

CENTRE FOR INTERNATIONAL CHILD HEALTH

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**The Epidemiology of Anaemia, Cultural Perceptions
and Dietary Practices among Postpartum Women
in Tororo District, Uganda**

**By
Louise Sserunjogi**

**Project Supervisor
Professor Andrew Tomkins**

**Dissertation submitted in partial fulfilment for the degree of
Master of Science in Mother & Child Health
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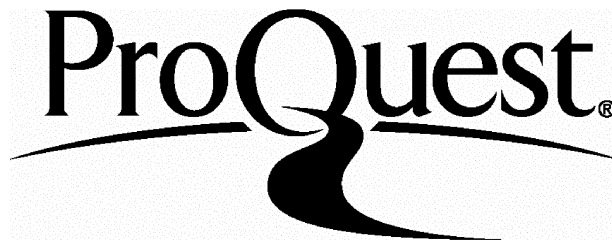
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ABSTRACT

Objectives and Study Design. The main objective of the study was to assess the prevalence and risk factors of anaemia in postpartum women, in Tororo District, Uganda. A cross-sectional study targeted a convenient sample of 349 mothers with children between the age of 6 weeks to 12 months. Quantitative and qualitative research methods were used to collect data. Blood haemoglobin (Hb) levels were measured using a Blood Haemoglobin Photometer- the 'HemoCue®. Clinical screening for anaemia was, in addition, carried out on a sub-sample of mothers to assess the sensitivity and specificity of the method.

Results. Anaemia (Hb <120g/L) was detected in 64.5% of women. 16% of the mothers had moderate or severe anaemia (Hb <100g/L). The mean haemoglobin (Hb) level for all women was 113.5 g/L. The study showed no statistically significant differences in mean haemoglobin (Hb) levels of women according to age group, postpartum age, parity and household social economic status. However, anaemia was detected more among older and multiparous women. Risk factors identified for women with anaemia (Hb <120g/L) included non-supplementation with iron during pregnancy, ($p < 0.01$); having experienced poor health since child delivery, with fever being the main symptom, ($p < 0.05$); and reported excessive bleeding at birth, ($p < 0.05$). Risk factors for moderate and severely anaemic women (Hb <100g/L) included presence of chronic lower abdominal pain, ($p < 0.05$); excessive bleeding, ($p < 0.05$); as well as fatigue and general weakness, as symptoms, ($p < 0.05$). Clinical assessment had sensitivity value of 60% for moderate and severe anaemia, and only 25% for severe anaemia alone. The method was highly specific (100%) for both cut off points.

Conclusions and Recommendations. Anaemia is highly prevalent in postpartum women during the first year postpartum. Infections, characterised by fever and lower abdominal pain; excessive bleeding at child birth; as well as lack of iron supplementation during pregnancy, were identified as risk factors, particularly, for women with moderate or severe anaemia. Prevention and treatment of infections, family planning to limit number of children, and iron supplementation for at risk women are potential strategies for control of anaemia in postpartum women. Management of excessive bleeding at community level needs to be improved.

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ACRONYMS

ACC	Administrative Committee on Coordination.
CHDC	Child Health and Development Center.
DANIDA	'Danish International Development Agency'.
DHV	District Health Visitor.
DMO	District Medical Office.
ENRECA	Enhancement of Research Capacity.
HMIS	Health Management Information System.
IDRC	International Development Research Centre.
ILSI	International Life Sciences Institute.
INACG	International Nutritional Anaemia Consultation Group.
JAMA	Journal of American Medical Association.
MCH	Maternal and Child Health.
MFED	Ministry of Finance and Economic Planning.
MMR	Maternal Mortality Ratio.
NIDS	National Immunisation Days.
OMNI	Opportunities for Micronutrient Interventions.
PCV	Packed Cell Volume.
SCN	Sub-Committee on Nutrition.
TBA	Traditional Birth Attendant.
TORCH	'Tororo Child Health' Project.
UNICEF	United Nations Children's Fund.
UNU	United Nations University.
USAID	United States International Development Agency.
WHO	World Health Organisation.

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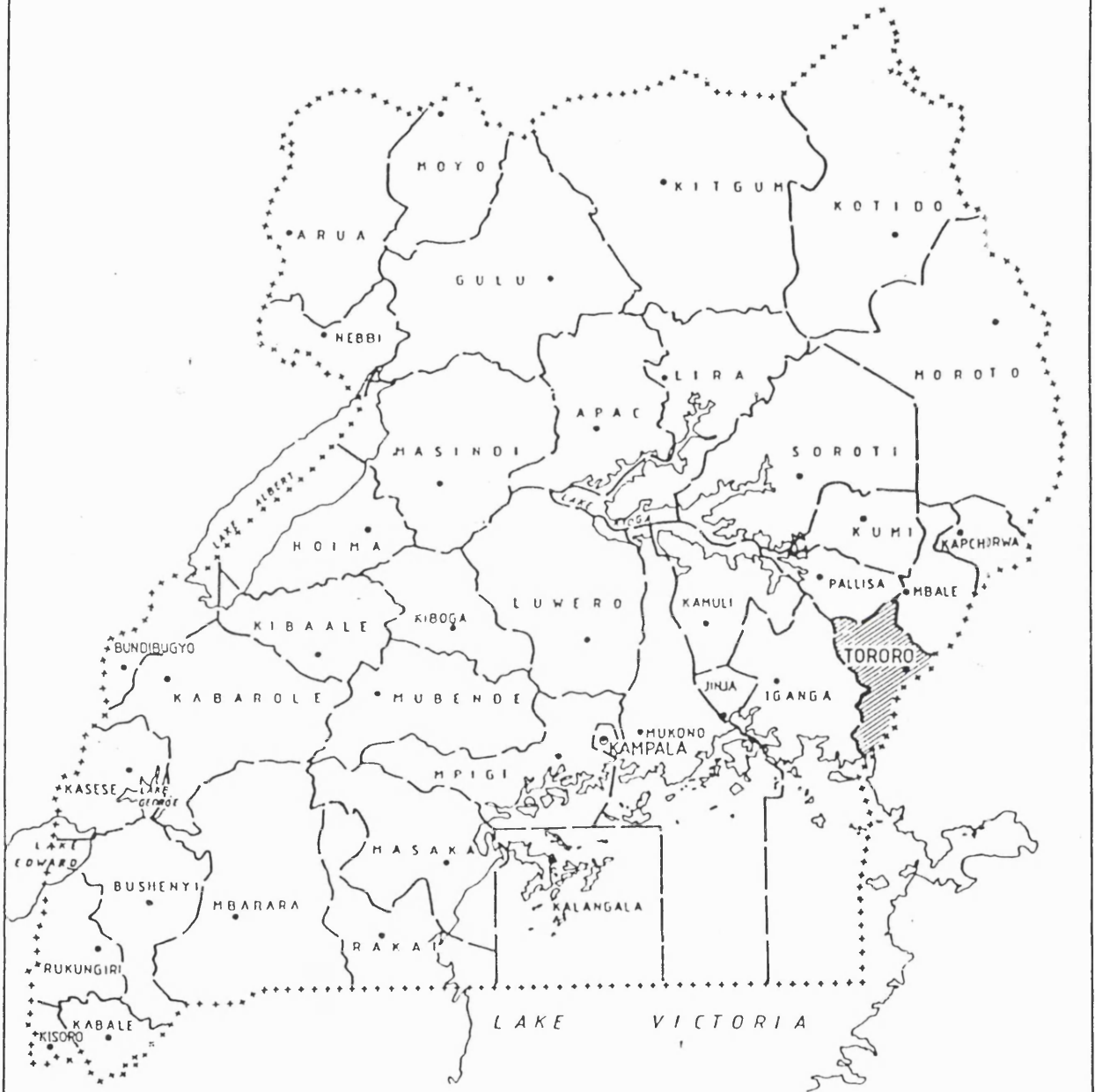
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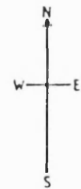
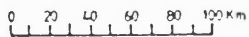
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UGANDA

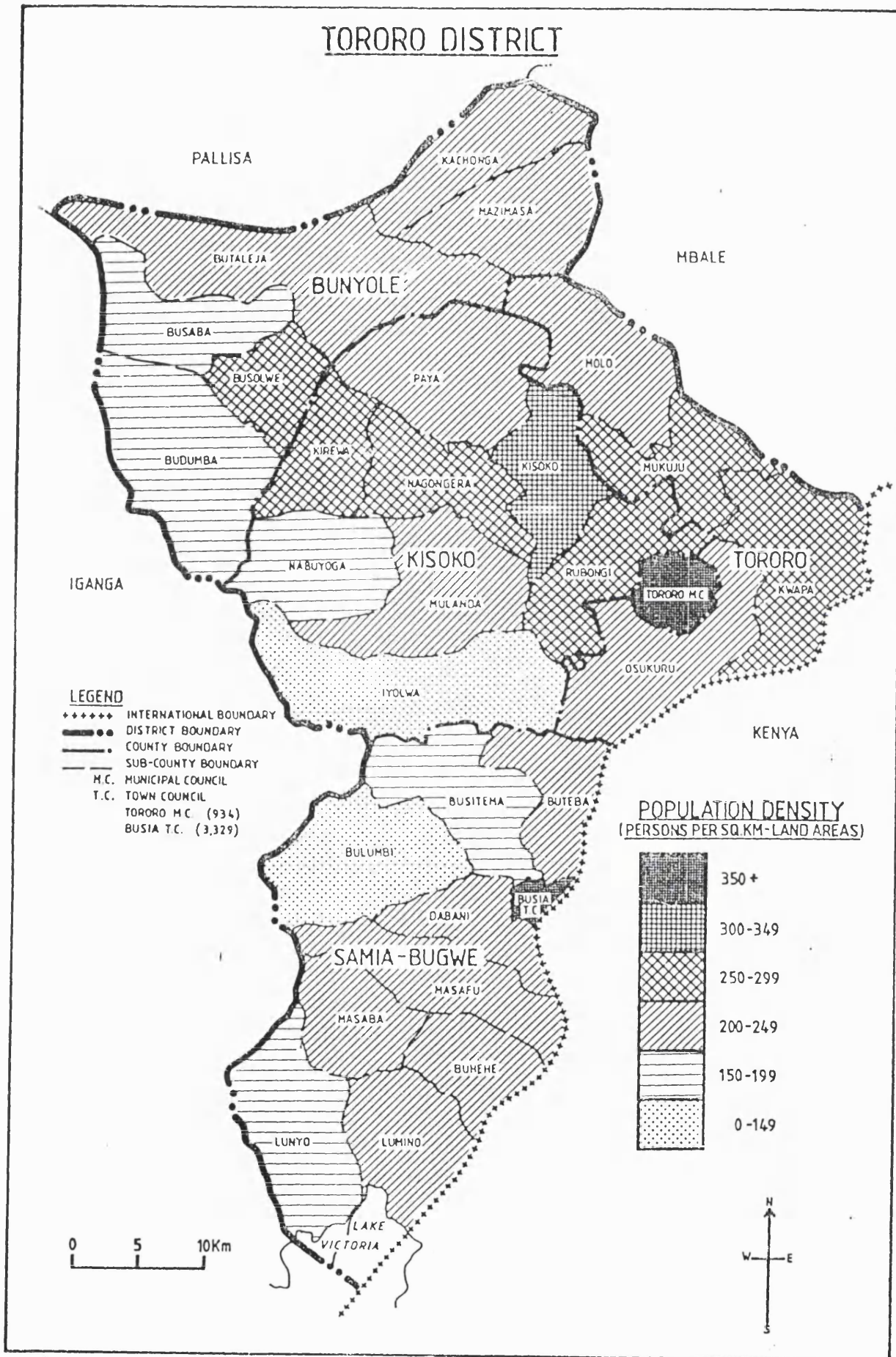


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TORORO DISTRICT



CHAPTER 1

1.INTRODUCTION

1.1 Introductory Statement.

Anaemia is one of the most neglected and most widespread nutrition-related disorder in the world, affecting particularly, women and children in developing countries. Roughly, 47% of non-pregnant women and 60% of pregnant women have anaemia worldwide, (Baker and (DeMayear 1997)

Anaemia is described as a condition in which insufficient haemoglobin is present in the blood to carry the oxygen required by an individual to perform normal activities. A non-pregnant woman, who in this case is, the postpartum woman, is considered anaemic when her haemoglobin concentration is below 120 grams per liter of blood.

Maternal mortality rates are significantly high among anaemic women, with much lower tolerance for blood loss and less effective functioning of the immune system, (Royston and Armstrong, 1998). Anaemia lowers resistance to infections and women are more susceptible to puerperal infections. They experience spells of increased tiredness and lethargy, headaches, dizziness and decreased exercise performance.

Nearly 600,000 women die a year from preventable problems related to their reproductive life. The main causes include severe bleeding, infections, abortions, and obstructed labour.

The high risk of the postpartum woman being anaemic may be due to the fact that she enters the postpartum period having exhausted the iron stores through pregnancy and child birth; she may even be a 'survivor' of one of the main conditions that could have killed other women.

Prevention of anaemia in postpartum women is, therefore, essential for reducing maternal mortality and morbidity, as well as improving work performance; at the time when the woman has to take special care of the newborn baby, as well as maintaining other pressing responsibilities for the rest of her family.

1.2 Background Information on the Study District.

1.2.1 District Profile.

Tororo District is located in Eastern Uganda. According to the 1991 Population Census (MPED, 1996a). The district has a total population of 553,574, with an annual growth rate of 2.8, compared to the national figure of 2.5. The district has a population density of 238 people per square kilometer, compared to the national estimate of 85 people per square kilometer. The district fertility rater is 6.91, and women head 53% of households.

The district has a total number of 2 hospitals and 23 health units. 44.4% of the population live within 5 kilometer radius of a health unit. According to the Health Management Information System's (HMIS) annual report in the District Medical Office (DMO), the top five main causes of morbidity and mortality in adults include malaria (26.4%), Acute respiratory infections (14.1%), trauma (injuries) 10.4%, intestinal worms (8.2%) and diarrhoeal disease (5.1%). Anaemia is represented by 3.3% of cases. (HMIS, 1997).

The immunisation coverage for 1997 was 52.2% for Polio and DPT1; 43.9% for Polio and DPT2; 35.8% for Polio and DPT3; 28.3% for measles. Coverage for women tetanus immunisation was 21.2% for dose 1; 23.4% for dose 2; 12.4% for dose 3; 7.9% for dose 5. Water and sanitation facilities are poor with 80.4% of the population having access to unsafe water sources. Latrine coverage is 59.1% (District Population Office, 1998).

1.2.2 Maternal Health.

There is very limited information on the district profile for maternal health in Tororo District. However, some national statistics and indicators will act as proxy indicators for the female population in the District. Maternal mortality ratio (MMR) for Uganda is 506 per 100,000 women (MPED, 1996b).

From the figures compiled from various community studies shown in Table 1, in Uganda haemorrhage is the second most common cause of maternal deaths ranging from 15-26% of all total deaths (WHO 1991a). Of all of the conditions shown in Table 1, excessive loss of blood would be an associated factor for conditions such as ruptured uterus, caesarian section, obstructed labour and ectopic pregnancy for any of the women that survive. Thus indicating possible occurrence of anaemia.

TABLE 1. Main Causes of Maternal Death in Uganda.

Condition	Number	Percent
Ruptured uterus	78	19
Haemorrhage	61	15
Associated with ceasarian section	50	12
Obstructed labour	49	12
Hypertensive disorders of pregnancy	21	5
Abortions	15	4
Sepsis	14	3
Ectopic pregnancy	12	3
DIRECT CAUSES (TOTAL)	300	71
Anaemia	15	4
Hepatitis	7	2
Others	21	5
INDIRECT CAUSES (TOTAL)	43	10
Unkown	77	18
TOTAL	420	100

Source; WHO (1991a). Maternal Mortality: A Global Fact Book. WHO Geneva.

A high proportion of women (95%) attend antenatal care, with the median number of visits being 4. The median time mothers start antenatal care is 5.9 months. (MPED, 1996b, Kaharuza 1998). About a half (49%) of births in Uganda benefit from antenatal care before six months of gestation. However a recent baseline survey in Tororo District showed that women attend antenatal care late in the second trimester, (Kaharuza et al 1998).

The overall median birth interval is 29 months. Total contraceptive prevalence rate is 12%. 5.2% use modern contraceptive methods. The injectable methods are most popular, while 7.0% use traditional methods which include periodic abstinence and withdrawal, (Kaharuza et al. 1998).

The median number of postpartum amenorrhoea for Ugandan women is 12.6 months. Women aged 30 or older have a larger duration of postpartum amenorrhoea of 16 months, compared to 11 months for women under 30 years of age. However, 25% of mothers are not protected at 6 months postpartum., (MFED 1996b).

The number of AIDS cases among women is higher than that of men, (Republic of Uganda 1998). This could be attributed to women's sexuality being controlled by men. In addition, at reporting time, it is the women who attend antenatal care and not men. This leads to data on women being captured more. (See Table 2 below).

Table 2. Number of AIDS Cases ('000).for Men and Women in Uganda.

1993	Women: 19.4:	Men: 15.5
1994	Women::20.1	Men: 18.0
1995	Women: 24.4	Men: 19.7
1996	Women: 21.1	Men: 18.4

Source. The Republic of Uganda (1998). Women and Men in Uganda. Facts and Figures.

Government Printer. Kampala.

A manual for reproductive health service delivery is available at all health units. It is expected to provide an integrated health service and standardised management of common maternal health problems. (Ministry of Health 1993).

2. LITERATURE REVIEW

2.1 Definition of Anaemia.

Anaemia is defined as a state in which the quantity or quality of circulating red cells is reduced below the normal level (DeMaeyer and Adiels-Tegman 1985).

For a non-pregnant woman the level of haemoglobin below 120 grams per liter is considered anaemic, while for pregnant women the cut off point for haemoglobin levels is 110 grams per liter of blood.

Table 3..Levels of Haemoglobin that Indicate Anaemia in Populations.

Age/Sex Group	Haemoglobin level (g/L).
Children 6 months-5 years	< 110
Children 6-14 years	< 120
Adult males	< 130
Adult females - non-pregnant.	< 120
Adult females - pregnant.	< 110

TABLE 4....Degree of Anaemia

Grades	Haemoglobin (g/L).
Mild	Above 100
Moderate	70-100
Severe	Below 70

For clinical examinations the corresponding grades of anaemia are shown in Table 4.

TABLE 5..Ranges for Normal Haematocrit (Hct) Values

Children under 5 years of age	Hct 38-44%
Women	Hct 37-43%
Men	Hct 40-50%

Source: Adapted from WHO Technical Report series No. 405 1968. Nutritional Anaemias, Report of WHO Scientific Group.

- DeMaeyer et al. (1989). Preventing and Controlling Iron Deficiency Anaemia through Primary Health Care.

2.2 Prevalence of Anaemia.

Anaemia affects particularly women and children (ACC/SCN, 1991). It is estimated that about 2150 million people are anaemic and about 90% of all anaemias have an iron deficiency component. About 60% of pregnant women have anaemia worldwide, (WHO 1991a, ACC/SCN 1991).

The prevalence of anaemia is highest in South East Asia (74%), and African (52%) countries, (WHO 1992a). Prevalence among school children under five years of age is estimated to be 51%;, school age children (5-12 years), 46%; adult males 26%; pregnant women 59%; and non-pregnant women 47%. (DeMaeyer et al. 1989). However according to compiled information by WHO (1992a), in Table 6 the estimated prevalence for all women in developing countries is high.

TABLE 6. Estimated Prevalence in Women.

REGION	Pregnant women	Non-pregnant women	All women.
World	51	36	37
Developing Countries	56	44	45
Developed countries	18	12	13
Africa	52	42	44
Asia	60	44	45
Latin America	39	30	31
Northern America	17	10	11
Europe	17	10	11
Oceania	71	66	67

Source: WHO (1992a). The Prevalence of Anaemia in Women. A Tabulation of Available Information. Maternal Health and Safe Motherhood. Nutrition Programme. WHO. Geneva.

There are few countries with information on mean haemoglobin levels. Table 7 shows a comparison of mean haemoglobin countries. Burundi, Somalia and Mali have mean levels below the expected levels, compared to the European countries..

TABLE 7

Distribution of Mean Haemoglobin Levels for Selected Countries in Africa and Europe.

Country	Mean Hb level (g/L)	Prevalence (%)
Burundi	111	69
Somalia	112	71
Burkina Faso	120	Not available
Gambia	120	48
Mali	117	Not available
France	140	Not available
Denmark	134	Not available
USA	138	Not available

Source: WHO (1992a). The Prevalence of Anaemia in Women. A tabulation of Available Information Maternal Health and Safe Motherhood. Nutrition Programme. WHO. Geneva.

2.3 Iron Requirements. Daily requirements for iron for all women of child bearing age are 48 mg per day; 76 mg for pregnant women, and 26 mg for lactating women, (King and Burgess 1995). In pregnancy a total of 500 to 600 mg of additional iron is needed, especially in the third trimester, (INACG, 1997). The required amounts of absorbed iron needs, cannot be met from food iron even if iron fortification is in place, (Viteri 1994).

During lactation the absence of menstrual blood loss is partially offset by the secretion of about 0.3mg of iron per day in breast milk, in addition to the basal losses. A woman's mean requirement during the first six months postpartum is estimated to be about 1.3 mg of iron per day (DeMeayer et al 1989). The iron requirements of menstruating women are in excess of 1.25 mg per day. Importantly, multiparous women tend to have greater menstrual losses that increase with parity. (Royston 1982; Viteri, 1994).

2.4 Methods For Assessing The Degree of Anaemia

The most common method for detecting anaemia is by examining the mucous membranes; measuring haemoglobin (Hb) level or packed cell volume (PCV) haematocrit (Hct) levels, and dietary intake.

2.4.1 Clinical signs using mucous membranes. Mucous membranes are those parts of the body where the blood vessels are close to the surface of the skin the membranes examined include the lower eyelid; the tip of the tongue; the everted lower lip and the fingernail. The use of clinical signs requires minimal training and can be used at village

level health centers, however this method is highly subjective. (DeMaeyer et al 1989; OMNI 1996).

The method although widely used had been found to have limited sensitivity power for diagnosis of moderate and severe anaemia or for severe anaemia alone, especially for conjunctival pallor, (Meda et al 1996, Sanchez-Carrillo 1989; Zucker et al. 1997). However, Zucker et al. (1997) found severe nail or palm pallor to be more sensitive for severe anaemia compared to conjunctival pallor.

Other qualitative methods recommended include inquiring from the mother whether or not she suffers from breathlessness, or feels tired, as an indicator of anaemia, (Mothercare Matters, 1993).

2.4.2 Haemoglobin Level. Haemoglobin concentration is the most widely used screening test for iron deficiency anaemia.(DeMaeyer and A-Tegman 1985; Gibson 1990). The major limitation for the method include;

- The haemoglobin concentrations for men is on average about 20g/l higher than in women, but this diminishes gradually with age.
- Individuals of african descent have haemoglobin values which are 3 to 10mg/l lower than Caucasians, irrespective of age and income.
- The method has low specificity because low haemoglobin values also arise in chronic infections and inflammations, haemorrhage, protein energy malnutrition, pregnancy and other states of overhydration or acute plasma expansion.
- Elevated haemoglobin values occur in conditions of dehydration.

- Cigarette smoking is associated with higher concentrations of haemoglobin, (3 to 5 g/L) in adults.

- Haemoglobin values tend to be lower in the evening than in the morning, by up to 10g/L.

2.4.3 Packed Cell Volume (PCV) (Haematocrit).

Measurement of PCV needs a high speed centrifuge and is often used when there is an experienced technician. This method requires whole blood being collected in a micro hematocrit tube and centrifuged at high speed. It is useful at health center level but dependent on electricity or battery power, which may not be affordable in most health centers. Sensitivity is high (>90%), (OMNI 1996; Gibson 1990).

2.4.5. Serum Iron, TIBC, and Transferrin Saturation. Serum iron, total iron binding capacity (TIBC), and transferrin saturation are particularly useful for differentiating between nutritional deficiencies of iron and iron deficiencies arising from chronic infections, inflammation, (Gibson, 1990).

The limitations of the method include;

- Age: Serum iron levels rise during childhood, whereas total iron-binding capacity falls.
- Women taking oral contraception have elevated levels of binding capacity characteristic of iron deficiency.

2.4.6 Serum Ferritin. Serum ferritin is the only iron status index that can reflect a deficient, excess and normal iron status, (Gibson, 1990). A low concentration of serum ferritin is characteristic only of iron deficiency.

The limitations include;

-There is an elevated concentration of ferritin in the serum in conditions of infection, inflammation therefore; the method should not be used as an index of iron status in countries where iron deficiency coexists with infection or inflammation.

2.4.7 Dietary Assessment. This is a quantitative way which only gives descriptive information about usual consumption patterns (Gibson 1990). It is an indirect approach for estimating the status of iron nutrition. Studies in adults have shown lack of correlation between estimated dietary iron intake and iron nutritional status (Yip et al 1996)

2.5 Causes of Anaemia.

Common causes of anaemia include nutritional deficiencies of iron, folate, vitamin B12, vitamin A and protein (Baker and DeMaeyer et al. 1979, Royson 1982,).

2.5.1 Diet

Dietary quality rather than quantity has been proven to be the determinant of impaired iron deficiency, (Baker and DeMaeyer 1979; Allen 1991, World Bank 1994).

Dietary iron is derived from two sources, the haem iron that is found chiefly in animal foods, with the exception of egg and milk. Non-haem iron is derived from foods of vegetable and cereal origin that contain iron absorption inhibitors such as phytic acid and

tannins (Disler 1975, DeMaeyer et al 1985; Bothwell et al 1989). Only 3% of iron in the non-haem foods like green vegetables, millet, sorghum beans and tea are absorbed compared to 10% from the meats. Haem iron and ascorbic acid mainly found in fruit promote absorption of non haem iron, when eaten at the same time. (Hallberg, 1989,) fermentation and germination of cereals improve iron absorption by hydrolyzing most of the phytate (Derman, et al 1980, Sandberg 1996).)

2.5.2 Folate Deficiency. Folate is a B vitamin needed to make healthy red blood cells. Folate deficiency may occur because of a poor diet, malabsorption of the vitamin, pregnancy when needs increase, or in sickle cell disease. It has been found to produce increased susceptibility to infections. Good sources of folate are liver, kidney, fish fresh vegetables especially dark green leaves, beans and groundnuts.

2.5.3 Vitamin A Deficiency. Vitamin A is involved in mobilising stored iron. and poor vitamin A status has been reported to be associated with altered iron metabolism and iron deficiency anaemia; (Suharno et al. 1993). Vitamin A and iron supplementation significantly increased haemoglobin levels.

2.5.4 Malaria. Malaria causes anaemia because the infectious agent plasmodium invades and destroys red blood cells. Malaria is believed to be the primary cause of severe anaemia (<70g/l) in at least 50% of subjects living in malaria endemic areas, Harrison 1982; Fleming and Werblusker 1982);; Gillespie and Johnson, 1998). Malaria accounted

for over 50% of children with severe anaemia, (Menendez et al. 1997), and in adults (Lutalo and Mabuwa 1990).

2.5.5. Sickle cell disease. This is an inherited lifelong condition in which the red cells are easily destroyed the condition increases the requirements for iron and folate, (WHO 1991b).

2.5.6 Intestinal Parasites. Intestinal blood loss due to hookworm and schistosomiasis significantly contributed to moderate and severe anaemia in area where they are endemic (Baker and DeMaeyer 1979, Srinivasan et al 1987, Stoltzfus et al 1997). The intensity of infections that can be experienced before the onset of anaemia depend on the iron balance of individuals (Crompton and Whitehead 1993).

2.5.7. HIV/AIDS. and Other Infections. Anaemia is strongly associated with HIV infections. Up to 70% of people with AIDS are anaemic (Gillespie and Johnston 1998). It may be associated with the acquisition of HIV infection through blood transfusion, and HIV infection may be a cause of anaemia.. In a recent study in Kenya, 55% of women were found to be anaemia and 6% had severe anaemia. Severely anaemia women were significantly more likely to be HIV positive than other women, (Zucker et al, 1994).

Symptoms suggestive of other infections in developing countries include lower abdominal pain, high fever and foul discharge as shown inTable 8.

TABLE. 8 .Percent of Women Reporting Symptoms of Genital Infection

Country	Lower abdominal pain (%)	High fever (%)	Foul discharge (%)
India	4.4	5.3.	0.5
Egypt	21.9	15.5.	9.8
Bangladesh	19.0	16.5.	10.2
Indonesia	15.2	13.4	4.5

Source: WHO (1998). Postpartum Care of Mother and Newborn: A practical Guide. (Technical Support), WHO. Geneva.

Delivery practices of traditional birth attendants (TBAs), and opportunistic infections in immuno-suppressed women with HIV/AIDS are strongly correlated with the above symptoms. (Royston and Armstrong 1989, WHO 1992c; WHO 1998).

Postpartum Haemorrhage.

Postpartum haemorrhage (PPH) is defined as the loss of 500 mls or more of blood from genital tract after the birth of the baby, (WHO 1990). Among the common causes of postpartum haemorrhage are retained placenta and genital tract injury or cuts made by traditional practitioners in Africa. Blood loss at cesarian section is also a common cause.

Menstrual loss. On average a healthy woman loses 40 ml of blood each month. This is equivalent to an average daily loss of 0.6 mg, (DeMayerar at al 1989), menstrual loss is

also affected by intrauterine device (IUDs) and hormonal contraceptives, where the former increases the average menstrual loss by over 35%, and the latter decreases the blood loss by about 50%, (Royston 1982).

2.6 Interventions and Approaches To Control and Prevent Anaemia in Postpartum

Women.

General principles for controlling anaemia include supplementation with iron food fortification, dietary modification, control of malaria and intestinal parasites. However for the postpartum woman the following are crucial.

2.6.1 Supplementation with Iron and Folate.

Guidelines by INACG, WHO and UNICEF for iron supplementation every pregnant woman should have 60mg iron with 400mcg folic acid daily for 6 months of pregnancy, and continuing to 3 months postpartum. It is only in cases where the prevalence of anaemia is less than 40% that pregnant women get iron supplements for 6 months during pregnancy only. (Stoltzfus, Dreyfuss 1998). It is also recommended that if 6 months duration cannot be achieved in pregnancy, continue to supplement during the postpartum period for 6 months, or increase the dose to 120 mg in pregnancy.

Elevation of haemoglobin by iron supplementation resulted in increased work capacity in tea pickers after treatment with 200mg of ferrous sulphate given daily for a month, (Edgerton, 1981). However, the effectiveness supplementation programmes is constrained by the problem of non-compliance. Most studies of non-compliance due do

gastrointestinal side effects have mainly been on pregnant women, (Charoenlarp et al 1988; Barnar et al. 1969), however there is need to confirm this in postpartum women.

2.6.2 Control of Parasitic Infestations.

Complementary parasite control measures in pregnancy should be put in place. According to guidelines by INACG, WHO, UNICEF in areas where hookworms are endemic (prevalence 20-30% or more anthelmintic treatment once in the second trimester of pregnancy should be given. In areas where hookworms are highly endemic (prevalence more than 50%). Anthelmintic treatment should be repeated in the third trimester of pregnancy, (Stoltzfus, Dreyfuss 1998). WHO, through the Mother-Baby package recommends routine single dose of anthelmintic (eg. 500mg Mebendazole) to postpartum women, (WHO 1994a; Stoltzfus and Dreyfuss 1998). However severely anaemic women will need 120mg iron and 400 mcg folic acid daily for 3 months.

2.6.3 Malaria Control

Recommendations for malarial prophylaxis to prevent anaemia have mainly been given for pregnant women but it extends well in the postpartum period. Malarial prophylaxis is taken one at the first antenatal attendance with 120 to 240 mg iron and folic acid daily through out pregnancy to 6 weeks postpartum .(Flemming et al 1986; Stoltzfus and Dreyfuss 1998).

2.6.4 Reproductive and Obstetric Interventions

Preventing adolescent pregnancies, reducing the total number of pregnancies and increasing the time between pregnancy, will contribute to the control of anaemia, (Allen, 1994). Promotion of exclusive breast feeding for about 6 months followed by breast feeding with complementary feeding into the second year of life will contribute to control of iron deficiency in women of reproductive age, (Stoltzfus, Dreyfuss 1998).

Routine single dose of oral anthelmintic treatment for the postpartum woman, as well as early detection and management of postpartum complications. Information and services for family planning, STD/HIV prevention are also recommended. (WHO 1994b). Lactating women are advised to be given 200,000 IU of Vitamin A once during the first month after delivery, (WHO 1994c). However, This has recently been revised to be within 8 weeks, (BASICS 1998).

2.7 Consequencies of Anaemia In Postpartum Women.

Common complaints in the postpartum period include infections, backache, frequent headaches, pelvic pains, depression, anxiety and extreme tiredness.

2.7.1 Maternal mortality and morbidity. Anaemia has severe consequences among women in both their reproductive and productive roles. Anaemia is a major contributor or sole cause of postpartum death, (WHO 1962b). Maternal mortality rates are significantly higher among severely anaemic women. Direct anaemia related mortality is due to heart failure, shock or infections that take advantage of the woman's impaired resistance (Royston and Armstrong, 1989). Anaemia contributes significantly to mortality when

women are unable to reach a health care unit because of fatigue and lethargy, (Harrison, 1982). Anaemic women are also poor anaesthetic and operative risks. After surgery wounds may fail to heal promptly or may break all together, (Royston and Armstrong, 1989).

Anaemia may affect cell-mediated immunity, even before frank anaemia. Lowered resistance may manifest itself in increased morbidity from diarrhoea, respiratory and other infections (Basta et al 1979). In the case of bacterial infections, normal bone marrow function is suppressed so that even if relevant nutrients are all present in the body, their conversion to haemoglobin cannot take place until the infection is brought under control, (Royston and Armstrong, 1989).

Clinical anemia was a common cause of mortality and morbidity in women with sepsis, obstructed labour and postpartum haemorrhage, (Kampikaho and Irwig 1991; Ogunniyi and Falenyumi B L 1991; Haesterman et al. 1996; Dare et al 1998).

2.7.2 Lowered Physical Activity. Energy metabolism, particularly in muscle cells, is impaired by iron deficiency anaemia as is the ability of blood to transport oxygen around the body. Physical work is therefore, reduced by anaemia (Viteri and Torum, 1974). Women with low haemoglobin levels were more likely to report feeling of low energy, breathlessness, faintness/dizziness and had a greater tendency to report other physical problems like chest pain, palpitations, and abdominal pain,(Paterson, et al 1994). Work

output in less physically strenuous tasks had significant associations between functional deficits and anaemia, in factory women, (Scholz et al, 1997).

CHAPTER 2

2. HYPOTHESIS, RESEARCH OBJECTIVES AND STUDY DESIGN

2.1 Hypothesis

Postpartum anaemia is highly prevalent, and has defined risk factors.

2.2 Study Objectives

2.2.1 Main Aim

To assess the prevalence of anaemia, cultural perceptions and dietary habits of postpartum women.

2.2.2 Specific Objectives

- To determine blood haemoglobin (Hb) levels of post-partum women.
- Determine the risk factors for anaemia among the women.
- To assess their knowledge and perceptions on the existence and significance of anaemia among women.
- To identify medical, cultural, dietary practices and other interventions that are used to correct anaemia in women.
- To assess post-partum health care offered to women, and how much it costs.
- To identify key issues on maternal anaemia, which need to be addressed within the national micronutrient programme
- To compare clinical diagnosis of anaemia with the results of the haemoglobin measurement.

2.3 Study Design

This was a cross sectional study conducted to assess the epidemiology of anaemia in postpartum women bringing their children for immunisation during the first year of a child's life.

2.4 Study Population

A convenient sample of any of the mothers falling under the inclusion criteria below was sampled for the study.

Inclusion Criteria

All women attending immunisation clinics for DPT1; DPT2; DPT3 and for measles. The children's ages would be between 6 weeks and 12 months; (born between 30 June 1997 and 30 May 1998).

Exclusion Criteria.

Mothers who had brought children to the clinic for services other than immunisation were excluded from the study.

Women who did not agree to sign the consent form were not included in the study.

2.5 Study Justification.

A woman's reproductive years, is a period of nutritional stress, related to frequent, closely spaced pregnancies where requirements for various nutrients increase. This study intends to emphasise the need to maintain adequate health and nutrition during the immediate period following child birth. This is the time the woman experiences a lot of stress not

only from nutrient loss but also from the physical roles she has to play to care for her family. After pregnancy therefore the woman needs to start building a 'threshold' of nutritional resources that will enable her to accomplish all her caring role.

There is no published community study in Uganda that has addressed the magnitude of anaemia in women. Most of the available information is health-center based. The study will explore and recommend strategies to control anaemia in postpartum women.

CHAPTER 3

METHODOLOGY

3.1 The Consultation Process

3.1.1 Clearance with the Child Health and Development Centre

A meeting was held with the Director and administrator of the Child Health and Development Center (CHDC), Makerere University, to introduce the research proposal and discuss the logistics and administrative issues of the project.

The CHDC is already cleared by the National Council for Science and Technology to carry out community research in Tororo District under the TORCH (Tororo Child Health) project and the ENRECA Health network funded and supported by DANIDA. There was no need to register this particular research activity again with the National Council for Science and technology

3.1.2 Visit to the Research District. It was necessary to visit Tororo Districts where data was to be collected. The research proposal was presented and discussed with the District Medical Officer (DMO), who then appointed two district coordinators to work with the research team. A medical assistant and an assistant health visitor, both of whom have worked extensively with the communities, were selected. These officers were conversant with the local languages.

In addition to these two, a laboratory technician working with the district vector control programme was hired to work with the team for the haemoglobin assessment component of the study.

3.1.3 Selection of study sites. The initial consultations on selection of health clinics for the study proved difficult, because the immunisation coverage of many of the areas is very low. It was therefore deemed necessary to identify health units that are known to have a larger turn-up of mothers for immunisation clinics.

The immunisation days for the individual identified health units were noted, and it was decided that these units be visited in order to confirm their coverage and clinic-operation days. All health clinics were visited and the potential research sites were confirmed. The timetable for data collection was then generated.

3.2 Training and pre-test of survey instrument

3.2.1 Training. The research assistants were introduced to the objectives of the study, and the criteria for selection of study subjects was outlined.

The study questionnaire was explained to the research assistants, and each question was reviewed in detail, translating it into how it could be asked in the local languages.

3.2.3 Pre-testing of questionnaire. The Merikit health centre in Tororo County was selected as the pre-test site. The whole exercise was explained to the mothers who had turned up for the immunisation clinic on that day, by the medical assistant in-charge of the centre. It was made clear that mothers would not have to sign the consent form if they did not wish to participate in having their blood tested for anaemia. Because of the strict control on the cuvettes for the main study the laboratory assistant was able to practice the technique of measuring haemoglobin using the HemoCue®, on only 10 mothers.

The issue of letting mothers take the consent form raised a commotion when one husband came and complained as to why his wife's blood was being tested. The health centre staff and mothers present resolved that only those who wished to participate should participate. Later it was decided that mothers leave the consent form at the health center.

3.3 Preparation for Data Collection

3.3.1 Pre-visit to study sites. The data collection time table was reviewed with the DMO, and was confirmed. Letters of introduction were prepared by the DMOs office, for distribution to local leaders and health workers in the study sites.

The sites were visited and dates for data collection and officers to assist in at the clinics were confirmed.

3.3.2 Editing of Questionnaire. The questionnaire did not require much editing, but a question on pregnancy status was removed, as this was found idle through out the exercise.

3.4 DATA COLLECTION

A number of survey methods and participatory techniques were used to elicit both quantitative and qualitative information.

3.4.1 Structure Interviews.

The information collected using a questionnaire (Appendix 1), included;

Demographic, social and economic characteristics. Each mother had to give her name, tribe and age. The child's date of birth was recorded from the immunisation card of the mother, if available, or the mother had to indicate the date of birth of the child. The child's age indicated the postpartum age of the mother. Marital status meant whether or not the mother was living with a partner or she was alone as head of the household; whether she was a full time housewife or engaged in any economic activity or employment out side the home. The main source of income for the household referred to any of the economic activities the household depends on to generate income for household needs.

Health status of the mother. The mother's health status was reviewed by inquiring whether or not she had had a fever, a week prior to the study. Her general health status since the birth of the youngest child; the presence of pelvic inflammatory disease indicated by lower abdominal or smelly discharge experienced at different periods during the year of child birth were also asked about.

Obstetric History. The mother reporting the number of children ever born to her determined her parity. Past obstetric history was related to antenatal clinic attendance, number of visits, and place. Services that the mother received at the antenatal clinic, as well as information on bleeding and malaria during pregnancy were recorded. Information was also collected on place for child delivery, common complications such as excessive bleeding, sepsis, and hypertension. Mothers had also to indicate any postpartum health care that was sought. Information on cost of antenatal care for the first visit was requested for in order to have an idea about the cost of health care and cost-sharing policy in the district.

Dietary Practices. A weekly food frequency on consumption of selected foods was conducted. The foods were selected from those commonly eaten in the area, and because of their direct influence on the anaemia status of individuals. Information on whether mothers drink tea with or in between meals was also collected.

Cultural practices. Information was collected on foods prohibited or promoted during and after pregnancy, as well as traditional practices such as soil eating.

3.4.2 Focus Group Discussions. (See Appendix 4)

Three focus group discussions were arranged for mothers, and two for Traditional Birth Attendants (TBAs).

The focus group discussions were conducted using a discussion guide. Appendix 4, for mothers and Traditional Birth Attendants.

The discussions were aimed at generating information about;

1. Post-partum mothers

Mothers' experiences in regard to antenatal care attendance, and services, as well as child delivery experience.

Their knowledge and perceptions of anaemia and what they do about it.

Utilisation of antenatal and post-natal services.

The effects of cost sharing.

2. Traditional Birth Attendants (TBAs).

Their knowledge and perceptions on anaemia among mothers

Remedies they use to control or treat anaemia.

Detection of anaemia in mothers.

3.4.3 Key Informant in-Depth Interviews.

In addition to information given by individual mothers. Members of the community with special knowledge, and some of those involve in policy and administration of district Maternal and Child Health (MCH) and related programmes were interviewed as key informants, using the Key informant Guide, (Appendix...).

The people interviewed included:

The District Medical Officer (DMO)

The District Health Visitor (DHV)

The District Inspector of Drugs

The Hospital Matron

An elderly TBA woman in the area.

A nursing officer at a Health Centre

3.4.4 Observations.

Three observation lists were used to observe different aspects of health care for women at the health centers visited. (Appendix 6).

3.4.5 Screening for Anaemia

3.4.5.1 Use of The HemoCue.

A laboratory Assistant was hired from the District Vector Control Programme to assist with the use of the HemoCue® for the measuring of Haemoglobin levels of mothers.

Equipment used include;

HemoCue Blood Hemoglobin Photometer

HemoCue B-Hemoglobin Cuvettes

Control Cuvette

Rubber gloves

'Unistik' for pricking the finger.

Cotton wool

Surgical spirit

Disposable bag for disposal of cuvettes, pricking device, and cotton swab.

Instruments Used

1. The HemoCue®

The 'HemoCue' is Blood haemoglobin Photometer, which is battery operated and used disposable cuvettes. Whole blood is converted to 'azine methomoglobin' in a disposable, chemically treated cuvette and then measured photometrically at a specified wavelength. The haemoglobin value is displayed digitally. The main limitation is that the cost of the instrument is high, and uses only expensive disposable cuvettes, It has sensitivity of 85% in the field conditions, approaching 100% in controlled laboratory settings (OMNI 1996), and creates solid waste.

The determination of haemoglobin concentrations is relatively simple and inexpensive and can be done in the field by using a Hemocue (Van Schenck et al 1998). The Hemocue is a portable, battery-operated photometer with disposable cuvettes, which is durable and reliable.

2. Unistik ®(Sterile single dose).

The 'Unistik is a Registration Mark ® for a device used to prick the finger to collect blood this is a single use capillary blood sampling devise, composed of a lancet which operates the needle that pricks the finger. It is used once for each individual.

3.4.5.2 Procedure for measuring haemoglobin .

- An explanation was given to a group of mothers waiting to be assessed as to what exactly was going to be done to them. Most of them of course expected pain, and were fearful.
- Wearing gloves, the left hand was asked for and the middle finger was cleaned with a cotton wool swab saturated with surgical sprit. This was then left to dry in air.
- The finger was rubbed gently and then pricked using the 'Unistik'.
- The first drop of blood is wiped away, and blood is collected using the cuvette put in the middle of the new blood drop.
- When cuvette is filled, excess blood is wiped off, and is inserted in the cuvette holder and then into measuring position.
- Mother's finger was covered with a clean swab of cotton wool and mother asked to leave it for sometime for the blood to stop flowing. The cuvettes and the cotton swabs are then put in the disposable bag.

3.4.5.3 Clinical Assessment

Two nurses and three medical assistants were involved in carrying out of clinical assessment for anaemia in five health units. The clinics were Busolwe Hospital, Merikit health centre, Kwapa health center, Nagongera Health center and Paya Health center

The total number of mothers assessed clinically was 170. The criteria for selection of only 5 health units out of the ten visited was according to the availability of a health worker (nursing/widwife or a medical assistant), who was not too busy with other clinic activities, to participated in the clinical assessment exercise.

3.4 6. Flow of Research Activities at the Health Centre.

Registration for both child immunisation and Anaemia study on the same table

Mother collects 'study card' with her name and age of child recorded from Child Health Card, if available.

Consent Form (Appendix 2) signed and left at registration desk.



Mother presents 'study card' with her name and child's date of birth to clinical officer for assessment of mucous membranes for anaemia*



The clinical officer records on mother's 'study card' degree of anaemia (whether; nil, mild, moderate or severe)



Mother moves to HemoCue station with 'study card with information on the degree of clinical anaemia.



Mother presents 'study card' to the laboratory. assistant and her name is recorded on the Haemoglobin record register (see Appendix 3).Clinical degree of anaemia is also registered on the same form.

Haemoglobin is measured on the HemCue and recorded on the register form.

Mother leaves the HemoCue station and proceeds to the interview desk.



After completion of structured interview,

mother returns to HemoCue station to get results of her haemoglobin level; advice on foods to eat and supplementation with iron, if found with haemoglobin level of less than

120g/l.



The mother would be allowed to go with her 'study card', and proceeds for the immunisation station for the child.

The nursing officers and medical assistants were allowed to review the screening records to assess how well or poorly they had done. On the whole they had done very well.

3.4.7 Review of Documents

Baseline data survey data on the district, district annual reports and population data were reviewed to collect information on issues that were not assessed through the structured questionnaire. Information included the district population profile; national and district

maternal health indicators; immunisation coverage; contraceptive use, hygiene and sanitation and common diseases for adults in the district.

3.5 Data Management

Quantitative data from the interviews with mothers was coded, entered and cleaned by the principal investigator with assistance from a qualified statistician at the Child Health and Development Centre, Makerere University, Kampala. Data was entered and analysed using a statistical package software of Epi-Info 6 (Center for Disease Control and Prevention, Atlanta, GA, USA). Categorical variables were analysed using frequency distributions, mean distributions, and differences among the study population were determined by Chi-square tests. Regression analysis was conducted on identified continuous variables. Sensitivity and specificity and predictive values for the anaemia screening methods were calculated using a manual calculator for moderate and severe (Hb <99g/L) anaemia assessment together, as well as assessment for severe anaemia (Hb <70g/L), alone.

3.6 Quality Control.

- The study instrument was pre-tested before main data collection exercise.
- Interviewers and laboratory technician were trained before data collection
- It was extremely important to ensure that all research activities be completed within the same month July, in order to guard against recruiting mothers the second time when they bring their child for subsequent immunisation visits.
- Only mothers who brought children for immunisation were recruited for the study.

- Mothers bringing children for other health services were not recruited for the study.
- The child's date of birth, where possible, had to be verified from the Child Health Card, in mother's possession. Mothers reporting for the first time would give the known date of birth verbally. There was no mother who was found not to know the child's date of birth.
- Principal investigator carried out close supervision of all research activities.
- All data and records were edited while still in the field.
- Research information was collected using both qualitative, quantitative and review of district documents and reports.
- A laboratory technician with knowledge of handling mothers was hired to concentrate on operating the HemoCue for haemoglobin levels' estimation.
- Clinical assessment had to be done before estimation of haemoglobin by HemoCue to avoid bias through comparison of results.
- The HemoCue was calibrated daily before work started using the control cuvette, and it never deviated from the required range of ± 3 , as indicated by the operating manual.

3.7 Study Limitations

Study Subjects

- Immunisation coverage and health clinic attendance in some Counties is very low. It was therefore only possible to recruit mothers from health centers that were known to have better client attendance.

- The number of mothers bringing children for immunisation after four months of age is low; this necessitated special targeting for these older children in all health centers.
- Mothers attending immunisation clinics may not have been a fair representation of all postpartum women. This criteria would leave out mothers who lost their babies at an earlier age; mothers who do not bring children for immunisation; mother who were too sick or too weak to come to a health unit.
- It was not possible to confirm mothers who were pregnant, as this question remained idle during the pretest exercise, and was omitted in the final questionnaire.
- The study relied on the mothers' reporting for determination of 'excessive bleeding'.
- It was left to the health workers' discretion to identify mothers they thought might have sickle cell anaemia.
- It was not possible to know if there was heavy hook worm infestation associated with anaemia.

Study Sites.

- Some of the clinics would not have enough mothers to interview or assess, so this necessitated rushing to another clinic operating on the same day to recruit more mothers for the study.

Research Methodology.

- Clinical assessment was done by five different health workers, by the analysis took the collective effort to measure sensitivity and specificity of the method.

- Information on health status, dietary practices was very subjective. It would be difficult to confirm whether the mother correctly reported having had malaria, fever, abdominal pain, vaginal discharge, excessive bleeding, or had actually eaten the foods mentioned.
- The weekly food frequency information may not be a true prediction of seasonal or habitual food intake of essential nutrients.
- The study relied on mothers to determine or estimate the extent of bleeding to be categorised as 'excessive bleeding'.

Timing

The study was done two weeks before the National Immunisation Days (NIDS), so many health officers both in health centers and in the DMO's office were out either training for the NIDS or mobilising resources for it. There was observed shortage of staff in the health clinics, which could not be a true revelation on staffing needs.

CHAPTER 4

RESULTS

4.1. DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF RESPONDENTS

4.1.1 Place of Residence.

A total number of 349 mothers were included in the study from 4 counties in Tororo Districts. The majority (55.0%) of mothers were from Tororo County; 20.3% from Samia/Bugwe; 15.2% from Kisoko; and 9.5% from Busolwe County, as shown in Table 9, Tororo County was over sampled because of the large turn-up of mothers for child immunisation in the clinics visited, during the three weeks of the study.

Table 9. Distribution of Study Population by County.

County	Number	Percent
Tororo	192	55.0
Samia/Bugwe	71	20.3
Kisoko	53	15.2
Bunyole	33	9.5
TOTAL	349	100

4.1.2 Marital Status, Occupation and Ethnicity.

294 (84.2%) of mothers were in marriage unions, while 15.8% were single mothers.

96.5% of mothers were housewives, having no employment outside their homes; 3.5%

were in paid employment, while 3 mothers were young girls still leaving and depending on their parents for support.

The main tribes represented in the study were Chapadhola (37%), Itesot (28.7%), Samia/Bagwe (20.1%), Banyole (8.6%), 5.8% were represented by mothers from Bagishu, Basoga, Baganda and Bakiga tribes.

4.1.3 Age of the Mother and the Child.

The mean age of mothers was 23.8 years, with a range of 14 to 45 years. As shown in Figure 3, one in every five mothers (20.9%) were aged below 20 years. The largest proportion (43.3%) were aged between 20 and 24 years, while only 16.6% were thirty years and above.

4.1.4 Mothers' Postpartum Age.

The age of the child represented the mother's postpartum age. As shown in the Table10 children aged four months and below, represented the largest group (40.9%) of the child study population.

The majority (98.0%) of mothers were still breastfeeding their children. The seven mothers who were not breastfeeding were distributed throughout all mothers' age ranges and parity.

Figure3 Mothers' Age Distribution.

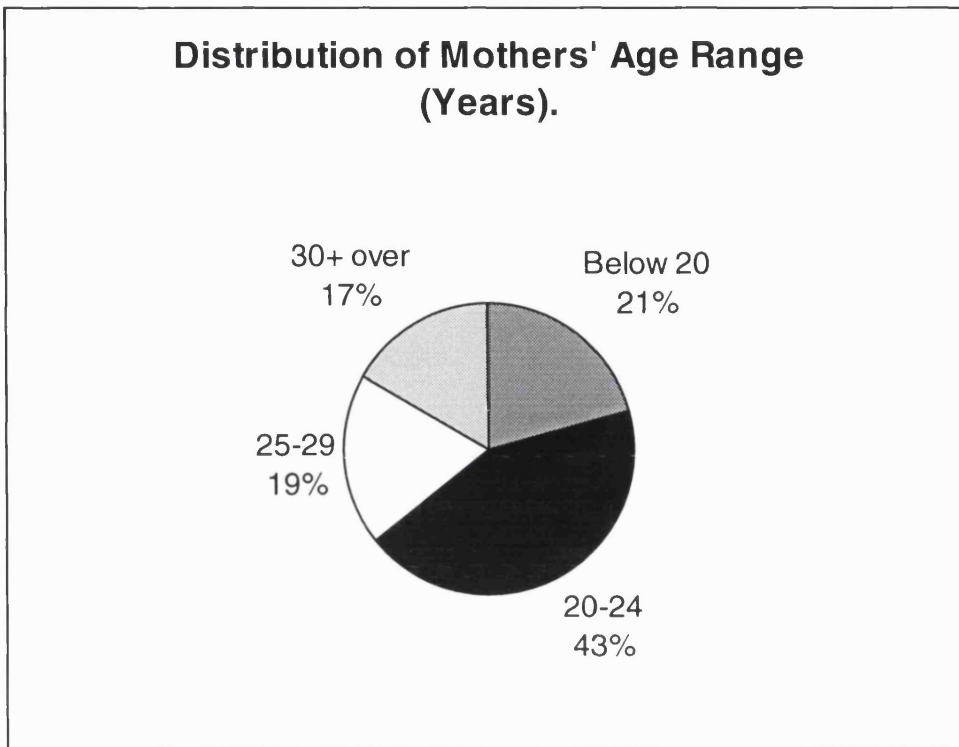


TABLE 10. Distribution of Children's Age = (Mothers' Postpartum Age Range).

Age of child	Number	Percent (%)
6 weeks - 4 months	143	40.9
5 - 8 months	107	30.7
9 - 12 months	99	28.4
TOTAL	349	100

4.1.5 Main Source of Household Income.

The main source of income generates resources for all household needs.

Table 11. Source of Household Income

Income Source	Number	Percent
Subsistence farming	154	45.3
Husbands salary	72	20.6
Sale of labour	58	16.6
Market vending	24	6.9
Family business	18	5.2
Mother's own salary	11	3.2
Brewing of beer	8	2.3
TOTAL	349	100

The Table 11, shows that the majority (45.3 %) of households, depend on subsistence farming by selling some of the crops for income. 20.6% of households depend on the husband's salary as an employee in a paid job, (16.6%) sell their own labour by digging in other families' gardens to generate income. Other income generating activities included market-vending by 6.9% of mothers; family business, which included ownership of shops, metal workshops and carpentry were sources of income in 5.2% of households. Eleven (3.2%) of mothers depend on their own wages/salary for income. Brewing of local beer was a major activity in 2.3% of households.

4.2. HEALTH STATUS OF THE MOTHERS

About one third of mothers (38.4%), reported to have had fever, two weeks prior to the study. All mothers talked in the focus group discussions agreed that 'malaria' is a common problem in the areas, for both adults and children.

In regard to mother's general health status since the birth of the youngest child, 33.2% indicated that they had experienced poor health. The common problems experienced and specified by these mothers included malaria, by 71.6% of mothers; 56.8% felt physically weak; 21.6% experienced recurrent headaches; 19.0% had cough, and 14.7% had back-ache.

Over one half (57.0%) of mothers, reported that they had experienced unusual abdominal pain. Most mothers talked to in focus group discussions reported that lower abdominal pain, backache and general weakness and sometimes giddiness, were common especially during the first few months after delivery.

"We get the usual 'after pains' after child birth, but these last for about a week and disappear, but in most cases all other pains continue to persist."

A mother with a five months old child said;

" I bled so much at delivery and there after, I started feeling very weak and dizzy, with headaches for most of the time. I still feel weak."

A smelly discharge was experienced by 16.3% of mothers. About one third of mothers talked to in focus group discussions said that they have, at one time, had a smelly discharge, and they never sought any medical care for it. The reasons given for not presenting the problem to the health workers were;

" I thought the pain and the discharge would disappear as the child grows, but up to now I still have it".

"We cannot afford to pay for being looked at the health unit, and then again pay for the drugs."

The cost-sharing fee for medical consultation at a health center is 500 Shillings (= \$0.5)

A few mothers reported that they had a discharge during pregnancy, but the majority experienced it after child delivery.

4.3. OBSTETRIC HISTORY

4.3.1 Parity.

As shown in the Table 12 below, one in every five mothers (19.2%) had had only one child. One half, (51.0%) of mothers had had between two and four children, while almost one third of mothers (29.8%) had had at least five or more children. The mean parity of all mothers was 3.6.

TABLE 12. Distribution of Mother's Parity

Parity	Number	Percent (%)
1	67	19.2
2-4	178	51.0
5 and Over	104	29.8
TOTAL	349	100

Table 13 below, shows the mean parity for mothers, by age group. Mothers aged below 20 years had already had an average parity of 1.5. Those within the 20 to 24 years age group had had an average parity of 2.9, those aged between 26 and 29 years had had an average of 4.4, while mothers aged 30 years and above had had an average of 6.6.

Table 13. Mean Number of children by Age Group of Mothers.

Age Group (Years)	Mean No. of Children (Parity)
Below 20	1.5
20-24	2.9
25-29	4.4
30 and above	6.6
All Mothers	3.6

4.3.2 Antenatal Care.

Most mothers 93.1% attended antenatal care (ANC). The average number of antenatal visits was 3, with a range of 1 to 7 visits. Only 15.7% of mothers attended antenatal care

clinics at hospitals, while the majority, 84.3% attended at health centres. Although most mothers never plan to deliver in the health center, they said they attend antenatal clinics because they want a health worker to assure them that their babies are doing well in the womb.

"Coming to attend the clinic; even for only one visit, reassures you that the baby is doing well."

4.3.3 Cost of Care

The cost for antenatal care for the study population ranged between 100 to 3,000 Uganda Shillings (approximately = \$ 0.1 - 4), with a mean charge 700 shillings (= \$0.7). Mothers were asked to give the amount of money they paid for only the first visit.

The official cost for each antenatal care visit was reported to be 500 Shillings at the first visit, and at subsequent visits they would pay 300 shillings. However, mothers reported different rates, and it was difficult to know whether any of these rates were official charges for the health care. A nursing officer clarified the matter and reported that;

"It is up to each health unit to decide on fee to charge for health care. This is why you find different rates paid at different health units"

"Very often there are mothers who come and do not have enough money. They are then asked to pay what they can afford on that day, but are reminded to bring more money the next time they come back to the clinic."

The District Medical Officer (DMO) said that the District Medical Office no say in how funds are raised or spent at health centre level, but a system was being put in place to stream-line the cost-sharing policy in the district.

"It is up to each local health centre management committee to decide on the user-charge fee of their communities".

4.3.4 Antenatal Care Services.

The District Health Visitor (DHV) noted that there is a shortage of midwives in the district, and therefore Traditional Birth Attendants (TBAs) and Nurse-aids have been trained to deliver some of the services at the health centres.

When a midwife or any other health worker is not available to give service to the mothers, a trained TBA and a Nurse-aid are often the ones called upon to assist the mothers at the clinic. The range of services provided and exposed to the mothers during the antenatal visits varied, as shown in Table 14.

4.3.4.1 Screening for Anaemia. All mothers get routine screened for anaemia by clinical examination, and for blood pressure. Laboratory services for screening anaemia are only available in hospital settings. However, only nine mothers out of the 51(17.6%) who attended hospital antenatal clinics had their blood screened for anaemia.

TABLE: 14 Antenatal Services Provided

Service	Number (n=325)	Percent (%)
Malaria prophylaxis	6	1.8
Blood test for anaemia	9	2.8
Body weight measurement	60	18.5
Malaria treatment	76	23.4
Nutrition education	111	34.2
Iron supplementation	165	50.8
Tetanus toxoid vaccination	286	88.0

4.3.4.2 Nutrition Education and Weight Monitoring. Information about diet was exposed to only one third (34.2%) of mothers. Many mothers reported that they had never been told what to eat when pregnant. But the mother who had been exposed to nutrition education reported that they are advised to eat groundnut sauce with green vegetables, tomatoes and cabbage in order to have enough blood for the baby and them. Some mothers reported that they got nutrition education when they were identified as being anaemic.

“I was told what I should eat after the nurse had examined me and said I did not have enough blood. She gave me 3 tablets and advised me to eat foods such as soda, beans, green vegetables, and plenty of millet and sorghum porridge.”

Some mothers reported that it is hard to get all the foods they are advised to get. A health worker in Bunyole County reported that;

"It is difficult for these women to get enough to eat. Most of them do not plant enough food. They either depend on markets for food or they exchange their labour for food or money. In this area most fields have been planted with rice and maize which are cash crops, and there is little land left for cultivation household food crops."

Only (18.5%) of mothers reported having ever been weighed at an antenatal clinic. It was observed that most health units did not have functioning weighing scales for adults.

4.3.4.3 Iron Supplementation. Iron supplementation was given to half (50.8%) of mothers who attended antenatal clinics. The officers in charge of the health centres reported that they never get enough ferrous sulphate tablets and folic acid for their clients. The midwives found at the clinics reported that the antenatal drug-kit contains a total number of 2,000 tablets to last for 3 months, but these barely last for two months.

A mid wife reported;

"We give only a few tablets to mothers we feel are severely anaemic, and instruct others to buy more from the shops".

The District Inspector of Drugs admitted that the DMO office has just realised the great magnitude of the problem of anaemia, and that the procurement of ferrous sulphate and folic acid will be improved.

A few mothers reported that they feel nauseated on taking the iron tablets.

"I managed to swallow the tablets for only a few days and threw the rest away because they have a bad smell and leave an un pleasant taste in the mouth."

Many, however, believed the tablets would help them. A mother explained;

"Eee! When you are told you have no blood, of course you worry about whether or not you will be able to deliver the child. You have to do all you can to get, and eat the foods we have been advised to eat., but it is not easy."

Mothers reported that they try to increase consumption of green vegetables, if they can find them. Many depend on herbal mixtures, and clay preparations given by traditional healers, and/or their mothers.

4.3.4.4 Curative Services. The supplementary drugs-kit contains malarial (Fansidar), and deworming (Mebendazole) drugs, but it was reported by the DHV that there is never enough to give all mothers who attend the antenatal clinic. The District Inspector of Drugs reported that the deworming programme is priority for primary schools.

Malaria prophylaxis in pregnancy was indicated in only 6 mothers. Almost one half (49.6%) had suffered from malaria, and about one quarter (23.4%) had been treated for it during pregnancy. Tetanus toxoid vaccination was given to (88.0%) of mothers.

4.4 CHILD DELIVERY

4.4.1 Place of Delivery

As shown in Figure 4, two thirds (65.0%) of mothers delivered their babies at home, and (8.6%) delivered at a TBA's home. About one quarter (26.4%) delivered under the supervision of a trained health worker in a hospital or health center. Majority of children were delivered normally, except for 7 who were delivered by caesarian section, and 2 by forceps.

A midwife reported that;

"The number of mothers delivering at the health centre dropped drastically, when the policy of cost sharing was introduced."

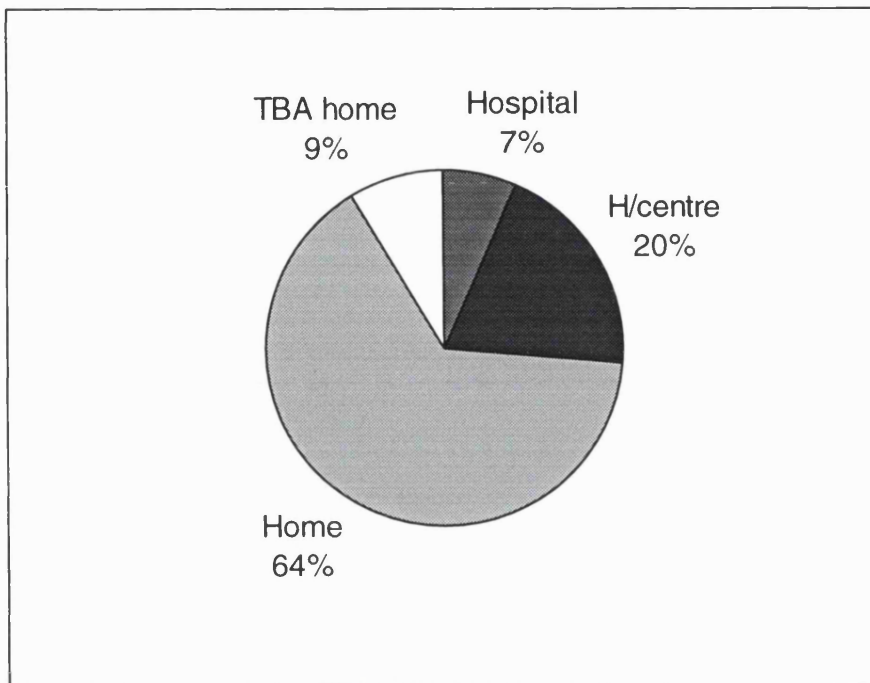
Mothers pay about 5,000 Shillings (approx = \$5), for child delivery at a health unit. The health workers reported that this money covers the cost for gloves, ergometrine, and other obstetric requirements. Mothers would pay extra money if they required additional medical care.

Several reasons were given by mothers as to why they prefer to deliver their babies away from the health unit.

"We deliver at home because we cannot afford the cost at the health unit."

"I delivered at home because labour started abruptly, and there was no time to go to the health unit."

FIGURE 4. Place of Child Delivery



"There is a TBA near my home; she delivers most of the children in our neighbourhood."

The majority of mothers, however, reported that a relative, most often the mother or grand mother assists in delivery.

4.4.2 Delivery Experience.

One third of mothers (31.8%) reported having had what they, themselves, considered as excessive bleeding at delivery. Excessive bleeding was defined as a lot of blood during delivery and days following delivery. Some mothers compared the experience of blood loss with that of earlier deliveries.

A high proportion of mothers (45.9%), of those who reported excessive bleeding at delivery had parity of between four or more, compared to 18.0% with parity one, and 36.0% with parity between 2 and 3. The differences were not statistically significant.

The common child delivery problems reported by the TBAs included excessive bleeding before and after delivery, and retained placenta. They reported that in such cases they are advised to give mother some porridge to drink and then refer her immediately to the hospital. The TBA did not feel comfortable being asked about any remedies they give mothers under such conditions, and could, therefore, not disclose whether or not they use any traditional or herbal drinks to give to mothers. Mothers however admitted that they depend on traditional drinks to regain their strength under such circumstances.

A Mother reported that;

“We a given plenty of herbal drinks prepared from green leaves to take, and these help you to regain strength”

Six mothers said they received blood transfusion. Fourty (11.5%) were hospitalized for excessive bleeding, 8 for hypertension; 5 for malaria; 2 for sepsis. Other conditions

mentioned that necessitated hospitalization for a few mothers included lower abdominal pain, backache, headache, giddiness, cough, breast abscess and anaemia.

One third (35.1% of the mothers who reported having experienced excessive bleeding at birth were hospitalised for the condition.

4.5. POST-PARTUM HEALTH CARE

4.5.1 Postpartum Clinic

The District Health Visitor (DHV) reported that there are no postpartum services at health units. Only curative services are available, and at a cost. A mid-wife at a health centre clarified the matter by saying;

"The immunisation clinic at 6 weeks post-delivery, acts both as a post-natal clinic and first immunisation session for the baby. This is the time the mother can to report any complication or health problem she may happen to have. She would then be referred to the out-patient clinic for registration and for appropriate health care".

Mothers reported that they are never informed that they should return to the health unit at 6 weeks postpartum, to have a general obstetric check-up. However, 80 mothers reported that they attended a postpartum clinic. Over half the number (56.3%) of these 80 mothers reported having had a obstetric check-up. Iron supplementation was given to 22.5%, and 23.8% mothers were treated for malaria. Other conditions presented were breast abscess, vaginal discharge, and cough.

It was, however, later revealed that all mothers who claimed to have attended post-natal services had come with a health problem, and not for routine postpartum check-up.

A TBA reported that they do not advise mothers to go back to them, but remind them to take their children to the any health unit for immunisation.

4.5.2 Vitamin A Supplementation. Vitamin A supplementation is expected to be given to each mother within the first month, post-delivery. However it was observed that mothers who brought their babies for BCG immunisation were not given the Vitamin A capsule. This, however was due to problems of lack of supply.

A medical assistant reported that they do give vitamin A to mothers who report to the clinic within the first one-month post-delivery. However most clinics reported that the capsules they were supplied with, had already expired and were not issued to mothers. In most cases the expired capsule supply was taken back to the district head quarters.

Mothers who reported having been given the capsule at some point, were asked as to whether it was explained to them why they were taking the capsule. All of them did not know why they were being given the 'red capsule', (as it was locally known). Women are told to swallow the capsule there and then, at the clinic, in the presence of health worker. It was realised that a Nurse-aid or a vaccinator, who in most cases had no idea as to why they were dispensing Vitamin A capsules, manages the supplementation. One mother giggled and said;

“For myself; I thought this red medicine was for us who produce children non-stop- to stop up us from reproducing more!”

A nursing officer reported that the officers left on the ground to implement the activities of some of the new health programmes are never recommended for the training workshops and seminar at district level. She reported that there have been many training workshops for the Vitamin A supplementation programme in the District, but its only their bosses who go to attend them, and when they come back they never pass on the knowledge they have acquired. She said;

“When new activities or programmes are introduced at the health center, it is always those who never attended the training that are left to implement the activities. This is why we cannot give mothers a convincing explanation.

“We know that Vitamin A is good for the eyes”

The nursing officer expressed concern about the training policy in the district. She recommended that training should be at sub-county level, so that those who are directly involved in delivery of services benefit from them, as well.

In regard to the Vitamin A supplementation programme, the District Inspector of Drugs acknowledged the problem of the expired drugs and reported that the programme is under

the management of the ophthalmic officer. He disclosed that there are plans to involve TBAs in dispensing Vitamin A capsules to mothers, soon after birth.

4.5.3 Family Planning Services. Mothers are informed about the need for family planning during the antenatal visits, and Family planning counseling is available on the same day as antenatal care. Family planning supplies were however available. It as observed that the injectable contraceptive, ‘Depo-Provera,’ was the most popular method mothers used, and tended to run out of stock quite frequently.

Only 3 women among all those talked to in discussion groups had stated using family planning methods. The reasons given for not participating included cost implications, as well as husband’s permission to do so.

“He is the one to give me the money to pay for the Family Planning clinic.”

Women have to pay 500 hundred shillings (approx.= \$ 0.5)for the services, although there were mothers who reported paying 1,000 shillings (approx. =\$ 1).

4.6 DIETARY PRACTICES

Mothers indicated the frequency of consumption of some selected foods during the seven days (a week) prior to the study period. Table 15 Shows the proportion of mothers who had consumed any of the selected foods on any day of the week.

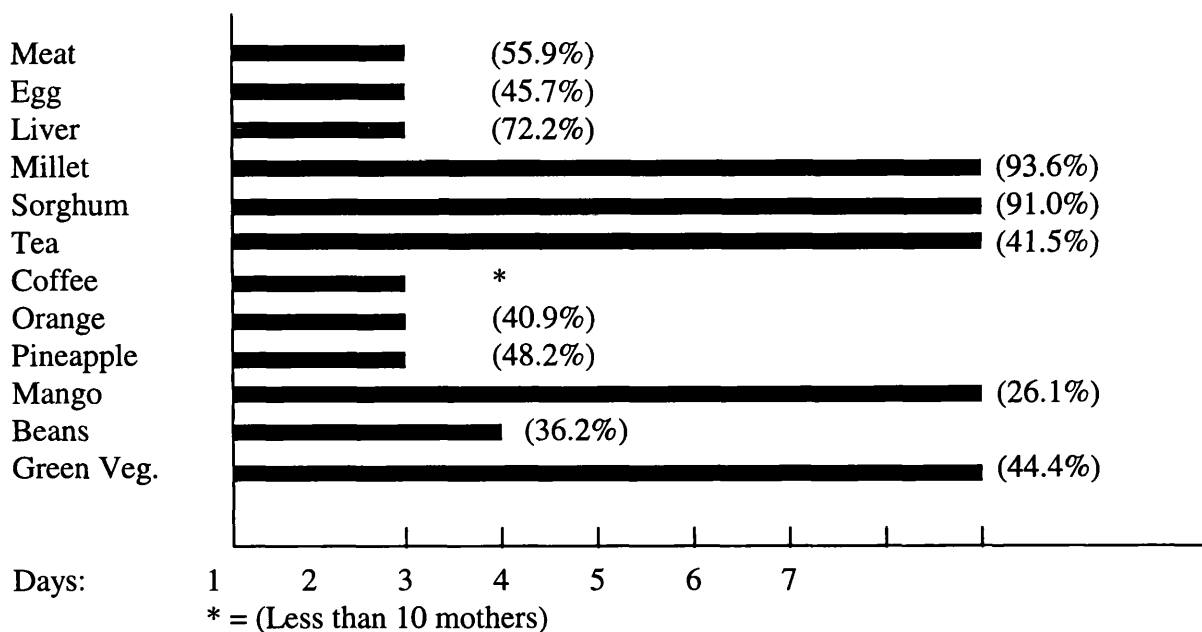
Table 15. Proportion of Mothers who Consumed any of the Selected Foods and Beverages in During one Week proir to the Study.

Type of Food	Number	Percentage (%)
Meat/fish	236	67.6
Egg	162	46.4
Liver	38	10.
Millet	282	80.8
Sorghum	277	79.4
Tea	234	67.0
Coffee	17	4.9
Orange	127	36.4
Pineapple	112	32.1
Mango	211	60.5
D.G.L.V	340	97.4
Beans	260	74.5
Peas	58	16.6

As shown in the Table 15, foods that were consumed by more than two thirds of mothers included, dark green vegetables, millet, sorghum, meat and fish, mango, beans and tea. Orange and pineapple fruit were consumed buy about one third of mothers. Liver and coffee were consumed by a relatively small number.

Although Table 15 shows that a high proportion of mothers had eaten such foods as meat, egg, beans, the majority had eaten them for only one day as demonstrated in Figure 5 below.

FIGURE 5. Frequency of Consumption of Selected Foods in by Number of Days by Highest Proportion of Mothers During the one Week.



Meat and egg were hardly consumed for more than three days in a week. The majority (55.9%) for meat, and (45.7%) for egg, had consumed these foods for only one day in the week. Millet and sorghum are part of the daily diet eaten throughout the week, and very often they are mixed together to make the staple bread. Although tea was consumed by nearly 40% of mothers throughout the seven days, another one-third (30.8%) had taken it for only two days in the whole week.

Pineapple and orange were eaten by majority of mothers for only one day. 21.3% of mothers who took an orange every day of the week. The proportion of mothers who consumed mango was more distributed throughout the week, and one quarter (26.1%) who consumed mango on every single day of the week.

The same pattern of consumption for mango was demonstrated for the consumption of leaf green vegetables. Although 44.4% consumed green vegetables every day of the week, there were mothers who had it for as few as 3 days in a week. Consumption of beans was, again more distributed throughout the week, with the majority (36.1%) having had it for two days, and 21.9% for every day of the week.

This makes it easier to speculate that foods eaten for at least seven days by majority of households constitute the daily diet of mothers in Tororo District. Millet, sorghum, dark green leaf vegetables (D.G.L.V), and a fruit in season (mango) were the common foods.

“Consumption of green vegetables is limited, as most households do not plant these vegetables; they simply collect them wild. Green vegetables are considered low status in most homes”, (Nursing officer).

One mother commented;

"We are tired of eating green vegetables day in day out! We would prefer to eat some meat or fish occasionally, but we cannot afford it."

A TBA old lady lamented and said;

"Women do not eat well these days, and they are too weak to go out even to gather green vegetables to get enough blood in their bodies."

In regard to consumption of tea, 44.1% of mothers reported that they take tea with meals, while 55.9% take tea in between meals. Consumption of tea in the home is said to depend largely on the availability of sugar, as most homes cannot even afford milk in tea. Tea is often taken when there is something the family can take with it, such as cassava, maize or any left over food.

4.7 CULTURAL PRACTICE.

Cultural practices are often associated with consumption of special foods and herbal preparations around the period of pregnancy and childbirth. The results of the study do not indicate wide spread restriction of foods during pregnancy and the period postpartum. One third (32.7%) reported craving to eat matoke (plantain), while 30.4% preferred millet bread or porridge during pregnancy. The other foods liked included meat and green leaf vegetables. These are foods that are readily available.

Foods avoided during pregnancy were mainly fish by one quarter (25.5%) of mothers, and 20.3% of mothers dislike maize meal. A few mothers also disliked sweet potato. Fish and pork were reported by TBAs as foods that are traditionally prohibited and not eaten by pregnant women. Mothers reported that the strong smell of fish puts them off eating fish

during pregnancy. No particular reasons were given for the dislike of maize meal. Few mothers reported avoiding foods after pregnancy.

Many women have a cultural habit of eating different types of soil during pregnancy. Results of the study show that about one third (30.4%) of mothers ate some soil during pregnancy. The common types of soil eaten included that from the kitchen wall by 66.0% of mothers. The clay preparations bought from markets, or supplied by traditional healers and Traditional Birth Attendants (TBAs), were used by (24.5%) of mothers. The other types include the anthill, and the soil termites build on the back of trees. Eating of soil continued in only 15.4% of mothers during the postpartum period.

Different soils serve different purposes. . A TBA said;

“Mothers eat soil because of the special craze that develops during pregnancy.

“The clay preparations are often mixed and dried with herbal medicine. When mixed with water and drunk, they tend to cleanse the mothers system for the baby;The mother gets strength and she remains health.

“Some of the clays are meant to soften the mother’s bones for the baby’s passage, during delivery.

4.8. ANAEMIA STATUS, ASSESSMENT AND PERCEPTIONS.

4.8.1 Methods of Assessment.

Assessment of the anaemia status of all mothers was carried out measuring haemoglobin levels using a HemoCue®. A sub-sample of 170 mothers were assessed by both measuring haemoglobin and clinical examination of mucous membranes of conjunctivae, tongue, and nails.

Two thirds (64.5%) of mothers were found anaemic, with haemoglobin levels of less than 120g per liter (g/L), of blood. The range of haemoglobin levels was between 26 and 156 g/L, with a mean value of 113.5 g/L. Five mothers (1.4%) were found severely anaemic (Hb <70g/L); (14.6%) had moderate level (Hb 70-99g/L) of anaemia; while nearly half, (48.4%) had mild anaemia (100-119g/l), as shown in Table 16 below.

One third of mothers (33.5%) had haemoglobin concentration below 110g/l; a cut off point for anaemia in pregnant women.

TABLE 16 Prevalence of anaemia

Hb Level	Number	Percent (%)
<70g/l (severe)	5	1.4
70 - 99g/l (moderate)	51	14.6
100 - 119g/l	169	48.4
Normal (120g/l and above)	124	35.5
TOTAL	349	100

The purpose of the clinical assessment was to assess the sensitivity of the method, as it is the most utilised in the health centers.

Figure... shows the comparison of the two methods for the 170 sub group of mothers. The clinical assessment method identified only one mother severely anaemic, compared to four identified using the HemoCue. For moderate anaemia, the clinical assessment diagnosed only 17(10.0%) of mothers, compared to 26(15.3%) identified using the HemoCue. For mild anaemia the clinical assessment identified more mothers 99(58.2%) compared to 80(47.0%) by the haemoglobin measure.

Table 17 Comparison of Screening Methods for Anaemia.

Level of Anaemia	Clinical examination by health workers (n %)	Hb measure (n %)
Severe (<70g/l)	1(0.6%)	4(2.4%)
Moderate (70-99g/l)	17(10.0%)	26(15.3%)
Mild (100-119g/l)	99(58.2%)	80(47.1%)
Normal (120g/l and above)	53(31.2%)	60(35.3%)
TOTAL	170	170

To test the specificity and sensitivity of clinical assessment for moderate and severely (Hb <100 g/L) anaemic mothers combined:

Number of true positives = 18

Number of falsepositives = 0

Number of true negatives =140

Number of false negatives =12

Sensitivity =18/30 = 60%

Specificity =140/140 =100%

Positive predictive value =18/18=100% (All the 18 anaemic mothers identified by the clinical method were among the 30 identified anaemic by the HemoCue).

Negative predictive value = 140/152=92.1% (Twelve anaemic mothers according to the HemoCue were identified as non-anemic by the clinical assessment).

For moderate or severe anaemia (haemoglobin <100g/l), the clinical method was able to identify 60% of truly anaemic mothers. The clinical method identified more mothers negatively anaemic , thus giving the method a rate of 92.1% negative predictive value. Otherwise the method was sepecific in identifying those who did not have severe or moderate anaemia.

To test the sensitivity and specificity of clinical assessment for the severe anaemic (<70g/l) only:

Number of true positives = 1

Number of false positives = 0

Number of false negatives = 3

Number of true negatives = 166

Sensitivity = 1/4 =25% (Only one, out of the four mothers with anaemia was identified by the clinical assessment).

Specificity = 166/166 = 100%

Positive predictive value = 100%

Negative predictive value = $166/169 = 98.2\%$ (Three of the anaemic mothers were categorised as non-anaemic by the clinical assessment).

The clinical method had a poor sensitivity rating of 25% for severe anaemia, although the number was small.

The District Medical Officer (DMO), reported that the district depends on clinical assessment for the diagnosis and surveillance of anaemia in the district;

"We depend on clinical diagnosis for anaemia; how well this is being done is still questionable. The degree of severity is difficult to determine."

All health workers both at the district and community level agreed to the fact that anaemia is common in both pregnant and non- pregnant women. The health workers at the health units reported that it is easy to know women who have anaemia because of the symptoms they present when sick. A Medical Assistant reported;

" In post partum women, we can easily identify who is anaemic, when they present with complaints like dizziness, severe headache, extreme fatigue, heart palpitations. Very often some have lower abdominal pain and sepsis".

It was mentioned that many women present with severe anaemia when it is too late, and when advised to go to the hospital many do not go because they cannot afford the transport and money for health care.

The TBAs talked to reported that they have been trained to recognise anaemia, by checking pallor under the eye, tongue and hand.

Some TBAs have come to realise the seriousness of anaemia in women, as one of them experienced a death of a woman who came to deliver at her place when severely anaemic.

"Now when I recognise a woman with all signs of not having enough blood, I do not allow her to deliver at my place."

Another TBA commented that;

"Before we were taught how to identify women with little blood, we were not aware that the condition is so serious and can even kill women".

4.8.2 Perceived Causes of Anaemia

There is no local name for anaemia in this district. But 'not having enough blood' is near enough to what mothers understand by anaemia. Women take it seriously when they are informed that they do not have enough blood, although they never consider it as a disease or a major health problem, outside the child delivery concept.

An elderly TBA explained;

" We have always been aware that many mothers do not have enough blood. They feel weak all the time, because they do not eat well."

" These women come looking restless, their skin looks 'ashy' and often wrinkled. They look very weak, and this is enough to indicate that they do not have enough blood."

"These are people who do not eat properly, their blood gets used up when they do all the daily strenuous work, and this is why they feel so tired"

The TBA training has sensitised TBAs on the main causes of anaemia. Eating insufficient food, drinking contaminated water, eating raw and half-cooked food infested with worms are the major causes of anaemia, known.

The mothers themselves do not perceive anaemia as a problem. The District Health Visitor (DHV) said that when women get symptoms like extreme fatigue and severe headache, they think they are be-witched and they go to traditional healers. Mothers do not associate these common symptoms of anaemia.

Women found it funny to be asked what they thought causes the recurrent headaches and general weakness and fatigue. Some of them believe all these problems are brought about by some 'traditional forces', like witch craft from other women.

"We live with our headaches and general weakness. You can go to a native doctor and gives you some herbs to bathe the head and rub around the ears (the temple). But you can never get better. Then you can buy some 'Aspro' from the shops and the headache goes temporarily".

(‘Aspro’ is a common analgesic drug readily available on open market).

Mothers seemed to appreciate the antenatal visits, because all clinics observed were very busy with more than 50 mothers attending on the same day.

"when we come to the clinic we are sure of being told ,if we do not have enough blood".

Mothers said they would always want to know whether or not they have ‘enough blood’. All mothers were anxious to know their anaemia status at the study site when the HaemoCue assessed their haemoglobin level. The activity created excitement in all women attending other clinics, and they all requested to be assessed, although it was not possible because of lack of enough materials.

Mothers want to be told the status of their health.

"Oh, Yes. Being told that you do not have enough blood, is enough to indicate you that child birth will not be easy, because you may even lose even the little blood you may have."

"I would not have known that I did not have enough blood if I had not been told at the clinic. I was given some tablets for it and I knew I would get better."

The District Health Visitor and the Inspector of Drugs reported that they would not rule out the role of worm infestation as a major cause of anaemia in the district. The hygiene and sanitation situation in most households in the district was said to be very poor.

Women were asked as to whether they were aware that worms in unsafe water and poor hygiene could contribute to anaemia..

"We used to boil water when we were instructed that there was cholera in the district. Now that cholera is no longer a there, we drink water any how."

It was observed that women are in the habit of stopping at the well to have a drink of water, after their long walk to and from the clinic or the market place. The containers they use and the water they drink were observed not to be hygienically safe.

CHAPTER 5

5. DETERMINANTS OF ANAEMIA.

The proportion of anemic mothers of less than 120g/L of haemoglobin will be outlined to show any differences among groups, and in their exposure to various factors or variables in the study.

Statistically significant differences for overall anaemia (Hb <120g/l) and for those with moderate or severe anaemia will be identified and determinants or risk factors.

5.1.1 Proportion of Anaemic Mothers by Demographic and Social Characteristics

TABLE 18. Distribution of Anaemic Mothers by Demographic and Social Characteristics. (n=225).

Variable	Number	Percent	p- value
Place of Residence (County)			
Bunyole	27	81.8%	0.026
Kisoko	35	66.0%	
Samia/Bugwe	51	71.8%	
Tororo	112	58.3%	
Mother's Age (Years).			
Below 20	45	61.6%	0.81
20-24	96	63.6%	
25-29	46	68.7%	
Over 30	38	65.5%	
Postpartum Age (Months)			
6wks-4	94	65.7%	0.88
5-8	69	64.5%	
9-12	62	62.6%	
Marital status			
Single	38	69.1%	0.53
Married	187	63.6%	

5.1.1 Prevalence of Anaemia by County of Residence. As shown in Table 18, Bunyole County had the largest proportion (81.1%) of anaemic mothers. About two thirds of anaemic mothers were found in both Kisoko County 71.8% and Samia/Bugwe County 66.0%, respectively; while Tororo County had the lowest proportion, 58.3% mothers found anaemic. The differences were statistically significant at $p = <0.05$.

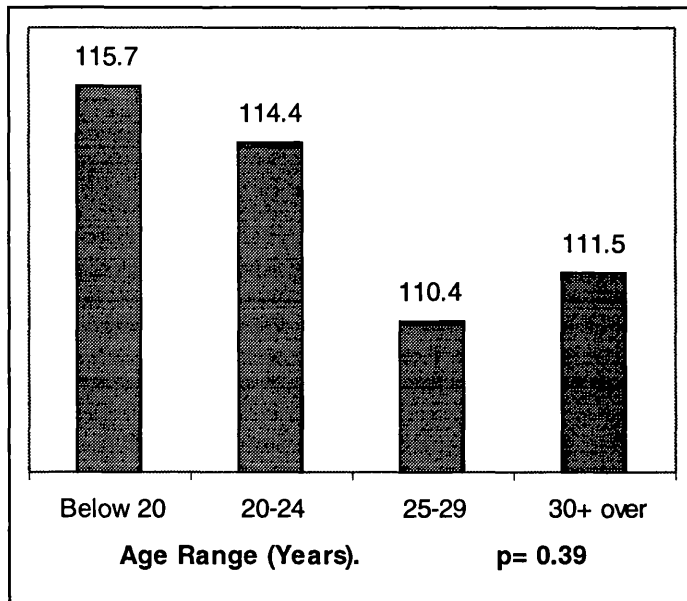
5.1.2 Proportion of Anaemic Mothers by Mothers' Age. The results in Table 18 show that about two thirds of mothers within each age group were anaemic. The highest proportion was among mothers within the age range of 26 and 29 years.. The differences were not statistically significant, ($p=0.81$). Statistical regression did not show any linear relationship of anaemia and mothers' age.

Further analysis of data distributing mean haemoglobin levels showed the age group of 26 to over 30 years had the lowest mean haemoglobin value of 110g/L, as shown in Figure 6. The differences were not statistically significant, ($p= 0.39$).

5.1.3 Proportion of Anaemic Mothers by Mothers' Postpartum Age

Taking the postpartum age of the mother, which was in reality the age of the child, the results in the Table 18 show that the proportion of anaemic mothers was higher (65.7%) among those with postpartum age of four months and below, compared to 64.5% and 62.6% for 5 to 8 months, and 9 to 12 months, respectively. The differences were not statistically significant, ($p=0.88$). Linear regression analysis did not show any relationship between anaemia and postpartum age.

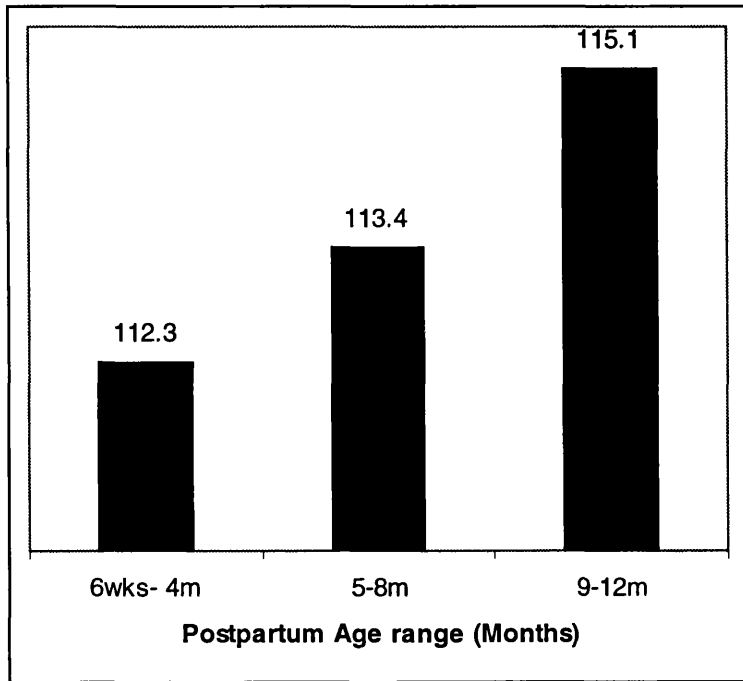
FIGURE 6. Mean Haemoglobin (Hb) Levels by Age Group of Mothers



(p = 0.39).

Comparing the mean Hb values for each postpartum age group, mothers within the age four months and below had the lowest haemoglobin mean of 112.3g/L, as shown in Figure 7 below. The differences were not statistically significant, (p = 0.42).

Figure 7. Mean Haemoglobin (Hb) Levels by Postpartum Age group.



(p =0.42)

5.2 Proportion of Anaemic Mothers' by Occupation and Household Economic Status.

The results do not indicate any statistically significant difference for anaemia by mothers occupation and household social economic status. However, the mothers in paid employment had a lower proportion (58.3%) of anaemic mothers, compared to 64.7% of the married ones. Households that depended on alcohol brewing (75.0%), mothers' wages (72.7%), and subsistence farming (68.4%) for income generation, had comparatively higher proportions of anaemic mothers compared to those that depend on husband's salary (58.3%), market vending (58.2%) or family business (55.0%), (Table 19).

TABLE 19 Distribution of Anaemic Mothers by Social Economic Status (n=225)

Variable	Number	Percent	p- value
Mothers occupation			
Housewife	216	64.7%	0.88
In paid employment	7	58.3%	
Household source of income			
Subsistence farming	108	68.4%	0.58
Husbands salary	42	58.3%	
Sale of labour (digging)	38	65.5%	
Mother's wages	8	72.7%	
Market vendor	13	58.2%	
Alcohol brewing	6	75.0%	
Family business	10	55.0%	

5.3 Proportion of Anaemic Mothers by Health Status.

As shown in Table 20, a higher proportion (76.9%) of anaemic mothers was found among those that had had a fever during the week prior to the survey, compared to 62.3% of those who had not. The differences were not statistically significant, ($p=0.34$).

In regard to general health since the birth of the youngest child, mothers who reported having felt poorly and sickly, mainly from malaria, were found significantly more anaemic (73.1%) compared to (59.7%) of those who reported having had good health ($p<0.05$).

TABLE 20. Distribution of Anaemic Mothers by Health Status (n=225).

Variable	Number	Percent	p- value
Fever - past week			
Present	91	67.9%	0.34
Absent	134	62.3%	
General health status since delivery.			
Good health	139	59.7%	0.010
Poor health (sickly)	86	74.1%	
Fatigue/general weakness			
Present	45	68.2%	0.57
Absent	180	63.6%	
Lower abdominal pain			
Present	132	66.3%	0.46
Absent	93	62.0%	
Smelly discharge			
Present	30	52.6%	0.058
Absent	195	66.7%	

Anaemia was found more among mothers who reported fatigue and general weakness (68.2%) compared to 63.6% of those who were relatively well. Having had abdominal pain was not statistically associated with anaemia, although more mothers (66.3% with the pain were anaemic, compared to (62.0%) of those that did not.

Surprisingly, mothers who reported that they did not have a smelly discharge were more anaemic (66.7%), compared to 52.6% of those who had the discharge. The differences were at border-line statistical significance,(p= 0.058).

5.4 Proportion of Anaemic Mothers by Obstetric History.

5.4.1 Parity.

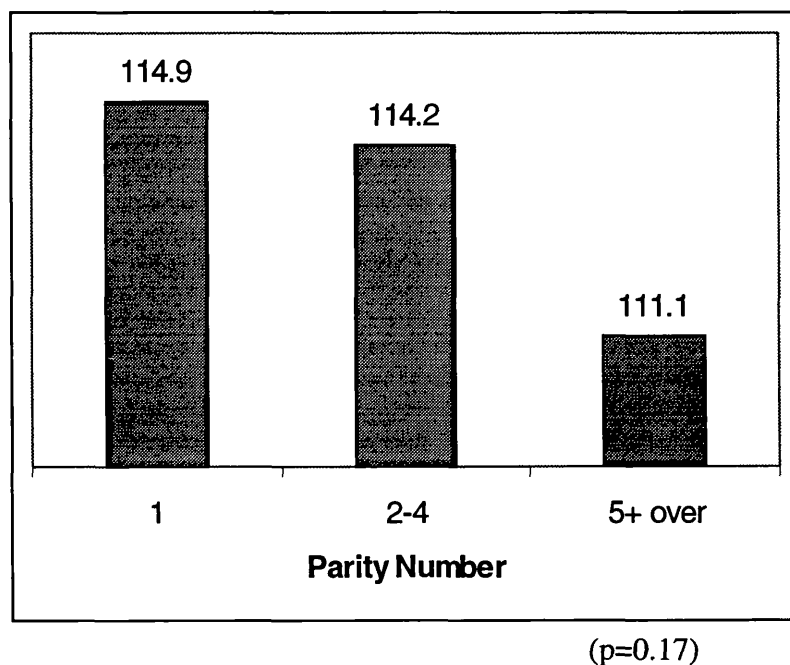
The highest proportion (65.5%) of anaemic women was found among those with parity between two and four, those with parity one had the lowest proportion (61.2%), as shown in Table 21

Table 21. Distribution of Anaemic Mothers by Obstetric History.

Variable	Number	Percent	p- value
Parity (n=225)			
1	41	61.2%	
2-4	117	65.7%	
5 and over	67	64.4%	0.80
Antenatal care attendance (n= 225)			
Present	209	64.3%	
Absent	19	66.7%	0.99
Iron supplementation (n= 209)			
Provided	92	55.8%	
Not provided	117	73.1%	0.001
Nutrition education (n=209)			
Exposed to:	76	68.5%	
Not exposed to:	113	62.1%	0.31

Considering the mean haemoglobin distribution for each parity group, mothers with parity of five or more had a comparatively lower haemoglobin mean level compared to others, as shown in Figure 8. The difference was not statistically significant ($p=0.17$)

Figure 8. Mean Haemoglobin Levels (g/L) by Parity



5.4.2 Antenatal Attendance and Services.

Antenatal attendance was not statistically associated with presence of anaemia, although the mothers who had attended were less anaemic (64.3%), compared to 66.7% of those who never attended an antenatal care clinic (Table 16). Among the services provided supplementation with iron was significantly associated with anaemia, where 55.8% of mothers who had not been supplemented with iron were found more anaemic, compared to 44.0% of the supplemented group, (p=0.001).

Nutrition education, ironically, did not seem to influence the anaemia status of mothers. More mothers (68.5%) who claimed to have been exposed to nutrition education were

found anaemic, compared to 62.1% of those with no exposure (Table 21). The differences were not statistically significant. ($p=0.31$).

5.5 Proportion of Anaemic Mothers by Child Delivery and Child Delivery Experience.

Table 22. Distribution of Anaemic Mothers by Child Delivery Experience. (n=225)

Variable	Number	Percent	P - value
Place of delivery			
Hospital	15	65.2%	0.36
Health center	44	63.8%	
Home	151	66.5%	
TBA	15	50.0%	
Excessive bleeding			
Present	81	73.0%	0.031
Absent	144	60.5%	
Hospitalised for bleeding.			
Yes	28	70.0%	0.54
No	197	63.8%	

Place of delivery was not associated with prevalence of anaemia in mothers. The results in Table 22 show that mothers who reported having experienced excessive bleeding at

childbirth and there after, were found more anaemic, (71.0%), compared to 63.8% of mothers without excessive bleeding, ($p < 0.05$).

5.6 Postpartum Health Care

Table 23 Distribution of Anaemic Mothers by Postpartum care

Variable	Number	Percent	P - value
Postpartum visit (n= 225)			
Present	81	61.3%	0.58
Absent	176	65.4%	
Iron supplementation. (n= 49)			
Given	11	61.1%	0.79
Not given	38	61.3%	

Mothers attended postpartum care were those that had a health problem that needed treatment. Anaemia in those who got iron supplementation was not different from those that did not, although prevalence of anaemia was less among mothers who attended a clinic, as shown in Table 23.

5.7 Proportion of Anaemic Mothers by Diet and Cultural Practices.

Consumption of any of the selected foods was not statistically associated with prevalence of anaemia in mothers. See Table 24.

TABLE 24. Distribution of Anaemic Mothers by Diet and Cultural Practices.

(n=225).

Variable	Number	Percent	P -value
Consumption of:			
Meat			
Present	146	61%	0.13
Absent	79	70%	
Egg			
Present	105	62.5%	0.52
Absent	120	66.3%	
Liver			
Present	27	61%	0.77
Absent	198	64%	
Millet			
Present	180	65.0%	0.79
Absent	45	62.5%	
Sorghum			
Present	184	66.4%	0.17
Absent	41	56.9%	
Orange			
Present	93	71.0%	0.063
Absent	132	60.6%	
Mango			
Present	137	64.0%	0.91
Absent	88	65.2	
Green vegetables			
Present	215	63.8%	0.27
Absent	10	83.3	

(Table 24 cont....)			
Tea			
Present	164	64.1%	
Absent	61	65.6%	0.89
Tea Time			
With meals	71	62.8%	
In between meals	93	65.0%	0.81
Soil eating			
Present	71	67.0%	
Absent	154	63.4%	0.59

However the results shown in table24 indicate that a higher proportion of anaemic mothers was found among those who did not consume meat, egg, liver, tea, and green vegetables. Anaemia was also more prevalent in mothers who consumed millet, sorghum, orange, drinking tea in between meals, and eating of soil during pregnancy.

5.8 RISK FACTORS FOR MODERATE OR SEVERE ANAEMIA (HB <100g/L).

56 (16.0%) of mothers were found with moderate or severe anaemia. Factors that were found with statistically significant differences for women with moderate and severe anaemia are identified as risk factors for naemia (Table 25).

Fatigue and general weakness as a symptom ($p < 0.05$); lower abdominal pain ($p < 0.05$); and excessive bleeding ($p < 0.05$), were found statistically significant in women with moderate or severe anaemia (Hb <100g/L).

TABLE 25. Distribution of Risk Factors for Mothers with Moderate or Severe Anaemia. (Hb <70g/L). (n= 56).

Variable	Number	Percent	P - value
Fatigue/general weakness.			
Present	18	27.3%	0.010
Absent	38	13.4%	
Lower abdominal pain			
Present	41	20.6%	0.011
Absent	15	10.0%	
Excessive bleeding			
Present	25	22.5%	0.036
Absent	31	13.0%	

CHAPTER 6

DISCUSSION

Prevalence of Anaemia.

The study has shown that postpartum anaemia (Hb <120/g/L) is highly prevalent (64.5%) among women in Tororo District. Of these, nearly one half (48.4%) of women were found with mild anaemia (Hb 100-119g/L), 16.0% were found with moderate and severe anaemia (HB <100g/L) believed to be at a greater risk of poor health. Some programmes have opted to use the term anaemia to mean moderate and severe anaemia only because, they argue that treating moderate and severe anaemia helps to reduce the load of primary health care, (Topley 1998, Meda et al 1996). However, focusing on severe and moderate anaemia alone leaves out a larger proportion of women with mild anaemia who are already at risk of developing moderate and severe anaemia, if unattended to.

The study did not show any statistical difference between mean haemoglobin levels of mothers according to their age, postpartum age, parity and social economic status. This indicates that some mothers do not improve their haemoglobin status within the first year postpartum.

Anaemia, not only likely to affect the health of women through increased susceptibility to infections, but also through lowered physical activity which affects her caring capacity for her family members in terms of economic development and energy to care for them, especially the children. The first year of a child's life is extremely crucial for both the mother and the child. This is the time when a child needs extra care and protection in

order to ensure optimum growth, through proper feeding and protection from diseases; all of which should be provided by a healthy, energetic and productive care giver, the mother.

Assessment of anaemia

The implementation of guidelines for treatment of anaemia depends on the ability of health workers to recognise that the mother is anaemic. Recommendations based on haemoglobin levels are useful for managing women when there are efficient laboratory facilities to measure the haemoglobin. In many developing countries, with limited resources, clinical screening for anaemia will remain the only option.

The haemoglobin estimation method using the 'HemoCue' is considered relatively sensitive with a value of 85% sensitivity in a field setting (OMNI 1996). However one of its limitations in poor countries is the cost. In an effort to find a solution to this, WHO has introduced a new haemoglobin 'Colour Scale' proven to be cheap and more reliable for diagnosing severe anaemia in community settings, (Lewis et al. 1998). It has a sensitivity and specificity of 91% and 86%, respectively.

The study found that clinical criteria for diagnosis of anaemia had limited sensitivity of (60%) for moderate or severe anaemia (Hb <100g/L), and 25% for severe anaemia alone (Hb <70g/L). This implies that 40% of moderate or severely anaemic women were misclassified as 'not at risk'. Likewise, ¾ (75%) of severely anaemic women were missed out. Misclassification of life-threatening conditions like severe anaemia, fails to achieve set goals for reduction of prevalence of the condition. Detection of anaemia per se may

not be enough, without identifying other possible underlying causes. Health workers should therefore find the root causes in order to provide effective management for anaemic people.

Health workers reported that they can easily recognise a woman who is anaemic by the symptoms presented. These symptoms include recurrent headaches, fatigue and dizziness. Using such criteria may still not be able to classify the degree of anaemia in a woman, for proper management. Consequently this would lead to mothers to seek for other alternative remedies for a cure. However knowledge on such symptoms would in a way be useful indicators for mothers to know the possible causes so that go to credible health care facilities, (Mothercare Matters, 1993).

Mothers Age and Parity

Tororo District is unusual in that women head 53% of households, compared to the national figure of 29%. Any conditions which affects the well being of women will definitely have a significant impact on the welfare of majority of households in the district.

One in every five women studied were mothers aged below 20 years. Adolescent mothers are particularly vulnerable as they start producing children at an age when they themselves need all the nutritional resources for their own growth and development. The adolescent mothers in the study, however, had comparatively higher mean haemoglobin levels compared with the older mothers, despite their average parity of 1.5.

Thus need to encourage young girls to delay child bearing. Promotion of education for girls could play a useful role to protect them from early marriage and consequently, early pregnancy. However, local and cultural factors influencing early child bearing such as male attitudes may also require attention. This data suggests that adolescent anaemia may not be a problem if unaccompanied by pregnancy. But marginal iron levels may become deficient as mothers have more and more children.

There was an association, although not statistically significant, between mother's age and parity. The Uganda Demographic and Health Survey, 1995, showed that a woman will have given birth to 2.6 children (more than one-third of her lifetime births) by age 24, and to 4.2 children (two fifth of her lifetime births) by age 30,(MFEP,1996b).

This current study has demonstrated the same trend with mothers aged between 20 and 24 having an average parity of 2.9, and that of mothers ages between 25 and 29 was 4.4. High fertility seems to have influenced the haemoglobin levels of mothers.

The median birth interval for Ugandan women is 29 months, but there are 10% of women who produce a child within 18 months of last delivery, (MFEP,1996b). Birth spacing will therefore prevent many mothers from having children in such a very short period. Traditional methods of birth spacing such as frequent breast feeding may be under threat now that perinatal transmission of HIV/AIDS in maternal milk is recognised.

The goal of postpartum care is early detection and prevention of problems for appropriate treatment and referral if nessessary. But women are not expected to return for postpartum

visit until 6 weeks postpartum. The question here is, who is supposed to take care of a woman who is at risk of death during the early postpartum period before 6 weeks? Most women are unaware of the consequences of the symptoms they get. Women may consider some of these problems as a norm; and part of the 'child-bearing saga'.

Prevention strategies have traditionally focused on prenatal and delivery periods, yet a recent analysis concluded that the postpartum period is also crucial. Haemorrhage, pregnancy-induced hypertension complications, and obstetric infection were the most common causes of postpartum death. Nearly half of the postpartum deaths occurred one day of delivery, and 80% within two weeks. Ironically, the traditional time for the first postpartum visit by mother and baby is at six weeks, a time when there is no danger of maternal death, (Li XF, Fortney JA, Kotelchuck M et al., (1996).

Mothers within the more advanced postpartum age, (after five months), appeared to have had slightly higher mean haemoglobin levels compared to those with postpartum age below five months. Mothers may be particularly vulnerable during the first four months postpartum. The high risk of postpartum women being anaemic may be due to the fact that women enter the postpartum period having exhausted their iron stores through pregnancy, mainly due to the substantial iron demands for the developing foetus and the placenta, and of course through blood loss during delivery.

Supplementation of Vitamin A during the early postpartum period would target very few mothers within four weeks postpartum as recommended by WHO. But the new guidelines

that extend the period to 8 weeks post partum will go a long way in improving coverage for the programme for the postpartum mother, (BASICS 1998). The first visit to a health unit postpartum is at 6 weeks for child immunisation.

The majority of mothers in the study (98.0%) were still breastfeeding their children. Lactation is believed to increase the woman's risk of iron deficiency because breastmilk concentrations are maintained at the expense of maternal nutrient stores, also puts heavy demands on maternal folate reserves (Royston 1982; Allen, 1994).

One limitation of this current study was not to have identified women who were already pregnant. Overlap of pregnancy and lactation puts extra stress and demand on maternal nutritional reserves (Mortorell and Merchant, 1992). However the median Uganda National birth interval is high, and thus few women are likely to be pregnant so soon after delivery.

Other studies have shown a high prevalence of postpartum anaemia. In Burkina Faso, the overall prevalence of anaemia among breast-feeding and non-pregnant, non-lactating women was found to be 64.2% and 38.9%, respectively, (Meda et al 1996). A study in Tanzania, found that pregnant women had significantly lower haemoglobin levels than non-pregnant women of the same age. (Kitange et al 1993).

Previous studies indicate that maternal iron deficiency does not necessarily affect the secretion of iron in breast milk, neither does the supplementation of mother, (Viteri,

1994). Iron supplementation would therefore benefit the mother more than the baby. This supports the notion that building maternal iron resources during pregnancy will be crucial in maintain good iron status for both the mother and the baby. This study has shown that anaemia (Hb <120g/l), was found significantly higher (73.1%) among mothers who were not given iron supplements during pregnancy, compared to 55.8% of the supplemented mothers. Iron supplementation during pregnancy remains an important strategy for the protection of anaemia of postpartum women. However it makes sense to advocate supplementation for postpartum women as INACG, WHO and UNICEF recommend that supplementation should continue for 6 months postpartum where adequate supplementation was not possible during pregnancy, (Stoltzfus, Dreyfuss, 1998).

The study, unfortunately, does not indicate the time or pregnancy period mothers mostly report for antenatal care, or how frequently iron supplementation was taken. It is recommended that iron supplementation should especially occur during the second half of the pregnancy. (ACC/SCN, 1991). According to the recently conducted baseline survey in Tororo District, the majority of women have their first antenatal attendance in the second trimester (Kaharuza, et al 1998).

Risk Factors for Anaemia.

Supplementation of pregnant women may prevent a deterioration of the anaemic condition during the increased physiological burden of pregnancy, but does not address the underlying iron deficiency present at its onset; most likely before conception, as well as in the inter-pregnancy period. This, therefore, addresses the need to maintain adequate

iron levels before the woman becomes pregnant again. The early postpartum period of four months would be the most ideal period implementation of any intervention to improve mother's nutritional status, - long before she becomes pregnant again. This is the time she is likely to have limited nutritional reserves because of stress due to pregnancy and child delivery.

Excessive bleeding was identified as a significant a risk factor for anaemic women with haemoglobin levels below 120g/L, as well as women with moderate and severe anaemia (Hb<100g/l). Excessive bleeding was found more frequently (45.9%) among women with parity four and more, compared to 36.0% with excessive bleeding with of parity between two and three, and 18% bleeding with parity one. The differences were not statistically significant. High fertility appears to have influenced haemoglobin levels of the women in the study because of severe bleeding. It was not possible to validate accuracy of mothers' reporting to estimate the volume of blood loss.

The main causes of excessive bleeding could not be assessed in this study. Apart from retained placenta and prolonged labour, other causes include injuries experienced in childbirth. Traditional Birth Attendants in this study mentioned retained placenta and excessive bleeding as the most common complications they encounter. Injury could play a dual role of causing haemorrhage and introducing infections to the birth canal of the mother. Many women in developing countries do not have straightforward deliveries, and are subject to harmful interference during labour by untrained attendants who do not appreciate the significance of hygiene, (Royston and Armstrong 1989).

Infections can cause anaemia by metabolic suppression of red blood cell in the bone marrow. Proper treatment is, therefore, an important part in the treatment of pelvic inflammatory disease. Safe delivery through improved hygiene practices at birth, will prevent introduction of infections into the mothers.

Many women reported having not sought any medical care for their health problems, such as the reported lower abdominal pain and vaginal discharge. The reasons could be because they might not be aware of the consequences or seriousness of the conditions, or they could not afford the health care costs. Although it was envisaged that the cost-sharing policy of the district would make drugs and services more available, but many mothers reported that they could not afford to pay for the services. There is a reduction in government expenditure on health in many developing countries, and user-charges will continue to be the only option to guarantee improvement in health care services, (Costello, 1997). In order for members of the community to appreciate the changes in policy, health care system has to prove its worth. It cannot be over emphasized that many maternal infections go untreated because of unfriendly and inaccessible health care facilities). Long waiting time, late opening of clinics, and unfriendly behavior of some health workers sometimes put off mothers from attending health services. (Sauerborn, et al 1989; Tomkins, et al 1994).

Tororo District, like all other districts in Uganda is malaria endemic. Mothers who felt sickly since the birth of their children complained that fever was their most common

health problem. This group of mothers was found significantly more anaemic than those who enjoyed relatively good health.

Tororo District has poor sanitation and hygiene facilities. Although the study was not able to assess hook worm infestation, most people would be expected to be at risk of heavy worm infestation, as this is among the top five health problems in the district.

Women, however, need to be made more aware of their health problems. Women tend to ignore their general health after the birth of a child, and there is a tendency to focus more on the newborn. (Safe motherhood, WHO, 1993). This, however, is also reflected in the health care system where there is no provision for postnatal services for mothers especially in health centers, in rural areas.

Interventions such as nutrition and prenatal care are often justified on the basis of the benefit to the child. Even strategies for mother' survival are justified as necessary for child survival. However, to save mothers' lives, certain relatively high cost interventions are needed, that will have less impact on perinatal mortality (Fathalla M F, 1993)

The child becomes more important and the mother is expected to fend for herself, sometimes not knowing her vulnerability. In most cases mothers resort to traditional care facilities to care for her own health, without understanding the underlying causes of the presenting symptoms. Most women could not relate the common symptoms of fatigue,

dizziness, and general weakness to presence of anaemia, and reported that they approach traditional healers to alleviate the problems.

Routine postpartum health care was non-existing in the health centres visited, except for curative and family planning services, for which mothers have to pay a fee. The postpartum period is an opportunity for services such as family planning, supplementation of vitamin A and monitoring how the mother is managing with breastfeeding and other infant feeding problems, especially the first time mothers. This makes it extremely important to target the mother when she, inevitably, has to attend child health services.

Family planning utilisation by some mothers seemed to be influenced by husbands' consent. Improving women's economic status alone, will give limited success if the men are not convinced of the benefits of family planning. Women in Tororo district mainly use traditional methods of family planning, such as periodic abstinence and breastfeeding. But some of these methods have limited protection, as for example, lactational amenorrhoea protects only 73.6% of women at 6 months postpartum, (MFED, 1996).

Dietary and Cultural Practices.

The Tororo diet can be described, according to Allen and Ahluwalia, (1997), as one with high content of non-haem iron due to the high phytate and tannin content. The diet is composed of mainly sorghum, millet and green leaf vegetables. Consumption of meat or

fish depends on purchasing power of the household, and contributes little to iron intake because of infrequent consumption, and small quantity.

The most effective approach to improve iron intake of the Tororo diet may involve reducing the phytate and or tannin content by fermentation or germination processing methods, which are already known in the area. This will not only improve utilisation of iron, but also for other essential nutrients such as zinc and calcium.

Fermentation of sorghum and millet for porridge is common in many parts of Uganda, (Sserunjogi, and Tomkins, 1991). In addition to this, a wild citric fruit, known as tamarind, or locally known as 'Chwa' in Eastern Uganda, and 'Kiti' or 'Pitei', in Northern Uganda, is added to porridge and tea in order to improve the flavour, especially in household where sugar may not be available, (Sserunjogi, 1988). This fruit is rich in Vitamin C, and would enhance the absorption of iron found in millet, sorghum and green vegetables. Local remedies to improve quality of diet are therefore under utilised because of limited knowledge of their value.

The major limitation to potential fermentation and fruit use for women is that the practice is only common for preparation of porridge (for children) and local beer (mainly for men and some women). Beer could have religious implications. The main staple food, however, will remain unaffected. Consumption of fruit with meals is not a cultural practice.

Conventional nutrition education methods have always tried to advise women to increase the amount of food they eat or to introduce new foods in order to improve the quality of their diet. This approach has failed to address the issues of improving the quality of the already available foods, which may be inadequate in quantity, and at the same time rarely meeting the required requirements because of poor bioavailability, due to various factors. Solutions for improving quality of local diets, should endeavor to promote traditional processing techniques which could be the answer towards alleviating some of the nutritional problems of mothers and children.

There are foods forbidden to eat in pregnancy, because of various cultural beliefs associated with the growing baby in the womb. Fish and pork are believed to affect the physical shape of a child's mouth, and attitudes towards life while growing up. However, it is unfortunate that these are the foods that would enhance the utilisation of iron in the body, although they are rare in the local diet. Many studies that have addressed soil eating in pregnancy and childhood, have presented contradictory views about the benefits of the practice. Soil eating is believed to contribute to mineral nutrition, particularly iron and zinc, and in the elimination of gastro intestinal discomfort and nausea and vomiting in women, (Abrahams 1997; Aupreiter et al. 1997). However, others (Giessler 1997; JAMA 1969; Walter et al. 1985), have cautioned the possible occurrence of intestinal worms, and consequently anaemia in subjects that consume soil. Women in the study believed soil preparations give them extra strength, and are good for the system and the growing foetus. Whatever the case, there is need to identify benefits or negative consequences of the practice in women and children.

Fatigue and general weakness were significantly associated with women who had moderate and severe anaemia. Excessive fatigue and lethargy would not only affect the physical activity, but would also prevent at risk mothers from reaching health care facilities for themselves and their children, (Harrison 1982). Only 44.4%% of families are within 5 kilometers of a health unit in Tororo district. A severely anaemic mother will find it difficult to walk long distances to take their children or herself to a clinic for health care. There is need to make mothers aware of the common problems and their symptoms, so that get access to cost-effective and appropriate health care.

Regional differences for anaemia in women will need more extensive research in order to identify vulnerability of mothers in some of the areas. Anaemia was found significantly higher among mothers living in Bunyole County compared to the other counties. The numbers of mothers from Bunyole was, however, too small to be able to identify specific risk factors for that group. The possible explanation to this could be that majority of households depend on hiring their labour. There is very little land for cultivation because of the large farms for rice and maize cultivation.

CHAPTER 7.

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS.

Postpartum anaemia is highly prevalent among women in the District. It influences a woman's productivity, resistance to infections, and may contribute to maternal mortality.

However, postpartum anaemia has received low status for its management and control in Maternal and Child Health (MCH) programmes, in Uganda.

Presence of infections with symptoms of fever, lower abdominal pain, general weakness and fatigue, as well as excessive bleeding were identified as strong determinants of anaemia, especially for women with moderate or severe anaemia (Hb <100g/L).

Although iron supplementation during pregnancy appeared to have made a difference for anemic women with Hb < 120g/L, it did not have any significant impact on women with moderate and severe anaemia, (Hb, <100g/L). This could be explained by the effect of pelvic inflammatory disease and excessive bleeding, which were significantly associated with moderate and severe anaemia in mothers. Pre-pregnancy iron reserves from which to draw from, and iron supplementation during pregnancy will play a role in protecting postpartum women from anaemia.

There is lack of knowledge among the women about the underlying causes of poor health for conditions such as lower abdominal pain, recurrent headaches, and fatigue. This has

prevented them from seeking for appropriate health care, and have become victims of traditional healers' exploitation.

About three in every four mothers, deliver their babies away from a health care facilities, and very often assisted by untrained relatives. Management of excessive bleeding, and safe and hygienic delivery practices to prevent infections poses serious implications for the local health care system at community level. Access to health care facilities within easy reach of mothers will remain to be an important factor for the care of these women, and strategies to deal with emergencies while still in the community need to be strengthened and improved. Interventions to promote vitamin A supplementation and consumption should not be taken lightly, because vitamin A has a significant role to play in control of anaemia. High fertility influenced haemoglobin levels of women. Contraceptive use among women is still low, there is need to encourage men and women to use family planning.

Clinical screening for anaemia and needs to be improved in order to be able to identify mothers with severe anaemia, who are at greater risk of death through heart failure.

The local diet is predominantly composed of foods with low bioavailability of iron.

Local remedies to improve availability of iron of the local diet by fermentation and use of local fruit, are available and should be promoted.

There is missed opportunity to target the mother for interventions that will benefit her health, when she brings her child for immunisation. More integration of maternal and

child services is required in order to improve on coverage for services. The postpartum period is the time for a range of health care activities. Infections can be detected early and treated appropriately. Women with other health problems can be given advice and treatment, and mothers can be given advice on breast feeding, family planning and care of the child.

Anaemia in women could be multi-factorial in origin. With background information on poor hygiene and sanitation, high prevalence of malaria and other infections, as well as inadequate intake of iron rich foods, all could be potential causes.

Treatment and prevention of infections, improving environmental sanitation, sensitising men and women on family planning and improving bioavailability of the local diet will greatly contribute to reducing anaemia in postpartum women. Improving the social economic status of households, and especially for the mother will go a long way in making her more able to deal with her own problems. Education of girls is crucial in order to prevent early child bearing.

7.2 RECOMMENDATIONS.

- There is need to strengthen integration of postpartum maternal health with child health, in order to improve and target coverage of services to mothers who are at risk of poor health.
- In order to identify at risk mothers there is need to revise policy on content of background information on the Child Health Card to indicate child birth 'At Risk Mothers.' An example;
 - Normal child birth
 - Caesarian section
 - Excessive bleeding.

When ever a Child health card is presented, the mother's health status according to the risk factors would be checked.

- Iron supplementation should be mandatory for at risk mothers within the first 4 months postpartum.
- Vitamin A programme needs to be strengthened to ensure that all mothers are supplemented postpartum.
- Sensitisation on hygienic child delivery practices should not only target Traditional Birth Attendants, but also other community members as they also assist in child delivery.
- Aggressive messages should be disseminated in regard to common symptoms and consequences of severe anaemia in women, so that they seek for appropriate health care.

- There is need to sensitise men more about the consequences of high fertility, so that they readily consent to their wives' using of family planning.
- Meals that can benefit from traditional processing methods, other than beer or porridge, need to be identified for the benefit of women.
- There is need to improve management of excessive bleeding at community level.
- More research is needed to identify mucous membrane surface that has a 'hue' that can be sensitive enough to identify subjects with moderate or severe anaemia.
- There is need for more research on benefits or negative consequences as well as bioavailability of iron and other minerals of the soil-eating practices.

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If yes, what type of soil.....

10. Anaemia Screening

10.1 Haemoglobin value.....(g/L)

10.2 Clinical signs.....(mild/ moderate/severe/nil)

**Appendix 2
CONSENT FORM**

Tororo district Anaemia Study.

DATE.....

PARISH.....VILLAGE.....

NAME OF MOTHER.....

AGE.....

RESERCHERS NAME.....

Anaemia is an important problem in Women in Uganda. It is not known how many women have the problem, and the factors that cause it. We would like to take a sample of blood by finger prick, and the results of the anaemia status of every woman will be given to her after the test. The finger prick causes slight discomfort with no complications. We shall also ask a few questions on food, health care and some cultural habits women have during and after pregnancy.

“ the general purpose of the study has been explained to me. I now do consent to have a little blood taken from me to see if I am anaemia and to answer some questions. The benefits as well as the discomfort of the finger prick have been explained to me.

Signature of Mother

or

Thumb Print

.....

.....

DATE.....

WITNESSED BY

SIGNITURE.....

NAME.....

HEALTH UNIT.....

Appendix 4

Focus Group discussion Guide

A. For Mothers.

Local terms for anaemia.

Mothers health status since delivery and common health problems.

- Incidence of malaria.
- Antenatal care attendance.

Services obtained at antenatal clinic;

- Iron supplementation.
- Nutrition education.
- Availability of drugs.
- Compliance to taking iron tablets.

Child delivery.

- Place of delivery preferences.
- Complication at delivery.
- Family planning utilisation
- Recognition and perception of anaemia
- Vitamin A supplementation.

B. For Traditional Birth Attendants.

- Knowledge on existence of anaemia among women
- Local name for anaemia.

- Foods avoided or promoted in pregnancy.
- Use of herbal remedies in pregnancy.
- Detection of anaemia.
- Main obstetric complications experienced or known.

Appendix 5

Key Informant Discussion Guide.

A. Health Workers

Status of anaemia as a health problem in the district.

Causes of anaemia in the district.

Methods of screening for anaemia used.

Postnatal services for postpartum women.

Availability of drugs.

Perception of anaemia by the community.

Cost sharing policy for health care.

B. Elderly Traditional Birth Attendants (TBA)>

Known causes of anaemia.

Detection of anaemia.

Common obstetric complications experienced.

Remedies to prevent or manage anaemia.

Appendix 6

Observation Check List

Three observation check lists were used.

1. Activities for mothers.

Activities being conducted at the health centre.

Time mothers bring their children for immunisation. This determined the time the health staff start work.

The amount of time mothers spend at the clinic.

What mothers do while waiting for their turn for immunisation, and what they do after their children have been immunised, while still at the health unit.

2. Health Care Services

Antenatal care and number of mothers attending.

Frequency of clinic days

Health/nutrition education

Availability of equipment and drugs

Availability of health staff, and services provided for mothers.

3. Community Environment

Status of community water sources and their utilisation