PREVALENCE OF SICKLE CELL HAEMOGLOBINOPATHY AND PREGNANCY OUTCOME IN DAR ES SALAAM.

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A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of the Muhimbili University of Health and Allied Sciences.

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October, 2007

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled: **Prevalence of sickle cell haemoglobinopathy and pregnancy outcome in Dar es Salaam** , in partial fulfilment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of the Muhimbili University of Health and Allied Sciences.

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I, Dr Erasto Francis Ngonyani, declare that this dissertation is my own original work, and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

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I do, Praise, honour and thank the almight God for giving me strength and ability for the success of this work.

DEDICATION

This desertation is dedicated to my parents Mr and Mrs.F Ngonyani, for a very strong base they gave me towards education. My lovely two daughters, Beatrice and Theresia who witnessed my efforts under very stressful situation.

ABSTRACT

Background:

Sickle cell disease is one of the commonest diseases of inheritance with serious complications among pregnant women and their infants. As compared to other races, Africans are more affected and it is thought that about 200,000 children are annually born with the disease worldwide majority being in sub-Saharan Africa. It has been reported that the survival of majority of patients with sickle cell disease in Africa is not higher than 5 years old. Long term research programmes in America and Jamaica have shown that simple interventions such as comprehensive care programmes, early detection and treatment of acute events as well as more complex approaches such as blood transfusion and hydroxyurea therapy have a direct impact on clinical course, quality of life and survival. Despite all advances, there has been a limited comparable studies of SCD in Africa.

Objective:

To determine the prevalence of sickle cell haemoglobinopathies among pregnant women and describe the pregnancy outcome of those with the disease/trait.

Methodology:

A cross-sectional study was done in the labour wards of MNH, Amana, Mwananyamala and Temeke Hospitals. The candidates were all women in labour who consented for the study. They were screened for HbAs/Hbss and those who were found to have any of the HbAS/HbSS, their neonates were recorded birth weight and APGAR score.

Results:

The prevalence of sickle cell gene was found to be 10.9%. Only 0.3% of the study population were homozygous for the gene. IUFD and an increased risk to blood transfusion were the common

problems in both the previous and current pregnancies. Prematurely, low birth weight and low APGAR score were more frequent to women with S-gene.

Conclusion:

Sickle cell disease is common in our setting and is associated with an increased risk of adverse foetal and maternal complications.

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ABBREVIATION LIST

BMJ – British Medical Journal

ENND –Early Neonatal Death

Hbs –Haemoglobinopathies

IUFD –Intrauterine Foetal Death

IUGR – Intrauterine Growth Restriction

LBW – Low Birth Weight

MNH – Muhimbili National Hospital

PROM – Premature Rupture OF Membrane

PSP – Prevalence of Sickle cell in Pregnancy

SCA – Sickle Cell Anaemia

SCD – Sickle Cell Disease

SGA – Small for Gestational Age

USA – United State of America

WHO – World Health Organisation

INTRODUCTION:

Sickle cell disease is a condition resulting from mutant autososmal gene responsible for synthesis of hemoglobin S (Hbs)[1,2] . The single beta chain substitution of glutamic acid by valine at codon 6 of the beta-globin gene leads to this condition. This single alteration in the B-globin is responsible not only for the Electrophoretic mobility distinguishing the different haemoglobins but also for their clinical manifestations. The sickle cell disease (SS), the sickle cell hemoglobin C (SC disease), and sickle cell beta- Thalassemia disease (S-B thalassemia) are the most common of the sickle haemoglobinopathies[3,4].

The red blood cells from people with SCD take the shape of a sickle when de-oxygenated leading to a shortened cell survival. A normal blood cell can survive 120 days where as a sickle cell can only survive 15 days! This makes anemia inevitable, with most patients having a hemoglobin concentration of around 8g/dl[5] . Clinically the hall marks of sickling episodes are periods during which there is ischaemia and infarction within various organs. These changes produce clinical symptoms, predominantly pain and are called sickle crisis. Other crises are sequestration and haemolysis [6]

The painful crisis is the most common cause of morbidity and most frequent reason for short term immobilization[7]. It may occur in any organ but it most often affects bones and joints. To emphasize the importance of severe pain in sickle cell disease, Platt and colleagues observed that African cultures have named the disease for its painful episodes. For example, the Ga language of Ghana, the disease is known as chwechweechwe, for relentless repetitive chewing often seen in patient with excruciating pain[8] .

Apart from the painful crises there is a high risk of pneumonia, particularly caused by streptococcus pneumonia, cerebral vascular accidents, renal disease, osteonecrosis of hip and the shoulder and retinopathy[9]. Severe lung reactions (acute chest syndrome) can cause respiratory failure[10]. All these complications decrease the life expectancy of SCD patients.

The median survival of patients with SCD in United States is 42 years for men and 48 years for women [3]. Women have higher survival rate because they do still have a stable HbF at age of 40 years compared to men [11]. Low HbF level are associated with high risk of mortality[12].

During pregnancy the outlook of the disease worsens. Thirty percent of sicklers with homozygous state will experience a sickling crisis. Emesis gravidarum poses a risk as it can lead to dehydration which may culminate in a sickle cell crisis. In pregnancy crises are frequently encountered in the last four weeks of pregnancy, in labour and first week of pueperium[13]

The appearance of systolic hypertension and protenuria in a bone pain crisis around the end of pregnancy (sometimes referred as pseudotoxaemia) is of a grave prognostic significance as it is associated with bone marrow fat embolism and in absence of effective medical care, the mortality from it is high.[14]. Also these patients are prone to respiratory and urinary tract infections. These infections are most difficult to control especially in pueperium and the associated fevers and acidosis may accelerate sick ling. These infections are increasingly high when Hb and haematocrit are below 7g/dl and 20% respectively, all these complications leads to fetal growth restriction[15].

SCD is associated with high early mortality. In many African countries historically attributed to malaria, over whelming bacterial infections and malnutrition. The relation with malaria is of interest as HbAS is thought to confer protection against severe malaria[16]. A study done in Kenya by Aidoo et al, 2002 showed that sickle cell trait provided 60% protection against overall mortality due to malaria and most of this protection occurs between 2-16 months of life before onset of clinical immunity in areas with intense transmission of malaria. Also Moorman et al, 2003 showed that the prevalence of hemoglobinopathy was 26% in malaria holoendemic lowland area compared with 3% in highland area which was malaria free[16]

A diagnosis of SCD is suggested by the presence of hemolytic anemia, red cell morphology and intermittent episodes of pain. The sickling test is a screening test to detect the presence of Hbs and this is often followed by hemoglobin electrophoresis[17]

Adequate management of sickle cell hemoglobinothies is of paramout importance. Close observation with careful evaluation of all symptoms, physical findings, and laboratory studies are needed. One rather common danger is that the symptomatic woman may categorically be considered to suffer from a sickle cell crisis while not. As a result ectopic pregnancy, placental abruption, pylonephritis, appendicitis, cholecystitis or other serious surgical or obstetrical conditions may be overlooked. Therefore the diagnosis of sickle cell should be applied only after all other possible causes of pain or fever or reduction in haemoglobin concentration have been excluded.

Antenatally the management includes giving pain killers and hydration in sickling crisis, giving antibiotics and antimalarials in infections and blood transfusion in severe anaemia. Intrapartum care includes pain killers, hydration and close monitoring to avoid prolonged labour. Postpartum care involves early ambulation, antiembolic stockings, hydration, aggressive treatment of suspected infection and family planning advice[17].

About 50% of patients with sickle cell disease will have an uncomplicated labour. In the rest, some will be complicated by obstetrical problems and others by having some of the complications peculiar to sickle cell disease[18]. Vaginal delivery is the best mode of delivery but should labour be prolonged for 12 hrs, there should be no hesitation in doing caesarean section. This is because dehydration, acidosis and anxiety which occur in prolonged labour may precipitate painful crises. Elective caesarean section has no special advantage unless there are other obstetric indications[19].

The treatment approach of pain crises involves strong analgesics, adequate hydration, blood transfusions and rest[20]. Prophylactic penicillin, immunization against pneumococcal infection

and folate administration can lower the frequency of hospital admissions [22]. Prophylactic therapies used in MNH are malaria prophylaxis and folic acid supplements.

Currently there are a few experimental therapy being studied worldwide. Combined regimens of hydroxyurea and 5 azacytidine as well as recombinant erythropoiten increases fetal hemoglobin production with less sickling. However, the long term safety of hydroxyurea is unknown though it decreases the annual sickle cell crises by half [21]

Perinatal diagnosis of sickle cell disease may allow in utero stem therapy with normal hemoglobin stem cells. Immunological immaturity of a second trimester fetus may dumpen rejection of foreign cells and thus allows a high success rate for transplantations[8]

A promising potential treatment for sickle cell anemia is bone marrow transplantation. Because there is a basic defect of borne marrow stem cells in haemoglobinopathies, introduction of normal hemoglobin of erythrocytes precursors may be curative. The success rate is USA is about 78% so far [8]

Following the above argument it can be seen that individuals with sickle cell trait may not suffer from serious health problems and so may not learn of their condition except through screening. These people have a potential of having children with one of the sickle cell diseases if the other parent has a gene for one of the haemoglobinopathies. Unless they are made aware of this potential possibility, they may have children with a sickle cell disease that they might have chosen not to have, or may suffer emotional and/or adjustment problems through lack of preparation for handling the difficulties associated with the problem. Hence screening has a potential benefit.

LITERATURE REVIEW

Sickle cell disease presents a major medical problem in Tropical Africa, Caribbean, the Middle East, and Indian subcontinent. The prevalence is quite variable but it is estimated that 8 percent of black people in America and Jamaica have a sickle cell gene[21].The vast majority of people with sickle cell disease are from sub-Saharan Africa. The highest gene concentration is in Equatorial Africa where it reaches up to 40%. It is less common in Northern and Southern Africa where the prevalence is 0.2% to 14.7%[22,23].

In Kenya the prevalence of sickle cell gene is 26% [25].

In some parts of Tanzania limited studies have been done to identify the magnitude of the problem. A study done by Mitchel et al in 1972 in some areas in Tanzania reported the prevalence of the disease to be 16.4% and 31.4% in Dar es Salaam and Musoma respectively[24]. In Dar es Salaam alone, 17% of all children admitted at Muhimbili National Hospital for various reasons were found to have the sickle cell gene among them one in every four has the homozygous state[25]. WHO survey in 2006 estimates that the prevalence in Tanzania is about 15-38%.[26]

At MNH paediatric outpatient clinic, 2000 sickle cell patients were seen from January 2001 to December 2001. These were patients who had been confirmed to be homozygous for the sickle cell gene[27]. Currently the clinic attends up to 4000 children with HbSS per year, out of which about 950 are new cases. However, Maternity data base has no data of heamoglobinopathic pregnant women attending at MNH.

A number of studies from Africa confirm a continuing a high rate of maternal and perinatal complications from HbSS disease. In Nigeria, maternal mortality rates among sicklers ranged from 2 to 9 per 100,000live births and perinatal mortality rate was as high as 19 percent.[28] . Poddar and colleagues (1986) reported increased pregnancy wastage as well as a maternal mortality rate of 7 per 664 (1.1%) in pregnant women with hemoglobin SS disease[29]. From

these studies, it is apparent that mortality from hemoglobin SS disease is still significant in current times.

A cooperative study which was done in 19 centers between 1979 – 1986 predominantly those with HbSS, revealed that in 445 pregnancies, the maternal complications included the following; preeclampsia 14%, eclampsia 1%, pyelonephritis <1%, placenta praevia 1%, PROM 6%, premature labour 9%, acute anaemia event and maternal mortality 0.45%. Fetal complications observed included miscarriage 6%, stillbirth 1%, small for gestation age 21% and prematurity 27%.[30]

Another study which was done to compare the perinatal outcome among sicklers and non-sicklers revealed that perinatal loss was 31.7% among sicklers and 10% for non sicklers. In the same study there was a higher rate of low birth weight, stillbirth and neonatal death among the former as compared to the later[31].

Rajab et all did a study in Bahrain among pregnant women with SCD and found that sickling crisis was the commonest complication(42.2%),abortion 32%,preterm 25.9% and IUGR 10% [32]

Problem Statement

The prevalence of Sickle cell trait/disease is unknown among pregnant women in our set up. The associated complications have not yet been described in Dar es Salaam. At MNH paediatric outpatient clinic the proportion of children with sickle cell disease is increasing (records from MNH paediatric record 2006). There is no data on the prevalence of the condition among pregnant women in Dar es Salaam.

Rationale of the Study

Sickle cell disease and the related complications in pregnancy and early infancy is a common problem in Sub Saharan Africa (14). In order that an appropriate care is given, determination of

the magnitude of the problem, which will enable case prediction, and description of the associated complications is imperative. The results will add more insight to clinicians and policy makers towards appropriate intervention measures.

Study Objectives

Broad Objective:

To determine the prevalence of sickle cell haemoglobinopathies among pregnant mothers and the outcome of their pregnancies in Dar es Salaam.

Specific Objectives:

1. To determine the prevalence of sickle cell haemoglobinopathies among women who deliver at MNH, Amana, and Mwananyamala and Temeke hospitals.
2. To describe frequency of complications encountered in pregnant women with sickle cell haemoglobinopathies in previous and index pregnancy.
3. To determine fetal outcome in terms of APGAR score and birth weight of neonates from mothers with sickle cell haemoglobinopathies

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METHODOLOGY

Study design

Descriptive cross sectional study

Study Setting:

The study was done in Dar es Salaam city. The city is organized into three municipals and has a population of about 3 million (2oo2 beaurae of statistic). The study was conducted in four government hospitals; one tertiary referral and University teaching hospital, Muhimbili National Hospital and three Municipal hospitals, one in each municipal namely Amana, Mwananyamala and Temeke. In all these hospitals the study was done in the labour wards to women who are in labour.

Majority of women who go for delivery in the municipal hospitals come straight from home. A few are referred from private hospitals, health centers and dispensaries.

At Muhimbili National Hospital, women who come in labour are referred from the Municipal hospitals, private hospitals. However even in this hospital as well majority come from home.

In each of these hospitals the number of deliveries per day ranged from 20 to 40 as per hospitals record of January 2007.

On arrival Expectant women in labour to these hospitals are admitted and checked among other things, the screening of obstetrical risks in the past and index pregnancy by looking at the Antenatal Card and at times direct communication to the woman. The woman is then sent to the labour ward.

In the labour ward the team of trained personnel's on call on that day takes care of the women in labour until delivery. At MNH the team comprises of midwives, intern doctors,

registrar/residents, specialist and consultants. At Municipal hospitals the team comprises of midwives, clinical officers, assistant medical officers, intern doctor's registrars and specialists. Following an uneventful delivery, the mother and her neonate(s) are sent to the postnatal ward for observation. If there are no complications 6 hours later the woman is allowed to go home. Women who develop complications are admitted in the post natal wards.

Study population:

Women who came for delivery at MNH, Amana, Mwananyamala and Tem eke hospitals.

Study period:

The study was done between 12th February 2007 _14th march 2007 (one month)

Sample size:

The sample size was determined by using Epi info version 6 STATCALC programme.

Where by a formula used is $N = \frac{Z2 \times P(1-P)}{e^2}$

$\frac{1.976 \times 1.976 \times 38 \times 62}{9} = 1016$

N = Minimum sample size required,

Z = Percentage of normal distribution, this equals 1.976 using 97% confidence interval.

P = Expected prevalence of the disease which is 38%, (WHO 2005, sickle cell anemia report by secretariat)

e = marginal error, taken at 3%

1016 subjects were recruited in the period of study

Sampling Technique

Systematic sampling technique was used. Every other woman who came in labour was recruited in the study until a sample of 10 women per day in each hospital was reached.

Inclusion criteria

All women who came in labor in the four hospitals mentioned.

Exclusion criteria

Women with multiple pregnancies were excluded as low birth weight is prevalent in this group.

Data Collection

Women who came for delivery in these hospitals were informed of the study. Verbal informed consent was sought at the admission room where the research assistant/ doctor on call did confirm whether the woman has true labor. Screening for those with high obstetrical risks was done and they were given a closer monitoring. Women who consented were interviewed and the checklist filled either before or after delivery depending on the stage of labour (appendix 2_consent form). The checklist consisted of socio-demographic data, past and index obstetrical complications related to sickle cell hemoglobinopathy. The checklist, antenatal card and the laboratory request form did bear the same identification number. The top of the antenatal card was marked with a red marker pen "PSP" (prevalence of sickle cell in pregnancy) for easy identification.

Venous blood was drawn from their cubital fossa, put in EDTA bottle which did bear a client PSP number and send for analysis to JICA laboratory located at MNH where sickling test was done (see appendix 3 for details of procedure). Those found Positive with sickling test; electrophoresis was performed (appendix 3 for details).

The blood was drawn twice a day. First at 08.00hours, from all women who consented for the study from 14.00 hours of the previous day to 08.00hours the next morning and at 14.00hours from those who consented for the study from 08.00 hours of the same day.

Daily the Principal researcher did collect all samples and filled checklist between 14 hrs and 16hrs in all hospitals, the time was conducive due to minimal traffic jam as the samples were not supposed to exceed 8hrs exposed at room temperature from when they were drawn.

The JICA laboratory was opened at 07.00hrs and closed at 18.00hrs every working day. All samples were processed in this laboratory by the same technician.

Because the labour ward is a 24 hours service, the study was also done for 24 hours. The researcher did liaise with the nursing administration to make sure that in each hospital one research assistant was available in each shift.

Women who underwent a normal delivery, their neonates were checked Apgar score and birth weight recorded then requested to come for their results at respective hospitals a month later. Their discharge summary did bear PSP number similar to the laboratory request form. Those who were admitted after delivery due to maternal or neonate complications did have their results while still in the ward depending on time of stay.

Research Assistant Training.

Twelve research assistants, three in each hospital and one laboratory technician were oriented to the **Study**

The questionnaire and the sampling technique were tested on the same day and it was found that majority of women agreed to be tested.

Study variables

Fetal: APGAR score at 5 minutes, birth weight in grams and admission to antenatal ward.

Maternal: gravidity, parity, SCD related complications.

Definition of Terms

Low birth weight – birth weight below 2.5 kgs

Low score – Apgar score less than four at five minutes

Data Management and analysis

The questionnaires were coded and entered into a computer using Epi Info programme 2002 then data cleaning this was done on daily basis

During data analysis the frequency of occurrence of each complication was considered only once regardless the number in both previous and index pregnancy.

Limitations of the study

This was a hospital based study, may not represent general population

Ethical clearance

Before being recruited in the study all women were assured that the blood sample taken was going to be used for the intended goal only and not for other tests. Women who did not consent for the study were assured that they would not be deprived of good care. women found to have S gene were instructed to come with their children for screening at MNH JICA laboratory.

Ethical clearance was sought and granted from the Research and Publication Committee of the Muhimbili University College of Health Sciences (MUHAS).

Permission for the study

Permission to conduct the study was obtained from the Executive Director of MNH and District Medical Officers of Amana, Mwananyamala and Temeke.

RESULTS:

A total of 4791 women delivered in these hospitals during study period, of these a total of 1016 pregnant women in labour were recruited in the study, out of which 110 were found to have s gene (10.9%). Only 2 women (0.2%) of the study population were homozygous. Majority of women were married (82.9%) and had primary education (68.6%). Primigravidae accounted 37.7% 0f study population.

ENND and abortion were the most encountered complications in previous pregnancies (2.9%, 8.9% respectively)

In the current pregnancies IUFD was the prominent complication accounting 1.3 %. Among sicklers, IUFD, IUGR, blood transfusion, infection and sickling crises were common (50%

each). Low birth weight accounted 10% from general population, and accounted 50% among neonates of sickler mothers.

Tables of results

Table 1: Socio-demographic profile of mothers in the study sample

	AA		AS		SS		Total	
	n	%	n	%	n	%	n	%
Age								
12 – 17	41	100	0	0	0	0	41	4.0
18 – 34	808	88.1	107	11.7	2	0.2	917	90.3
35 and above	67	98.5	1	1.5	0	0	68	5.7
Education level								
No formal	57	66.3	29	33.7	0	0	86	8.5
Primary	658	94.4	39	5.6	0	0	697	68.6
Secondary	165	82.9	33	16.6	1	0.5	199	19.6
College/University	26	76.5	7	20.6	1	2.9	34	3.3
Marital status								
Married	761	90.4	79	9.4	2	0.2	842	82.9
Not married	145	83.3	29	16.7	0	0	174	17.1
Gravidity								
Primigravida	340	88.8	42	11	1	0.2	383	37.7
Multigravida	566	89.4	66	10.4	1	0.2	633	62.3
Total	**906**	**89.1**	108	10.6	2	**0.3**	**1016**	**100.0**

The prevalence of sickle cell hemoglobinopathy is 10.9%. Most women in the study sample aged 18 - 34 (90.3%) and were married (82.9%). Primigravidae alone comprised more than 1/3 of the study population (37.7%).

Table 2. Sickle cell hemoglobinopathy related complications in the previous pregnancies.

HB TYPE	*AA*		*AS*		*SS*		TOTAL	
							n	%
NO COMPLICATION	*496*	*(87.9) %*	*63*	*(95.5) %*	*0*	*0*	n =	559
SICKLE CELL CRISIS	0	0	0	0	1	100	1	0
ABORTION	17	3	2	3	0	0	19	1.9
IUFD	9	1.5	0	0	1	100	10	0.9
ECLAMPSIA	6	1	0	0	0	0	6	0.6
ENND	29	5.1	1	1.5	0	0	30	2.9
BLOOD TRANSFUSION	9	1.5	0	0	1	100	10	0.9
TOTAL								

Data shows frequency of sickle cell related complications in previous pregnancies, not the actual number of women. To all women, ENND was the most common complication encountered (2.9%) followed by abortion (1.9%). Sickle cell crisis, blood transfusion and IUFD occurred to woman with SS gene.

Table 3: Sickle cell hemoglobinopathy related complications in the current pregnancy.

Hb TYPE	AA		AS		SS		TOTAL	
							n	%
NO COMPLICATIONS	880	(97.4 %)	103	(95.4) %	0	0 %	n=	983
IUFD	9	0.9	3	2.8	1	50	13	1.3
IUGR	3	0.3	1	0.9	1	50	4	0.04
BLOOD TRANSFUSION	5	0.5	0	0	1	50	6	0.06
INFECTIONS	9	0.9	1	0.9	1	50	10	0.9
SICKLE CELL CRISIS	0	0	0	0	1	50	1	0.09
Total								

In all women, pregnancy loss (IUFD) was the most common complication accounting 1.3 %., Women with SCD had more proportion of IUFD, IUGR, blood transfusion, infection and sickling crises (50% each). However the number of sickle cell disease is small to make any significance statistically.

Between the two sicklers one was Primigravidae who had IGUR had one episode of sick ling crises necessitating blood transfusion and had a preterm baby. The second sickler was G3 P0 +2 (two abortions occurred in the past in 1st trimester), previous pregnancies she experienced crises but none in this however she had IUFD.

Table 4: Neonatal outcome of mothers in the study population.

HB TYPE	*AA*		*AS*		*SS*		**Total**	
	n=906		*n=108*		*n=2*		**n=1016**	
FETALOUTCOME	*n*	*%*	*n*	*%*	*n*	*%*	n	%
Full term	846	93.3	95	88	1	50	942	92.7
Preterm	61	6.7	12	12	1	50	74	7.3
*Low APGAR Score	58	6.4	3	2.8	1	50	62	6.1
Low birth weight	81	8.9	21	19.4	1	50	103	10

* Low APGAR score included stillbirth fresh.

Most mothers in the study population (92.7%) delivered full term babies. Of the adverse neonatal outcome found in this study Low birth weight and pre-term were the most prevalent 10% and 7.3% respectively.

Discussion:

In this study the prevalence of S-gene among pregnant women who were screened was found to be 10.9%, which is relatively lower than the prevalence of the gene in Tanzania which ranged from 15 – 38% (WHO Survey 2006, Fupi et al 1971). It is thought that to get a consisted prevalence one need to have an indigenous population of whom the S-gene has been modified by the environment of that particular area. Dar es Salaam being a cosmopolitan city, explain the variation between the findings from this study and those previously reported.

Majority of women with sickle cell disease do have repeated abortions therefore there was a possibility of missing them as study population was only women in labor, moreover patient with sickle cell disease have sub fertility hence few are expected to have pregnancy.

Studies have shown that if appropriate case management is not done among pediatrics with SCD majority tend to succumb within the first five years of their life and only few of them reaches reproductive age[23]. In this study, only 2 out of 1016 recruited clients were homozygous for the S gene. According to the data available at MNH of 2006, currently the paediatric SCD clinic attends 4000 patients annually, out of which 950 were new cases.
If such efforts will be rolled over nationwide, it is hoped that in future we shall see many SCD pregnant women there is therefore need to be prepared to face this challenge.

As regards to maternal complications during pregnancy, several studies have shown that there is increase in complications. Rajab et al showed that sickling crisis is common during pregnancy and it accounted 42%. Also Lawson proved the same that sickling crisis is commoner among the SCD complications in pregnancy as it accounted for 30%. In this study the sickling crisis accounted 50% among the pregnancy complications.

Smith et al in their study observed that acute anaemia mainly due to haemolysis lead to BT (48.9%). In this study 50% of sicklers had acute anaemia necessitating blood transfusion.

Though in other studies like those done by Samal & Smith showed an increase in pre-eclampsia and eclampsia among sicklers during pregnancy, other studies like that done by Rajab et all showed that there were no difference in the rates of pre eclampsia and eclampsia. In this study none experienced above complications. The complication absence can be accounted by little number of SCD in the study rather than saying it is uncommon in our set up.

Studies have shown that fetal outcome is worse in SCD expectants than in general population. Samal et al., Rajab, both have shown that miscarriage, IUFD, Stillbirth, SGA and prematurity were more common this is also revealed in this study where both IUFD accounted (50%) and SGA (50%) among sicklers. The other complications were not observed may be because of little number of SCD clients in the study and not that they are uncommon.

Conclusions:

- The Prevalence of sickle cell gene is high among pregnant women in our set up.
- During pregnancy, SCD patients encounter more complication than general population.
- Adverse fetal outcome are more common to expectants with SCD than general population.
- These findings in my study are in agreement with reports on prevalence, morbidity and pregnancy outcome conducted elsewhere.

Recommendations

- A multidisciplinary approach is required for comprehensive management of pregnant women with SCD so that the complications to be dealt with appropriately.
- Premarital counseling and testing for the sickle cell gene will help in achieving the improvement of fetal outcomes as healthier babies come from healthier parents.
- There is a need of screening programme to all neonates.

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