CHAPTER ONE

1.0 Introduction

Adolescence is the state or process of growing up or the period of life from puberty to maturity and is usually from the age of 15–19 years (Tawiah, 2002). In this study, an adolescent girl is regarded as one from the age of 12 to 19 years old. McIntyre (2002), states that adolescence is a period of rapid development when young people face new capacities and are faced with new challenges of physical and emotional changes; they get attracted to the opposite sex and develop sexual feelings. Adolescents are vulnerable to risk behaviours since they do not understand what may be happening to their bodies. This vulnerability has serious consequences for health through having unprotected sexual relations, which may lead to unplanned pregnancy. Adolescent girls are susceptible to malaria infection especially during pregnancy.

According to Rogerson (2007), globally, malaria kills about 2.7 million people each year. About 90 percent of malaria cases occur in the Sub –Saharan Africa that includes Zambia. Over the years, malaria has undergone genetic transformation. This includes both the malaria parasite that has become resistant to drugs such as chloroquine and the anopheles mosquito that has become resistant to some insecticide hence the need for constant research to curb malaria. Climatic change has favoured the increase of anopheles mosquitoes while population movements have increased the chances of spreading malaria to non-endemic areas. Other challenges to malaria prevention include the use of ineffective anti-malaria drugs. All these factors increase the malaria burden further.

One of the vulnerable groups that are affected by malaria is a pregnant woman, of which the bigger problem affects the adolescent pregnant girls. This is because young age and null parity in the same individual lead to a very high risk for malaria infection. This has been revealed by Briegers, (2007) that in the Sub –Saharan Africa, many adolescents are parasitemic and anaemic at the time they first become pregnant. Malaria cases in pregnant adolescents are missed out because the majority shows no symptoms since it attacks and hides in the placenta and renders the use of blood slide useless. Therefore, it is relevant to protect both the infected and those who are not infected by taking IPT.

In view of this, there is need to seek to understand factors that can assist to reduce the burden of malaria in adolescent pregnancy. One way of preventing malaria is to adequately treat the disease after being infected through prompt case management and the other way is by taking IPT before being infected to prevent it from spreading and causing the disease. Therefore, reducing malaria burden requires that there is a critical understanding on these dynamics that include knowledge on IPT as well as factors that are linked to access to IPT among pregnant adolescents. This study sought to determine knowledge and accessibility of IPT among adolescent mothers from the age of 12 to 19 years in Mazabuka District.

1.1 Background information on Malaria estimates

Globally, malaria cases range from 300-500 million annually. About 700,000 to 2.7 million deaths occur annually worldwide. It was estimated that 200,000 newborn deaths occur as a result of malaria during pregnancy per annum (Safe Motherhood, 2004). Africa experiences 10,000 maternal deaths, 2-15 percent maternal anaemia, 5-14 percent of low birth weight babies of

which 30 percent are due to malaria and 3-5 percent of infants' death every year (Otolorin, 2005).

Malaria infection is a major public health problem particularly in adolescent pregnancy in both tropical and sub-tropical regions of the world. Malaria cases of which 90 percent occur in Africa, affect all pregnant women of which the adolescents who are in the first and secundigravidae are particularly more affected than other pregnant women because of decreased resistance to malaria together with other risk factors such as immaturity of the pelvic bones and the birth canal could be significant risk factors in obstetric and may cause obstructed labour and other obstetric complications such as fistulas. In Africa, over 50 million women who live in malaria endemic areas get pregnant each year. About 41 percent of the population live in areas where malaria is transmitted (Rogerson, 2007).

Malaria in adolescent pregnancy is a serious illness and is responsible for many hospitalisation cases. In Zambia, 95 percent of malaria infection is caused by Plasmodium Falciparum (P.F). This is the parasite that is associated with severe anaemia in adolescent pregnancy. It thrives well in temperatures between 35-40°c and 65 percent humidity. The crude parasitic rate is estimated at 75-90 percent in rural areas and 20-70 percent in urban areas (RBM, 2000). This implies that most adolescents in rural areas are at higher risk than those in urban areas.

Malaria during adolescent pregnancy is both symptomatic and asymptomatic. In asymptomatic cases one may not even know that she has malaria because the parasites tend to hide in the placenta hence the importance of IPT. Even the use of blood slide is rendered useless. This shows why it is important for adolescent mothers to be both knowledgeable and accessible to IPT (MOH, 1999).

Malaria has various devastating effects on the pregnant adolescent. These include severe anaemia, cerebral malaria, high morbidity rate, high maternal mortality, febrile illness puerperal sepsis and placental infection. Malaria affects the foetus in the following ways; stillbirths, spontaneous abortion, congenital infection, low birth weight and fatal growth restriction (Briegers, 2007 and Brabin, 1991).

It is for this reason that the World Health Organisation (WHO) gave a recommendation for areas of high and moderate malaria transmission, where pregnant women (including pregnant adolescents) should use Intermittent Presumptive Treatment (IPT) with other preventive measures such as Insecticide Treated Nets (ITN) and effective case management in order to prevent the adverse effects of malaria (Valley, et. al, 2007). Even though malaria guidelines do not mention adolescents specifically in existing policies on malaria, they need to be prioritised in available interventions in order to reduce disease burden. IPT is recommended for all pregnant women and should take a full treatment dose of three tablets of sulphadoxine-pyrimethamine (SP) as a single oral dose. A qualified midwife should directly observe pregnant adolescents while taking treatment at health centres. SP tablets consist of 500g sulphadoxine and 25g of pyrimethamine. This intervention is delivered as part of routine antenatal care at any health centre in Zambia. They should receive IPT thrice during their course of their pregnancy. One dose is received during the second trimester at twenty weeks and the other dose is taken at thirty weeks in the third trimester. Zambia introduced IPT to pregnant women in 2003 that is administered to pregnant women through routine ANC services in all health services in Zambia by using Fansidar that is a common brand in Zambia (Ontolorin, 2005).

Despite the adverse effects of malaria, adolescent mothers do not have adequate contacts with available preventive and curative systems available. Accessibility to IPT among adolescent pregnant girls is hindered by a number of factors such as poverty, geographical inaccessibility, little knowledge, low quality of services, negative attitudes towards malaria by adolescents and health workers as well as beliefs against bitter tasting western medicines. Also stigma, long distance, high transport cost and embarrassment especially for unmarried adolescents because available facilities are not often oriented to their special needs. Many adolescents are not able to recognise that they are pregnant at an early stage or may not even identify themselves as being pregnant. They may not view ANC as a priority and therefore delay to seek its services and may miss out some of the doses of IPT (Nnaji, et. al.2006).

1.2 Statement of the problem

Adolescent pregnant women are more vulnerable to malaria infection due to young age, parity, reduced immunity and other physiological changes. Since all these occur in the same individual, they lead to an increased risk of malaria infection. Each year, over 50 million women in Africa, are pregnant and get exposed to malaria infection in malaria endemic areas (Rogerson, 2007). Malaria during pregnancy in endemic areas, pose a serious threat to both the young mothers and their unborn babies. It kills about 200,000 newborn babies each year. Over 10,000 maternal deaths take place in Africa per annum (USAID, 2005). The deaths are higher among the adolescent mothers and their newborn babies than adult mothers.

Granja (2002) and W.H.O (2003) have found that young age is a significant factor to more severe malaria and that nulliparous among adolescents are more prone to placental infection. In

high malaria endemic areas, some pregnant adolescent mothers tend to be asymptomatic, because the parasites hide in the placenta that is an immunologically privileged site. As a result, the blood slide in most cases is negative hence limiting the usefulness for this method. This shows the importance of IPT (Malaria Journal, 2005). This calls for increased intensification in the area of sensitisation on IPT in malaria prevention during adolescent pregnancy. This can only be done after conducting a study to determine the existing knowledge gaps and factors related to accessibility in IPT among adolescent mothers.

IPT requires a complete dose of three SP that should be taken at once and three times during the entire pregnancy that should be taken during the second and third trimester. The first dose of SP begins at sixteen weeks of pregnancy while the other two doses at an interval of one month apart in the third trimester. This should be done during ANC visits under direct observation by a trained health worker (MOH, Kampala, 2000).

Malaria in adolescent pregnancy has several effects both to the mother and the unborn baby. Findings from a study carried out in Tanzania and Malawi show that adolescents had a higher prevalence of parasitemia of 41 and 46 percent respectively. This study also showed that low birth weight prevalence was highest among adolescents' delivery at 32 percent during the malaria season than adults' at 15 percent (Wort, 2006). Other effects of malaria in adolescent pregnancy include; cerebral malaria, stillbirths, premature delivery, spontaneous abortion, severe anaemia, high morbidity and mortality rates, febrile illness, puerperal sepsis, intra-uterine growth retardation because of reduced nutrients and oxygen transportation to the baby (Briegers, 2007).

The coverage in malaria prevention with the standard two doses of SP in Malawi showed that more than half pregnant adolescents received inadequate anti-malaria treatment. IPT in malaria prevention was lower for younger adolescents aged 17 and less, at 35 percent than the older adolescents aged 18 and 19 at 53 percent (Malaria Journal, 2005). Adherence to malaria prevention in IPT is the key to success, if we are to reduce the effects of malaria in adolescent pregnancy. IPT is the main policy that improves low birth weight outcomes and reduces anaemia in adolescent pregnancy. However, malaria efforts are focused on pregnancy but not on adolescent pregnancy (Malaria journal, 2005).

In developing countries of which Zambia is a part, pregnant adolescents face a number of challenges such as; low education, unsatisfactory prevention and curative care, which generally fall short at national standard and are often insufficient. MERA, (2004) states that though the interventions against malaria are available, the burden of malaria still persists due to ignorance and inaccessibility. Inaccessibility may be due to poverty, geographical inaccessibility, low quality of services, little knowledge and negative attitudes by community and health workers towards adolescent pregnant girls and lack of education and information on IPT as reviewed from literature. Long distance to health centres, beliefs that fever is a normal sign of pregnancy and that bitter tasting medicine could provoke abortion are barriers in accessing IPT (Worall, 2007). Where ANC services are available, prenatal care may not be used because child bearing may be considered to be normal for young women and requires no medical attention.

Maternal mortality accounts for 421.9/100,000 in Zambia, of which 20 percent is attributed to malaria. In Zambia, 26 percent of the pregnant women are adolescents. Only 56 percent of the mothers in Zambia received two or more doses of IPT in rural areas. While in southern province, only 63 percent took two or more doses of Fansidar during their previous pregnancies. 44 percent of the women in Zambia deliver at health centres while 56 percent deliver at home (MOH, 2007). This implies that only few women utilise the health centres. This poses a question on accessibility to IPT and knowledge among adolescent mothers in health centres.

Malaria is the number one cause of morbidity among the top five diseases in Mazabuka district. Adolescent mothers have not been spared. It is estimated that 20 per of the women in childbearing age are adolescent mothers of whom 15 percent are affected by malaria. In 2006, Mazabuka experienced a rise in malaria cases from the incidence of 323.7/1000 in 2005 to 421.9/1000 population (MOH, 2007). 54 percent of the women in Mazabuka district have access to the standard three doses of IPT in malaria prevention. This is below the current target of coverage rate of at least 90 percent of women taking three doses of IPT. About 25 percent of the pregnant women who attend antenatal for the first time, among who are the adolescent mothers, do not complete the three doses of IPT. It is important to note that malaria contributes 20% to all infants' mortality in Zambia (MOH, 2005). There was therefore, need to look into the pregnancies especially in adolescent girls and their exposure to malaria. Many of them may not have had any idea about IPT during pregnancy.

Since most adolescents tend to have unwanted pregnancy, they either book late for ANC services or they do not book at all. Some of the unmarried pregnant adolescent girls do not want to be seen in public. So they hide their pregnancy since most clinics lack privacy hence this poses a

question on whether they have been targeted for outreach programmes to educate them on the meaning and the importance of IPT (Nnaji, 2006). Information about prevalence of knowledge and accessibility of IPT among adolescent mothers in Mazabuka district is scanty.

Moreover, Zambia, and, Mazabuka in particular, no detailed study had been done on knowledge and accessibility in IPT among adolescent mothers. A critical understanding of knowledge is not an easy thing. Doing a research in this area has filled this gap in information, hence the relevance of doing this study.

CHAPTER TWO

2.0 Literature Review

2.1 Background on malaria

Malaria is a protozoa disease. It is caused by parasites of the genus Plasmodium. Malaria is transmitted to man through a bite of an infected female anopheles mosquito. When a person has been attacked by malaria, he/she experiences three distinct stages: hot, cold and sweating stages. Malaria attack can be mild, severe or complicated depending on the parasites present and according to the person's immunity (Parks, 2005). One of the special features of malaria in adolescent pregnant mothers is that it can lead to death for both the mother and the unborn baby in severe cases. Prevention is better than cure hence the importance of IPT during pregnancy.

2.2 Malaria burden estimates

According to MERA (2006), malaria is still a devastating global problem despite the control and prevention effort of so many countries. Malaria prevention includes the use of Intermittent Presumptive Treatment (IPT), Insecticide Treated Nets (ITN) and Indoor Residue Spray (IRS) in malaria endemic areas of Africa, Asia, the Middle East, Central and South America. Rogerson (2007), reports that over 50 million women are exposed to the risk of malaria in pregnancy every year including adolescent mothers. About 41 percent of the population live in areas where malaria is transmitted. Globally, malaria cases range from 300-500 million annually. 700,000 to 2.7 million people die of malaria each year. Malaria mortality and morbidity is high among adolescent mothers who do not have adequate contact with available preventive and curative health systems. This therefore, leads to under - reporting of malaria cases specifically those who do not attend ANC and prefer to deliver at home. Consequently deaths occur with inadequate post mortem diagnosis. It is therefore difficult to reflect the true burden of malaria worldwide.

Globally, adolescent mothers tend to be poorer, less educated, and, under-nourished than elderly mothers. They also face greater social disadvantages (Population Council, 2005). Network Programs for Adolescents (2000) reports that adolescents often lack autonomy in decision-making. For example in rural Bangladesh, women who are pregnant for the first time, are constrained in making decisions about their use of medical care as mothers-in-law often expect adolescents to give birth at home with traditional birth attendants. Adolescent mothers often lack access to information and services, hence, are vulnerable to a host of reproductive health problems. The study also reveals that women in their first pregnancy (which is typical of adolescents) are more susceptible to malaria parasitic infection than pregnant older women. The pregnant adolescent particularly those who are pregnant for the first time are susceptible to malaria because young age and null parity in the same individual greatly increases the risk of malaria infection. This is partly due to reduced acquisition of acquired malaria immunity in young adolescents and lack of parity-specific malaria immunity acquired during the first pregnancy. Malaria in pregnant adolescent is both symptomatic and asymptomatic hence the importance of IPT.

Despite the use of IPT in adolescent malaria prevention, World Bank (2006) concludes that malaria can only be conquered by full coverage, access to, and, use of anti-malaria services by priority groups, such as, children and adolescent pregnant mothers in particular. To conquer malaria, we need services such as counselling, education, as well as, referral services to mention a few. Malaria is difficult to eliminate and poses a huge challenge because of wide-spread anopheles-breeding sites. The large number of infected people, as well as use of ineffective anti-malaria drugs makes it worse. In 2002, W.H.O declared that reducing maternal and neonatal morbidity and mortality among adolescent expectant mothers was a priority. This was to be achieved by making existing “Safe Motherhood” activities more responsive and accessible to

pregnant adolescent mothers. “Safe Motherhood” services include pregnancy prevention, emergency obstetric care, care of newborns and abortion. “Safe Motherhood” also deals with prevention of malaria in pregnancy and access to IPT in health centres. World Bank (2006) studies have shown that in primigravidae and secundigravidae women, the incidence of severe maternal anaemia, placental parasitemia, and low birth weight were 25-95 percent lower when mothers took IPT than when they did not.

According to Worall, (2007) access to IPT in malaria prevention is limited by poverty, geographical inaccessibility, lack of proper care given to adolescent mothers in health centres, low quality of services, little knowledge and negative attitude towards malaria both by health workers and adolescent mothers. Additional barriers are beliefs that fever is a normal sign of pregnancy, or that bitter tasting substances can provoke abortion. Such perceptions can hinder access to treatment including avoiding IPT in malaria prevention. In Africa, some studies have revealed that considerable progress in malaria control has taken place. However, malaria is still a serious problem particularly South of the Sahara 90 percent of clinical cases occur. Among the victims of malaria, adolescent pregnant girls are the worst hit as they often are parasitemic and anaemic at the time they first become pregnant (Brieger, 2007).

2.3 Factors associated with IPT use in Uganda and Nigeria

According to Magnussen et.al (2003) Sub-Saharan African women (including adolescent girls) often seek Anti-Natal Care (ANC) services late in pregnancy and is usually irregular. This means that most adolescents do not take the required SP for at least two times in the second and third trimester as recommended by W.H.O. In Uganda for example, 42 percent of pregnant women attend the required four times ANC visits. This low figure can be

attributed to deficiencies in drugs, high cost of transport and long distance to health centers. Ayisi et al, (2003) and W.H.O (2001), report that adolescents often face difficulties in accessing health services and may not seek timely care for malaria. These studies revealed that pregnant adolescents in Uganda are least likely to use antenatal care. The studies concluded that even if pregnant adolescents recognized the importance of IPT, there were several constraints that limited access to services. These included stigma and negative attitudes of health workers against adolescent pregnancy. Similar findings were also reported in Nigeria where low levels of education affect negatively treatment- seeking and prevention- behavior in malaria prevention. In South Eastern Nigeria by contrast, where people have high education, this was accompanied by improved knowledge and practice about the appropriate strategies for prevention and treatment of malaria. This implies that adolescents with low education, in most cases, do not have the ability to recognize the signs and symptoms of malaria. Adolescents also lack knowledge of treatment and prevention of malaria.

2.4 Research Studies on IPT from Kenya, Tanzania, Ethiopia and Malawi

Studies that were undertaken in Kenya and Malawi revealed that severe anaemia, placental malaria and low birth weight can be significantly reduced if women including pregnant adolescents receive intermittent sulfadoxine /pyrimethamine as part of ANC during their first and second pregnancies. These studies showed that intermittent treatment with a single dose of sulfadoxine/pyrimethamine at the beginning of the second and third trimester significantly reduces the prevalence of anaemia and low-birth weight. The latter is the greatest

single risk factor for high infant mortality rates in Zambia. These studies showed that the S.P drug was well tolerated with minimal adverse effects; hence, it is safe for adolescent mothers. In the Malawi study, 75 percent of women receive one dose of SP but only 30 percent receive the recommended two or more doses (W.H.O, 2000 a.). Therefore, in order to maximize IPT benefits, there is need for adolescent mothers to start ANC at an earlier stage of pregnancy.

Magnussen, (2003) arrived at similar conclusions after looking at several randomized controlled studies and doing a meta analyses of a number of randomized placebo-controlled trials that prevention has beneficial effects on maternal anaemia, placental malaria and low-birth weight babies, especially, among the primigravidae including adolescents.

In a cross-section descriptive survey, Wort (2006) found that adolescent primigravidae had a higher (41.3%) parasite prevalence than the adult primigravidae (31.5 percent). This study also found out that low birth weight prevalence was highest among adolescents delivery during the malaria season. In this study, it was concluded that failure to prioritize malaria in adolescent pregnancy would seriously limit the success of malaria control in pregnancy programs.

Nosten and Macgready (2003), states that malaria is still the first cause of hospitalisation in pregnant women in Ethiopia, Mozambique and Zimbabwe. In Ethiopia, W.H.O reports that women are reluctant to see male health workers for cultural reasons which may also lead to under reporting of malaria cases in the studied region. This study also revealed that women were using less frequently the malaria control services because of workload, which left them with little time to attend to their own needs. Men in most cases dominated in decision-making on whether or not to visit a male or female heath worker, women were not in a habit of expressing their

needs, as doing so would be perceived as being sexually disloyal to their husbands. Language barrier is another problem reported to have limited accessibility in health centres. These studies also revealed that there is strong evidence that resistance to SP is quickly spreading through East Africa.

According to Warenius (2006), adolescent sexuality in Kenya and Zambia is highly charged with moral issues. Adolescent girls did not fully utilise public health facilities especially in sexual and reproductive health. The study carried out in these two countries revealed that nurse-midwives disapproved of adolescents' sexual activity and had a pragmatic attitude towards handling these issues. Nurse-midwives' attitudes limited accessibility to ANC services and IPT. Only those nurses who had received continuing education on adolescent's sexuality and reproduction showed a tendency towards more youth friendly attitudes.

National Bureau of Statistics (2005) reports that in Tanzania, only 52 percent pregnant women received SP/Fansidar at least once during antenatal and about 22 percent of pregnant women (i.e. inclusive of both adolescent and adult mothers) received a complete IPT of two or more doses during ANC visits. Generally, the use of IPT among adolescents is not wide spread as they either visit herbalist or may also practice self-medication by buying anti-malaria drug from drug stores. Most adolescents are ignorant of malaria in pregnancy since it is asymptomatic in some cases. They are more aware and worried about the side effects of anti-malaria drugs than about the adverse effects of malaria infection on themselves and their babies.

2.5 Background on Malaria in Zambia

In Zambia, child bearing begins as early as the average age of eighteen. Three out of ten adolescent women aged between 15 and 19 would already have begun child bearing. Among adolescents, 26 percent would have had at least one child whilst 6 percent pregnant would be carrying their first child. However, the legal age at which a girl can get married in Zambia is 21 years (Population Council, 2005).

Zambia's vision on malaria is to have a malaria free country with equal access to quality assured and cost-effective malaria prevention and control services. This should be as close to the family as possible. In Zambia, access has improved as 75 percent of the populations live within 12 kilometers radius from a health center (M.O.H, 2004). Although, access has improved, 50 percent of the rural population has no real access. The evidence can be seen from the 56% of the mothers who prefer to deliver in their homes. This could be due to various logistics like distance, disturbances in normal domestic routine, poverty, beliefs on the existing health service delivery and security.

2.6 Introduction of IPT in Zambia

Zambia introduced IPT in 2003 in order to mitigate the negative effects of malaria in pregnant women including pregnant adolescents. The success of IPT is attributed to the treatment given to pregnant women who receive IPT/SP at least twice during their pregnancy regardless of whether they are infected with malaria or not. IPT is important in adolescent pregnancy because malaria parasitemia is greater among pregnant adolescents than pregnant adults. This finding comes from a research in Tanzania where adolescents had a higher prevalence of parasitemia 41.3 to 31.5

percent (Wort, 2006). Malaria in adolescent pregnancy is characterized by an invasion of the placenta by plasmodium falciparum. Malaria in pregnancy is dangerous because it sometimes lacks symptoms. Therefore, IPT is convenient where prompt and effective case management is not available for the prevention of malaria infection. Most developing African countries including Zambia, where there is high transmission of malaria, experience malaria related low-birth weight. According to a study carried out in Ndola, it was found that malaria was associated with 84 percent of all anaemia in pregnant women, followed by folate deficiency and iron deficiency. Another study done at Nakambala, Zambia 1993 found 40 percent of births from primiparae and 20 percent of births from multiparae had low birth weight babies (MOH, 1999). It is for this reason that adolescents need to have good access to pregnancy care. This includes attendance for early pregnancy assessment and screening for other diseases like malaria to control it at an early stage.

MOH (2006) in the malaria indicator survey, reports that only 56 percent of mothers in rural areas received two doses or more of IPT. This also includes mothers from the age of 15 to 49 years old. In contrast, women of the same age group from urban areas received at least two or more doses. About 71 percent of women made at least one visit to the ANC services. Amongst the nine provinces, North Western (NW) had the highest number of people who completed two or more doses of IPT; this was 83 percent and the least was 44.1 percent in Western province. Central and Lusaka provinces had 53 percent respectively, whilst Southern province, recorded 63 percent of the women who took two or more doses of Fansidar during their previous pregnancy. In terms of mothers' education it can be argued that the higher the mother's education level, the greater the completion rate of two or more doses of IPT.

2.7 Effects of malaria in pregnancy

The adverse effects of malaria in adolescent pregnancy are of great concern. The effects of malaria in adolescent pregnancy in the Sub-Saharan Africa and Southern Asia include severe anemia, cerebral malaria, high morbidity rate, high maternal mortality, febrile illness, puerperal sepsis and placental infection. Malaria also has the following consequences on the fetus; stillbirths, abortion, congenital infection, low-birth weight as well as fatal growth restriction; Briegers (2007) and Brabin (1991). Moreover, poor nutrition leads to imbalance in micronutrients such as vitamin A, zinc, and iron. Poverty, HIV co-infection, limited access to effective primary health care and lack of emergency obstetric services worsen the impact of malaria in adolescent pregnancy W.H.O, (2004).

In Zambia, it is reported that maternal mortality rate accounts for 421.9/100,000 of which 20 percent is due to malaria (MOH, 2005). The crude parasite rate is estimated at 75-90 percent in rural areas and 20-70 percent in urban areas (RBM, 2000). The study conducted by Nkata (1997), showed that the cause of most deaths among mothers were malaria, sepsis, obstructed labor and uterine rupture. According to Spilanyambe, (2005), malaria misdiagnosis is about 34 percent in Zambia. The most important group likely to be misdiagnosed is the pregnant adolescent. Misdiagnosis may be due to antibodies that are directed against the surface of infected erythrocytes in the placenta. Antibodies are important in protection against malaria infection, but, are usually absent in first and second pregnancies.

2.8 Background on malaria Mazabuka

Mazabuka in particular, has not been spared by malaria infection. Mazabuka district has been negatively affected by malaria. This was revealed by HMIS database as shown below. The following are the figures from District Health Management Information System (DHMIS) database for the period 2000- 2007:

YEARS	UNDER 5s INCIDENCES	ABOVE 5s INCIDENCES	TOTAL INCIDENCES/ 1000 POPULATION	CRUDE FATALITY RATE /1000 ADMISSIONS	TOTAL CASES SEEN PER YEAR
2000	882.1	198.5	335.2	33.8	87,487
2001	1,031.1	271.1	423.1	25.5	88,261
2002	902.6	234.9	368.4	23.6	83,190
2003	1,344.9	399.5	588.6	24.5	131,752
2004	888.4	252.5	379.7	37.1	88,345
2005	822.6	199.0	323.7	30.3	78,117
2006	958.8	287.6	421.9	22.8	105,490
2007	420.9	103.6	167.0	30.1	19,524

NB: 2007 data is only for the first and second quarters.

Source: Mazabuka Health Management Information System- database; 2000 –2007.

From the data above, it is clear that malaria incidences are far from being reduced as observed from the sporadic increases in malaria incidences: 131, 752 in 2003 when IPT was just introduced; and, 105,490 cases in 2006 three years after IPT was introduced. The total incidences per thousand populations in 2005 were 323.7. This increase to 421.9 in 2006 is cause for concern. However, there was no specific data for pregnant women or adolescents as they were all considered to be above five years old.

Mazabuka is a land of sugar production with many risk factors both man-made and natural. Man made risk factors include: irrigation canals for irrigating the sugar plantations, lakes and garden

pools, and the long sugar cane plants that mimics grass is a good breeding site for mosquitoes.

Natural risk factors include: rainy season, temperatures between 20 –30ºc, humidity of about 60%, higher rainfall, endermicity of falciparum, Parity, young age and positive HIV status. However, factors that are associated with malaria in Mazabuka District are poorly understood.

2.9.0 Review of Concepts

2.9.1 Educational Level

The level of education for the adolescent mothers is very important. If they have no education, it will be very difficult to understand simple instructions on how to take Fansidar and also to understand the importance of IPT during pregnancy, hence not seeing the importance of taking it, may reduce accessibility.

2.9.2 Knowledge on IPT

Adolescent mothers should have the knowledge on IPT about when to take it, how to take it and why they should take it. If they are not knowledgeable on IPT in pregnancy, this may affect accessibility as they may not know when to start ANC services when pregnant. They may even start attending ANC late and hence falling to take the recommended three doses of Fansidar.

2.9.3 Beliefs

These are cultural values of what people believe concerning Fansidar or any western medicine**.** If their beliefs are negative definitely; this will reduce access to IPT.

2.9.4 Religion

Some religion or cults may stop people from taking any western medicine. Instead they may believe in the power of prayer or herbal medicine which may be a hindrance to accessing Fansidar in health centers.

2.9.5 Availability of Fansidar

Adolescent mothers may not have access to Fansidar even if they travel long distances to a health center because the drug is not available. This may reduce access and confidence in the

health care providers because each time a pregnant adolescent goes to the health centre, they only find that there are no drugs.

2.9.6 Acceptability of Fansidar

Where people have not accepted Fansidar as a preventive measure for malaria, it becomes a problem to access it because people will not be willing to go to the clinics for ANC services where

Fansidar can be given freely by specialized health personnel.

2.9.7 Attitude of health workers towards young mothers

When health workers have a negative attitude towards young pregnant adolescents, the attitude tend to discourage them from attending ANC services. This becomes a hindrance to accessing Fansidar during pregnancy.

2.9.8 Health education and promotion

Lack of health education and promotion may imply that some people are not sensitized on the value and importance attached to taking Fansidar as a way of preventing malaria during pregnancy. This may reduce accessibility to Fansidar during pregnancy.

2.9.9 Distance to health centers

Long distance to health centers may discourage many adolescent mothers from attending ANC services thereby reducing accessibility to IPT.

2.9.9.0 Demographic factors

It's necessary to know the demographic features of the Participants because these may be used to determine the extent of influence they may have on accessibility to IPT.

2.9.9.1 Significance of the study

This study is significant in that it will improve the knowledge base and address the factors related to access in IPT among adolescent mothers. Based on this study, prevention strategies on IPT will be adjusted as well as policies on malaria strategy will be sharpened. The results of the study will be beneficial to the health care providers in mapping out strategies to improve pregnant adolescent participation in accessing IPT that would play a life saving role to both the mother and the baby (foetus).

This study is significant in that information is scanty on the level of knowledge and accessibility on IPT in Mazabuka District among the adolescents from the age of 12 - 19 years in the southern province of Zambia.

2.9.9.2 Rationale of the study

In Zambia, 56% of the pregnant mothers deliver at home and 25% of the first time Pregnant women do not complete the recommended three doses (MOH, 2007).
This means that if the adolescent mothers do not have the knowledge and do not go for ANC services, they will not have access to free Fansidar in health centres which exist through out the country. This may jeopardize the health of the mother and their infants leading to increased maternal mortality rate among adolescent mothers.

Currently only 54% of the mothers in Mazabuka have access to three doses of IPT. It is important to sensitize people especially adolescent mothers on the importance of IPT during pregnancy so that many can be knowledgeable and have access and reach the target of 90% taking three doses. Once barriers to access Fansidar are identified and removed uptake will increase. This will indeed reduce the disease burden among adolescent mothers.

2.9.9.3 Scope of the study

The study was only limited to the adolescent girls who were at least four months pregnant or with at least one child. Those who were in the selected study areas within Mazabuka were included in the study.

2.9.9.4 Research questions

What are the actual knowledge gaps that exist in IPT malaria prevention and what factors are related to accessibility of IPT among adolescent mothers in selected areas of Mazabuka District.

CHAPTER THREE

3.0 Objectives

3.1 Aim of the study

To determine factors that may be associated with IPT use among adolescent mothers of 12 to19 years old in some selected parts of Mazabuka District.

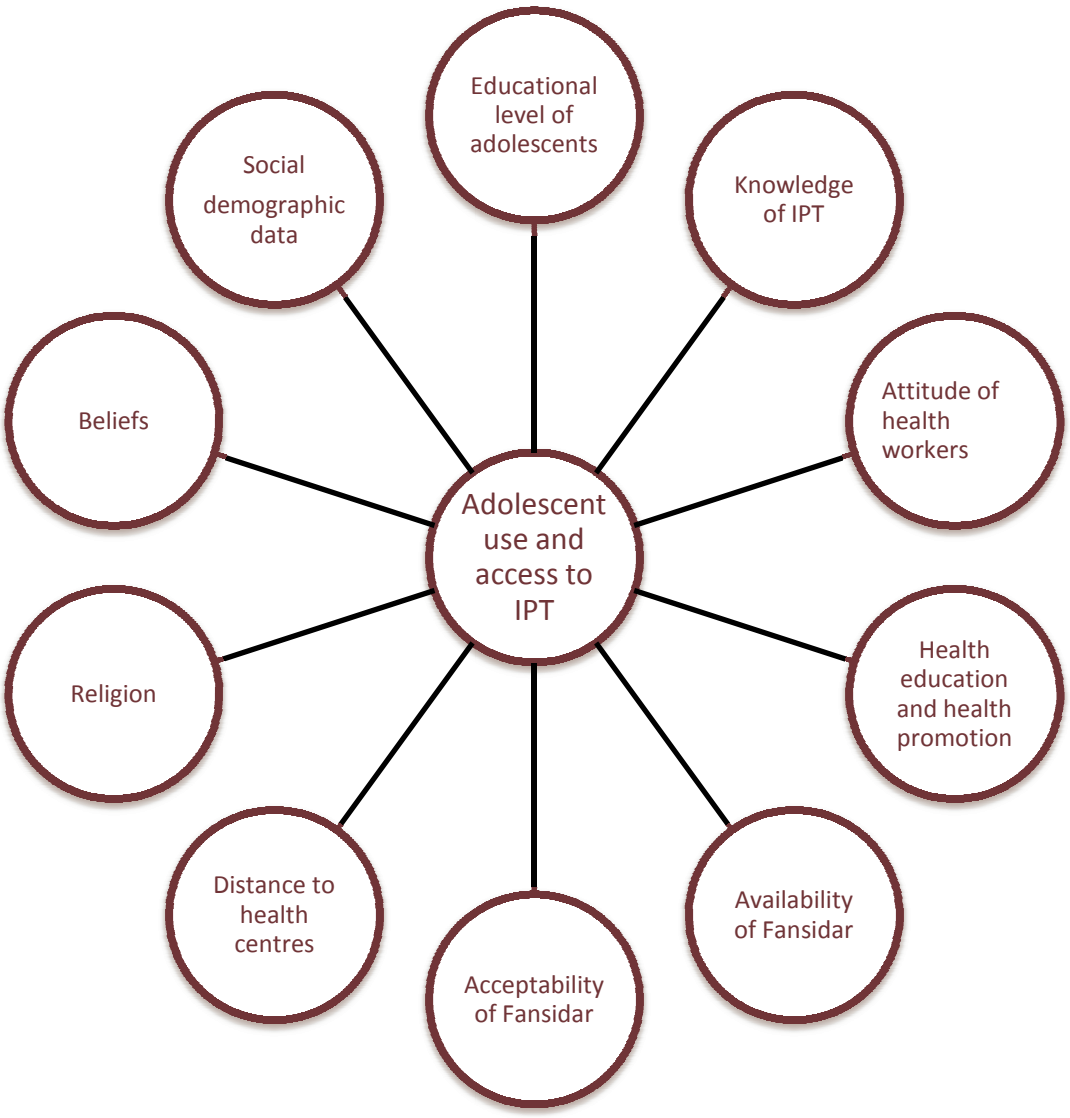
3.2 Specific Objectives

i. To describe social demographic factors associated with the use of IPT among adolescent mothers in Mazabuka district.
ii. To find out the source of existing knowledge and associated gaps on IPT among adolescent mothers.
iii. To determine when the adolescent mothers start antenatal care services in order to access the full three dosages of IPT.
iv. To find out the preferred source and the use of IPT (Fansidar) among the adolescent mothers and why.

CHAPTER FOUR

4.*0 Conceptual Framework*

Dependent variables that could be at play in relation to knowledge gaps and factors related to access to IPT in adolescent mothers were illustrated in the conceptual framework below.



4.1 Study area

The study was conducted in Mazabuka urban and some selected rural areas such as Nansenga, Kasengo, Riverside, Nanduba, Magoye and Chivuna of Mazabuka District. This was a population-based study in both rural and urban setting.

4.2 Study population

Mazabuka had a population of 57,013 women of childbearing age. 20 Percent of the women were adolescents of which 15 percent were affected by malaria. This population had been selected because, although all pregnant mothers were at risk of malaria, its complications were greatest among the adolescent pregnant women.

All adolescents' girls aged from 12 to 19 years who had never had a child in their lifetime and lived within or outside the study area were excluded.

4.3 Study units

An adolescent girl aged from 12 to19 years and was either four months pregnant or more.

Those who had at least one child were also included.

4.4 Study design

This was a cross-section analytical study. A cross sectional survey in this study can be defined as a descriptive study that examines the relationships between variables in terms of prevalence in a defined population and at a particular point in time (Park, 2005). The study design was replicated in all the study areas.

4.5 Review of theories informing choice of design and methodology.

The choice of study design was influenced by the need to have both qualitative and quantitative data. A triangulation of data collection techniques was used and this increased confidence in the validity of findings. The study used both questionnaires and record review of ANC cards. Structured closed ended questions were used to collect information on knowledge and access to IPT during adolescent pregnancy while open ended questions were used to collect data from the respondents to reveal the needs, barriers to access and attitudes of health workers towards adolescent pregnant women.

4.6 Inclusion criteria

The inclusion criteria included the following;

- Those who had biological children within the study areas.
- Four to nine months pregnant adolescent girls aged from 12 to 19 years old.
- Those who gave consent to participate in the study.

4.7 Exclusion criteria

The exclusion criteria were as follows;

- Those aged below 12 years old.
- Those above 19 years old
- Those who were 12-19 years old and had never been pregnant before.
- Those below four months pregnant.
- Those who did not give consent to the study.

4.8 Sample size

Based on the population size of Mazabuka (57,013) since the prevalence of pregnant adolescent girls was unknown, sample size was calculated using Epi - info at 50 percent expected frequency, 45 percent worst accepted results, and power at 80 percent, the minimum sample size found was 430. An allowance of 10 percent refusal was tolerated.

4.9 Sampling technique

The sampling procedure was replicated in all study sites. To be eligible for this study, one had to be an adolescent pregnant girl from four to nine months and from the age of 12 –19 years, and had at least one child. However, all adolescents who had never had a child were not eligible including those who lived outside the study area.

All women who satisfied the above criteria and accepted to be interviewed were enrolled. All those who refused had their demographic characteristics recorded such as age and educational level. This enrollment took place for a period of two months.

Purposive sampling was used in the selection of the subjects based on the inclusion criteria.

4.9.1 Ethical Consideration

Permission to carry out the study was sought from the District Health Office for Mazabuka. The District office informed respective health centres' to help in the dissemination of the information to study areas concerning the pending study to be carried out on knowledge and accessibility of IPT among adolescent mothers from the age of 12 – 19 years old. For the adolescents aged 12 to 17 years, consent was sought from their parents while those aged 18 and 19 years consent was

sought from individual subjects to be studied. Permission was sought from chiefs or Headmen of the villages.

Approval was sought from the University of Zambia research ethics Committee. In carrying out this study, the nature and the purpose of the study was clarified to the respondents. Furthermore, consent was obtained from the participants. Anonymity and confidentiality was assured, as numbers were used instead of names on the data collection tools.

The researcher gave the address of the ethics committee of the University of Zambia and her contact phone number and address to participants of the questionnaire in case they wanted further clarity on the study.

4.9.2 Pretesting of questionnaires and training of the research assistants.

A total of 20 questionnaires were tested on adolescent girls from Kaonga basic school to check for clarity, ambiguity, clear understanding of the questions as well as spaces provided if they were enough for eligible mothers. A few adjustments were made to the questionnaire in the spaces provided for answering questions.

To ensure that good quality data was collected, research assistants were trained for two days. The questionnaires were pre-edited daily. This was to ensure completeness and consistence in the data collected by the interviewers.

4.9.3 Fieldwork procedures

Data was collected on January 2nd to March 5th 2009.

The researcher explained the details of the study to the respondents. Questions from the

respondents were answered and clarified. Confidentiality was assured to the respondents. A written and signed consents were obtained from both those who were 18 and 19 years old. For those below the age of 18, consent was obtained from their parents/guardians.

4.9.4 Data collection procedures

Data was collected using interviewer administered structured questionnaires and antenatal cards were reviewed to verify the use of IPT during pregnancy from health centers. Both the researcher and the trained research assistants collected data from all the selected areas in Mazabuka district. About 430 questionnaires were administered to the respondents. The interviewers directly asked the questions to the respondents and the responses were recorded with the exact meaning without any alterations. Pre-editing was done daily to ensure consistence and completeness.

Data collection was largely on social demographic information as well as factors linked to access and knowledge on IPT in pregnancy among adolescent mothers.

4.9.5 Data entry, processing, analysis and management

Data was collected from over a period of two (2) months from some selected areas in Mazabuka rural areas like Chivuna, Magoye, Nanduba, Riverside, Nansenga and Kasengo. Mazabuka urban covered: Nakambala, Zambia Compound, kapufi, Kaleya East and Kaonga.

Once collected, data was entered using Epi-data with pre-set checks. Data cleaning was carried out with the help of an experienced data manager. Then, data was categorized, coded by assigning numbers to response categories and then entered into spreadsheet in the computer.

Column counts, cross tabulations, frequencies and percentages were also used on all factors to accessibility.

The Chi-Square test was used to identify significant factors using the p-value associated with accessibility among adolescent mothers. Data was further analysed using SPSS 17.0 Software package. Multivariate analysis were performed using the logistic regression to control for confounders that were significant during the univariate analysis to assess which factors were independently associated with accessibility to IPT. The findings of the study have been presented in table form and pie charts. This was appropriate because tables and pie charts summarised the results in the meaningful way which facilitated understanding of the study findings.

4.9.6 Budget

The total budget was K32, 000,000.00. The funds catered for food, transport, stationary, computers use, secretarial services and research assistants. Details of the budget are in appendix A.

4.9.7 Time frame

The study commenced on January 2nd and completed on March 5th, 2009.

CHAPTER FIVE

5.0 Presentation of Findings

This section consists of overall descriptions of variables, factors associated with accessibility and determinants of accessibility to three (3) doses of IPT.

Table 1.0 (appendix h) summarises the demographic features of the respondents.

5.1.0 A description of Social demographic factors associated with IPT use

Table 1 (appendix h) show that, out of 430 interviewed adolescents, 59.3% (255) were from urban and 40.7% (175) from rural areas. There were 76.0% older adolescents aged from 18 to 19 years and 24.0% younger adolescents aged 12 to 17 years. The majority (56.5%) were singles 43.5% married. About 49.3% had secondary education, 46.3% had primary education while 4.4% had no education. Forty percent were employed and 60.2% were unemployed. The majority 96.3% of the adolescent were Christians and 3.7% (16) belonged to other religions.

5.1.1 Other factors important to accessibility

Knowledge factors

Table1 (appendix h) shows that 90.2 % (330) had knowledge on the negative perceived effects of malaria on both the mother and the unborn baby. Seventy - two percent (357) of the adolescents learnt about IPT from antenatal clinics while 27.8% (118) learnt from other sources such as friends, relatives and pharmacies/shops. About 83% (357) stated Fansidar as the correct drug used for malaria prevention in pregnancy and 17.0 % (73) did not know. Seventy-nine percent stated correctly the number of tablets per dose while 21% (77) did not know. Of the respondents,

63.9% (271) stated that the first dose is taken at four months and 29.8 % (128) were uncertain. About 23.7% (102) of the adolescents interviewed stated the negative effects of malaria on the mother correctly and 61.2% (263) stated correctly the effects on the baby.

Maternal factors

Out of 430 respondents, 53.8% took the recommended three doses of IPT and 46.2% took less than three doses in their previous pregnancies. However, evidence from antenatal cards show that 36.5% (148) took 3 doses of IPT and 63.5% (258) did not take the recommended 3 doses.

About 86.1 % (360) of the adolescents were pregnant at the time this study was being conducted and of these 90.1% (381) had attended ANC before. In addition, 62.1% (267) had children. Six-four percent stated the appropriate time for the onset of antenatal visits which was equal to or less than (≤) three months of pregnancy duration.

System factors

Table1 (appendix h) further shows that 90.9% of the respondents stated that Fansidar (SP) was available in health centres while 9.1% stated that it was not. Eighty-six percent (368) stated that waiting time was less than an hour in Mazabuka health centres and 14.0% wait for more than one hour. Thirty-two percent (102) of the adolescents had experienced negative attitudes from health workers as a result of their young age.

Perception of IPT

Fears on IPT

Figure 1.0: Fears on Fansidar (SP)

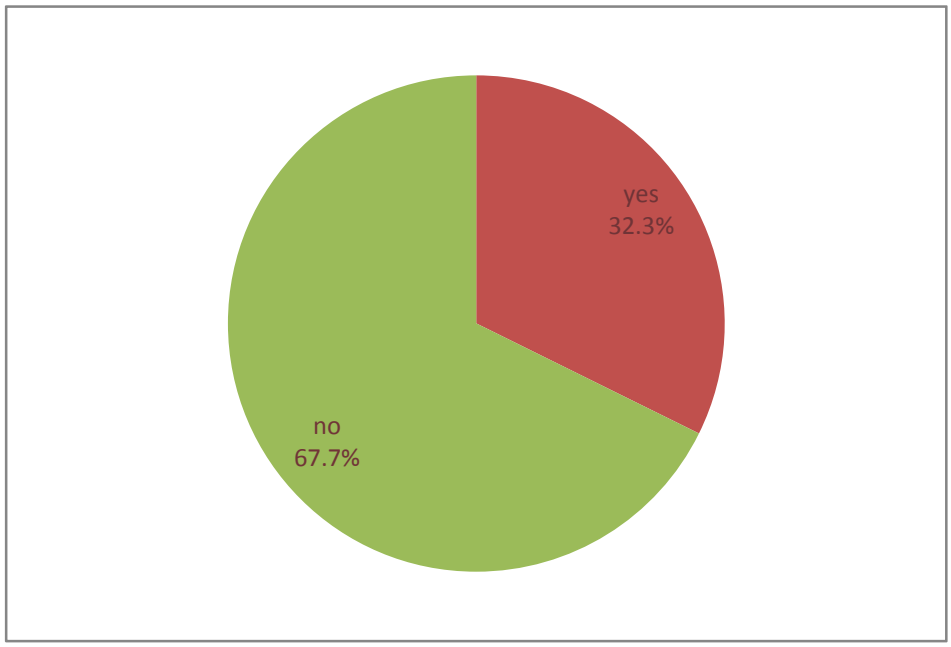


Figure 1 shows the distribution of adolescents' perceptions on Fansidar intake. It revealed that 67.7% (291) of the adolescent mothers do not have any fears on Fansidar intake as a preventive measure for malaria during pregnancy while 32.3% (139) have. In addition, 41.9% had been threatened by the members of their community that Fansidar (SP) intake in pregnancy had bad effects. The study further showed that threats from community members and fears at individual levels were similar in that in both the adolescent mothers were scared of being sick and having abortion when they take Fansidar during pregnancy.

The study also revealed that 78.1% (336) of the adolescents preferred to get SP from health centres, 13.3 % (57) from friends and 8.6 % (37) from pharmacies/shops. Of those who preferred to get from health centres, 37.7 % (162) stated that Fansidar is free of charges as a reason for their preference, 26% (112) felt that SP drug was in most cases available, 19.5% (84) felt that less time was spent to collect the drugs and 16.7% (72) indicated availability of trained health personnel.

Access factors to IPT

Table 1(appendix h) also show that among the adolescents, 96.5% (389) never paid for SP the anti-malaria drug and 3.5% (14) paid for it. In addition, 79.8 % (343) of the adolescents spend less than one hour to walk from home to the clinic and 20.2% (87) spend more than an hour to walk. The majority 82.8% walk and 17.2% use vehicles and other forms of transport such as ox-carts and bicycles.

Table 2 (appendix h) show factors associated with accessibility to IPT.

Age group

Table 2 (appendix h) shows that there was a significant relationship between age and accessibility to three doses of IPT ($p< 0.001$). The age distribution of the respondents shows that there were more adolescents from the age group 18 to 19 years with 48.7% (150) who had access to three (3) doses of IPT than the age group 12-17 years with 33.9 % (21).

Marital status

There was a significant relationship between marital status and accessibility to three (3) doses of IPT ($p= 0.005$). The distribution of marital status shows that there were more married adolescent

mothers at 54.2% (91) than the unmarried at 39.6% (80) who had access to three (3) doses of IPT.

Level of Education

There was an association between the level of education of the respondents and accessibility to three (3) doses of IPT ($p < 0.001$). There were more adolescent mothers 53.2% (84) with primary education who had access to three (3) doses of IPT than 45.1 %(87) with secondary education. For those who had no education, no one had access to three (3) doses of IPT.

Occupation

There was an association between occupation and accessibility to three doses of IPT with more 78.3% (112) employed adolescents having access to three doses of IPT than 26.0 %(59) who were unemployed ($p < 0.001$).

Other important factors associated with accessibility to IPT in pregnancy

Source of information on IPT

There was a positive association between the source of information on IPT and accessibility to three (3) doses of Fansidar (SP) ($p<0.001$).There were more adolescents 52.7% (154) who had access to three doses of IPT for those whose source of information on IPT was obtained from antenatal care than those who got it from other sources 22.1%(17). Other sources include friends, relatives, schools and Tradition Birth Attendants (TBA'S).

Maternal factors

Parity

There was a positive association between parity and accessibility to three (3) doses of IPT ($p < 0.001$). There were more adolescents 62.5 % (167) who had accessibility to three doses of IPT from adolescents with children than 3.9 % (4) who did not have.

Onset of ANC visits in pregnancy

There was an association between the onset of ANC visits and accessibility of IPT ($p<0.001$). The adolescents 52.5 % (171) who started ANC visits at less than three months of pregnancy duration completed three IPT doses compared to those who started more than three months where nobody 0.0% (0) was able to complete the three doses of IPT.

Systems factors

Availability of Fansidar (SP) in health centres

There was an association between those who said Fansidar was available in health centres and accessibility of 3 doses of IPT ($p<0.001$). There were 51.2% (171) adolescents who had access to three doses of IPT and no one completed three doses among those who said that Fansidar was not available in health centres 0%.

Waiting time in health centres

There was an association between those who waited for less than an hour in health centres before members of staff could attend to them and accessibility of 3 doses of IPT ($p<0.001$). There were more adolescents 53% (170) who accessed three doses of IPT from those who waited less than an hour than those who spent more than an hour waiting 2%(1).

Negative attitudes of health workers towards young adolescent mothers

Table 2 (appendix h) revealed that there was an association between adolescents who had problems with health workers and accessibility to 3 doses of IPT ($p<0.001$). There were more adolescents 51.9 % (149) who had access to 3 doses of IPT because they had no problems with heath workers than those who had 26.5 % (22).

Perception factors

Fear

There was an association between fear and accessibility of 3 doses of IPT among adolescent mothers. There were more adolescents 52.5% (136) who had access to 3 doses for those who had no fears than those who had 31.2% (35), ($p < 0.001$).

Threats from community members

There was an association between those that received threats from community members and accessibility to 3 doses of IPT. There were more adolescents 60.1% (95) who had access to 3 doses of IPT from those who did not receive any threats from the community than those who received threats 35.8% ($p < 0.001$).

Preferred source of IPT

Table 2 (appendix h) shows that there was an association between the preferred source of IPT and accessibility to 3 doses of Fansidar. There were more adolescent s 53.9% (171) that had access to 3 doses of IPT for those who preferred health centers as a source of IPT than from those who preferred other sources where none 0.0% (0) completed 3 doses of IPT. Other sources include relatives, friends, Pharmacies and shops ($p < 0.001$).

Access Factors

Paid for Fansidar in health centers

There was an association between the cost for IPT and accessibility to 3 doses of Fansidar. There were more 100 %(14) who had access to three doses of IPT for those who paid than 44.1% (157) who did not pay ($p<0.001$).

Time spent walking from home to the clinic

Table 2 (appendix h) shows an association between time spent walking to the health centre and accessibility of IPT to 3 doses .There were more adolescents 55 % (171) that had accessibility to 3 doses of IPT for those who spent less than an hour to walk to the health centre than 0.0% who spent more than an hour ($p< 0.001$).

Mode of transport used

There was an association between mode of transport used to go to health centers and accessibility to three doses of IPT. There were more adolescents 70.3% (52) of those who were using vehicles who had access to three doses of IPT than 40.2% (119) of those who were walking ($p< 0.001$).

Determinants of accessibility for IPT

All results for logistic regression are on (appendix h) table 3.

Table 3 highlights main determinants of accessibility using univariate and multivariate logistic regression model. The model showed the goodness of fit Hosmer and Lemeshow test (x^2-55.5, df-8, $p<0.001$) on the determinants of accessibility. The Cox and Snell R square and the Nagelkerke R Square indicated the variability of between 34.9 percent (0.349) and 46.6 percent (0.466) is explained by the variables. Distance, fear of SP intake and threats from members' of their community were significant factors associated with accessibility to 3 doses of IPT. Adolescents who spent more than one hour to walk to health centers from their homes were 0.19 times less likely to access three doses of IPT than those who were not (OR-0.19, 95% CI 0.09-0.41). The odds of an adolescent accessing three doses of IPT were 0.14 times lower for the one with fear than for the one without fear (OR-0.14, 95% CI 0.71-0.30). Those who were threatened by the members of their community on the intake of Fansidar were 0.22 times less likely to

access 3 doses of IPT than those who were not (OR- 0.22, 95% CI 0.11-0.43). However, in the multivariate analysis, the model could not fit well when categorizing variables.

Table 4: Association of accessibility for IPT by educational level and distance from the health facility in both urban and rural areas

Residence	Factor		<3 IPT doses %(n)	=3 IPT doses %(n)	P-value
Urban	education	low	48.3 (42)	51.7 (45)	0.23
		high	56.6 (69)	43.4 (53)	
	Distance	Near	41.3 (69)	58.7 (98)	0.001
		Far	100 (42)	.0 (0)	
Rural	education	low	56.7 (51)	43.3 (39)	0.56
		high	52.1 (37)	47.9 (34)	
	Distance	Near	49.3 (71)	50.7 (73)	0.001
		Far	100 (17)	.0 (0)	

Table 4 shows that there was no significant association between level of education and accessibility to three doses of IPT in both rural and urban areas respectively (p=0.56), (P= 0.23).

The table further show that long distance makes it difficult to access three doses of IPT in both rural and urban areas as no one 0%(0) who walked for more than one hour had access to 3 doses. However, those who were near to the health facilities, accessibility to three doses were high 58.7% (98) urban and 50.7% (73) in rural areas. Long walking distance significantly reduces accessibility to 3 doses of IPT in both rural and urban areas (p<0.001).

CHAPTER SIX

6.0 Discussion of Results

A summary of results

The majority had knowledge on the negative perceived effects of malaria on the mother and the unborn baby of which they learnt from antenatal health education programs and more than half of the respondents start their first antenatal visit at ≤ 3 months. The majority preferred to collect Fansidar from health centers because it's free of charge, its available, less time is spend to collect the drug and trained health personnel are found. Almost 100% never paid for Fansidar in health centers. More than 80% of the respondents walk to health centers. However, accessibility to 3 doses of IPT is hindered by long walking distance of more than one hour (National strategic plan, 2005), fear and threats from members of their community. In both rural and urban areas, less than 50% of the respondents completed the recommended three doses of IPT. This was also confirmed by record review from antenatal cards that revealed that 36.5% which is also less than 50% of the adolescents had access to three doses of IPT for both rural and urban areas.

It is possible that bias could affect these results but a non response rate of 2% may not have greatly influenced the results as such especially that those who did not respond may share the same characteristics with those who responded in terms of age, residence, marital status and education level. Furthermore, two percent none response rate is too small to significantly influence the outcome of these results.

The other likely bias that would arise among adolescent mothers would be recall bias on the number of doses taken during the previous pregnancy. This was counter checked by record review from antenatal cards.

Other bias could also arise from observer bias; by the way the interviewer would ask some questions and also from the respondents by giving the answers that would impress the interviewer. To avoid this kind of bias, interviewers were trained to collect data in a standardized manner and also blindfolded by not knowing the aims and objectives of the study.

Confounding bias was also possible but eliminated by doing a logistic regression analysis of all the variables that seemed to be associated with accessibility during the univariate analysis.

Above all, sampling bias could have been possible, but given a sample size of 430 respondents, to the power of 80%, this would remove any possible sampling errors that could arise in the selection process since the sample size was adequate.

Main findings

The purpose of this study was to determine the factors that were associated with accessibility to IPT with evidence from selected areas in Mazabuka district. In general, from record review data 36.5% of the adolescent mothers had access to three doses of IPT during pregnancy in both rural and urban areas which is far below the intended national target of 80% by 2011 and also to achieve the malaria incidence rate of < 121 per 1000 population per year by 2015 (MOH, 2005 b). O f those who live in urban areas 46.9% had access to three doses of IPT and 45.3% in rural areas. This shows that there is low accessibility of 3 doses IPT intake among adolescent mothers as more than 50% of them are either partially or not protected at all from malaria. The findings are similar to other studies that states that adolescents face difficulties to accessing health services and may not seek timely care for malaria (Ayisi 2003; WHO, 2001). Low access to 3 dose intake during pregnancy is influenced by fear of abortion or being sick which have been

perpetuated by threats from members of their communities. Moreover, studies that were carried out by MOH, (2005) showed that 54% of the women in Mazabuka district have access to three doses of IPT which is more than the adolescent mothers. This is reasonable because these results include both the adolescents and the adult mothers.

Main determinants of accessibility

Multivariate analysis revealed that long walking distance, individual fears (beliefs) and community threats that Fansidar intake makes one sick and induces abortion during pregnancy were major factors that were associated with low accessibility of IPT among adolescent mothers in Mazabuka district.

The multivariate analysis reveal that age group was not associated with accessibility, (OR- 0.81; 95% CI 0.24-2.66), even if it was significant in the univariate analysis (OR-1.85; 95%CI 1.05-3.28). This was surprising because Wort (2006) found that, there was a higher parasitic prevalence 41.3% among the adolescents primigravidae than adult primigravidae. According to network programs (2000), young age and null parity in the same individual greatly increases the risk of malaria. This also implies that since the young adolescents are less likely to access IPT, they are more at risk of malaria in pregnancy. Some risks of malaria on the mother may include severe anemia, cerebral malaria, maternal mortality, febrile illness, puerperal sepsis and placental infection. The unborn baby may also have serious infection of malaria which may cause still births, spontaneous abortion, congenital infection, low birth weight and fatal growth restriction (Briegers, 2007; Brabin, 1991). These may be prevented by taking 3 doses of IPT during pregnancy. Some of the reasons why the young adolescents may not access 3 doses of IPT are that they may not have the autonomy to make their own decisions to go for ANC, whilst others

may hide their pregnancy because they are ashamed of unwanted pregnancy. Some fear their guardians and others are discouraged by the negative attitudes of the nurse-midwives towards young pregnant adolescents (Warenius, 2006).

Long walking distances of more than one hour may significantly reduce accessibility to three doses of IPT. Those who live more than one hour walking distance were 0.19 times less likely to access three doses of IPT than those who walk less than an hour to the health facilities (OR-0.19; 95% CI 0.09-0.41). This is reasonable because of the opportunity cost involved in time spent to get to the clinic and getting the services. Time is lost for child care, economic and social activities. The finding is similar to Worrall's (2007) which found that access to IPT is limited by geographical inaccessibility which includes very long distances and poor roads leading to health centers. This is also true especially during the rainy season when most roads are inaccessible. In addition, 20 health posts had been commissioned out of the target of 3,000 which were to be established in radius of five 5 km in sparsely populated rural areas while 1,210 health centers were established out of the targeted 1,385 in Zambia (MOH, 2005). There are fewer health post and health centers in rural and urban areas than the intended target for the nation. This is not surprising as to why long distance to the health centre is a major factor hindering accessibility in Mazabuka. By not accessing health services easily due to long distance, adolescents may not receive adequate knowledge on health issues. It is therefore not surprising to see that fears of individual adolescents about IPT intake and fears brought about by the community are important factors of IPT intake as they may not have adequate knowledge on the importance of 3 dose IPT intakes. The findings on community myths about IPT intake were logical and they were similar to Worrall (2007) who stated that beliefs may hinder accessibility to IPT especially bitter tasting western medicine may provoke abortion. Some cultures, traditions and even religions may not

allow the adolescent mothers to access IPT in pregnancy because of their values and norms. Fear of abortion and sickness which they think is caused by IPT intake during pregnancy may cause the adolescent mothers to deliver at home, hence putting them at a greater risk of Malaria in pregnancy. Fifty-six percent of the women in Zambia deliver at home of which an adolescent pregnant mother cannot be an exception (M.O.H, 2007). Pregnancies among adolescents are a big question mark as far as legality is concerned. Adolescent pregnancy could be due to casual sex and others are victims of circumstances such as rape or incest which may instill fear in them and may even be threatened by the members of their community hence failure to access three doses of IPT. This could be the reasons why the study revealed that those who had fear were less likely to access three doses of IPT than those who had not (OR-0.14, 95% CI 0.71-0.30).

The study found that the level of education was not associated with accessibility in both univariate (OR- 0.90; 95% CI 0.60 -1.36) and multivariate analysis (OR-0.70; 95% CI 0.36 - 1.37). In other studies that were carried out in other countries, (Ayisi, 2003; WHO, 2001), found out that low levels of education affected negatively treatment seeking and prevention behaviour where as in the South eastern Nigeria, high education was accompanied by improved knowledge and practice about appropriate strategies for prevention and treatment of malaria . Of the adolescents interviewed, 50.7% had low education and very few completed the recommended 3 doses of IPT about 36.5% according to evidence from antenatal cards despite 64% percent of the adolescents starting antenatal visits at $\leq$ 3 months which is an appropriate time. This is not surprising considering that more than 50% had low education. This is similar to studies done in other countries where few women 22% inclusive of adolescents completed the recommended 3 doses of IPT (National Bureau of Statistics, 2005). The reasons that could be attributed to low adherence include; most adolescents are ignorant of malaria in pregnancy because of low

education, they may practice self medication by buying drugs from pharmacies/shops and that malaria in pregnancy is asymptomatic in some cases (W.H.O, 2004). In asymptomatic cases, adolescent mothers may not see the need to go for IPT during pregnancy. There is however, great need for adolescent mothers to take IPT in pregnancy as revealed by the study in Zambia where 84% percent of all anemia in pregnant women was associated with malaria (MOH, 1999). Moreover, these hindrances to accessibility of 3 doses of IPT may fail the district to reach the Millennium Development Goal (MDG) of reducing maternal mortality rate to 162 deaths per 100,000 live births by 2015 and nation at large if this situation is true in other districts (MOH, 2005 b).

Limitations

This study was limited to the respondent's response and review of antenatal cards. No key informants were interviewed in health centers to establish availability of IPT drugs and to assess the attitudes of health workers towards adolescent mothers as well as to establish the distance of the furthest catchment area to the health centre.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

Conclusion

This study examined factors that were associated with accessibility to three doses of IPT in Mazabuka urban and rural. The study showed an average of 46% of adolescent mothers had access to three doses of IPT in both rural and urban areas.

Logistic regression in the univariate and multivariate analysis established long walking distance to health centers, personal fears and threats from the community members that Fansidar intake during pregnancy causes sickness and abortion were important factors that reduced accessibility to three doses of IPT among adolescent mothers. The Cox and Snell R Square and the Nagelkerke R Squared indicated that between 34.9 percent and 46.6 percent of the variability was explained by the variables in the model. Ayisi (2003) stated that adolescents often face difficulties in accessing health services and may not seek timely care for malaria because there were several constraints that limited access to services. These findings were also consistent with Worall (2007) which stated that beliefs are a barrier to accessibility of IPT. Other factors that were important though insignificant in the multivariate include; 72.2% of adolescents obtained their knowledge from antenatal care, and 78.1% preferred to collect IPT drugs from antenatal because its free, available, short time spent to collect the drug and trained health workers are found in whom they have confidence. Sixty –four percent of the adolescent mothers start antenatal visit at ≤ 3 months. Failure to prioritize the problems faced by the adolescent mothers in accessing three doses of IPT during pregnancy, would seriously limit the success of malaria

control programs during pregnancy in Zambia. Therefore, a holistic approach must be used to address the problem of not accessing three doses of IPT bearing in mind the factors associated with accessibility that is long walking distance, fear and threats from the community that Fansidar intake during pregnancy may cause one to be sick and may induce abortion. If not addressed, the MDG to reduce maternal mortality to 162 deaths per 100,000 live births may not be achieved by 2015(MOH, 2005b).

Age group and education was not associated with accessibility in this study in the multivariate analysis despite being important factors of accessibility in studies that were carried out in other countries, Network programs for adolescents (2000) and Ayisi (2003).

However, this study was limited to the respondent's and review of antenatal cards. No key informants were interviewed in health centers to establish availability of IPT drugs and to assess the attitudes of health workers towards adolescent mothers as well as to establish the distance of the furthest catchment area to the health centre.

Policy implication

The findings show that there was poor accessibility to three doses of IPT among adolescent mothers. The question is can it improve to 80% by 2015? What strategies, cost effective tools can be used to improve it, is it achievable?

Recommendations

Research

The study focused on the adolescent mothers and accessibility to 3 doses of IPT. The study showed that there was low accessibility of three doses on average of 45.5% in both urban and rural areas due to long distance to health centre, and perception factors such as fear and threats from community members. Bearing this in mind, there is need to do a study to evaluate the effectiveness of health education and promotion programs by the ministry of health on the adolescent mothers in order to come up with a better strategy to improve accessibility of three doses of IPT among adolescent mothers.

Program implementation

1. The government needs to build health posts in communities within 5km radiuses as a long term measure while mobile antenatal clinics should be introduced in distant places as a short term measure before they build permanent structures to reduce long walking distances.

2. The government should facilitate the construction of good roads in rural areas by providing funds in order to construct tar marc and bridges in areas which are not accessible.

3. Improving accessibility to three doses of IPT among adolescent mothers may call for a bigger campaign. Both the community and the adolescent mothers need to be educated to counter misconceptions (the fears and the threats from the communities) that they may have on IPT intake during pregnancy. Knowledge on when to start ANC visits in pregnancy, why and when they should take the recommended three doses should be imparted. This can be done by a

combined strategy, to address the fears at individual level and threats at community level. Both bahavioural change which can change people's perception into a positive one and sensitization programs are important strategies to improve accessibility to three (3) doses of IPT. The ministry of health can do door to door campaign targeting even the youngest adolescents so that none is left out. Promotions can be done through radio and television as well as print media through newspaper, leaflets, billboard massages and role plays by the community members. Campaigns have demonstrated good coverage of 93% in some countries (Gueri .et.al, 1979; Mcdivitt et.al, 1993).

4. Education in general should be encouraged among adolescents for both mothers and none mothers, warning them of the dangers of early pregnancy and malaria if they do not complete three doses of IPT. This will improve their level of understanding and also to have a correct perception towards Fansidar intake during pregnancy. For those who are not yet pregnant but are sexually active, they can be advised to start family planning at an early age to avoid unwanted pregnancy. However, abstinence should be strongly encouraged.

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