sample. The first was a village outside the main tea estate area and 6 km from the nearest government health facility. It was chosen (i) to represent villages that are not so heavily dependent on the estates for income (or the means of living) and healthcare and (ii) because of its distance from the government health clinic, in order to highlight barriers to anaemia reduction in a community where structural constraints are important.

The second community selected was a large tea estate compound relatively close to the tea estate clinic. Estate compounds differ from villages within the tea estates in that the land and houses are owned and controlled by the estate. They are also smaller and much more compact than villages and there is minimal land for farming. The compound chosen was relatively large and contained a range of housing types and estate employees. Being close to the estate clinic and relatively close to the district hospital, it was also chosen to highlight barriers to anaemia reduction when distance to health facilities is not an important constraint.

The third community chosen was a village in the middle of the tea estate area, served by a clinic in an adjacent tea estate and the district hospital, both of which were nearby. It was chosen as a contrast to village one, in that it was expected to be highly dependent on the

estates, both economically and for healthcare, and because distance to healthcare was not a barrier.

Upon arrival in a community, the area was divided into three parts and each interviewer worked in one. The areas of the villages were defined randomly, but for the estate compound, the interviewers stratified the estate into three blocks according to housing type and each interviewer covered one block.

Selection of Respondents

For the first two communities, the fieldwork team decided that the main sampling unit would be "cases" (a case consisted of a woman of reproductive age plus at least one other person (relative or friend) with whom the woman frequently interacted). Cases were chosen as the sampling unit so that the woman's opinions and behaviour could be evaluated along with those of people likely to influence her. Each group of people comprising a case was visited at least twice, and usually three times. Depending on the situation when the respondent was visited, individual interviews and/or small group discussions took place. Within each community, each interviewer tried to find cases of women from different age groups. The "case" methodology was not used in the third community, and instead, three group discussions took place because of time constraints and because on the first day the team intended to visit the community there were severe storms which made it inaccessible. By that time the interviewers had identified the main themes arising in conversations and only wanted to find out how these differed for this community. Thus, the three group discussions were considered to be adequate.

Key informants were also identified and interviewed. In the health clinics nearest each community (excluding private clinics), a medical assistant and a nurse midwife were interviewed. Trained TBAs nearest each community were also interviewed. Grocers from two communities were interviewed, as they are an essential component of healthcare delivery. In the tea estate compound, husbands were away from the compound whenever we visited so no men were included in the cases. Therefore, interviews were conducted separately for men from the compound and are regarded as key informant interviews.

Data Collection

The method of data collection and the data collection instruments were devised by the fieldwork team. Different interventions for reducing anaemia were discussed. For an intervention based on increasing coverage and compliance with iron tablets, two behaviours became the focus for obtaining information, getting iron tablets and taking iron tablets. A brainstorming session was held where ideas on what could influence these two behaviours were put forward. These ideas were then discussed and grouped. In addition to the behaviours of getting and taking iron tablets, ideas relating to food consumption and birth spacing for reducing anaemia were considered.

The team decided that semi-structured interviews using an interview guide would be the method of data collection for the cases. A data collection instrument was designed, based on the ultimate and specific objectives, and the ideas generated during the brainstorming session. This was revised, slightly, twice throughout the fieldwork, mainly by adding new questions as information arose. The final instrument is shown in Appendix II. The data collection instrument was adapted for key informants, as appropriate. Instruments for some of the key informants are also shown in Appendix II.

Most conversations took place in Chechewa. These were tape-recorded and then translated into English whilst being transcribed. Where tape recording was not possible, summaries of conversations were written up immediately afterwards. In addition to the data collected verbally, interviewers were encouraged to observe non-verbal signals from respondents, as well as aspects of the surroundings which might influence the data collected and provide some information on socio-economic class. Observations were noted discreetly during interviews or were written up immediately after.

Iron Tablet Trials

These took place in the first village and in the tea estate compound. Some of the women interviewed as part of the main study and their neighbours were given a known number of iron tablets (ten for Village 1 and seven for Compound 1). Interviewers did not try to assess who might or might not be anaemic when giving out the tablets but were aiming at variation in age and pregnancy status.

At times, the iron trial in Village 1 became quite riotous, as there was a very strong demand for the tablets. Since women had generally been advised by health providers to take tablets with food, we decided to advise women similarly, in order to avoid confusion. Women were told that the tablets were a gift to them because they were helping us with our research, and that the tablets would help them to make sure they had "enough blood." In these communities, there is a way of asking people to do things that makes it "a rule." The team judged that it would be extremely unlikely that women would report not taking the pills or sharing them if they had been told to take them as "a rule". Therefore, this form of requesting women to take the pills was avoided.

We returned to Village 1 seven days later and to Compound 1, five days later, to conduct the follow-up interviews. The data collection instruments are shown in Appendix 2.

Measures for Reducing Response Bias

Many measures were taken to reduce response bias during interviews, including: (i) Interviewers generally refused chairs when these were offered and sat on straw mats on the ground with the respondents. (ii) Interviewers ensured that their clothing and appearance was in keeping with that of the women interviewed. (iii) Respondents were visited several times in order to build up a feeling of friendship, and the conversations were presented to the women as informal chats. (iv) Interview guides, notebooks, and

tape-recorders were made as unobtrusive as possible (although permission was sought before tape-recorders were used). (v) Women were told that we were trying to build up a general picture of women's health and all respondents were assured that the information they gave us would be confidential.

RESULTS

Characteristics of the three communities sampled

Village 1

This is a small village on the outskirts of the tea estate area. Most of the residents are from the Lomwe ethnic group. Within this ethnic group, daughters tend to stay near their relatives after marriage, whereas sons move away to live near their wife's relatives. Table 1 shows that interviewers frequently found female relatives and/or husbands with case women.

The village was long and thin, and was distributed along a dirt road. The majority of houses were constructed from mud bricks and had grass roofs. A few had metal roofs. Most households had land outside the village on which they grow maize and vegetables, but many complained about the yields, blaming the size of their plot, lack of rain, or lack of fertilizer. Apart from a few traditional remedies available in the village, women have to walk long distances to get traditional or "western" healthcare. However, a mobile clinic had recently started visiting the community once a month. Women also had to travel long distances to collect firewood and to go to the maize mill. Water could be collected from two boreholes, one well, or a river a short distance from the village. However, women complained that there were always queues at the boreholes and that often no water came out. The nearest primary school was two villages away.

Some men from this village worked on the estates but fewer than in the other two communities. A few women had worked on the estates when younger but no women presently working on the estates were found. This village appeared to be poorer than the two other communities visited.

Compound 1

This large compound consisted of one- or two-room houses made from brick with metal roofs. The houses were in uniform rows, much closer together than in the village. Gardens had been planted on all available space in and around the compound but most women did not have access to a garden apart from at their home village. The estate clinic was within easy walking distance and an ambulance was available for emergencies. Traditional health care was not easily accessible since, apart from a few locally known "treatments", residents had to travel to nearby villages or go to their home village. There were fewer complaints about water and firewood than in the villages, and separate

buildings contained latrines and washing facilities. None of the women interviewed worked for the estates but their husbands had permanent jobs.

The vast majority of compound residents were living as nuclear families, away from their extended families in the villages. This is illustrated by Table 1, which shows that women spent time with neighbours rather than their female relatives, and that the older generation was not to be found. Many of the women spent substantial proportions of time in their home villages (many of them in the Mulanje area), especially at the times they were needed for agricultural work. The study period occurred during the "low" season of tea picking, so many men were only working four days a week. No temporary workers were living in the compound.

Some women mentioned sending their sons to the local primary school, which was within walking distance of the compound. This community appeared to be wealthier than Village 1 but less well-off than Village 2.

Village 2

This was a large village completely surrounded by tea estates. House construction was much more varied than in Village 1, with clay, as well as mud brick houses, being common. There was a mixture of ethnic groups, but as in Village 1, female relatives tended to reside close to one another. Women reported taking firewood from the tea estate woods (that are grown to service the factory boilers). There is a primary school adjacent to the village. Women use an estate clinic or the district hospital for health care. They have access to traditional medicine and trained TBAs within the village. This was the only community where women were commonly employed by the estates. This appeared to be the wealthiest of the communities studied.

Characteristics of the Sample Population

In Village 1, twelve cases were interviewed, including two young, eight medium-aged, and two older women. Two of the medium-aged women were pregnant. Eight female relatives, two neighbours, and five husbands were also interviewed as influential persons. In Compound 1, ten cases were interviewed. Two younger women and eight medium-aged women were the focus of the cases, and five of the medium-aged women were pregnant. In addition, three female relatives and eight neighbours were interviewed as influential persons, but no husbands or older women.

In order to obtain men's views, in Compound 1, three men were interviewed. One of these was the compound overseer, one the watchman, and two were not working on the day of our visit. For a person to be included in the sample, they had to have been substantially involved in interviews or discussions. Thus, inclusion in the sample involves judgement rather than objective criteria. Other people not included in the sample were those who joined in discussions for a relatively short time. In Village 2, group discussions were held with three groups of women varying in size from 4 to 16.

Three trained TBAs were interviewed. One of these was the TBA closest to Village 1 and the other lived and worked in Village 2. There was no TBA on the estate compound.

The medical assistant and a nurse/midwife from the government health facility nearest Village 1 were interviewed, as were the medical assistant and a nurse/midwife from the estate clinic nearest Compound 1 and Village 2. An additional nurse midwife, who was pregnant and had recently moved to the area, was also interviewed as she had strong views about iron tablets.

A grocer and his wife from Village 1 and female grocer from Compound 1 were also interviewed.

In Village 1, one pregnant and nine non-pregnant women of reproductive age were interviewed following the iron trial. In addition, four older women were also included in the trial and interviewed, as it would have been disrespectful to exclude them and their responses are of interest. In Compound 1, eight pregnant and twelve non-pregnant women of reproductive age were interviewed following the trial. In addition, two women who had been given the tablets were reported by others as avoiding being interviewed because they had not taken their tablets. (Table 1) Results of the iron trial are shown in Table 2.

The fieldwork team judged that despite time constraints resulting in a lower sample size than had been planned (especially for Village 2), adequate numbers and types of people had been interviewed for the objectives of the study to be met.

Table 1. Characteristics of Sample

Village 1

Respondent Number	Women in mid-20s or younger (Young)	Women late-20s to mid-40s (Medium)	Women in late-40s or older (Older)	Men
C1			case	Husband
C2		case + aunt		Husband
C3		case (pregnant)		
C4		case (pregnant)	mother	
C5	Daughter	Case	grandmother	
C6		Case		Husband
C7	Case	Mother		Husband

Village 1 (cont'd)

Respondent Number	Women in mid-20s or younger (Young)	Women late-20s to mid-40s (Medium)	Women in late-40s or older (Older)	Men
C8	case + sister (sister pregnant)			
C9		Daughter + Neighbour	case	
C10	Daughter	Case		
C11		Case + neighbour		
C12		Case		Husband

Compound 1

Respondent Number	Women in mid-20s or younger (Young)	Women in late-20s to mid-40s (Medium)	Women in late-40s or older (Older)	Men
C13	Neighbour	Case (pregnant) + neighbour		
C14		Case		
C15	case (pregnant) + neighbour			
C16	case (pregnant) + 3 neighbours (1 pregnant)			
C17		case + 2 pregnant neighbours		
C18	Daughter and niece (pregnant)	case (pregnant) + sister		
C19		Case		
C20		case (pregnant)		
C21		Case		
C22		Case		

Village 2 - group discussions

Discussion group 1	minimum of 5 women
Discussion group 2	16 women (of whom 13 related in some way)
Discussion group 3	4 women

Key Informants

- K1 Compound overseer + 2 friends, Compound 1
- K2 Watchman, Compound 1
- K3 2 young men, Compound 1

- K4 Young grocer + wife, Village 1
- K5 Female grocer, Compound 1

- K6 TBA nearest Village 1
- K7 TBA, Village 2
- K8 TBA, Village 2

- K9 Medical Assistant at government clinic nearest to Village 1
- K10 Medical Assistant at estate clinic near Compound 1 and Village 2

- K11 Nurse/Midwife at government clinic nearest to Village 1
- K12 Nurse/Midwife at estate clinic near Compound 1 and Village 2
- K13 Nurse/Midwife (pregnant) recently moved to area

Response Bias

Despite the measures taken to reduce response bias, it was clear that many respondents were guarded in their responses, especially in Compound 1. It is likely that after the Banda regime people still do not feel completely at ease to be open. In fact, there was some reporting back to the health care providers from within Compound 1 on what people had said to us. Several women in the compound were threatened by a nurse/midwife who was driving around in an estate vehicle shouting through the window at women not to tell us they were not being given iron tablets.

For example: " ..even yesterday some health people were asking me, they said 'you Mrs what were you saying about us not giving you medicine for increasing blood, your visitors will soon leave you and we'll ...'. They said the same thing to women up there." Following this another of our respondents (a pregnant woman) avoided questions on the number of iron tablets she had been given at ANC.

Several of our respondents seemed nervous and hesitant in their replies, as if they thought they were being tested. The TBA nearest Village 1 eventually admitted that she was indeed very afraid and thought we were there to test her.

Therefore, despite reassurances about confidentiality and efforts to bring about an easy informal exchange, there is likely to be some response bias in the data.

Communities' Assessments of Health Problems

General

Cough, diarrhoea, and malaria/fever were mentioned as serious illnesses by the majority of respondents. AIDS was mentioned in Compound 1 and was commonly mentioned in Village 2. These illnesses were said to cause wasting and possibly death and to affect adults as well as children. Health facility personnel also mentioned problems of AIDS and malnutrition. However, even though these diseases correspond to biomedical conditions such as malaria and wasting due to AIDS, TB, and malnutrition, it was apparent that communities also thought these diseases could be caused by the other categories of illness described below, i.e. social or supernatural causes. Headache and body pains were also mentioned frequently, although they did not seem to be regarded as serious.

Some illnesses are believed to be caused by breaking rules or obligations relating to sexual behaviour and/or by adding salt to the cooking pot when unclean. This was a complex subject and a full description of all the diseases and variations is not possible in this report, although some extra detail is given in Appendix III. The "diseases" caused by breaking rules involve mixing and polluting the blood by sexual behaviour or contaminating food, and so, are connected with the disease, "lack of blood," described later. They result in "thinness and swelling" and can lead to death if not treated.

The behaviour of parents is thought to affect newborn babies and spouses as well. One of these diseases, caused mainly by a husband's adultery, "tsempho," is characterised by thinness and swelling with bloody diarrhoea (and "veins standing out" in babies). Another of these diseases, which affects men who have sexual intercourse with an "unclean" woman, "kanyera," also results in thinness and swelling, but paleness and coldness were often described as being like AIDS. Although belief in this type of illness was widespread, with remedies for "tsempho" being commonly known within communities, there has obviously been some health education informing people that "tsempho is really neglect and malnutrition. Men were more likely than women to report that "tsempho" is malnutrition.

The other common classes of illnesses in these communities are those due to sorcery. These are suspected if a serious illness develops suddenly or if "hospital medicine" cannot find the cause and cure the illness. Many respondents described how they or their child had been cured by a "singanga" (witchdoctor) after hospital medicine had failed, and only one male respondent said that he did not believe in witchcraft.

Women's Reproductive Health

General illnesses among women of reproductive age that were mentioned include infertility, long-term stomach ache, and stomach ache connected with menstruation. With regard to problems during pregnancy, women mentioned bleeding, back and stomach aches, weakness of the body, dizziness, and heart palpitations. Loss of appetite was also mentioned, sometime in conjunction with not wanting to eat "good" foods.

There are many rules which women follow in order to have easier deliveries. Women are advised, both by older women and "hospital people," not to do hard work such as hoeing and pounding. However, traditionally, women were also encouraged to keep working and become strong so that the baby would be strong and delivery would be easier. The set of beliefs, whereby the baby takes on the characteristics of the mother, is called "walaza". Other beliefs include, that the woman should not stand and wait in a doorway or the child will wait at the doorway when the time comes to be born, and a pregnant woman should not send off a visitor or the child will wait for that visitor when the time comes for delivery.

Taboos concerning nutrition during pregnancy (not eating eggs, meat, tomatoes) were reported as being less strong than in the past. However, the belief that pregnant women should not eat food from the market as it may have been prepared by a "hot" person (see Appendix III), was mentioned as still being strong. If the woman eats such food, it is believed she may abort. As mentioned above, the sexual behaviour of the pregnant woman and/or her spouse were believed to affect the pregnancy, with broken rules leading to abortions or dangerous deliveries.

Problems occurring after delivery were described as blood loss and stomach pains. Some of these pains were referred to as wounds made by the child. There was great concern about what happened to the placenta after birth, as it is believed that if it is used for witchcraft, the women and child will grow weak and sickly and the women will not be able to become pregnant again.

Health Seeking Behaviour

General

In Village 1, "hospital medicine" is provided free at the local government clinic located 6 km away and the district hospital which takes four hours to reach by foot. However, there is a private clinic that is closer and a mobile clinic has started visiting the village, though respondents said it was rarely seen.

Respondents in Village 1 complained bitterly about the distance to the government clinic and the lack of drug supplies, if and when they went there. In addition to these complaints, some respondents mentioned the amount of time they had to wait for

attention and the fact that they were not examined, but rather, were diagnosed according to what they told the medical assistant. Some had paid for private health care for serious illnesses mostly because they saw it as effective, in addition to being closer and attention being quicker. The prices for private treatment were expensive, starting at 60 Kwacha just for admission. People described the sacrifices they had had to make in order to pay for treatment.

Medicines were available from grocers within the village, although people agreed that the grocer with the widest range of goods was in the next village. The local grocery owner who was interviewed was selling pain killers (cafenol, aspirin, and panadol), a decongestant (conjex), tablets for bilharzia, and vitamin tablets (which he initially described as medicine for increasing blood), but not iron tablets or Fansidar.

Buying medicines from a grocer was reportedly common in this village because the government clinic was so far away and it frequently ran out of drug supplies, and health personnel tell people to buy medicines from the grocer. If people went to the clinic first they were told or given a slip of paper listing the medicine to buy. However, if people did not go to the clinic, they often bought medicine on the basis of what had worked for a similar illness in someone else. In some cases medicine was requested on the basis of price rather than name. For example, "the medicine that is going at 1 kwacha 50."

In Village 1, women tended to discuss what to do about illnesses with older female relatives, although the husband was always consulted for permission and any necessary money and usually did the purchasing of medicines. However, the wife's extended family could put substantial pressure on the husband to take action on health matters.

Some traditional remedies were available within the community and the headman was said to have quite good knowledge of roots. However, to find a traditional healer or witchdoctor who knew a wide range of medicines and divining, people had to travel to other villages.

A variety of traditional and formal treatments were sought in order to find an effective cure for illness. Traditional healers and diviners were frequently sought before or after "hospital" medicine, depending on what the cause of the illness was thought to be. For simple remedies, traditional healers charged small amounts, but for cures involving sorcery, hundreds of kwacha could be charged. People tended to have strong feelings about different traditional healers, describing them as crooks and liars or as "good", depending on whether they felt they had been cured. When asked what made a healer good, whether traditional or formal, the effectiveness of the cure was by far the most commonly mentioned factor, although the pleasantness and politeness of providers were also considered important.

In contrast to the one- to two-hour walk of those in Village 1 to get to the government clinic, residents of Compound 1 could walk to the estate clinic in about ten minutes. In addition, an ambulance could be called for very serious cases. Therefore, there were no

complaints about distance. There were also no complaints about supplies running about. However, there were complaints about the providers' policy on giving out medicine. Since all those living in the compound were families of those working on the estates, they get free health care from the clinic.

Overall, it was likely that women in the Compound had more contact with the formal health sector than those in Village 1. As for Village 1, there were no "expert" traditional healers within the community and women had to travel to nearby villages if they wanted traditional remedies. There were also reports of people spending large amounts of money on both singangas (witchdoctors) and/or private "hospital" treatment because they felt them to be more effective than the free care available at the clinic or district hospital. In the Compound, medicines were also purchased from grocers and penicillin seemed to be popular. The grocer interviewed was selling aspirin, conjex (sometimes), and penicillin, but not vitamins, iron, or Fansidar.

Whereas illnesses were discussed with female relatives and husbands in Village 1, in Compound 1 they were discussed with neighbours and husbands. Husbands were said to take on the responsibility of the extended family for the health of their wife and children. As in Village 1, husbands definitely had to be consulted (and usually provided the money) for any health care.

In Village 2, those working on an estate and their families got free health care from estate clinics. Estates varied in their policy on helping those with no family member working on the estate. The estate clinic nearest Compound 1 and Village 2 treated those with no connection to the estate for a modest charge. Village 2 is relatively close to the district hospital where free health care is provided. There are also TBAs and knowledgeable traditional healers within the village. "Shopping around" for effective treatments was common in the other two communities.

Women's Reproductive Health

Traditional Birth Attendants

In addition to the "hospital" and traditional medicine for general curative healthcare, women could consult TBAs for problems relating to reproductive health. The communities interviewed understood that a TBA was a government trained TBA, and health facility staff confirmed that trained TBAs were considered to be part of the formal health sector. Sometimes they were female traditional healers (who now hide their traditional medicine from health officials) and sometimes they were women chosen by the community to train to be TBAs. There were no untrained TBAs, but rather, "women who know how to deliver." These women delivered babies within the extended family but not outside it, because if something went wrong they would be blamed.

A woman had been chosen by Village 1 to train as a TBA but had never been called for training. The nearest TBA to Village 1 was two villages away, and women complained

about this distance. This TBA ran antenatal classes, as well as helping with deliveries. She also had remedies for stomach aches associated with menstruation and delivery, and two types of sexually transmitted diseases. She had been told by hospital staff that her traditional remedies were bad and should not be used. This TBA's waiting home had recently collapsed after it rained and she was concerned that the building she used for delivery would also soon collapse. Her main problem was getting grass for the roof, since the manager of the estate near where she lived had prohibited people from gathering grass.

There was no TBA in Compound 1 but there were two in Village 2. One of these TBAs had a newly built house in which to assist with deliveries. Prior to this, she visited people in their homes. She did not give antenatal classes, saying that she did not have the necessary equipment. The second TBA conducted antenatal classes and hoped to have a waiting home soon. Neither of these TBAs admitted knowing or using traditional medicines.

Antenatal Care

Antenatal care for women from Village 1 was available from the government clinic or the TBA described above. Those from Compound 1 and Village 2 could choose between the estate clinic or the district hospital, and those from Village 2 could also visit TBAs within the village. Several pregnant respondents had not yet attended antenatal care but said they intended to. Most women had attended some antenatal care at a clinic, hospital, or with a trained TBA, at some time, but it was difficult to ascertain whether they went for every pregnancy and how regularly they attended. Months five and six of pregnancy were the most common time for the first antenatal visit.

When asked which was the most important aspect of ANC, most women replied, being examined. However, receiving iron tablets was also said to be desirable, and women often reported disappointment at the low number of tablets given or the fact that they weren't given any. Women also remembered receiving nutritional advice at ANC and said that eating a varied diet including meat, vegetables, and fruit would produce a strong baby.

Delivery

The options for delivery outside of the home for Village 1 were the government clinic, the TBA, and a private clinic. Compound 1 and Village 2 had an estate clinic and the district hospital, and Village 2 had TBAs within the village.

The long distance between Village 1 and the government clinic and the trained TBA (neither of which had waiting facilities) was reported as the reason that many women delivered at home or whilst walking to one of these places. If they delivered at home or "on the way" they were assisted by a female relative, often one who was experienced in handling deliveries.

Women reported: "I myself delivered on the way to the hospital because the hospital is far;" and "even my daughter did the same thing, she delivered on the way;" and [what do you do next?] "we just come back home and we give whatever help we can."

If there were problems when delivering at home or on the way, the woman was taken to the TBA or clinic on a stretcher. If the TBA or midwife could not deal with the problem, they sent for an ambulance. The TBA used to be able to send a messenger to the nearby estate to telephone the District Hospital free of charge, but since a charge was recently introduced, one woman had died because no one had the money to pay. The government clinic that serves Village 1 used to have radio contact with the district hospital. However, this was not working at the time of the interviews and they had to depend on sending a messenger on foot or by bicycle to the hospital (a journey which took about one hour by four-wheel-drive vehicle). In addition, government vehicles were not allowed to drive at night, so such cases had to wait until morning.

A few women from Village 1 expressed concern at being treated by providers who were not "cold" (see Appendix III) but thought that perhaps "hospital people" did not have to follow that rule, since births at the health facilities were not more problematical than those at home.

The estate clinic did not have waiting facilities. Therefore, women from Compound 1 and Village 2 started to go there only after labour had started. They usually walked, but in an emergency, an ambulance could eventually be called. There was a waiting area at the District Hospital and some of the trained TBAs also had waiting facilities.

The estate and government clinics and the trained TBAs referred primigravidas, grandmultiparas, and women with previous complications to the district hospital for delivery. However, all nurse/midwives and TBAs who were asked about this reported women's fear of delivering at the district hospital and said many women returned to the clinic or TBA, or went home to be delivered by relatives rather than delivering at the district hospital.

They reported: "when you tell them, you should go to Thyolo District Hospital, they go home. We ask who is going to deliver your baby and they say their grandmother or the TBA. We ask them why, and they say the nurses are rude, I'm afraid I'll be slapped, and this and that. But, usually they don't go there."

Reports on how women were treated by estate clinic staff showed that while some nurse/midwives were appreciated, others were not, as follows:

- "Some are nice, some are not."
- "For example, most of the time, pregnant women were met with roughness, and the staff tended to threaten them and say that if they continued this way, they were going to send them to Thyolo Hospital. That's when we say this is a bad nurse. But there are some who care for us as if they are our mothers."

- "There is one particular nurse who is nasty. Sometimes she leaves you alone when the baby is about to be delivered. When it is born she comes back and scolds you for delivering in her absence. She says we should hold back until she comes back from wherever she is going. For example, I delivered my youngest child all by myself. This particular nurse went away just when the head was about to come out."

Nurse/midwives and TBAs reported a traditional medicine called "mwanamphepho" as contributing to problems with delivery. They said that this medicine was taken by the cupful by pregnant women either to bring on labour (especially if they suspected someone had used witchcraft to prevent them from giving birth) or to make a "fast and safe delivery." "Mwanamphepho" brings on fast and strong contractions, often before the cervix has dilated sufficiently. This was reported as causing ruptured uterus, as well as extremely painful deliveries. Nurse/midwives also said it led to women being too exhausted to push by the time the cervix had dilated.

The nurse/midwife interviewed at the estate clinic estimated that over 50 percent of women used "mwanamphepho." Nurse/midwives and TBAs admitted "scolding" women to get them to say whether they had taken mwanamphepho, since most deny it: "They know that we shout, we don't accept it." And, "You ask them how many teaspoonfuls of "mwanamphepho" they have taken, usually they deny it, they don't agree, but we force them."

Although the practice of taking "mwanamphepho" was thought to be dangerous, and those assisting women to deliver needed to know whether it has been taken, the attitudes revealed in the above quotations from the nurse/midwives are indicative of the roughness and rudeness described by women.

However, despite problems of long distances (for Village 1), imperfect referral systems, complaints about treatment by nurse/midwives, and some concerns about the "hotness" of health facility staff, women reported that it was better to deliver at a health facility or with a TBA because there was more chance of help if there was a problem. The help given by "hospital people" when there was a difficult delivery was often referred to as "widening the way". It was not clear whether this referred to forceps delivery, caesarean section, or both.

Sources of Health Information

As mentioned above, in Village 1, people tended to consult about health problems within the extended family and in Compound 1, with friends and neighbours. Spouses also consulted together about illnesses and, unless the husband could not be reached, the husband's permission was needed before health treatment was sought. Consultations, during which people exchanged information on where they had gone for treatment, what medicines they took, and what was effective, seemed to be the most influential source of health information influencing health-seeking behaviour.

In Village 1, five cases said their household owned a radio and an additional household used to own a radio until it had been recently stolen. In Compound 1, five cases reported owning radios (with two of these owning two radios). One said their radio had been stolen recently and two other cases said they heard radios but did not have their own. A few respondents said that the batteries were low and they could not afford to buy new ones at that time.

In Village 1, there was a major difference between men and women in health information obtained from the radio. Women generally felt themselves to be too busy to pay attention to health messages on the radio and reported that it was mostly men who listened to them. This was validated by the observation that during interviews men were much more likely to mention health messages they had heard on the radio than women. In Compound 1, this difference between men and women was less obvious and women also mentioned messages they had heard on the radio.

All women interviewed had seen posters at antenatal clinics or under-5 clinics and most could describe posters and/or give the underlying message. However, many said they did not pay attention to them, especially if they were ill or were looking after a sick child.

One woman reported that a poster showing a woman overwhelmed with many children had inspired the women to make up a song. Villagers offered to sing songs in honour of our visit, and one woman described the health talks in the compounds as no good because there were no songs. Songs seem likely to be a popular way of getting health messages to women.

The Illness, “Lack of Blood”

Chechewa Translation of Anaemia

Health providers translate anaemia into Chechewa as phrases describing quantity of blood and iron tablets are described as medicine for increasing blood, as follows:

- magazi osakwana = insufficient blood;
- wochepea magazi = little blood;
- kusowa magazic= lacking blood;
- mankhwala a magazi = medicine for blood; and
- mankhwala o onjezela = medicine for increasing blood (iron tablets).

Village 1

In Village 1, "lacking blood" was recognised primarily as a wasting disease. Lack of food was given as the cause of lack of blood by the vast majority of respondents, and phrases such as "food is blood" were common. Tsempho was also thought by most respondents to lead to lack of blood because of the loss of appetite and the water lost through diarrhoea. Water loss through diarrhoea was thought to lead to lack of blood, with people using the phrase "water is blood". Water loss through sweating was also cited when people talked about how hard work could lead to lack of blood, and people described how, when they worked, they could feel the life (meaning blood) leaving their bodies. Several respondents from this village told us they felt they themselves were lacking blood because of lack of food and too much hard work. Any long illness was also thought to lead to lack of blood and fever was thought to dry up blood. No respondent said that sorcery could directly cause lack of blood, but most said that sorcery could cause illnesses which would lead to lack of blood. Loss of blood at delivery was mentioned rarely but was acknowledged when prompted. Symptoms of lack of blood in Village 1 focused mainly on swelling. Weakness, faintness, and heart palpitations were mentioned by a few, and pallor was rarely mentioned.

Compound 1

In Compound 1, lack of food was reported as an important cause of lack of blood but was not mentioned as frequently as the major cause as in Village 1. Frequent deliveries were commonly mentioned, as were AIDS, malaria, and high temperatures, with a few women mentioning breastfeeding and pregnancy. Lack of the right kind of food, rather than just quantity, tsempho, and sorcery were also mentioned. Worms, snakes of the stomach, bilharzia, and the belief that lemons dry up blood were mentioned, but infrequently. A greater variety of symptoms of lack of blood were mentioned in Compound 1, with dizziness, weakness, heart palpitations, and pallor being mentioned much more frequently than in Village 1.

Village 2

In Village 2, lack of food was mentioned first as the cause of lack of blood, but malaria, illness (especially frequent), heavy work, and frequent births were also mentioned. As for Compound 1, the symptoms mentioned included, heart palpitations, pallor, weakness, faintness, and swelling.

All Communities

In all communities, removal of blood for transfusions and hospital tests was also described as a cause of lack of blood.

Without probing, respondents in all communities tended to describe severe lack of blood but on probing recognised different levels of severity according to the severity of symptoms.

Treating “Lack of Blood”

Transfusions were mentioned as the treatment for severe “lack of blood.” Many related stories of relatives needing transfusions, blood they had donated, and hearing requests for blood on the radio. Several respondents mentioned transfusions in the context of blood loss after delivery.

In Village 1, food was the most frequently mentioned treatment for less severe lack of blood, with "vegetables and tomatoes" being the most commonly mentioned food for increasing blood. Coca cola was also bought to increase blood. Iron tablets were mentioned rarely as a treatment for lack of blood, and men and pregnant women were much more likely than others to mention them. However, at the end of several interviews, women said they felt they were lacking blood and asked for iron tablets.

In Compound 1, food was also frequently mentioned as a way of increasing blood, but respondents described a greater variety of fruits and vegetables and several mentioned eggs and meat. There must have been a recent health education programme advising people to eat three food groups as this was frequently mentioned. Coca cola was also commonly used to treat lack of blood, with many respondents reporting that health care providers had advised them to get coca cola after delivery and to take iron tablets with coca cola. Iron tablets were much more frequently mentioned as a cure for lack of blood than in Village 1, and again, there was some indication that men and pregnant women were more likely to mention them. However, unlike in Village 1, respondents did not ask interviewers for iron tablets.

All respondents asked about traditional medicine said there was none for increasing blood. However, there were medicines for treating underlying causes (such as tsempho), and diviners could be consulted if a disease causing lack of blood was thought to be due to sorcery.

In all communities, the idea of treating lack of blood was mentioned, but the idea of prevention was rare. One TBA and one women from Compound 1 mentioned taking iron tablets "to protect themselves" and to keep themselves strong, and two men from Village 1 reported buying iron tablets to keep themselves strong.

Iron Tablet Supplementation for Women of Reproductive Age

Supply

Village 1 - Community

Sources of iron tablets for women in Village 1 were the government clinic (during ANC and curative) and the nearest TBA (during ANC), and buying from grocers, mobile salesmen, and markets. The majority of women who had attended ANC mentioned the government clinic as the place they attended.

Currently pregnant women reported receiving between two and eight tablets per visit, although one of these said: "These days, it's not common to find tablets at the clinic." Another of these women complained about the number given and told the interviewers that many women and children were dying of lack of blood after swelling.

Women reported getting between 7 and 11 tablets during their previous pregnancy. If the clinic had run out of supplies, they were given an alternative date to come back. Many of the nonpregnant women complained that they were not given iron tablets outside pregnancy, even though they felt they needed them because of a lack of food and hard work. There were also some complaints that the TBA would not give iron tablets to nonpregnant women. Almost all pregnant and nonpregnant women in this village said they had not had to buy iron tablets. Only one reported buying them for her child. Two of the men interviewed in this village bought iron tablets to help keep themselves strong.

Village 1 - Providers

The lack of supplies at the government clinic near Village 1 was confirmed by the medical assistant. He reported that he had not been given sufficient supplies for the size of population and frequently runs out of many drugs before new supplies arrived. He receives four tins of 1000 tablets per month, of which he uses two and gives two to the maternity ward. Even if he requests extra supplies, the amount given is less than that requested and he still does not have enough. He gives less than the required dose of medicine to try and make supplies last. When they run out, he writes what is needed on a slip of paper so that people can go and buy it. He mentioned that AIDS was big problem in the area, but that he did not tell people when he suspected they had AIDS. Rather, he sent them home with iron tablets. He thought that even if he told them they had AIDS, they would still think it was witchcraft.

The TBA confirmed that she gave out iron tablets to women who came to her ANC sessions. She gave women nine tablets every other week during pregnancy and ten to be taken after delivery. (She was dealing with the last of a group of 20 women who she had seen through from pregnancy and to delivery.) She was given the iron tablets she requested from Thyolo Hospital, receiving two tins of 1000 each, approximately every six months.

The grocer interviewed did not sell iron tablets, but when first asked, described vitamin tablets as medicine for increasing blood. He did not give advice on how to take medicines or check what they were for.

Village 1 - Preferred Outlets for Iron Tablets

During interviews and the follow-up to the iron trials, respondents were asked their preferences for securing iron tablets. A supply that was more local than the clinic was unanimously preferred. The TBA was also thought to be quite far away but otherwise was recommended (although some women complained that they would not give out tablets to non-pregnant women). The headman was strongly favoured by many respondents who said that his being a man would not be a problem. However, other respondents were strongly opposed to this idea, saying the headman would not be fair and would favour his family. The mobile clinic was favoured by a few people; some said they would buy tablets if they were sold cheaply at the grocers; while others reported they would still have trouble affording them or that grocers would not sell them at the low price.

Compound 1 - Community

Women in Compound 1 reported going to the estate clinic for ANC. Of the six pregnant women talked to about this, three had not yet started ANC. One of these said she would start at five months and the other at six months.

The other three pregnant women said they were getting between five and seven tablets per visit, and one of them also buying iron tablets (for around 10T) when she could afford them. Among non-pregnant women, the number of tablets given per visit during previous pregnancies was between four and nine. Several of these women reported that they were only given the tablets if they were ill. Some women in the compound seemed wary of buying iron tablets or getting them from TBAs, as they had heard they the tablets might be expired and feared they would poison them. One woman bought pills for 5T from a mobile seller when she felt she lacked blood after donating blood. (The hospital had not given her tablets when she requested them.)

Compound 1 - Providers

The medical officer explained that the policy at the clinic was to encourage good nutrition practices rather than dependency on iron tablets because of concerns about the sustainability of supplies: "We cannot depend on iron forever. The time will come when it won't be available. If they get addicted to this thing ..."

The medical officer said there had been a problem with the supply of iron tablets but at the time of the interview, were getting some supplies directly from Central Stores, which eased the problem. He mentioned giving iron tablets to AIDS patients and those with

malnutrition, both of which he reported were common problems in the area. The nurse/midwife described how the women who attend ANC at the clinic were given nutritional advice but could not always afford to take it.

For example, the nurse/midwife said: "If you tell them eat vegetables, meat, they say - I can't afford, but if you can give me some medicine ...". And, a female respondent reported: "They know that even when we give this person medicine she doesn't have enough food in her box. They give one of those red pills."

The nurse midwife was very pleasant and helpful throughout the interview but avoided the question on the number of iron tablets given. Eventually, she said that women were given 28 pills on their first visit, but were only given pills on subsequent visits if they showed pallor or reported symptoms of lack of blood.

The grocer interviewed in Compound 1 did not sell iron tablets. She was very nervous during the interview and directed the conversation to malaria whenever questions were asked. (She illegally sells penicillin.)

Compound 1 - Preferred Outlets for Iron Tablets

When asked about preferences for the supply of iron tablets, the majority reported that they would prefer the compound watchman to distribute them. Many seemed to be vehemently against distribution by the Health Surveillance Assistant (HSA), although he was favoured by a few. However, there were some suggestions that those in the compound feared the watchman and that in the long term he could not be trusted to distribute them fairly.

Village 2 - Community and Providers

In addition to the estate clinic and the district hospital, pregnant women can also get iron tablets from trained TBAs. Both TBAs interviewed gave iron tablets to pregnant women, even though one of them did not conduct antenatal sessions. The TBA who did not conduct ANC gave 10 iron tablets to pregnant women who come to her. However, it was not clear how regularly women visited her and whether they visited her instead of going to ANC elsewhere. This TBA also reported giving tablets after delivery if the women had lost a lot of blood. She used a tin of 1000 tablets each month. The other TBA, who did antenatal sessions, reported giving women 21 tablets every other month between months 4 and 8, and then, 7 tablets every other week in the ninth month. She also gives women nutritional advice. She was not asked about the number of tins she used, and did not mention any supply problems.

Leakage of Iron Tablets from the Health Sector

Several respondents mentioned buying iron tablets from mobile salesmen, markets, and grocers. The medical assistant at the clinic closest to Village 1 also commented on the fact that he saw a lot of medicine for sale at markets, while his clinic was so short of supplies. Therefore, one of the research assistants visited a few hawkers and grocers in the two main towns in the district to ascertain what was for sale.

In one town she tried six hawkers and found two of them sold iron tablets for 10 T per tablet. She bought some of these tablets and found that they were taken from a UNICEF tin. She also noticed that the expiration date was three months past, but the hawker reassured her that there would be no problems up to seven months after the expiration date. She was advised to take two tablets three times a day. The research assistant asked the hawker if he could give her a full tin and he replied that although he did not have one today, he could help her. She also tried two grocers and found one of them had iron tablets. The medicine was hidden in a bag under the counter but the research assistant could see that all the medicine was in bags used for outpatients at government hospitals. The iron tablets sold looked the same as those sold by the hawker. In the second town the research assistant tried four hawkers but all said they were out of stock.

Another example of leakage was reported by one respondent in Compound 1, who mentioned that she had been given iron tablets by her sister whose husband was a medical assistant at a clinic.

Table 2. Results of Iron Trials in Village 1 and Compound 1

Village 1		10 given, visited 7 days later			Older Women			
Feels lack of blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
Yes (prior to trial)	Yes	4	2 per day		knees and ankles less stiff & heart stopped beating as fast		when she goes to hospital they don't give them to her	headman free (1) headman 5T (2) grocer 5T (3)
Yes (retrospectively)	Yes, but gave 1 to husband	4	1 per day after lunch	none	gaining strength	husband wishes we had given him some neighbours also wished they had been given some	would love to get even more, hospital is far and only place people can buy them is the market	headman free (1) grocer 5T (2)
	No	0		made body ache so gave them to people who wanted them				
	Yes	3		none	can see a change, but skin problem is still there		didn't understand question	TBA - if in village & reliable stock grocer - a problem because of lack of money headman - no, emphatically

Table 2. (cont'd)

Pregnant Women								
Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
Yes (retrospectively)	Yes	2	1 per day after a meal	- one day got heart palpitations - didn't feel like eating anything afterwards	None	Neighbours told her "the government wants to reduce its people & therefore when you take the pills you are going to die"	ANC only gives 5 tablets per month would buy if she had the money	government clinic too far, mobile clinic rare and private clinics expensive prefer headman free (1) headman 5T (2) grocer 5T (3)
Nonpregnant Women								
No	Yes	4	on waking		felt weak on waking before but now wakes with strength		"pills rarely found unless one goes to buy at a private clinic"	grocer 5T
	No		was waiting to see how husband got on with his					
	Yes	0		"there is no such thing as being unhappy with medicine"	"I feel better now I think maybe it's these pills"		not given after delivery	prefer someone local but needs to be discussed at village level
	Yes		1 per day	none	feeling better		clinic too far	free from grocer

Table 2. (cont'd)

Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
Yes (retrospectively)	Yes	6 (as away in town for a few days)	1 per day after porridge		"I can see my body is physically fit"			TBA if in village and good stocks
	Yes but gave 3 to child	0	morning sometimes evening	none			"the clinic is far and it's definite that you cannot receive enough medicine"	not the headman
Yes (retrospectively)	Yes but gave 2 to child	0			feels fit (blood = life)	Neighbours complained that only some people received them	TBA won't give them to nonpregnant women	interviewers preferred grocer a problem because of lack of money "chief will not share properly"
Yes (retrospectively)	Yes but 3 to child	0	after lunch every other day	pains and weakness first day "felt a bit of a smell in my mouth"	feel fit	Husband was happy that she had received the tablets was told at the borehole that the tablets were FP but thinks it was jealousy	"have problems where to get them"	headman (1) a village elder
Yes (retrospectively)	Yes but gave 4 to daughters	0	1 per day after lunch	1st day had body pains and weakness but did not consider stopping taking them	feels fit and physically strong	Husband asked if she had been advised how to take them was also at borehole when people were saying the pills were FP	has bought in past for child	chief (1) mobile clinic (2)

Table 2. (cont'd)

Compound 1 Given 7 tablets visited 5 days later Pregnant Women								
Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
	Refused tablets			worried about taking pills without being examined		Husband told her "you are silly you didn't get the pills, in your state (pregnant) that's what you need"	asked us for pills when we returned for interviews	
	Yes	1		felt dizzy first day but then fine	sleep better stronger	Husband told her she was lucky to have been given the pills Neighbours wanted to know why they had been given pills and not everyone else		compound watchman preferred
	Yes	1	after breakfast		no change as getting at ANC anyway (thinks pills are helpful)	Neighbours looked at the pills and confirmed that they were iron tablets, they told her she was lucky to get them		
	Yes			none	none	told husband she had the pills but not the neighbours	couldn't tell	would be willing to buy because they are medicine
	Yes			nausea (but nauseous anyway)		Husband didn't mind her taking them Neighbours wanted to know on what basis the pills had been given		clinic except that they only give to anaemic women local people could not be trusted interviewers preferred

Table 2. (cont'd)

Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
Yes (retrospectively)	Yes	0	1 in the morning and 1 in the evening with water	worried about taking pills without being examined	have become strong	Husband was told about the pills	getting the pills especially from clinics "only pregnant women are given"	compound watchman "people will know the pills will be entrusted there" grocer - no because wouldn't know where or when he got the pills
Yes (prior to trial)	Yes (forgot on one day)	1	after breakfast or supper	none	none	Husband encouraged her to take them	getting medicine	watchman strongly against HSAs (would sell them) cant get them on demand at clinic
	Yes	3	each day after supper	"the medicine has the smell of blood but that didn't worry me because they are helpful and good"		did not tell neighbours	hospital people would not give them out on demand	compound watchman

Table 2. (cont'd)

Nonpregnant Women								
Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
	Yes			dizzy first day but then no problems	(looked better to interviewer - swollen feet almost normal)		access to pills	HSA preferred even though would have favourites and sell the medicine
	Yes			none	enable her to work better	told husband she had the pills		clinic no-one locally interviewers preferred
	Yes		before bed	first day couldn't get up	stronger and better			(as above discussed together)
Yes (retrospectively)	Yes	0	1 in morning 1 in evening	didn't like the smell	getting strength	Husband asked what the pills were for Neighbours said they would not have chatted with us on such issues	"they don't give us when we go to the hospital/clinic, it is rare"	HSA preferred
	Yes then stopped	4	1 per day	stopped taking tablets because felt weak & knees and ankles shook		Husband asked what the pills were for did not tell neighbours	"they don't give them at the clinic"	HSA as "they can be trusted" (1) the watchman (2)
	Yes but offered them to husband	1	before breakfast	made her hungry worried to take pills without being examined	less dizziness and gaining strength	Husband didn't take pills although offered them Neighbours wished they had been given some	"pills are not easily found" "one can't easily get the pills at the clinic/hospital"	HSA as it would be convenient

Table 2. (cont'd)

Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
	Yes	3	one in the morning and one in the evening after meals	none		Husband asked what the pills were for did not tell neighbours	getting pills	compound watchman most preferred grocer least preferred
No (prior to trial)	Yes	3	1 per day	heart palpitations 1st day even though pills taken after supper		Reported that 2 neighbours given the pills were not going to take them because they were worried	people not given tablets unless sick (this person previously very adamant that should only take tablets if lacking blood)	
	Yes	1	after breakfast (or supper if forgot)	overslept 1st day after taking tablets night before at first was hesitant to take the medicine as thought it was bad			not enough pills given, 7 on first ANC visit only	
No (prior to trial)	Yes but gave some to child	1	after breakfast (or supper if forgot)	no problems	body no longer weak and dizzy in the mornings	Husband encouraged her to take them		"give them to the compound watchman rather than the hospital people"
No (prior to trial)	Yes	1	after breakfast	none	none	Husband encouraged her to take them		

Table 2. (cont'd)

Feels lack blood?	Took tablets?	No. tablets left	When & how tablets taken	Negative aspects of taking tablets	Positive aspects of taking tablets	Comments by husband or neighbours	Problems with taking more tablets	Preferences for provision of tablets
	Yes	2	1 each day after lunch	heart palpitations and a slight smell		<p>Husband asked to see the medicine then didn't say anything</p> <p>Neighbours told her it was medicine to make her barren</p>	can't get on demand at hospital	compound watchman best

Compliance

Questions on compliance were asked during case interviews. In addition, iron trials were undertaken with the specific aim of eliciting information on compliance. The results of the iron trials in Village 1 and Compound 1 are shown in Table 2.

Village 1

During case interviews, women were asked about iron tablets taken during the present or previous pregnancy. All women said they had taken the iron tablets given to them, even though one of them said she had not taken Fansidar when given it. The dosage recommended was one or two tablets per day, with two being slightly more common.

The women reported the following:

- One of the nonpregnant women said she was advised to take the pills with coca cola.
- One of the three pregnant women commented that the pills were helpful.
- Of the seven nonpregnant women, four said the iron tablets make them feel better.
- One nonpregnant woman said she was told that the pills would stop her losing a lot of blood at delivery.
- Another had been told that at delivery she would only lose the blood increased by the pills.
- Two of the nonpregnant women mentioned that they suffered from nausea when taking the pills, although one said she did not suffer the side effect when she took the pill with food.
- Two of the nonpregnant women mentioned that they did not share their tablets because they were given an exact dose.

In Village 1, ten women of reproductive age (one of whom was pregnant) and four older women, took part in the iron trial. The pregnant woman had taken one tablet a day, despite having heart palpitations the first day she took them and loss of appetite thereafter. Neighbours had tried to warn her about taking the pills by saying that they were being used to kill her. She was only given five tablets at ANC and would have bought more if she had the money.

Among the nine nonpregnant women of reproductive age, only one had not taken any pills, as she was waiting to see how her husband (who had also received pills) was doing. Four of the other women shared some tablets with their children. Of the eight nonpregnant women who had taken pills, two reported side effects on the first day, but seven made positive comments about how they felt. Of the four older women who took the pills, three reported only positive effects. One reported that her body had ached so she had given the tablets away to those who wanted them. Reported comments by neighbours included complaints that they had not received pills.

Although the vast majority of women said that they took the tablets they were given, one of the husbands interviewed said that some women did not take the pills because they

caused drowsiness, headaches, and nausea. This husband often listened to the radio and was one of the few in Village 1 to list frequent births as a cause of lack of blood. The same man also thought it was possible to become addicted to iron tablets.

The medical assistant at the clinic nearest to Village 1 said that women like iron tablets: "They are keen, they are keen, ... and they say they need more."

Compound 1

During the case interviews with women talking about their present or previous pregnancy, no one reported not taking the medicine. The women reported the following:

- Among the three pregnant women who had started ANC, one was very enthusiastic about iron tablets and said she bought pills when she could afford to and another said that the pills helped with palpitations and faintness. However, the latter woman also said that if one took the pills when they were not ill, it led to a problem.
- Two of the eight nonpregnant women mentioned that the pills protect the baby (increase the blood for two lives).
- One nonpregnant woman mentioned feeling stronger when she took the pills.
- One nonpregnant woman reported feeling weak when taking the pills, so took them in the evenings.
- Five of the nonpregnant women mentioned that it was bad to take pills if not lacking blood because of "spoiling the blood or getting too much blood." One of these was very adamant and felt she had lost a lot of blood at delivery because she had taken iron tablets during pregnancy.
- Two of the nonpregnant women mentioned that the dose of iron tablets they received was specifically for them.

In this community, different coloured iron tablets were mentioned. The usual tablets were red or pink but some women had experience with khaki tablets. For both cases that mentioned the khaki tablets, there was a debate between women about whether both tablets were the same or whether the khaki ones were only for nonpregnant women.

Twenty women were followed up for the iron trial in Compound 1, eight of these were pregnant. Two other women given the pills were reportedly avoiding the interviewers because they had been too worried about the pills to take them. One of the pregnant women refused to receive the iron tablets saying that she had heard health messages on the radio that warned against taking medicine casually. However, her husband told her she should have taken the pills, and when the interviewers returned for the follow-up interviews, she requested some pills.

All the other pregnant women said they had taken the pills. Two women reported minor side effects and two reported feeling better; one pregnant and two non-pregnant women reported being worried about taking the medicine without being examined; and one of the 12 nonpregnant women stopped taking the pills because of side effects. However, the others said they had taken their pills despite side effects.

Some husbands encouraged their wives to take the pills; some neighbours were envious of the women receiving the tablets; and some women were told by neighbours that the pills were being given to make women barren. No sharing of pills was reported although one nonpregnant woman had offered one to her husband (he refused it).

There was some concern about the validity of the data collected during this iron trial. The belief that iron tablets shouldn't be taken if a person has enough blood was common in the Compound, as were concerns that tablets should only be taken after an examination and were given as an exact dose. Despite these concerns, only one woman refused the tablets and three did not take the tablets they were given.

Even one young woman who had been adamant about not taking pills if not lacking blood, received the pills and reported taking them. When questioned about this inconsistency she said: "Of course I cannot refuse a thing I've just been given freely! Suppose somebody has given you something, are you going to refuse it? Suppose someone gives you a chitenje (wrap), are you going to refuse it just because you have another chitenje?"

However, despite doubts about the validity of the data, the health providers confirmed the popularity of the tablets. When asked if women like iron tablets, the medical assistant at the estate clinic said: "Generally they like it. Some people come and ask for pills. So far, I never came across anyone refusing to take it." (He has women swallow the tablet in front of him because he is worried about sharing of pills.)

When the nurse midwife at the same clinic was asked if any women told her they wouldn't take the iron tablets, she reported: "No, I haven't heard that but when we were giving Fansidar, they were reluctant."

When asked if any side effects of iron tablets had been reported to her, she replied: "I think they seem to like the tablets."

Village 2

In Village 2, dizziness and palpitations were mentioned when iron tablets were discussed. However, women also reported feeling better and one had bought iron tablets. In one discussion, women reported that older women advised pregnant women to take iron tablets. Fears about getting too much blood and the belief that iron tablets were given in an exact dose were common.

The TBA in Village 2, who gives out iron tablets but does not run ANC sessions, said that women asked her for the pills and often came when she had run out. She said that women were happy with the red pills but had complained about the khaki ones. She thought that if women shared their iron tablets they would be too afraid to say so. The other TBA said that sometimes she could tell by the way that women received tablets that

they were not happy to take them. She said that the women often denied this but that their friends revealed the truth. She advised women who were reluctant to take the tablets to take them after food and found that this solved the problem. She also reported that women didn't like the grey iron tablets but were generally happy with the red ones. She said: "They talk (i.e. badly) about the contraceptive pills. They praise ferrous."

This TBA thought that a person with enough blood would not take iron tablets. She diagnoses lack of blood on the basis of pallor of eyes, palms, and tongue and reports of weakness, heart palpitations, tiredness and faintness.

The pregnant nurse/midwife who had recently moved from another district of Malawi and was working in a town clinic at the time of the interview, could not tolerate iron tablets during pregnancy, so took folic acid instead. She thought that if women experienced severe side effects during pregnancy it would be preferable to give them iron after delivery. In the district where she used to work she estimated that around 1 in 20 women complained of side effect. Her experience giving and taking iron tablets was very different than the other providers.

The Illness, "Too Much Blood"

In Compound 1 and Village 2, the illness of too much blood was a commonly mentioned concern. Taking iron tablets, if not actually lacking blood, was seen as a problem with phrases such as, "It's impossible to take iron tablets, and yet, you know you have enough blood!" being common. Too much blood was said to activate dormant diseases in the body.

One person said that sweating is a symptom of too much water in the body. One woman in Village 2 mentioned asthma as a disease activated by too much blood and another said she had developed heart disease because of having too much blood. The mention of heart disease raised the question of whether people were referring to high blood pressure as "too much blood." Medical personnel use a phrase translated as "blood running too fast" to describe high blood pressure, but it seems likely that people are confusing the two.

Other Interventions

This qualitative study of constraints to reducing anaemia in women of reproductive age was conducted prior to a hospital based study aimed at obtaining an idea of what was causing anaemia in the study area. The qualitative study, therefore, was based on the premise that iron deficiency would be a major cause.

Data on possible constraints to iron supplementation are provided above. This section briefly considers the constraints to improved diets, use of iron cooking pots, and malaria prophylaxis.

Nutritional Advice

The diet at the time of year of the interviews (October/November) consisted mainly of:

- Breakfast: Tea, maize porridge or nothing
- Lunch and/or supper: Processed or unprocessed maize alone or with a green-leafed "relish," which sometimes had tomatoes added. Small fish or beans were sometimes used as relish. Meat was consumed rarely, if at all.
- Outside main meals: Mangoes

Respondents in Village 1 reported that food could increase blood. The most commonly mentioned combination of food for increasing blood was vegetables and tomatoes. In Compound 2, the range of fruits and vegetables mentioned was wider and many people mentioned that it was good to eat food from the three food groups. However, money and food were reported to be in short supply. Tea estate workers were on minimum hours or short weeks, because it was the low season for tea picking and villages had run out of food from the last harvest. Therefore, people could barely eat enough of the staple (maize), let alone eat what they thought they should.

Village 1 respondents reported: "We always like to change from one food to another but we can't do that because we don't have money." And, "During harvest time it's easy to find food but during this time it's difficult to find food (maize) as well as relish."

Compound 1 respondents reported:

- "During the rainy season, vegetables such as pumpkin leaves, green jala, and leaves of cowpeas are easy because we grow them ourselves. But, this time they are expensive. For example, we are buying two leaves of pumpkin at 20 Tambala and rape, two leaves at 50 Tambala."
- "Like this time. It's difficult to find food because it's expensive. For example, maize is going at 2 Kwacha, 50 Tambala per Kg and the salaries are very little, and that maize lasts a few days only, and after ... problem, problem."
- "I don't eat fish and meat. The last time I ate meat, was last year."

There were some indications that when there was meat it went to the husband. Women mentioned that when they marry they are told to cook the food the husband likes. A couple of women mentioned that men prefer meat to vegetables, and one woman said that it was easier to give a small portion of meat to the husband than to divide it up. Giving the last piece of meat to the husband so he knew it was finished seemed to be a widespread practice. Apart from this, women said that the food was divided equally.

Use of Iron Cooking Pots

Throughout the study area aluminium and clay cooking pots were used. Therefore, there was potential for increasing iron levels in the population through the introduction of iron cooking pots. The acceptability of iron cooking pots was not investigated and no local supplies were known.

Malaria Prophylaxis

Especially in the tea estate compound and Village 2, malaria was known to be a cause of "lack of blood" and to be dangerous to unborn babies if occurring in pregnant women. Reports of what happen at ANC suggest that malaria prophylaxis was not routine. Information on compliance was not deliberately collected but in the course of collecting data on iron tablets in Compound 1, one nurse/midwife mentioned that women were reluctant to take Fansidar and one woman said she had not complied with taking it.

CONCLUSIONS

The Illness, "Lack of Blood"

Anaemia is defined by haemoglobin levels and it is not easily diagnosed by signs and symptoms, even by trained clinical personnel. However, the causes, symptoms, and treatment mentioned by men in Village 1 and men and women in Village 2 more closely fit the accepted clinical picture of anaemia than those mentioned by women in Village 1. Cough, malaria, and diarrhoea leading to wasting and death were seen as serious illnesses within the study area.

AIDS was mentioned in Compound 1 and Village 2. Wasting was more obviously associated with lack of blood in Village 1. These diseases are believed to be caused by sorcery and breaking rules of sexual behaviour and women's cleanliness, as well as biomedical causes.

Summary

Knowledge of causes of anaemia, especially those specific to women and not related to wasting, and symptoms other than "thinness and swelling," is poor amongst those with relatively little contact with health messages, such as those living in the villages, especially women.

Compliance

Women's beliefs about the cause of lack of blood in Village 1, combined with difficulties obtaining enough food and the need to work hard on the land, translated into a strong demand for iron tablets. This demand was not so obvious in Compound 1 and Village 2.

In Village 1, pregnant women were more likely to mention iron tablets as a way of treating lack of blood than nonpregnant women. Other than this, there was no obvious difference in attitudes to the tablets, compliance, or side effects between pregnant and nonpregnant women.

People in Village 1 mentioned fewer concerns about taking iron tablets than those in Compound 1 and Village 2. The concerns expressed included terms for too much blood, only taking tablets after examination, and being given an exact dose. Three women in Compound 2 did not comply with taking the tablets in the iron trials because of these concerns. It seems likely that a recent radio campaign about not taking medicine casually could be responsible for this, as could the fact that the estate clinic only gave iron tablets to women diagnosed (on the basis of pallor or reported symptoms) as anaemic.

Side effects were reported by women in both communities, and tended to be more common on the first day of taking the tablets. Only one woman in each community admitted to not taking the tablets in the iron trials because of side effects.

Apart from the five women mentioned above, all women said they complied with taking iron tablets. Some from Village 1 admitted sharing pills with children, whilst, apart from one woman offering tablets to her husband, no sharing was admitted in Compound 1.

Benefits of taking iron tablets were talked about in terms of the woman feeling better and stronger. By the belief of “walaza,” this would also lead to a stronger child. Benefits to the unborn child from taking iron tablets were rarely mentioned, although it was recognised that lack of blood in the mother would affect the child.

The majority of those interviewed regarded iron tablets as a cure for lack of blood, rather a preventive measure. However, women seemed to accept that they were slightly lacking blood when pregnant, and that they needed to increase their blood because they needed enough for “two lives.” “Increasing blood” to mitigate against the blood lost at delivery, was also mentioned as a reason for taking iron tablets either during pregnancy or after delivery.

Providers in all communities confirmed the popularity of iron tablets.

Summary

There is a demand from all sections of the community for iron tablets to help against wasting (regardless of the cause). Food was viewed as the primary way of imparting health to the mother and child. However, most members of the community recognised the benefits of iron tablets to the mother, and therefore, the child, in terms of treating slight lack of blood due to pregnancy, increasing blood for “two lives,” and mitigating blood lost at delivery.

In communities with a higher exposure to health messages (through radio and contact with providers), concerns were raised about iron tablets inducing the illness “too much blood,” taking iron tablets without an examination, and not taking them as an exact dose. There was a more liberal attitude to getting and taking iron tablets, as well as more sharing in communities that do not have these concerns.

There was some evidence of non-compliance due to the above factors, as well as side effects. However, in general, women and health providers confirmed the popularity of iron tablets.

Supply

When women from either community were asked what stopped them from taking more pills, the unanimous answer was that obtaining the pills was the problem. For example:

- In Village 1, the distance to the health centre, the small number of iron tablets given at ANC, and erratic supplies were cited as the main problems.
- In Compound 1 the low number of tablets given at ANC was cited as a problem, along with the fact that only women assessed as having anaemia were given tablets on subsequent visits. This policy likely contributed to the concerns about iron tablets described in the paragraph above.

Health personnel at the clinic closest to Village 1 confirmed the low number of tablets given at ANC, as well as erratic supplies. They said they were not given enough iron tablets or other drugs for the population they served. They thought this problem was common throughout Malawi and that there was some leakage of drugs onto the market.

Health personnel at the estate clinic which serves Compound 1 said that although they had previously had supply problems, they had overcome them by obtaining supplies directly from central stores. They confirmed the policy mentioned by women, of only giving iron tablets to all women on first visit, although there was some discrepancy between the numbers they said they gave and the number women said they received.

Medical assistants at both clinics reported giving iron tablets to those they suspected had AIDS or malnutrition. Given the extent of these problems in the study area, a significant proportion of iron tablets was likely to have been utilised in this way.

There was a government trained TBA two villages away from Village 1 and at least two trained TBAs in Village 2. All three supplied iron tablets to pregnant women. None mentioned supply as a problem.

A very brief preliminary inspection of hawkers and grocers indicated there was some leakage of iron tablets onto the market.

Women mentioned starting antenatal care around the fifth or sixth month of pregnancy, but it was difficult to assess how regularly they actually went.

Women in both communities were asked about preferences for distribution of iron tablets. Most wanted more local supplies, but local distributors such as the headman in Village 1, the Compound watchman, or the health surveillance assistants in Compound 1 proved controversial. Tablets being sold at a low price by grocers was viewed positively.

but with reservations about the ability to afford them, by some respondents in both communities.

Grocers showed a lack of knowledge about anaemia, iron tablets, and giving appropriate advice when people buy medicines.

Summary

All sections of the community, as well as pregnant women, felt the main barrier to taking more tablets was obtaining the them. Pregnant women were not given iron tablets at every ANC visit, and when they were given tablets, the number was low. This was due either to inadequate stocks, or the providers' policy.

Possible reasons for inadequate stocks for providers include inadequate supplies to the country as a whole, leakage into the market somewhere along the chain of distribution, and provision of tablets to large numbers of individuals suffering from malnutrition and AIDS. It is also likely that providers adjust their policy for giving out iron tablets according to the stocks they assess they can rely on.

The idea of increasing coverage by introducing additional local outlets was popular but there was controversy over who and what the additional outlets should be. If tablets were sold at a low price (e.g. 5 T) and advertised as such, more people than at present would likely buy them. Grocers have a low level of knowledge about anaemia and iron tablets. If health providers increase the number of iron tablets given out at ANC and for curative purposes, then the demand for purchased tablets may decrease.

Influences on Health Care Decisions

Decisions about health care are made through consultation among spouses and extended family members in Village 1 and consultation with neighbours in Compound 1. The husband usually had to authorise the final decision and payment. However, especially in the villages, considerable pressure could be put on him by the wife's family.

There were reports of nurse/midwives beating and scolding of women at delivery, as well as threats to some of the respondents about the information they were giving us. This attitude likely also discouraged women from attending health facilities. It was also indicative of the lack of a sympathetic relationship, where women could easily discuss side effects of medication.

Men in Village 1 and men and women in Compound 1 were more likely to listen to health messages on the radio than women in Village 1. Posters containing health messages were observed but described passively, while songs, both general and about healthcare, were described enthusiastically.

It seems likely that because of the distance from the government clinic near Village 1 and the erratic drug supplies, that people in Village 1 had less contact with the formal health centre than those living in Compound 1 or Village 2.

Summary

Decisions about health care were made by the family, rather than individuals. Men controlled the finances for purchasing treatment. Women were sometimes treated unsympathetically by nurse midwives. The difference in exposure to radio health messages and contact with health providers was associated with differences in knowledge about anaemia and iron tablets, as well as concerns about iron tablets. Men in the villages (through radio) and residents on or among the tea estates (through radio and contact with health personnel) had a higher exposure to health messages. This resulted in both more concerns about iron tablets and increased knowledge about maternal anaemia. Songs were likely to be a popular mode of communication for health messages.

Nutrition

Nutritional advice was favoured by the estate clinic as a method of reducing anaemia and women were advised to eat a varied diet including vegetables, eggs, and meat. Other health advice included a varied diet (three food groups). Women said they tried to follow this advice but could not afford such a diet at the time of year they were interviewed.

The belief that coca cola increased blood was common throughout the communities. Although coca cola was roughly 10 to 20 times more expensive than iron tablets, it was purchased by more people for increasing blood than iron tablets. Advice from nutritionists was conflicted with regard to whether coca cola contains iron and/or whether it facilitates absorption of iron from tablets or food.

Lemons were believed to reduce blood, but it was not clear that lemons were available in the markets or how they were used in the diet.

Tea drinking did not appear to be common. Sweet tea seemed to be most commonly drunk as breakfast.

When available, a relish of green leaves was eaten with the main staple, processed or unprocessed maize. Sometimes tomatoes were cooked with these green leaves. The absorption of iron from such a diet was not mentioned either by the communities or health providers.

There were some indications that men were more likely to eat meat than women, when it was available to the household.

Summary

Women in the village had less knowledge of nutritional advice than those on the estate, but all cited poverty as the major constraint to a varied diet. Gender roles may also have been a constraint to a varied diet for women. No nutritional advice was found regarding methods for increasing iron intake from food, particularly the type of staple (maize) eaten in Malawi. The role of lemons in the diet is unclear. There is conflicting information on whether coca cola should be discouraged.

Iron Cooking Pots

Aluminium and clay cooking pots were used in the study area. The acceptability of iron cooking posts to increase iron intake and the closest sources for iron cooking pots were not investigated.

Summary

The introduction of iron cooking pots into the area may be a sustainable way of increasing iron intake but their acceptability and availability are not known.

Compliance with Malaria Prophylaxis

Malaria was known to be a cause of "lack of blood" and to be dangerous to unborn babies if occurring in pregnant women, especially in the tea estate compound and Village 2. Malaria prophylaxis during pregnancy was not routine. However, there was some evidence that compliance with taking Fansidar as a prophylactic was a problem.

Summary

If malaria prophylaxis with Fansidar during pregnancy is recommended as part of the intervention, there are likely to be problems with compliance

RECOMMENDATIONS

Constraints to Increased Iron Supplementation Through Tablets

Supply of Iron Tablets

The major constraint to increasing the number of iron tablets taken during pregnancy is the number of tablets provided at ANC. Research to answer the following questions is recommended:

- whether the number of tablets supplied to Malawi is adequate;
- whether leakage onto the market is occurring and at what level;
- how the number of tablets supplied to specific providers is decided;

- how providers make the decisions about allocating their supply of iron tablets to ANC; and
- how providers decide to allocate iron tablets to pregnant women.

During this research it will be vital always to validate the number of tablets the supplier reports giving as compared to the number received.

Additional Outlets for Iron Tablets

- No additional outlets for free iron tablets are recommended.
- The legitimacy of supply of grocers, hawkers, and travelling salesmen should be investigated.
- Legitimate supplies of iron tablets should be provided to local grocers to sell at a low price (5 T).
- The availability and safety of iron tablets bought from local grocers needs to be advertised.
- Concerns about obtaining iron tablets other than after an examination by a health provider need to be dispelled (see below).

Target Groups for the Supply of Iron Tablets

- If supplies are adequate, pregnant women should be given the WHO recommended dose of iron tablets.
- If supplies are adequate, women should be given iron tablets after delivery.
- If supplies are adequate, women should be offered iron tablets at child clinics and when they request them because they feel they are "lacking blood."
- If supplies are inadequate, supplies need to be targeted at women assessed to be anaemic. Methods for assessing anaemia should be made as accurate as possible.

Behavioural and Knowledge Objectives Relating to Iron Tablets

Recommendations focused on all members of the community include:

- Improve knowledge of causes, symptoms, and treatment of anaemia, drawing special attention to aspects related to women and pregnancy (especially for those with limited access to health care and messages).
- Emphasise to elders and husbands that they are fulfilling their responsibility for the health of the woman and the unborn child when they encourage women to go to ANC and to take their tablets (without sharing).
- Dispel worries about the disease "too much blood" by (i) reassuring people that if iron tablets are taken according to the doses specified, they are unlikely to cause illness, even if a person is not obviously anaemic, and (ii) clarifying that high blood pressure is not caused by taking iron tablets.
- Inform communities that iron tablets are not like other medicines and can be bought and taken safely without an exam by a health provider (assuming that supplies are legitimate and unexpired).

- Inform communities that iron tablets are available in grocers at a specified price, and that this source of tablets is legitimate and safe.
- Inform communities that while donating blood can lead to "lack of blood," giving small amounts of blood for medical tests is necessary and does not lead to "lack of blood."

Recommendations for pregnant women include:

- Visit health facilities or TBAs in the second trimester of pregnancy and thereafter, as requested by providers, to obtain iron tablets (assuming supplies are adequate and providers will give them out).
- Talk to providers about any side effects and obtain advice on how to minimise them.
- Take iron tablets in accordance with counselling given by providers, to increase absorption but minimise side effects.
- Understand that TBAs are part of the health sector in Malawi and that the tablets they give out are not more likely to be expired (and therefore, poisonous) than those given out at clinics.

The benefits of iron tablets for pregnant women should be discussed in the following ways:

- They make the woman and, therefore, the baby healthy and strong (rather than big).
- Pregnant women need to increase their blood for "two lives."
- Pregnant women often slightly "lack blood," (relating this to the "two lives" and the fact that women may not want to eat properly).
- Increasing blood during pregnancy makes up for the blood lost at delivery.

Recommendations for iron tablet providers (including TBAs) include:

- Give the WHO recommended dose of iron tablets to every pregnant woman at ANC, if supplies are adequate.
- If supplies are inadequate, providers should be advised on the optimal way of targeting iron tablets.
- Advise women when to return for their next visit and their next supply of iron tablets.
- Be sympathetic and empathetic with women's problems with iron tablets, pregnancy, and delivery.
- Make every effort to obtain adequate supplies of iron tablets.
- Maintain an awareness of how iron tablets are being distributed among different groups (e.g., pregnant women, malnourished people, suspected AIDS/TB sufferers etc.).

Health providers, TBAs, and Health Surveillance Assistants should receive refresher training on:

- the causes, effects, consequences, and treatment of anaemia, especially mild anaemia which may not be obvious from signs and symptoms;
- recognition of moderate/severe anaemia based on observed signs and reported symptoms;

- effective ways to communicate information on anaemia during group teaching sessions and in one-to-one counselling; and
- the importance of being approachable and sympathetic.

Grocers should receive training on:

- the causes, symptoms, effects, consequences, and treatment of different severities of anaemia;
- when appropriate, recommending iron tablets to customers;
- on answering customers' queries and concerns about iron tablets; and
- the relative merits of coca cola and iron tablets for increasing blood.

Recommendations regarding communication channels include:

- Radio messages are likely to reach men and communities of higher economic status.
- Posters at wage collection points could be used to reach men.
- Health talks at ANC sessions (given by nurse/midwives and TBAs) could reach pregnant women. (Colourful visual aids could be incorporated.)
- Songs in the waiting area for child clinics could be used to reach women of reproductive age. (Existing expertise in the use of songs for communicating health message could be utilised.)
- Health talks given by HSAs could be used to reach women of reproductive age. (Colourful visual aids could be incorporated.)
- Drama groups could be utilised in market places, at eating places for estate workers, and during health talks, to reach different sections of the community.

Constraints to Increased Iron Absorption in the Diet

Recommendations for addressing this include:

- More information on diet throughout the year should be combined with expert nutritional advice to ascertain the optimal and most feasible methods of improving iron absorption.
- Nutritional advice should emphasise that citrus fruits help the absorption of iron and that lemons do not dry up the blood.
- Expert nutritional advice is needed to reconcile conflicting information on whether drinking coca cola to "increase blood" should be encouraged or discouraged.
- Men should be targeted for nutritional education as they often take part in planning food purchases or purchase the food themselves.
- Men and elders should be taught about the importance of encouraging women, especially pregnant women, to eat a varied diet, more specifically, an optimal diet for improving iron absorption.
- Present education for women of reproductive age on the importance of a varied diet/one optimal for iron absorption for pregnant women and their babies, should be continued.

Constraints to Increased Iron Intake Through the Use of Iron Cooking Pots

Further research should be conducted to ascertain acceptability and supply constraints to the use of iron cooking pots.

Constraints to the Reduction of Malaria Through Malaria Prophylaxis

If malaria is found to be associated with anaemia in this community and malaria prophylaxis is recommended as part of the intervention, the steps outlined above to improve motivation and compliance with iron tablets will need to incorporate compliance with Fansidar.

APPENDIX I

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APPENDIX II

DATA COLLECTION INSTRUMENTS

Reducing Iron Deficiency and Anaemia in Women of Reproductive Age in Thyolo District, Malawi

Revised Interview Guide: Women + friends/relatives

Introduction to the project:

Say your name and where you are from.

We are here to learn from people about women's health in general. Project Hope is helping us do this work. We would like to speak to people about what they think about health and the care they receive. We would like to talk about things which concern people, but in particular, we are interested in knowing about medicine for adding blood. Everything we learn from people we will put together to have a complete picture, but no names of people or the villages we visit will be written down or talked about with anyone.

Beliefs/ideas/values & personal experiences:

What are the main illnesses that affect adult women here?

What are the main problems that a pregnant woman can have here? (list- ask about severity, symptoms, causes, remedy, possible prevention for each illness cited). If possible, ask if she or anyone she knows has ever experienced any of these illnesses- concrete narrative)

What should a woman do and not do when she is pregnant (work-related, food taboos, sexuality...)? What happens if she does not do this? Do women often follow these rules?

What are the rules that a woman should follow after the baby is born? (ask about timing, possible risks, specific care-taking, who is available to help the mother)

What illnesses can affect a woman after the birth? Have you ever heard of any women having this?

Can the types of food you eat affect your blood? How? Why? When? What are vitamins good for? How? Why?

Can you tell me about the different types of diseases relating to slightly decreased blood or lack of blood? What can cause a person to have decreased blood? (probe diet, mtsempho, other disease, sorcery etc.) How can you tell whether a person has decreased blood etc? How does a person who has decreased blood feel? What can a person who has decreased blood do to treat themselves? (probe traditional, hospital etc, do they mention iron tablets?) What can happen if a person who lacks blood or has decreased blood is not treated? If a pregnant woman has decreased blood can this affect the baby? How?

Can a person have too much blood? How can this happen?

Experiences with iron tablets:

What do they do in antenatal care here? (list things) What do you think is most important for a doctor or nurse to do for a pregnant woman? (try to get a hierarchy and see where iron tablets are placed)

Have you ever taken iron tablets, when, what for? Who gave them to you? Did they give you any advice on how to take the tablets? What did the tablets make you feel like? Have you taken different types of iron tablet? (if so how are they different and which is better? Why?)

Have you heard any stories about iron tablets? (probe for details, whether they are commonly believed etc).

Do you think iron tablets can help pregnant women? How? Why? Do you think iron tablets could help women who are not pregnant? How? Do you think it is better to take iron tablets during pregnancy or after delivery? If iron tablets are taken during pregnancy can this affect the baby?

Do you think iron tablets can help men, children? How? Why? (Probe whether woman ever under pressure to share tablets with husband, children etc)

What affect do iron tablets have on people who do not have decreased blood?

Do you know of any TBAs who supply iron tablets? Would you like to go to a TBA to get iron tablets? Have you ever bought iron tablets? Where? How much were they? Why did you buy them?

What is it that makes getting, taking iron tablets difficult for you?

Health care seeking and expectations:

Who helps you and your family when you are sick? What options do you have? When was the last time you went there? Were you happy with what happened? What could have been better?

What do traditional healers here do for women? When was the last time you went to one? Do traditional healers help pregnant, menstruating, breastfeeding women? How? What do TBA's do for pregnant, menstruating or breastfeeding women here? Do they help you after the birth? What do they do?

What makes a good doctor, nurse, health care attendant, traditional healer?

If she has not mentioned a clinic or health centre: how long does it take to get to your nearest clinic? How do you travel there? When did you last go? Were you satisfied with what happened there?

Other sources of health information:

Who do you talk to most when you have a question about your health or the health of one of your family members?

Do you ever listen to the radio - are there ever any health messages on the radio?

When you go to the hospital or health centre (if at all), are there any posters there? What do they tell you?

Home craft groups/church groups/HSAs - do they help with health at all? What do they say to people?

(If people mention family planning as one of the messages probe: stories about family planning, whether and why it is good, what men think)

Household structure and relations:

Kinship diagram (for about 5 cases just to get an idea) See who are the main people in her life and in what ways they interact with her.

Who makes decisions about where to go for illnesses, about medicines to buy, about foods to buy?

Main sources of income. Who in your family works on the estates? Does the woman work? Does she have to ask for money? If she works, does she have complete control over that money?

Who decides how much money is going to be used for what household items (including food)? How is this decided? Has it ever changed? When and why? Rank main household expenditures from most important to least important. What would you do if you had to choose between these items? What does your husband like to spend money on apart from household items? (beer? clubs?)

Would you ever pay for health care? Have you ever paid for health care? Do you think health care that is paid for is better? Why? How much would you pay for iron tablets?

Do you like eating the same thing or do you like to change foods? Why? What types of relish do you like to eat? Who shares the same plates of food in this household? Who prepares the food? How is the food distributed in your family? Other women have told us that women in Malawi love their men too much and give them the best food - is this true?

Do you ever drink tea, coffee? What type of cooking pots do you use? (i.e. aluminium, clay, chrome, iron)

Is it difficult to get enough food for your family? When is it easier and when is it harder?

Form for demographic data: women

Name _____

Address/Village/Compound etc _____

Some assessment of age _____

Number of living children

Marital Status _____

Ever attended school? yes no

Socio-economic status

What do they use for cooking? _____

What do they use for lighting? _____

Do they have chairs? yes no

Do they have a bed yes no

Do they have a radio yes no

Mother

Is mother still alive yes no

How close does she live _____

Others interviewed

Names & relationship to woman of other people included in this case study:

Reducing Iron Deficiency and Anaemia in Women of Reproductive Age in Thyolo District, Malawi

Key Informant Interview Schedules

Medical Assistants

What are most common diseases here?

What are the most serious diseases here, leading to death?

Is there much hookworm, Shisto, malaria, anaemia, AIDS here? What facilities do you have for determining whether a person has anaemia?

When you see patients that you suspect have AIDS what do you do? (prompt give iron tablets?) What do you say to them? (what do they think is wrong with them?)

Do you think people might be confusing lack of blood and AIDS?

Do you get enough drugs to give to people? Why? What about iron tablets? Can you always give them when there is a need? Do you think they should be given routinely to pregnant women or only if they are anaemic?

Do people here like to take iron tablets? What do they say about them?

What do you think the best intervention would be to reduce iron deficiency and anaemia here?

Nurse/Midwives

What do you do for ANC here? (test for anaemia? look for anaemia? mention iron tablets?) What are the most common problems women suffer from during pregnancy? (mention anaemia?)

Do you think women should be given iron tablets routinely during pregnancy or only if the woman is anaemic? How many tablets do you give women here? for how long? etc Do women here like iron tablets?

What are the common problems/concerns of women at delivery? After delivery?

Do you think people might be confusing lack of blood and AIDS?

What do you think the best intervention would be to reduce iron deficiency and anaemia here?

Reducing Iron Deficiency and Anaemia in Women of Reproductive Age in Thyolo District, Malawi

Interview Guide :Azambas (TBAs)

Introduction to the project:

Say your name and where you are from.

We are here to learn from people about women's health in general. Project Hope is helping us do this work. We would like to speak to people about what they think about health and the care they receive. We would like to talk about things which concern people, but in particular, we are interested in knowing about medicine for adding blood. Everything we learn from people we will put together to have a complete picture, but no names of people or the villages we visit will be written down or talked about with anyone.

Beliefs

What should a woman do and not do when she is pregnant (work-related, food taboos, sexuality...)? What happens if she does not do this? Do women often follow these rules? Do you encourage women to follow these rules or not?

What are the rules that a woman should follow after the baby is born? (ask about timing, possible risks, specific care-taking, who is available to help the mother)

Women's illnesses and the TBA

What are the main illnesses that affect adult women here?

What are the main problems women have outside of pregnancy to do with reproduction? (probe: menstruation, infertility etc). Which ones can you treat? How?

What are the main problems that a pregnant woman can have here? (probe: how common, severity, symptoms, causes). Which can the TBA treat and which does she refer? What treatment does she give?

What do you do for antenatal care? (list things) What do you think is most important. How much is charged for antenatal care?

Do women come here to wait for delivery or only come when they have labour pains? How many women can you accommodate? What are the concerns of a woman when she comes to deliver? (probe: cheerfulness of TBA, delivery position, what happens to the placenta etc). Do many women take the medicine which brings on contractions? Do you find that women are afraid to deliver at Thyolo District Hospital if they are referred there?

What illnesses can affect a woman after the birth? (probe: how common, severity, symptoms, causes). Which can she treat and how?

Do you give any advice or services regarding family planning?

Lack of Blood

Can you tell me about the different types of diseases relating to slightly decreased blood or lack of blood? What can cause a person to have decreased blood? (probe diet, mtsempho, other disease, sorcery etc.) How can you tell whether a person has decreased blood etc? How does a person who has decreased blood feel? What can a person who has decreased blood do to treat themselves? (probe traditional, hospital etc, do they mention iron tablets?) What can happen if a person who lacks blood or has decreased blood is not treated? If a pregnant woman has decreased blood can this affect the baby? How?

Can a person have too much blood? How can this happen?

Experiences with iron tablets:

Have you heard any stories about iron tablets? (probe for details, whether they are commonly believed etc).

Do you think iron tablets can help pregnant women? How? Why? Do you think iron tablets could help women who are not pregnant? How? Do you think it is better to take iron tablets during pregnancy or after delivery? If iron tablets are taken during pregnancy can this affect the baby?

Do you give iron tablets during antenatal care, following delivery? How many, how often? Do you charge or are they free? Where do you get the pills from? Can you get as many tablets as you need? Do you think generally women would like to be able to receive tablets from TBAs. Do you think TBAs would be prepared to do the extra work needed so that people could come to them for iron tablets? What if TBAs could charge, say 5T per tablet and so make a small profit?

Do you think iron tablets can help men, children? How? Why? (Probe whether woman ever under pressure to share tablets with husband, children etc)

What affect do iron tablets have on people who do not have decreased blood?

About the TBA

How did you come to be a TBA? How long have you been a TBA?

What training have you had? is there any ongoing training?

What support do you get e.g. from the hospital, clinics etc?

What equipment, facilities, medicines do you have? Can you show me where you grow the plant for medicine which brings on contractions?

What do you charge for: treatment of illnesses; antenatal care; delivery

Form for demographic data: TBA

Name _____

Address/Village/Compound etc _____

Some assessment of age _____

Number of living children

Marital Status _____

Ever attended school? yes no

Socio-economic status

What do they use for cooking? _____

What do they use for lighting? _____

Do they have chairs? yes no

Do they have a bed yes no

Do they have a radio yes no

Others interviewed

Names of any additional people interviewed such as clients

Reducing Iron Deficiency and Anaemia in Women of Reproductive Age in Thyolo District, Malawi

Iron Trial Nadolo Village

Try and get the following information for each package of 10 pills handed out - concentrate on women of reproductive age, especially any pregnant women:

Last week we gave you some iron tablets when we said goodbye, so we thought we would call by and see how you got on with them.

Who took the tablets we gave to you? probe: yourself, husband, children, others? How many do you have left? Would you mind if we see them?

How many tablets per day were taken? What time of day did you (or the person/people who took the pills) take the tablets? Did you take them with any drink or food?

Were there any things about the tablets that you (or the person/people who took the tablets) didn't like (probe: size, colour, swallowing, tastes, smell, hates pills etc)

Did you notice any changes in how you (or the person/people who took the pills) felt while taking the tablets (probe: benefits, bad effects etc)

What did other people (probe: husband, family, neighbours etc) say about you getting and taking these pills?

Did you feel that you (or the person/people who took the pills) were (i) lacking blood at all (ii) had some other illness that iron tablets can help, when we gave you the tablets? If no: did it worry you to take the tablets when you weren't ill?

Would you like to take more pills? If yes: what are the biggest difficulties you face in (i) getting and (ii) taking the pills?

Would you prefer to get iron tablets from:

TBA (free)

TBA (5 tambala each)

Government clinic (free)

Mobile clinic (free)

Private clinic (charge?)

Headman (free)

Headman (5 tambala each)

Grocery (5 tambala each)

Some other way? (specify)

(try and rank these in order of preference)

Thank you again for your help.

Reducing Iron Deficiency and Anaemia in Women of Reproductive Age in Thyolo District

Iron Trial, Mango Compound

Try and get the following information for each package of 7 pills handed out - concentrate on women of reproductive age, especially any pregnant women:

Last week we gave you some iron tablets when we said goodbye, so we thought we would call by and see how you got on with them.

Who took the tablets we gave to you? probe: yourself, husband, children, others? How many do you have left?

How many tablets per day were taken? What time of day did you (or the person/people who took the pills) take the tablets? Did you take them with any drink or food?

Were there any things about the tablets that you (or the person/people who took the tablets) didn't like (probe: size, colour, swallowing, tastes, smell, hates pills etc)

Did you notice any changes in how you (or the person/people who took the pills) felt while taking the tablets (probe: benefits, bad effects etc)

Were there any things that worried you about taking the tablets (or giving them to others) (probe: too much blood, taking medicine when not ill etc.)

What did other people (probe: husband, family, neighbours etc) say about you getting and taking these pills?

Do you have problems getting or taking the pills?

Which of the following would you prefer to get iron tablets from? Why? (i.e. prompt for what they think would be the best way)

- TBA (free)
- TBA (5 tambala each)
- Government clinic (free)
- Estate clinic (free)
- Private clinic (5 tambala)
- Compound watchman (free)
- Compound watchman (5 tambala each)
- Grocery (5 tambala each)
- HSAS (free)
- Some other way? (specify)

Thank you again for your help.

APPENDIS III

Further Information on Illnesses Caused by Breaking Rules

The concept of "hot" and "cold"

A person who is having sexual intercourse only with their spouse is called "warm". A person abstaining from sex is called "cold". Women are expected to be cold before marriage, during menstruation, for around seven months after delivery, and if helping to deliver another women. Both men and women are expected to be "cold" for initiations, funerals and to help to treat certain outbreaks of disease in the village. If a person has sex with someone other than their spouse then they become "hot".

Tsempho

If people do not remain "cold" when they should, or if the husband or wife becomes "hot" it leads to tsempho. The most commonly cited form of tsempho was where the husband is adulterous when he has a new-born baby. This gives the baby and the wife tsempho and can lead to the death of both. Many mothers obtain medicine to bathe the baby which protects them from this type of tsempho.

Tsempho can also be caused by "cold" women adding salt to the relish and therefore polluting it. Therefore when a woman is "cold" she has to ask a child to add the salt for her. "People just hear that so is dead just because the woman added salt."

The symptoms describing tsempho were often very similar to those describing general wasting and the illness "lack of blood", that is thinness and swelling. The main difference was that tsempho is accompanied by diarrhoea, sometimes bloody whilst lack of blood was not. A few respondents also said it made the face swell. and several respondents when describing tsempho in babies said it made the veins "stick out".

Kanyera

Men can become ill with "kanyera" by sleeping with a women who is menstruating or recently delivered (i.e. "unclean"). If such a man then goes and sleeps with his pregnant wife this leads to abortion. If a man sleeps with a woman who has recently aborted, miscarried or had a husband or child die recently he can become ill and die very rapidly. The symptoms of kanyera in a man are similar to tsempho but with the additional symptoms of paleness and coldness. Many people described this illness as "being like AIDS".

Underlying Causes

Interestingly, many of these diseases are based on an underlying belief that women are unclean during menstruation, and after delivery or abortion. During these times a woman would pollute food by adding salt. Similarly, a man who has intercourse with a woman during these times becomes ill because he "sucks bad things from the woman's womb" (C17). After menstruation and delivery a woman can only become clean again by having intercourse. Asked why unmarried women cannot add salt one respondent said: "After your menstruation you haven't met a man to conclude the finality of your period and the things are still inside, so how can you add salt".

Other diseases involve the mixing of blood. For example the man's adultery makes his wife ill because: "It affects the woman's blood because the man will be taking someone else's blood and giving it to you."

Direct cause vs. sorcery

Some respondents spoke as if breaking these rules leads directly to illness, whilst others said that breaking these rules made you more susceptible to sorcery, which was what actually caused the sickness: "People just watch you, waiting for you to make a mistake so they can take advantage of that and practice their sorcery, and you get blamed for a minor mistake."

Prevalence of tsempho and kanyera

Some older respondents said that people were not following the rules so much these days and that this was leading to increased health problems in the community: "Too many illnesses nowadays, especially the adults, we are destroying their lives due to tsempho ... because we don't follow the rules."

Others had heard from health education that tsempho is really neglect and malnutrition, although many of them still said they could differentiate tsempho and malnutrition. For example: "Lack of food causes one to start swelling. People may say one has tsempho when it is merely lack of food."

The treatment for tsempho seemed to be among those available very locally which suggests it may be a common disease. Two of the respondents admitted to knowing and preparing the medicine to treat tsempho, and one of the TBAs said she could provide medicine for protecting babies from tsempho.

Diagnosis of tsempho

Tsempho seemed to be diagnosed on the basis of knowledge or supposition about peoples behaviour, in addition to an assessment of the symptoms suffered. The traditional medicine requires that the "guilty" person who has caused the tsempho should add salt to the medicine. The elders and extended family may be the ones who start suspecting tsempho and who put pressure on the "guilty" person to add salt to the medicine. If those suffering get well after taking

the medicine, it is regarded as proof that it was the "guilty" person's actions that were causing the problem.

BASELINE SURVEY REPORT

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SUMMARY OF THE BASELINE SURVEY

Methods: A survey was conducted in June 1996 amongst residents living in villages or estate compounds identified as supplying workers for Nchima or Central Africa Tea Estate. Cluster sampling was used to obtain a random sample of haemoglobin measurements in 210 pregnant women, 210 women who had delivered within the last 6 months, and 315 men. Sample size was calculated to obtain sufficient power for a comparison with the final evaluation survey (conducted in June 1998) for each of these three strata separately. In addition to haemoglobin measurements, a questionnaire was used to collect demographic and socioeconomic data; data on nutritional knowledge and practice; and data on knowledge and practice at antenatal clinics. This report includes a summary of these data and estimates of the prevalence of anaemia in each strata and the results of a secondary analysis that investigated risk factors for anaemia.

Results: Half the women in the study were from the Lomwe ethnic group, with other large groups including, Mang'anja, Chewa, Ngoni, Yawo and Khokola. Ninety-three percent were Christians, two-thirds of women lived in houses made from unbaked bricks with thatched roofs, 77 percent of households were headed by the woman's husband, and 8 percent were headed by the woman herself. Main sources of income were estate work, petty trading, and farming.

The majority of pregnant women surveyed were in the second or third trimester of pregnancy (93 percent). Women commonly started attending antenatal care (ANC) at a gestational age of around five or six months, although the age at which they thought they should start attending was around three or four months. Only half of women who were attending ANC received any iron folate (IFA) tablets at their last visit, and most of those who received IFA were given seven or fewer tablets. Previous research (Morison et al, 1996) showed that the supply of IFA was a serious problem in Malawi at the time of the survey.

Data from women who had delivered within the last six months showed that 97 percent had attended ANC at least once during their last pregnancy (15 percent of these with trained traditional birth attendants (TBAs) and the others at health facilities). The pattern was very different for place of delivery, with 34 percent of women delivering with TBAs and 22 percent delivering at home. Previous qualitative research (Morison et al 1996) showed that while women stated a preference for delivery in a health centre, the distance they would have to walk to get there made it very difficult. Midwives attitudes were also cited by some women as a reason for not delivering at health facilities.

Eighty-six percent of both pregnant and recently delivered women reported taking all the IFA tablets they were given, and 10 percent had sought IFA tablets from sources other than ANC. Compliance, therefore, does not appear to be a major problem, and it is more likely that there is an unmet need.

Anaemia, defined as a haemoglobin level less than 11g/dl, was found in 67 percent of pregnant women. Among women who had delivered in the last six months, anaemia, defined as a haemoglobin level less than 12g/dl, was found amongst 61 percent. However, in both these

groups the majority of anaemia was mild, with 4 percent or less having severe anaemia. Only 36 percent of men were found to be anaemic (haemoglobin < 13g/dl).

Among pregnant women, being from the Ngoni ethnic group, owning a radio, having 2 or more children over 5 years of age in the household, and having taken at least 35 IFA tablets during the present pregnancy, were all found to be protective from anaemia. Anaemia was also less prevalent amongst women in the first trimester of pregnancy than among those in later trimesters.

Among women who had delivered in the last six months, protective factors against anaemia included eating milk or meat in the last week and receiving malaria prophylaxis during pregnancy. Very young mothers (less than 20 years old) had a lower risk of anaemia than older women.

Conclusions: Results show that, although two-thirds of women in the study area were anaemic, there was very little severe anaemia (≤ 4 percent). Anaemia in this district was associated with both malaria and indicators of socio-economic status, suggesting dietary causes. HIV prevalence was also a likely cause, but could not be investigated in the present study. IFA supplementation during pregnancy was nonexistent or very low at the time of the study because of supply problems. At current levels of supply, there was no indication that compliance was a major problem.

The results suggested that the proposed intervention to promote a healthy diet, early attendance at ANC, and increased coverage and compliance with taking IFA tablets and malaria prophylaxis, was the correct approach.

INTRODUCTION

The baseline survey was part of a series of research components used for designing, implementing, and evaluating an intervention to reduce anaemia among women of reproductive age in Thyolo District, Malawi. Project Hope implemented the project, with funding from MotherCare under a delivery order from the Women in Development Office, USAID. The London School of Hygiene and Tropical Medicine provided technical support.

OBJECTIVES

The primary objective of the baseline survey was to provide initial estimates of the prevalence of anaemia in the study area. Following implementation of the intervention, the survey was repeated to estimate any change in prevalence. The baseline survey was designed to detect a decrease in the prevalence of anaemia among pregnant and recently delivered women, from 60 percent at baseline, to 40 percent after the intervention, at the 5 percent level of significance, with 90 percent power. To control for any changes in the prevalence of anaemia that were unrelated to the intervention, the prevalence of anaemia in men (assumed to be unaffected by the intervention) was also estimated.

The secondary objective of the survey was to investigate which, if any, socio-economic, demographic, nutritional, anthropometric, or healthcare utilization factors were associated with anaemia in pregnant and recently delivered women.

METHODOLOGY

Sampling Strategy and Sample Sizes

The study population was defined as villages and tea estate compounds in the Thyolo District of Malawi that supplied workers for the estates. Using the 1993 or 1987 census and estimated growth rates, Project Hope estimated the population for each village or tea estate compound. The total population of the study area in 1993 was estimated as approximately 100,000.

Three strata within this population were identified as the focus of the survey: pregnant women; women who had delivered in the last six months; and adult males living in the same households as study women.

A cluster sampling strategy was used. Sample sizes were calculated using data from a recent, similar survey in Burkina Faso, to give initial estimates of the prevalence of anaemia and of how large the standard errors of estimates would likely increase by cluster, rather than simple random sampling (design effect). Sample sizes were estimated so that a reduction in anaemia from 60 percent to 40 percent would be detected at the 5 percent level with 90 percent power for each stratum separately. The combination of number of clusters and cluster size that met this criteria and was logistically convenient, was 30 clusters, and 7 people from each of the 3 strata within each cluster.

Thirty clusters with probability proportional to size from the list of villages and tea estates were chosen. Within each cluster, households containing pregnant women or women who had delivered in the last six months were chosen randomly by the same method used for Epi surveys. This involved dropping a pen on the ground at the geographical centre of the community to obtain a random direction. The number of households between the pen and the outer edge of the community was counted. One household of these was selected randomly as the starting point (using slips of paper). The interviewers asked if a pregnant or recently delivered woman lived in this household and interviewed her, if present, or marked the household for follow-up if she was not currently at home. The interviewers then spanned out from the starting point, identifying households where pregnant or recently delivered women lived, until the desired number was obtained. Where women were consistently away from the household when visited, this was noted and a replacement identified. Refusals were similarly noted and replacements found. Where an adult male lived in the same household as a study woman, he was also included in the sample. In any one cluster, males were followed up until data for at least ten had been collected.

Preparatory Work for Data Collection

Prior to being visited by an interview team, communities were visited twice by the project coordinator. The first visit was to inform the village headman about the study and to request consent to collect data. The second visit was to find out if the headman, in consultation with the

villagers, gave his consent and to answer any queries. On arrival at a village the interview team greeted the headman, who helped identify the centre of the village. Data collection was postponed in villages if a major market was taking place nearby or where, on arrival, it became apparent that a funeral was taking place.

There were two interview teams, each consisting of a supervisor and three interviewers. The personnel was composed of nurse/midwives, although one of the supervisors was teaching at a senior level rather than practicing. All had previous experience in conducting surveys. A four-day training was organised for the interview teams. During the training the questionnaire was discussed and role-played amongst the group, with a final practice in a community not included in the sampling plan. The use of the HemoCue was described in detail by the project coordinator and its use practiced both in the group and in the field before data collection for the survey started. The data collection commenced in June 1996 and lasted for 30 days.

Data Collection

When women suitable for inclusion in the study were identified, the aims of the project, the questionnaire, and the procedure for testing haemoglobin were explained to them. Their consent was requested by reading out loud a prepared consent form (Appendix I). If the woman consented, she either signed the form or gave a thumb print. Refusals were noted and replaced in the sample. A similar procedure was followed for men.

A questionnaire was administered to women in Chichewa. A back-translation of the questionnaire in English is provided in Appendix II. Questions related to demographic details, socio-economic status, nutrition, and for the present or last pregnancy, use of the health sector and iron tablets received.

Following the questionnaire, a finger on the woman's least-used hand was pricked for a drop of blood to measure Haemoglobin using a HemoCue. The HemoCues were calibrated daily and used in accordance with the latest instructions from MotherCare. When the Haemoglobin reading had been recorded, all swabs and microcuvettes containing blood were given to the woman to dispose of herself. This was to allay fears about researchers taking away blood and using it to harm the person who gave it. High refusal rates had been feared, but this procedure led to extremely low refusal rates. The same procedure was used to obtain Haemoglobin estimates for men. If, on the basis of the Haemoglobin reading, a man or woman was judged to be anaemic, they were given a small supply of iron folate tablets and a referral note to take to their clinic.

Data Processing and Analysis

After completion, questionnaires were checked by the supervisors and taken to the Project Hope office where they were entered into a computer using a data entry and checking screen set up in Epi-Info. Questionnaires were double entered by different people and validated against each other to check for data entry errors. Uncoded information on the questionnaires was recorded manually. The data was then sent to the London School of Hygiene, where further data cleaning was carried out. Descriptive and bivariate analyses of risk factors were conducted using Epi-

info. Stata was used to fit regression models to examine the effect of each risk factor, whilst adjusting for others. Initial logistic regression models included parity, trimester, number of IFA tablets received, and whether malaria prophylaxis was received for the last pregnancy, as well as any other factors that had been significant ($P < 0.05$) in the bivariate analysis. Backward elimination was then used to remove variables which did not explain a significant amount of the variation in anaemia prevalence ($P \geq 0.010$) when adjusted for other risk factors. Odds ratios (ORs) are presented for this final model, as well as for the bivariate analysis.

RESULTS

Adherence to Sampling Design

The sampling design was adhered to reasonably well, with the number of pregnant women sampled varying between four and nine per cluster, and the number of recently delivered women varying from six to eight. Total sample sizes were 210 pregnant women, 210 recently-delivered women, and 315 men. Only four refusals were recorded. Two women refused to participate, one because her husband was not present and the other gave no reason. Two husbands of women included in the survey refused to give a blood sample and no reasons were given.

Demographic Data

The men sampled tended to be older than the women (Table 1), the majority of men were partners of the study women (Table 2), and around half the women sampled had a parity of one or two (Table 3). The most common ethnic group was Lomwe. Among the 102 women whose ethnic group was categorised as “other,” 58 were of the Mang’anja ethnic group, 23 from the Khokola ethnic group, 2 from the Chrimani ethnic group, and 1 each from the Chingulu and Nyanja ethnic groups. (Table 4) The vast majority of women were Christian. Other religions specified included “Abraham” (2), “Topia” (6) “Pagan” (1) “African Church” (2), and “Samaria” (1). (Table 5)

Table 1. Age Distribution of Men and Women

Age (women)	No. women and %	Age (men)	No. men and %
< 20 years	87 (21%)	<20 years	23 (7%)
20 - 24 years	162 (39%)	20 - 29 years	141 (44%)
25 - 29 years	86 (21%)	30 - 39 years	85 (27%)
30 - 34 years	47 (11%)	40 - 49 years	41 (13%)
35 +	38 (9%)	50 +	29 (9%)

Table 2. Relationship of Sampled Males to Study Females

Relationship	Number and percent	
“husband”	253	66%
Father	36	9%
Father-in-law	5	1%
Uncle	12	3%
Brother	53	14%
Other	23	6%

Table 3. Frequency Distribution, Number of Previous Pregnancies (including present and most recent)

Parity	Number and % of women	
1	86	21%
2	105	25%
3	57	14%
4	51	12%
5	41	10%
6	22	5%
7	24	6%
8	14	3%
9+	20	5%

Table 4. Frequency Distribution of Ethnic Groups

Ethnic Group	Number	% women
Lomwe	214	51%
Yawo	22	5%
Chewa	41	10%
Sena	5	1%
Ngoni	36	9%
Other	102	24%

Table 5. Frequency Distribution of Religions

Religion	Number	% women
Christian	387	93%
Muslim	18	4%
Other	13	3%

Socio-Economic Data

The majority of women lived in houses made from mud or unbaked bricks with a thatched roof and a mud floor. (Table 6) About half of the households had three to four members. Around three-quarters of households contained two adults. In 11 percent of these the study woman was the only adult. Almost half the households contained no children over age 5, and nearly half contained one child less than 5. (Table 7) Twenty-nine percent, 122 women, reported living elsewhere for more than one month in the last year. Of these, 15 had stayed on an estate, 47 had stayed in another village, and 57 had stayed in a town. Around three-quarters of households were headed by the husband of the woman interviewed and 8 percent were headed by the woman herself. (Table 8)

Table 6. Frequency Distribution of House Construction

House construction	Number	% women
Mud or unbaked brick walls with thatched roof and mud floor	265	63%
Baked brick walls and/or with an iron roof and mud floor	110	26%
Any type of walls or roof with a cement floor	45	11%

Table 7. Frequency Distributions of Household Composition

No. of people	Total	%	Adults	%	Over	%5s	Under	%5s
0	-		-		198	47%	85	20%
1	4	1%	45	11%	93	22%	198	47%
2	55	13%	307	73%	68	16%	117	28%
3	111	26%	1	10%	35	8%	17	4%
4	82	20%	8	4%	19	5%	3	1%
5	59	14%	7	2%	6	1%	-	
6+	109	26%	2	0.5%	1	0.2%	-	

Table 8. Frequency Distribution of Head of Household

Head of Household	Number and %
Husband	325 77%
Father	27 6%
Father-in-law	5 1%
Woman	34 8%
Other	29 7%

Sixty-three percent of women (264) reported that they had attended school and 46 percent (192) could read Chichewa. Around half the women reported having no income of their own. (Table 9) The most common main source of income for households in the study area was estate work, followed by petty trading, and farming. (Table 10)

Table 9. Women's Main Source of Income

Source of Income	Number and %
None	193 46%
Farming	68 16%
Petty Trading	102 24%
Estate Work	33 8%
Other	24 6%

Table 10. Household's Main Source of Income

Source of Income	Number and %	
None	23	6%
Farming	82	19%
Petty Trading	84	20%
Estate Work	168	40%
Other	63	15%

Only seven pregnant women and two recently-delivered women were currently working on an estate. However, 19 percent of pregnant women (40) and 27 percent of recently delivered women (56) had worked on an estate in the last year. Forty-six percent of women (195) reported that someone in the household (apart from themselves) currently worked on an estate.

Ownership of radios and small animals was relatively high, with around half of households owning a radio and 41 percent owning chickens, ducks, or rabbits. (Table 11)

Table 11. Household Ownership of Goods and Animals

Own?	Number and %	
Radio	194	46%
Bicycle	83	20%
Motorbike	6	1%
Chickens, ducks, or rabbits	171	41%
Goats	45	11%
Cattle	9	2%

Nutrition

The majority of women had eaten two meals during the day prior to the interview (Table 12), and nsima and green leaves were the most commonly eaten foods (Table 13). Eighty-one percent of women (340) said they had eaten meat or fish during the previous week. Of these, 93 percent (317) had done so three or fewer times. Ninety-two percent of those that had eaten meat the previous week, bought it (313), and 5 percent reported slaughtering their own. The percentage of women eating meat varied by ethnic group. Lomwe and Chewa women were significantly less likely to have eaten meat (71 percent and 64 percent, respectively) than Ngoni or other ethnic groups (80 percent and 91 percent, respectively). Twenty percent of women (83) said they had eaten eggs the previous week, and of these, 45 percent (37) had obtained them from their own animals, 41 percent (34) bought them, and 11 percent (9) obtained them from neighbours. Only 10 percent of women (42) reported that they had drunk milk during the previous week, with 71 percent (30) of these women buying the milk, 7 percent (3) getting milk from their own animals, and 17 percent (7) getting it from neighbours.

Table 12. Number of Meals Eaten by Women the Day Prior to the Interview

Number of Meals	Number and %	
0	1	0.2%
1	50	12%
2	299	72%
3 or 4	68	16%

Table 13. Food Eaten by Women during the Previous Day

Food Eaten	Number and %	
Meat or Fish	175	42%
Beans or Peas	108	26%
Eggs	17	4%
Nsima	408	97%
Rice	42	10%
Cooked Green Leaves	318	76%
Cabbage (uncooked)	27	6%
Tomatoes (cooked)	154	37%
Citrus Fruit (excl. lemon)	73	17%
Lemon	21	5%
Other Fruit	115	27%

Table 14 shows the foods that women thought “increased blood.” The most common spontaneously given answer was cooked green leaves, although after prompting, uncooked cabbage, tomatoes, and fruit (excluding lemons) were included. Notably, 31 percent of women thought that meat and fish did not increase blood, even after prompting. The majority of women (63 percent) said that lemons did not help to increase blood. Around three-quarters of women thought that coca cola increased blood.

Table 14. Foods Women Thought “Increased Blood”

Food	Does not increase blood		Increases blood (spontaneously mentioned)		Increases blood (after prompting)	
	(no. and %)		(no. and %)		(no. and %)	
Meat or Fish	128	31%	128	31%	164	39%
Beans or Peas	80	19%	168	40%	172	41%
Eggs	127	30%	73	17%	220	52%
Nsima	269	64%	22	5%	129	31%
Rice	266	64%	14	3%	139	33%
Cooked Green Leaves	6	1%	373	89%	41	10%
Cabbage (uncooked)	22	5%	150	36%	245	59%
Tomatoes (cooked)	15	4%	147	35%	258	61%
Citrus Fruit (excl. lemon)	32	8%	147	35%	241	57%
Lemon	260	63%	34	8%	122	29%
Other Fruit	36	9%	202	48%	182	43%
Coca cola	113	27%	33	8%	273	65%

Pregnant Women’s Responses about Current Pregnancy

Pregnant women were asked at which gestational age they should start ANC. Most thought they should start during the third or fourth month of pregnancy. (Table 15)

Table 15. Gestational Age at which Pregnant Women Thought They Should Start ANC

Gestational Age (months)	Age to Start ANC (No. and %)	
Don’t know	25	12%
1 or 2	10	5%
3	81	39%
4	61	29%
5	26	12%
6 or 7	7	3%

Table 16 shows what pregnant women thought should happen during antenatal care. Nearly all thought they should be weighed, measured, and examined, and nearly 88 percent thought they should receive iron tablets. When asked in a later question how many tablets a pregnant woman should receive per month, 79 percent said they did not know. Around three-quarters thought they should receive malaria prophylaxis and an examination for anaemia, but this tended to be after prompting rather than being mentioned spontaneously. Other activities women thought

should occur included Tetanus Toxoid vaccination (58 women), education or advice (45 women), given food (9 women), family planning advice (2 women), and blood or body examination (8 women).

Table 16. What Pregnant Women Thought Should Happen during ANC

Activities	Should not happen (no. and %)		Should happen (spontaneously mentioned) (no. and %)		Should happen (after prompting) (no. and %)	
Weighed and measured	20	9%	123	59%	67	32%
Examination	9	4%	163	78%	38	18%
Examination for anaemia	59	28%	36	17%	115	55%
Blood pressure taken	33	16%	103	49%	74	35%
Iron tablets given	26	12%	102	49%	82	39%
Malaria Prophylaxis	60	29%	47	22%	103	49%
Other	93	44%	92	44%	25	12%

Few women in their first trimester of pregnancy were interviewed. (Table 17) The majority (67 percent) had started ANC by the time of interview or intended to start in months 5 or 6 of pregnancy. (Table 18)

Table 17. Gestational Age of Pregnant Women Interviewed

Gestational Age (months)	Number and %	
1 or 2	7	3%
3	9	4%
4	23	11%
5	25	12%
6	33	16%
7	39	19%
8	38	18%
9	31	15%

Table 18. Gestational Age Pregnant Women Started ANC

Gestational Age (months)	Age when started ANC (no. and %)	Age intend to start ANC (no. and %)
2	3 2%	1 1%
3	10 7%	4 6%
4	25 18%	3 5%
5	41 29%	18 27%
6	41 29%	25 37%
7	17 12%	10 15%
8 or 9	4 3%	6 9%
Total	141 67%	67 33%

The district hospital was the most commonly attended place, followed by the tea estate clinics. Among women who attended ANC at an “other” type of health facility, 15 attended Mitengo Hospital and the others attended a variety of private clinics. Six women attended more than one place. (Table 19)

Table 19. Place of ANC for Currently Pregnant Women

Place of ANC	Number and %
MoH Clinic	25 18%
District Hospital	50 36%
Tea Estate Clinic	39 28%
TBA	12 9%
Other	21 15%

When shown IFA tablets, 95 percent of women recognised them. Around half the women received no IFA tablets and no women were given a month’s supply during their last ANC visit. (Table 20) Fifty-six percent of women who had started ANC reported they had received malaria prophylaxis.

Table 20. Number of IFA Tablets Received by Pregnant Women at Last ANC Visit

IFA tablets received at last ANC visit	Number and %
0	69 49%
1-7	50 35%
8-14	18 13%
15-22	4 3%

Nearly 10 percent of all pregnant women (18 of 210) obtained iron tablets from places other than where they received ANC. Eight bought the tablets (one from a pharmacy, two from grocers, one from the market, and four from private clinics). The price paid varied from 10 to 280 tambala per tablet. One woman received tablets from a relative, and the others received the tablets free (1 from a TBA, 2 from a tea estate clinic, and 6 from a government clinic).

Only 1 of the 112 pregnant women who had received iron tablets (from ANC or elsewhere), had not taken any of them. Fourteen women (13 percent) had taken some tablets, but the vast majority (87 percent) had taken all of them. Of the 111 women who had taken some iron tablets during their current pregnancy, 15 (14 percent) reported bad side effects. These consisted of nausea (5), palpitations (11), dizziness (7), and problems with stools (1). Eight women reported more than one bad side effect. Of the 111 women who had taken iron tablets during the current pregnancy, 91 percent reported feeling positive effects.

Recently-Delivered Women’s Responses about Most Recent Pregnancy and Delivery

Recently-delivered women were asked the age at which ANC should be started. Most thought it should start during the third or fourth month of pregnancy. (Table 21)

Table 21. Gestational Age When ANC Should Begin, Women Who Delivered in the Previous Six Months

Gestational Age (months)	Age when ANC should start Number and %	
Don’t know	11	5%
1 or 2	22	10%
3	79	38%
4	62	29%
5	24	11%
6, 7, or 8	12	6%

Nearly all recently-delivered women thought they should be weighed, measured, and examined during ANC, and 88 percent thought they should receive iron tablets. When asked in how many tablets a pregnant woman should receive per month, 76 percent said they did not know. Around three-quarters of women thought they should receive malaria prophylaxis and an examination for anaemia, but this tended to be after prompting rather than being mentioned spontaneously. Other activities they thought should occur during ANC included, TT vaccine (75), education or advice (42), food distribution (11), family planning advice (8), singing (3), and blood or body examination (3). (Table 22) The pattern of responses was similar to that of pregnant women.

Table 22. Activities that Should Take Place During ANC, Women Who Delivered in the Last 6 Months

Activities	Should not happen		Should happen (spontaneously mentioned)		Should happen (after prompting)	
	Number	%	Number	%	Number	%
Weighed and measured	16	8%	132	63%	62	29%
Examination	1	0.5%	168	80%	41	20%
Examination for anaemia	46	22%	48	23%	116	55%
Blood pressure taken	27	13%	122	58%	61	29%
Iron tablets given	12	6%	124	59%	74	35%
Malaria Prophylaxis	53	25%	43	21%	114	54%
Other	74	35%	101	48%	35	17%

Among the 210 women who had delivered in the previous 6 months, 204 (97 percent) reported attending ANC. The majority of women started attending ANC in their second trimester. (Table 23)

Table 23. Gestational Age when ANC Started, Recently-Delivered Women

Gestational Age when ANC Started (months)	Number	%
2	1	0.5%
3	16	8%
4	37	18 %
5	44	22%
6	57	28%
7	34	17%
8	11	5%
9	3	2%

Women most frequently attended ANC at the district hospital, the MoH and tea estate clinics. Among women who attended an “other” type of health facility, 19 attended Mitengo Hospital and the others attended a variety of other fee paying clinics and hospitals. Sixteen women attended more than one place for ANC. (Table 24) The number of ANC visits made by each woman is shown in Table 25.

Table 24. Place of ANC, Among Women Who Delivered in the Last 6 Months

Place of ANC	Number and %	
MoH Clinic	44	22%
District Hospital	63	31%
Tea Estate Clinic	41	20%
TBA	31	15%
Other	41	20%

Table 25. Number of ANC Visits During Last Pregnancy

Number of ANC visits	Number and %	
1-3	60	29%
4-6	111	54%
7-9	24	12%
10+	9	4%

Ninety-five percent of women who had delivered in the last 6 months recognised IFA tablets when shown them. Women were asked to remember how many IFA tablets they had received in total during ANC. Twelve percent of women (26) did not receive IFA tablets or could not remember receiving advice about how many tablets to take per day. Most women (135, 64 percent) were advised to take 1 tablet per day and 22 percent were advised to take 2 per day. Three women reported being advised to take three or four tablets a day. (Table 26) Thirty-seven percent of women (68) were advised to take the tablets with food. In addition to iron tablets, 69 percent of women who had attended ANC during their last pregnancy reported being given malaria prophylaxis.

Table 26. Total IFA Tablets Received During ANC

Total IFA tablets Received during ANC	Number and % of Women	
0	21	10%
1 - 10	29	14%
11 - 20	44	22%
21 - 40	59	29%
41- 100	44	22%
100 - 180	7	3%

Eighteen of the women who had delivered in the last six months (9 percent) obtained iron tablets from places other than where they received ANC. Five women bought their tablets (one from a grocer, two from a market, and two from a private clinic) at a cost of between 10 and 20 tambala per tablet. Three women had received tablets from relatives and the other 10 received them free from estate or government clinics.

Among the 184 women who received IFA during their last pregnancy from either their ANC or another source, 28 (15 percent) reported taking some of the tablets and 156 (85 percent) reported taking them all. No women did not take any of the tablets. Twenty-five (14 percent) of the 184 women who had taken some or all of their iron tablets during their last pregnancy reported negative side effects: 18 experienced nausea, 12 palpitations, 15 dizziness, 7 breathlessness, and 5 reported problems with stools. However, 92 percent said they experienced some positive effects.

Table 27 shows the number of months since delivery for women interviewed. Four percent of the births were to twins.

Table 27. Number of Months Since Delivery

Months since delivery	Number and %	
1	69	33%
2	30	14%
3	29	14%
4	22	11%
5	41	20%
6	19	9%

Among the 32 women who delivered at an “other” place, 14 delivered at Mitengo Hospital and 17 at other fee paying clinics and hospitals. One women reported delivering on the way to the hospital. (Table 28)

Table 28. Place of Delivery, Most Recent Child

Place of Delivery	Number and %	
MoH Clinic	29	14%
District Hospital	19	9%
Estate Clinic	12	6%
TBA	71	34%
Home	47	22%
Other	32	15%

Twenty-seven women (13 percent) reported receiving iron tablets since delivery because of blood loss during delivery. The women who had taken iron tablets since delivery said that they noticed the same side effects as when they took them during pregnancy.

Anthropometry and Night Blindness

Mean mid-upper arm circumference (MUAC) was 25cm for both pregnant and recently delivered women. Eighteen pregnant women (9 percent) and 19 women who delivered in the last 6 months (9 percent) reported difficulty seeing at night.

Haemoglobin Measurements

Severe anaemia was rare among the study population. Mean haemoglobin for pregnant women was 10.4 g/dl (95% CI 10.1-10.7) and for recently delivered women it was 11.4 g/dl (95% CI 11.1-11.8). The mean haemoglobin for men was 13.6 g/dl (95% CI 13.4-13.9). Cluster randomisation was taken into account when calculating the confidence intervals. (Table 29)

Table 29. Anaemia Among Pregnant and Recently-Delivered Women and Men, by Degree

	Number and Percent							
	Severe* Hb<7		Moderate* 7 ≥ Hb < 9		Mild* 9 ≥ Hb <11		Not Anaemic* Hb ≥ 11	
Pregnant Women	7	3%	33	16%	100	48%	70	33%
	Hb<8		8 ≥ Hb < 10		10 ≥ Hb <12		Hb ≥ 12	
Recently-delivered women	9	4%	33	16%	86	41%	82	39%
	Hb<9		9 ≥ Hb < 11		11 ≥ Hb <13		Hb ≥ 13	
Men	1	0.3%	21	7%	90	29%	203	64%

*All haemoglobin (Hb) levels given in g/dl

Risk Factor Analysis for Pregnant Women

The bivariate analysis found that several socio-economic variables were associated with anaemia. Being a member of the Ngoni ethnic group, owning a radio, drinking milk in the last week, and having two or more children in the household, were all associated with a lower prevalence of anaemia. Age and parity were not associated with the prevalence of anaemia in the bivariate analysis, but trimester was. Among women in their first trimester of pregnancy, the prevalence of anaemia was lower than among those at later stages. Having received more than 35 IFA tablets (to date) was significantly associated with a lower prevalence of anaemia.

In the adjusted analysis, being a member of the Ngoni ethnic group, owning a radio, and having more than two children in a household, remained significant protective factors. Being in the first trimester of pregnancy was still associated with a lower prevalence of anaemia, and the association with taking IFA continued to approach significance. (Table 30)

Table 30. Anaemia Risk Factor Analysis for Pregnant Women

Risk Factor	Categories	anae proportion	Mic %	OR	P	adjusted	
						OR	P
Ethnic Group	Lomwe	68/103	66%	1		1	
	Chewa	16/19	84%	2.74	0.13	3.53	0.09
	Ngoni	6/16	37%	0.31	0.04	0.24	0.02
	Other	50/72	69%	1.17	0.63	1.20	0.61
Woman literate?	No	73/105	70%	1			
	Yes	65/103	63%	0.75	Ns		
Head of Household	Husband	118/173	68%	1			
	Father	8/12	67%	0.93	Ns		
	Woman	8/12	67%	0.93			
	Other	6/13	46%	0.40			
Woman's main income	None	62/92	67%	1			
	Farming	24/35	69%	1.06	Ns		
	Trading	35/55	64%	0.85			
	Estate Work	14/21	67%	0.97			
	Other	5/7	71%	1.21			
Woman resided elsewhere in last year?	No	99/150	66%	1			
	Yes	41/60	68%	1.11	Ns		
Household's main income	None	4/8	50%	1			
	Farming	31/45	69%	2.21	Ns		
	Trading	30/43	70%	2.31			
	Estate Work	61/93	66%	1.91			
	Other	14/21	67%	2.00			
Type of Community	Estate	14/20	70%	1			
	Village	126/189	67%	0.86	Ns		

Table 30. (cont'd)

Risk Factor	Categories	anae proportion	Mic %	OR	P	adjusted	
Type of house	Risk Factor	Categories	anae proportion	Mic %	OR	P	adjusted OR P
Own radio	No Yes	89/118 51/92	75% 55%	1 0.41	0.003	1 0.51	0.04
Ate meat in last week	No Yes	17/31 123/179	55% 69%	1 1.81	Ns		
Drank milk in last week	No Yes	127/184 13/26	69% 50%	1 0.45	0.06		
Total adults in household	3 or less 4 or more	134/197 6/13	68% 46%	1 0.40	Ns		
Children over 5	1 or none 2 or 3 4 or more	108/151 25/47 7/12	72% 53% 58%	1 0.45 0.56	0.02 0.34	1 0.45 0.34	0.04 0.12
Children under 5	2 or less 3 or more	124/186 16/24	67% 67%	1 1.00	Ns		
Age	Less than 20 20 to 24 25 to 29 30 to 34 35 or more	33/47 52/76 34/48 12/23 9/16	70% 68% 71% 52% 56%	1 0.92 1.03 0.46 0.55	Ns		
Parity	1st pregnancy 2-4 pregnancies 5 or more	22/35 75/110 43/65	63% 68% 66%	1 1.27 1.15	Ns		
Trimester	1 to 3 months 4 to 6 months 7 to 9 months	7/16 58/81 71/108	44% 72% 66%	1 3.24 2.47	0.04 0.10	1 3.65 3.54	0.03 0.04
Total IFA given to date at ANC	Less than 35 35 or more	92/126 6/15	73% 40%	1 0.30	0.03	1 0.32	0.06
Malaria prophylaxis given at ANC	No Yes	46/61 52/79	74% 66%	1 0.63	Ns		
Mid upper arm circumference	25 cm or less > 25 cm	81/115 58/93	70% 62%	1 0.70	Ns		

Risk Factor Analysis for Women Who Delivered in the Last Six Months

Bivariate analysis showed that women living in a household headed by their father were less likely to be anaemic than those living with their husbands, and those who headed their own household were more likely to be anaemic than those living with husbands. Very young women (<20 years) were also less likely to be anaemic than older women. Having eaten meat and drunk milk in the last week (indicators of higher socio-economic status, as well as better nutrition) were both associated with lower prevalence of anaemia.

Total IFA taken during pregnancy was not associated with anaemia status, but there was some evidence that having taken malaria prophylaxis was protective against anaemia.

In the adjusted analysis having eaten meat remained protective, whilst the effect of drinking milk became less significant. The effect of age remained, whilst the effect of malaria prophylaxis became more significant when adjusted for other risk factors. (Table 31)

Table 31. Risk Factor Analysis, Women Who Delivered in the Last Six Months

Risk Factor	Categories	anae proportion	mic %	OR	P	Adjusted	
						OR	P
Ethnic Group	Lomwe	73/111	66%	1	Ns		
	Chewa	11/22	50%	0.52			
	Ngoni	10/20	50%	0.52			
	Other	34/57	60%	0.77			
Woman literate?	No	76/121	63%	1	Ns		
	Yes	52/89	58%	0.83			
Head of Household	Husband	92/152	60%	1	0.05	1	0.26
	Father	5/15	33%	0.33			
	Woman	16/22	73%	1.74			
	Other	15/21	71%	1.63			
Woman's main income source	None	62/101	61%	1	Ns		
	Farming	16/33	48%	0.59			
	Trading	30/47	64%	1.11			
	Estate Work	9/12	75%	1.89			
	Other	11/17	65%	1.15			
Woman resided elsewhere in last year?	No	93/148	63%	1	Ns		
	Yes	35/62	56%	0.77			
Households' main income source	None	8/15	53%	1		1	0.82
	Farming	14/37	38%	0.53			
	Trading	27/41	66%	1.69			
	Estate Work	51/75	68%	1.86			
	Other	28/42	67%	1.75			
Type of Community	Estate	14/21	67%	1	Ns		
	Village	114/189	60%	0.76			

Risk Factor	Categories	anae proportion	mic %	OR	P	Adjusted	
						OR	P
Type of house	Nonbrick wall & thatched roof	82/132	62%	1	Ns		
	Brick walls or iron roof	32/55	58%	0.85			
	Cement Floor	14/23	61%	0.95			
Own radio	No	71/109	65%	1	Ns		
	Yes	57/101	56%	0.69			
Ate meat in last week?	No	36/49	74%	1	0.04	1	0.07
	Yes	92/161	57%	0.48			
Drank milk In last week	No	122/194	63%	1	0.05	1	0.08
	Yes	6/16	37%	0.35			
Total adults in household	3 or less	122/196	62%	1	Ns		
	4 or more	6/14	43%	0.45			
Children over 5	1 or none	90/140	64%	1	0.11		
	2 or 3	29/56	52%	0.60			
	4 or more	9/14	64%	1.00			
Children under 5	2 or less	118/192	62%	1	Ns		
	3 or more	9/16	56%	0.81			
Age	Less than 20	18/40	45%	1	0.01	1	0.01
	20 to 24	60/86	70%	2.82			
	25 to 34	35/62	56%	1.53			
	35 or more	15/22	68%	2.62			
Parity	1st pregnancy	29/51	57%	1	Ns	1	ns
	2-4 pregnancies	67/103	65%	1.41			
	5 or more	32/56	57%	1.01			
Months since Delivery	1	42/69	61%	1	Ns	1	ns
	2-3	39/59	66%	1.25			
	4-6	47/82	57%	0.86			
Total IFA given at ANC	Less than 35	83/137	61%	1	Ns	1	ns
	35 or more	44/67	66%	1.24			
Malaria prophy-laxis given at ANC	No	45/64	70%	1	0.10	1	0.04
Yes	82/140	59%	0.60				
Mid upper arm circumference	25 cm or less	82/127	65%	1	.14		
> 25 cm	44/81	54%	0.65				

DISCUSSION

The baseline survey of 210 pregnant women, 210 women who had delivered during the previous six months, and 315 men, was successfully conducted in June 1996. Prior to the survey there was concern that collecting blood in the community would be too sensitive and controversial. However, the measures taken to allay peoples' fears were successful, as there were only four refusals to participate.

There are a variety of ethnic groups in the study area. This is probably due to the fact it is near the border with Mozambique and people migrate in for estate work.

Although the study women tended not to be working on the estate at the time of the study (presumably because of being pregnant or recently delivered), 8 percent reported estate work as their main source of income, with 40 percent reporting estate work as the main source of income for the household. Other sources of income for the household were farming and petty trading. The majority of households in the area were headed by the study woman's husband, but 8 percent were headed by the woman herself.

Household ownership of goods was used to indicate socio-economic status. Ownership of a radio and small animal were quite common (almost half of households), but ownership of bicycles and goats was rarer (20 percent and 11 percent respectively). The majority of study women (63 percent) lived in unbaked mud-brick huts with thatched roofs. The majority of the remainder (26 percent) had either baked mud brick walls or an iron roof.

Most study women (72 percent) had two meals per day, and nsima and cooked green leaves were the most commonly eaten foods. The proportion of women who had consumed animal protein was high: 42 percent had eaten meat or fish during the previous day and 81 percent had eaten some meat or fish in the last week. This may reflect the fact that the survey was conducted at the end of a particularly good growing season and the population in the study area was relatively rich, compared to other parts of the year or other growing seasons. The consumption of meat was significantly associated with ethnic group. Women from the more "local" tribes (Lomwe and Chewa), were less likely to consume meat than other tribes. This could be due to cultural factors such as the local belief that pregnant women should not eat meat. However, the qualitative study (Morison, 1996) showed that this belief was dying out.

The vast majority of women spontaneously cited green leaves as food that "increases blood." The data confirmed the results found in the qualitative research, that most women believe coca cola increases blood. Additionally, while most citrus fruits were thought to be helpful for increasing blood, the majority of women believed that lemons were not helpful, again supporting the results of the qualitative survey.

Only about one-fifth of women spontaneously mentioned that they should be examined for anaemia at antenatal clinics, and after prompting, around one-quarter still did not think it should happen. However, half of women spontaneously mentioned that they should be given iron tablets at ANC, and after prompting, around 90 percent said they should be given. When asked how many tablets should be given, three-quarters of women said they did not know.

Ninety-five percent of women recognised UNICEF IFA tablets when shown them. The data on the number of IFA tablets given at last ANC visit among currently pregnant women, and the total given during pregnancy for recently-delivered women, showed that women were getting very few tablets, and vastly less than the WHO recommended dose. This again, confirms the finding of the qualitative study, that supply was a major problem in the study area prior to the intervention.

The high reported level of compliance with taking IFA tablets and the fact that around 10 percent of women had obtained them outside of ANC, confirms the findings of the qualitative study that compliance was not a major problem and that there was, in fact, a demand for IFA.

One objective of the intervention is to encourage women to start attending ANC earlier than the five to six months gestational age common at present. Interestingly, when women were asked when they should start attending ANC, the most common gestational age cited was three to four months.

Another interesting aspect of the data was the comparison between place of ANC and place of delivery. Whilst only 15 percent of women went to a TBA for antenatal care, with the rest attending clinics or hospitals, when it came to delivery, most women either delivered with a TBA or at home. Very few women delivered at the District Hospital or the estate clinics. Considering that all primiparous or grand multiparous women were referred to the District Hospital for delivery, the numbers attending were very low. During the qualitative study, women often expressed concerns about distances to health facilities and how they were treated by midwives during delivery, especially at the District Hospital. These figures may reflect geographical and quality of care constraints to delivering at a health facility.

Given the random sampling scheme followed for this survey, the estimates of the prevalence of anaemia calculated from this survey should be representative of the study area. Over 60 percent of women were anaemic by the WHO criteria. However, the vast majority of these were mildly anaemic, and severe anaemia was rare (less than 4 percent of women).

The survey was conducted towards the end of the peak malaria season. In other malarious areas, anaemia has been found to be more prevalent among primiparous than multiparous women. It is hypothesized that this is because primiparous women are more susceptible to malaria. This pattern was not found by this survey, with the prevalence of anaemia being very similar across all parities. However, anaemia was less prevalent among women who had taken malaria prophylaxis, and was significantly so for women who had delivered within the previous six months. This suggests that malaria could be an important cause of anaemia in the area but not the predominant one. The associations with socio-economic indicators supports the idea that much anaemia is due to iron-deficiency because of poor diet.

HIV is highly prevalent in the study area (estimated at around 27 percent at the time of the study, [District Medical Officer, personal communication]). The interaction of HIV and anaemia is not yet well understood but it is probable that AIDS could exacerbate or cause anaemia, both directly and indirectly. It was not possible to measure HIV prevalence in this study because of a decision

by the national ethical committee and because the implementing organisation thought that people would not co-operate with the study if they knew they were being testing for HIV. If the prevalence of AIDS increased over the study period, it may mask any improvements due to the intervention. However, some idea of the possible general deterioration in anaemia status in the population can be gained by the data from men (who should not be affected by the intervention).

The results of the baseline survey correspond well with the results of the qualitative study on which the intervention was based, and therefore, no changes to the intervention were recommended.

REFERENCES

Morison, L. A., Semu, L., Behague, D., Sibale, C., Franco, C. (1996) A qualitative study of constraints to reducing iron deficiency and anaemia in women of reproductive age in Thylo District, Malawi. MotherCare report, John Snow Inc.

APPENDIX I

ENGLISH VERSION OF BASELINE SURVEY

BASELINE SURVEY OF ANAEMIA, THYOLO DISTRICT

PROJECT HOPE

- CHECK** **Is the woman pregnant?** (1=no, 2=yes) **PREG**
- Has the woman delivered in the last 6 months** **DEL**
 (1=no 2=yes)

If the answer to both the above questions is no do not proceed with this questionnaire

SECTION 1 Identification

- 1.1 Village / Compound Name

- 1.2 Cluster Number **CLUS**
 Estate Compound (=1) or Village (=2) **TYPE**
- 1.3 Identification Number **IDNO**
- 1.4 Date of recruitment // **DATE**
- 1.5 Initials of Interviewer **INT**
- 1.5 Woman's name _____
- 1.6 Woman's age (years) **AGE**
- 1.7 Women's estimated age **ESTAGE**
 (exact age unknown)

SECTION 2 Household

- 2.1 What is the woman's house constructed from?
 (room in which she sleeps)
- Walls 1=mud 2=unbaked brick 3=baked brick **WALLS**
- Roof 1=thatch 2=corrugated metal 3=tiles **ROOF**
- Floor 1=earth 2=cement **FLOOR**

- 2.2 How many people are there living in the household?
(including the woman and children) TOTPERS
- How many adults? (16 years and above) ADULTS
- How many children aged 5 or more? CHILD1
- How many children less than 5? CHILD2

Check that these numbers add up to the total

- 2.3 Who is the head of the household (financially responsible)?

1="husband" 2=father 3=father-in-law 4=woman herself
5=other

HEAD

If other specify _____

- 2.4 During the past 2 years has the woman lived anywhere
else for more than 1 month? (1=no 2=yes)

OTHRES

If yes, where was most recent?
(1=estate compound, 2=village)

TYPOTH

- 2.5 Does the family own (1=no 2=yes)

Functional radio

RADIO

Bicycle

BICYLCE

Motorbike or car

MOTORB

Chickens, ducks or rabbits

CHICK

Goats

GOAT

Cattle or pigs

CATTLE

SECTION 3 Employment and income

- 3.1 Is the woman currently employed on tea estate?
(1=no 2=yes)

EMPLW

If yes which estate 1=CAC 2=Nchima 3=Other

ESTW

If other specify _____

For how long has she been employed there?
1=<1month 2=1-3months 3=4-6months
4=7-11months 5=1-5years 6=>6years

LONGW

If no has she been employed on a tea estate
in the last year? (1=no 2=yes)

EMPLW2

Which estate? 1=CAC 2=Nchima 3=Other

ESTW2

If other specify _____

For how long?
1=<1month 2=1-3months 3=4-6months
4=7-11months 5=1-5years 6=>6years

LONGW2

3.2 What is the woman's main economic activity
over the year?

INCOMEW

1=none 2=farming 3=petty trading 4=estate work
5=other

3.3 How many people in the household apart from the
woman

are currently working on a tea estate? CURRW

if not currently working have worked
on a tea estate in the last year YEARW

3.4 What is the family's main source of income?

1=none 2=farming 3=petty trading 4=estate work
5=other

INCOMEHH

SECTION 4 Demographic characteristics of woman

4.1 To which ethnic group does the woman belong?

ETHNIC

1=Lomwe 2=Yawo 3=Chewa 4=Tumbuka 5=Sena
6=Ngoni 7=Other

4.2 What religion is she?

RELIG

1=Christian 2=Muslem 3=Other

If other please specify _____

- 4.3 Has she ever been to school? (1=no 2=yes) SCHOOL
 If what standard did she reach? STAN
 Can she read (1=no 2=yes)
 (ask her read something to confirm) READ
- 4.4 How many times has she been pregnant? PREVPREG
 (prior to current pregnancy if pregnant)
- How many ended in live births? LIVEB
 How many ended in stillbirths STILLB
 How many ended in abortions ABORT
- Check that these add up to the total**
- 4.5 How many surviving children does she have? ALIVECH

SECTION 5 Diet

- 5.1 Which of these foods are particularly good for increasing blood?
 1=no after prompting
 2=spontaneously mentioned
 3=yes after prompting meat or fish
- | | | |
|-----------------------|--------------------------|-----------|
| | <input type="checkbox"/> | KMEATFISH |
| beans/pigeon peas | <input type="checkbox"/> | KPULSE |
| eggs | <input type="checkbox"/> | KEGGS |
| nsima | <input type="checkbox"/> | KNSIMA |
| rice | <input type="checkbox"/> | KRICE |
| green leaves (cooked) | <input type="checkbox"/> | KLEAF |
| cabbage (uncooked) | <input type="checkbox"/> | KCABB |
| tomatoes | <input type="checkbox"/> | KTOM |
| oranges or grapefruit | <input type="checkbox"/> | KCITRUS |
| lemon | <input type="checkbox"/> | KLEMON |
| other fruit | <input type="checkbox"/> | KFRUIT |
| coca cola | <input type="checkbox"/> | KCOKE |
- 5.2 How many meals did the woman eat yesterday? WMEALS
- 5.3 Which of the following foods did she actually eat yesterday?
 (1=no 2= yes for each food)
- | | | |
|--------------|--------------------------|-----------|
| meat or fish | <input type="checkbox"/> | WMEATFISH |
|--------------|--------------------------|-----------|

beans/pigeon peas	<input type="checkbox"/>	WPULSE
eggs	<input type="checkbox"/>	WEGGS
nsima	<input type="checkbox"/>	WNSIMA
rice	<input type="checkbox"/>	WRICE
green leaves (cooked)	<input type="checkbox"/>	WLEAF
cabbage (uncooked)	<input type="checkbox"/>	WCABB
tomatoes	<input type="checkbox"/>	WTOM
oranges or grapefruit	<input type="checkbox"/>	WCITRUS
lemon	<input type="checkbox"/>	WLEMON
other fruit	<input type="checkbox"/>	WFRUIT
coca cola	<input type="checkbox"/>	WCOKE

5.4 Has the woman eaten meat or fish in the last week?
(1=no 2=yes)

MEATWEEK

If yes on how many days did she eat meat or fish
in the last week?

DAYSMEAT

Where was the meat from?

(1=no 2=yes)

slaughtered own

MEATSL

bought

MEATBUY

neighbours

MEATNEL

family occasion

MEATFAM

other

MEATOTH

If other specify _____

5.5 Has the woman eaten eggs in the last week?
(1=no 2=yes)

EGGWEEK

If yes on how many days did she eat eggs in
the last week?

DAYSEGG

Where were the eggs from?

(1=no 2=yes)

own poultry

EGGOWN

bought

EGGBUY

neighbours

EGGNEL

other

EGGOTH

If other specify _____

5.6 Has the woman drunk milk in the last week?
(1=no 2=yes)

MILKWEEK

If yes on how many days did she drink milk?

DAYS MILK

Where was the milk from

WHANCMH	district hospital	<input type="checkbox"/>	<input type="checkbox"/>
WHANCTE	tea estate facility	<input type="checkbox"/>	<input type="checkbox"/>
	TBA	<input type="checkbox"/>	WHANCTBA
	home	<input type="checkbox"/>	WHANCCHM
	other	<input type="checkbox"/>	WHANCOTH

If other specify _____

At what gestational age did she start ANC?
(month) STARTAGE

How many iron tablets did she receive at her
last ANC visit?
IFALAST

How many iron tablets has she been given
so far at ANC? IFATOTAL

Has she been given malaria prophylaxis
at ANC this pregnancy (1=no 2=yes) MALPROP

6.4 Apart from the ANC mentioned above has the woman
obtained iron tablets for this pregnancy from
anywhere else? (1=no 2=yes) IFAOTH

If yes number of tablets
IFAEXTRA

If yes from where?

	(1=no 2=yes)		
bought from pharmacy	<input type="checkbox"/>	IFAPHARM	
bought from grocer	<input type="checkbox"/>	IFAGROCER	
bought from market/mobile salesman	<input type="checkbox"/>	IFAMARK	
private health facility	<input type="checkbox"/>	IFAPRIV	
tea estate health facility	<input type="checkbox"/>	IFATEA	
MoH health facility	<input type="checkbox"/>	IFAMOH	
Azamba	<input type="checkbox"/>	IFATBA	
Relative or friend	<input type="checkbox"/>	IFAREL	

If tablets were bought how much was paid

per tablet (Tambala) for the most recent?
IFACOST

If the woman has not obtained any tablets at ANC or by other means go to 6.10

6.5 How many tablets a day was she advised to take? IFADOSE

6.6 Was she advised to take them with food?
(1=no 2=yes) ADFOOD

Any other advice (specify)

6.7 How many of the tablets she did actually take?
1=none 2=some 3=all TAKEALL

If she did not take all the tablets why was this?

If she took none of the tablets go to 6.10

6.8 If she took some or all of the tablets did they have
any bad effects (1=no 2=yes) BADEFF

If yes what were they

1=mentioned without prompting

2=mentioned after prompting

3=no even after prompting

nausea NAUSEA

palpitations PALP

dizziness DIZZY

unpleasant smelling breath BREATH

problems with stools STOOLS

Other OTHPROB

If other specify _____

6.9 If she took some or all of the tablets did they have
any good effects? (1=no 2=yes)
BENEFIT

6.10 At what gestational age do you think a woman should
start ANC? KNOWANC

(enter 0 for don't know)

Having started ANC how many iron tablets
KNOWIFA
do you think a woman should take per month?
(enter 888 for don't know)

6.11 Where does the woman intend to deliver
1=MoH clinic 2=district hospital 3=estate facility
4=TBA 5=home 6=other
PLANDEL

SECTION 7 Questions about the most recent pregnancy

Complete section 7 only if the woman has delivered in the last 6 months

7.1 How many months ago did she deliver WHENDEL
(0 entered for pregnant women)

Explain that you are now going to ask some questions about ANC for her most recent pregnancy

7.2 What does the woman think should happen at ANC?
1=no after prompting
2=mentioned spontaneously
3=yes after prompting

weighed and measured	<input type="checkbox"/>	KDMEAS
examination	<input type="checkbox"/>	KDEXAM
examined for lack of blood	<input type="checkbox"/>	KDPALLOR
blood pressure measured	<input type="checkbox"/>	KDBP
given iron tablets	<input type="checkbox"/>	KDIFA
given malaria prophylaxis	<input type="checkbox"/>	
KDMALPROP		
other	<input type="checkbox"/>	KDOTHER

if other please specify _____

Does she recognise iron tablets?
(1=no 2=yes) RECIFAD

7.3 Did she attend ANC (1=no 2=yes) ANCYND

If no go to 7.5

If yes how many ANC visits did she have at each of the following

	MoH clinic	<input type="checkbox"/>	<input type="checkbox"/>	DWANCMC
DWANCMH	district hospital	<input type="checkbox"/>	<input type="checkbox"/>	
DWANCTE	tea estate facility	<input type="checkbox"/>	<input type="checkbox"/>	
	TBA	<input type="checkbox"/>	<input type="checkbox"/>	DWANCTBA
	home	<input type="checkbox"/>	<input type="checkbox"/>	DWANCCHM
	other	<input type="checkbox"/>	<input type="checkbox"/>	DWANCOTH

If other specify _____

At what gestational age did she start attending ANC?(months) STARTAGED

How many iron tablets was she given at ANC altogether throughout the pregnancy
IFATOTD

Was she been given malaria prophylaxis at ANC this pregnancy (1=no 2=yes) MALPROPD

7.4 Apart from the ANC mentioned above did the woman obtain iron tablets for this pregnancy from anywhere else? (1=no 2=yes) IFAOTHD

If yes number of tablets
IFAEXD

If yes from where?

(1=no 2=yes)

bought from pharmacy	<input type="checkbox"/>	DIFAPHAR
bought from grocer	<input type="checkbox"/>	DIFAGROC
bought from market/mobile salesman	<input type="checkbox"/>	DIFAMARK
private health facility	<input type="checkbox"/>	DIFAPRIV
tea estate health facility	<input type="checkbox"/>	DIFATEA
MoH health facility	<input type="checkbox"/>	DIFAMOH
Azamba	<input type="checkbox"/>	DIFATBA
Relative or friend	<input type="checkbox"/>	DIFAREL

If the tablets were bought how much was paid

per tablet (Tambala) for the most recent? IFACOSTD

If the woman did not obtain any tablets go to 7.10

7.5 How many tablets a day was she advised to take? IFADOSED

7.6 Was she advised to take them with food?
(1=no 2=yes) ADFOODD

Any other advice (specify)

7.7 How many of the tablets she did actually take?
1=none 2=some 3=all TAKEALLD

If she did not take all the tablets why was this?

If she took none of the tablets go to 7.10

7.8 If she took some or all of the tablets did they have
any bad effects (1=no 2=yes) BADEFFD

If yes what were they

1=mentioned without prompting

2=mentioned after prompting

3=no even after prompting

nausea DNAUSEA

palpitations DPALP

dizziness DDIZZY

unpleasant smelling breath DBREATH

problems with stools DSTOOLS

Other DOTHPROB

If other specify _____

7.9 If she took some or all of the tablets did they have
any good effects? (1=no 2=yes) BENEFITD

7.10 At what gestational age do you think a woman should
start ANC? KNOWANC
(enter 0 for don't know)

Having started ANC how many iron tablets
KNOWIFA
do you think a woman should take per month?
(enter 888 for don't know)

7.11 What was the outcome of the delivery
1=singleton 2=twins 3=stillbirth 4=abortion OUTCOME

Where did the delivery occur
1=MOH clinic 2=district hospital 3=estate
clinic 4=TBA 5=home 6=other WHEREDDEL

If other please specify _____

Was the baby 1=small 2=medium 3=big BWTCAT

Birthweight if known (Kg) BWT

7.12 Has the woman obtained iron tablets since delivery?
(1=no 2=yes) SINCEDEL

If no go to section 8

If yes how many? NSINCE

If yes from where?

(1=no 2=yes)

bought from pharmacy	<input type="checkbox"/>	SIFAPHAR
bought from grocer	<input type="checkbox"/>	SIFAGROC
bought from market/mobile salesman	<input type="checkbox"/>	SIFAMARK
private health facility	<input type="checkbox"/>	SIFAPRIV
tea estate health facility	<input type="checkbox"/>	SIFATEA
MoH health facility	<input type="checkbox"/>	SIFAMOH
Azamba	<input type="checkbox"/>	SIFATBA
Relative or friend	<input type="checkbox"/>	SIFAREL

If the tablets were bought how much was paid
per tablet (Tambala) for the most recent?
IFACOSTS

For what reason were the iron tablets obtained?
(1=no 2=yes)

1=Loss of blood delivery WHYIFAD
2=Lacking blood on examination

3=Feels lacking blood
4=Other

Please specify _____

7.13 Did you take 1=none 2=some 3=all the tablets
TAKEYNS

7.14 Do you notice less bad effects of the iron tablets EFFAFTER
when you take them outside of pregnancy
(1=no 2=yes)

SECTION 8 Measurements

8.1 Does the woman have night blindness NBLIND
(1=no 2=yes)

8.2 Weight (Kg) WEIGHT

8.3 Mid-upper arm circumference (cm) MUAC

8.4 Does the woman agree to give a fingerprick AGREEW
of blood (1=no 2=yes)

8.5 Hb level
HBWOMEN

(see sampling plan on how to choose adult male)

8.6 Is there a male adult in the household? MPRESENT
(1=no 2=yes)

8.7 What is his relationship to the woman?
1="husband" 2=father 3=father-in-law
4=uncle 5=brother 6=other
RELATM

8.8 How old is he (years)? AGEMAN

8.9 Does he agree to give a fingerprick of blood AGREEM
(1=no 2=yes)

8.10 Hb level
HBMAN