

Research Article

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Utilization of Affordable Medicine Facility for Malaria (AMFm) Artemisinin based Combination Therapy in Ho Municipality, Ghana

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Abstract

Utilization of ACTs in Ghana has been low due to the high cost of the ACTs. The AMFm program which implements a subsidization of ACTs was therefore introduced in Ghana in August 2010. This program aims at increasing access to effective ACTs by making the ACTs available and affordable. Phase 1 of this program is presently being implemented in Ghana and will be evaluated after 24 months to determine if the program is to continue. Since the introduction of this program, no study has yet been done to determine the level of utilization of ACTs in the country. This study aims to determine the availability and utilization of the AMFm ACTs and to assess the factors influencing the choice of AMFm ACTs by those who buy antimalarials in the Ho Municipality. Method The study was a descriptive, cross sectional study which involved both quantitative and qualitative methods. The quantitative part involved an exit interview of people who bought antimalarials from pharmacies and chemical shops. It also involved administering semi-structured questionnaires to all pharmacists and chemical sellers in their shops in Ho Municipality. The qualitative part was an in-depth interview of one pharmacist and eight chemical sellers to assess the factors influencing the availability of AMFm-ACTs in pharmacies and chemical shops. Results the proportion of AMFm-ACTs bought from pharmacies and chemical shops during this study were 50.6%. The proportion of total ACTs bought was 69.7%. The proportion of pharmacies and chemical shops with stocks of ACTs was 68.9%. The main reasons that resulted in shops not having the AMFm ACTs were because the chemical sellers did not know the AMFm ACTs and the medicine not being available in the district when the chemical seller was trying to buy them. Pharmacists and chemical sellers were motivated to continue stocking the medicine because it was selling fast and was considered an effective medicine. Conclusion The utilization of the AMFm ACTs has increased from 0% to 50.6% since they were introduced in August 2010. The use of all ACTs in the district is now fairly high 69.7%. The pharmacists and chemical sellers in the district consider these medicines effective and are willing to continue selling them. People also consider this medicine affordable and effective. Therefore the use of ACTs in the district will continue to increase with the presence of these subsidized ACTs.

Keywords: Affordability, AMFm, Artemisinin Based Combination Therapy, Ho Municipality, Anti-malarial.

Introduction

It is estimated that about 247 million episodes of malaria and approximately 850,000 deaths occur annually.¹ Over 40% of the world's population is at risk of getting malaria. Malaria is one of the causes of the high level of poverty in Ghana and it is responsible for about 32.5% of the overall out-patient-department (OPD) attendance and 48.8 % of under-five year admissions in the country.²

Several interventions have been put in place to reduce the burden of malaria e.g. Distribution of bed nets, making artemisinin-based combination therapy the drug of choice for treating uncomplicated malaria and intermittent preventive therapy with pyrimethamine –sulphadoxine for prevention of malaria.

Several studies in Africa have shown that the artemisinin–based combination therapies that have been introduced are effective in the treatment of malaria. A study done in Zanzibar showed that two years after the introduction of free ACTs, malaria illness reduced by 77% and deaths of children decreased by 50%.³

Several African countries made ACTs the drug of choice for the treatment of malaria after the World Health Organization recommended ACTs as the drug of choice for the treatment of uncomplicated malaria. However, there has been a low level of access to artemisinin-based combination therapies since their introduction. This has been mainly due to the high cost of these medicines. A survey in African countries showed that less than 15% of children below the age of 5 years received ACTs in 11 out of 13 countries.⁴ Another study on prompt and effective malaria treatment in Tanzania showed that multiple factors including affordability, acceptability, and availability influence access to effective malaria treatment.

The Affordable Medicine Facility for malaria program was therefore introduced in several African countries including Ghana to make effective ACTs available and affordable to people with malaria. The Affordable Medicine Facility for malaria (AMFm) is a program with a financial mechanism that is managed by the global fund that enables countries to provide affordable and effective antimalarials. This program subsidizes the cost of ACTs to make them affordable. Ghana is presently implementing phase one of the AMFm program which is expected to last 24 months. After this period, the program will be evaluated and if phase one is successfully implemented, phase two of the program will be started. ACTs that are subsidized by this program are called AMFm-ACTs. The first subsidized ACTs arrived in Ghana in August 2010. The objective of the AMFm program is to make effective anti malaria medicines available and affordable to patients and crowd out other ineffective anti-malaria medicines from the market. It also aims at preventing the use of monotherapy antimalarials and hence delays the development of resistance to artemisinin–based combination therapy. This will be done by making the artemisinin combined therapy medicines available and affordable.

It is expected that with the subsidized ACTs in the market people will stop using artesunate monotherapy and other less effective anti-malaria treatment. The AMFm program is managed by the Global Fund and it negotiates with manufacturers to reduce the price of ACTs. When an order is placed by a first line buyer for ACTs, the Global Fund through the AMFm program pays part of the cost of the ACTs to the manufacturer and the remaining amount is paid by the first line buyer. This then serves as a subsidy to the first line buyer so that the ACTs can be sold at a considerably reduced cost to patients at about (USD 0.20-0.50). The first –line buyer is usually the one that imports the medicines. The first line buyer then sells at a reduced cost to whole sale distributors or the next level of the supply chain, thus passing on the subsidy to the next level. These AMFm-ACTs are presently distributed in both the public and private sectors. The Global fund decided with recipient countries to mark the AMFm ACT packages with a green leaf. This is expected to act as a means of easy identification of the drug and for sales promotion within the country.

With the presence of these ACTs that have been subsidized by the AMFm program, this study was done to determine the level of utilization of these subsidized AMFm-ACTs.

Statement of the statement

The use of artemisinin-based combination therapy as first line treatment for uncomplicated malaria in Ghana started in 2005.⁶ But the level of utilization of artemisinin-based combination therapy in Ghana is low because they are expensive compared to non ACTs. For example, it is known that in urban Ghana only 57.8% of patients receiving antimalarials from health facility pharmacies receive artemisinin-based combination therapy. The AMFm program, a global fund financing strategy which aims at making ACTs available and affordable was therefore introduced in Ghana in August, 2010.⁷ Phase one of these programs is presently being implemented in Ghana and is expected to last for 24 months. After this period it will be evaluated to determine if the program should continue. Since the introduction of subsidized ACTs by this program in August 2010, no study has been done to determine the availability and utilization of the AMFm-ACTs. This study aims at determining the availability and utilization of AMFm-ACTs in private pharmacies and chemical shops in Ho Municipality.

Conceptual Framework of the utilization of AMFm-ACTs

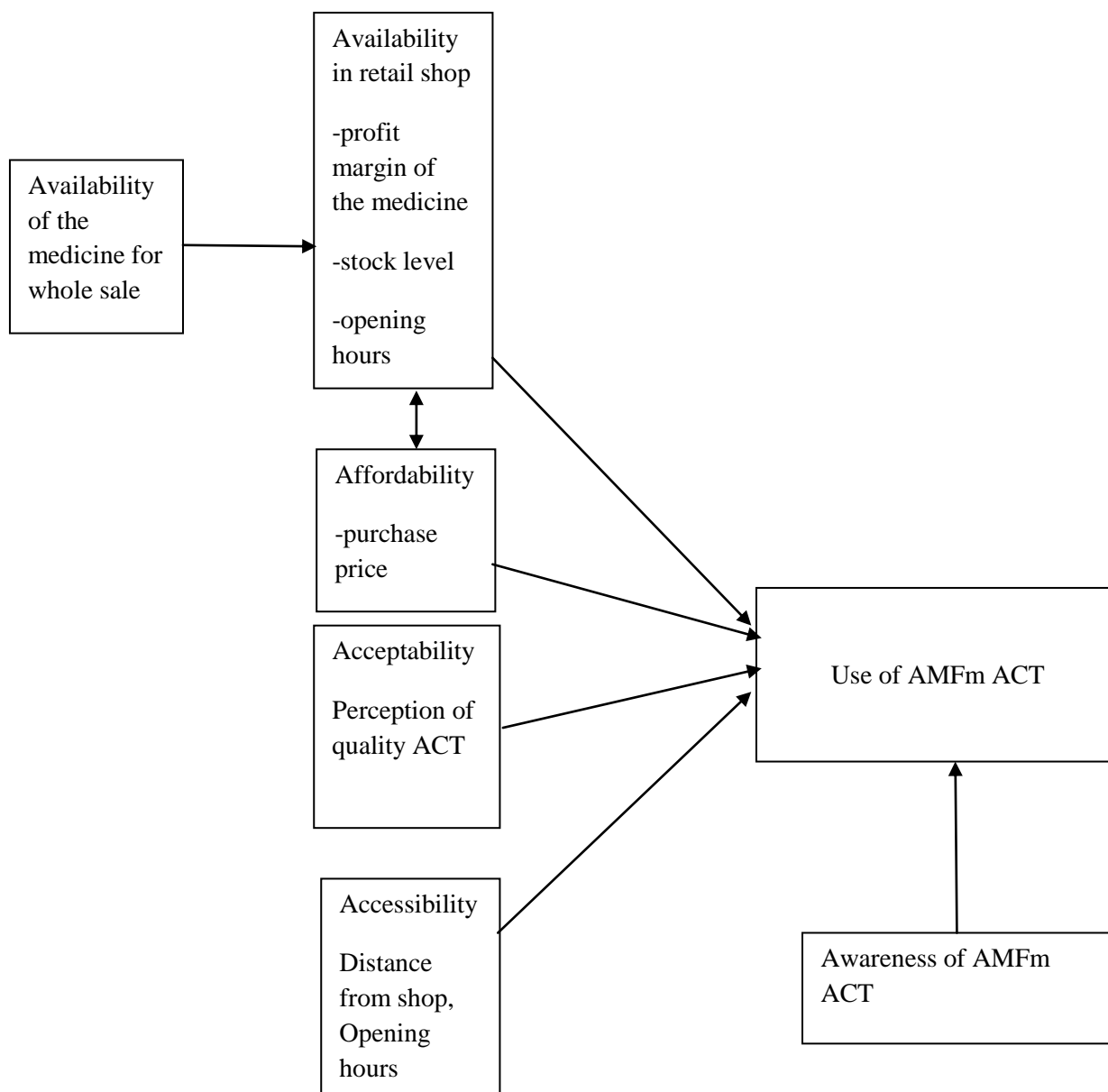


Figure 1: Conceptual framework of the factors affecting utilization of AMFm-ACTs

Availability of AMFm-ACTs affect the quantity of AMFm-ACTs used. The number of hours for which the shops remain open and the stock level will influence the availability of the AMFm -ACTs. The availability of AMFm- ACTs will also affect the affordability of the medicine. The use of AMFm-ACTs is influenced by the affordability of the AMFm -ACT. The price of the AMFm-ACT in relation to the price of other antimalarials will influence the demand for the AMFm-ACTs. A lower price of the AMFm-ACTs in relation to the price of other antimalarials is expected to result in more people using the AMFm-ACTs especially in areas where people cannot afford the more expensive antimalarials. The perception of people on the quality of AMFm-ACTs will influence the utilization of the AMFm-ACTs. Where people associate

low price with poor quality, they are likely to demand less of the AMFm- ACTs especially as they currently sells at GH¢ 1.50.

The availability of the medicine in the facility will depend of the decision to stock the shops with these drugs and the ease with which retailers buy and get these medicines to their shops for sale. Shops will stock the AMFm-ACTs if the profit margin they get from its sales is good or acceptable. For shops to stock the medicine it must be available for purchase locally in the district and in the capital and they should be able to transport it to their shops. Stock out of the drug at the level of the whole seller will make it difficult for retailers especially in rural areas to access these medicines.

Justification

It is important to know whether these medicines are available in the market and the extent to which people are making use of them. Knowledge on the availability and use of the AMFm-ACTs will help in putting interventions that will increase the availability and utilization of these medicines. It will also help in planning for future needs for the medicine.

It is also important to know whether people accept the AMFm- ACT as a good quality and affordable medicine. This study will inform the program on the need for strategies to make this medicine acceptable in the community.

General Objective

To determine the availability and utilization of AMFm-ACTs and assess the factors influencing the choice of AMFm- ACTs by those who buy antimalarials in private pharmacies and chemical shops in Ho municipality.

Specific Objectives

1. To determine the proportion of AMFm-ACT bought by those buying antimalarials.
2. To determine the proportion of pharmacies and chemical shops with stocks of AMFm-ACT
3. To assess the factors influencing the choice of AMFm-ACT by those buying antimalarials.
4. To assess the factors influencing the availability of AMFm ACT in pharmacies and Chemical shops.

In Africa, several interventions have been put in place to reduce the burden of malaria. These have resulted in some improvement in the malaria burden but morbidity and mortality from malaria are still high. According to the World malaria report (WHO, 2010) mortality due to malaria reduced by 50 % in eleven African countries since the year 2000.

One of the strategies recommended by the World Health Organization to reduce this high mortality from malaria has been the use of ACTs as the drug of choice for the treatment of uncomplicated malaria. ACTs were recommended because the malaria parasite was becoming resistant to the older drugs that were being used for the treatment of malaria, such as chloroquine. Studies have shown cases of resistance of the malaria parasite to chloroquine. In Zanzibar, an efficacy study that was done

2001, revealed a 14-day treatment failure of 60% of chloroquine.³

Governments in Africa then changed their first line treatment of uncomplicated malaria from chloroquine to artemisinin-based combination therapy. The ACTs are effective and it is difficult for the parasite to develop resistance to this combination therapy. ACTs have been found to be very effective and safe in large trials in Ghana, Nigeria and Uganda. A large scale multi country study was done in Ghana, Nigeria and Uganda in 2007 following distribution of artemisinin-based combination therapy to febrile children aged 6 to 59 months. This study showed that caregivers perceived ACTs to be effective and no severe adverse effect was reported.⁸

Even though the ACTs have been found to be effective, it has been difficult for people to get access to them. This has been mainly due to the high cost of the ACTs, especially in the private sector where most people seek treatment when they have fever. People seek treatment from private sector first when they have fever because there are multiple factors that act as barriers to the access of health care in the public sector. Some of these factors include distance from health facility and cost of treatment.⁹ The private shops are closer to people's homes and usually open for longer hours compared to health facilities. In Kenya, it was found that 56.8 % of adults use over the counter medications when they have fever.¹⁰ About 50% of caregivers buy malaria medicines from private outlets for their children in Sub Saharan Africa.¹¹

Because of these difficulties that people who need ACTs encounter, the Affordable Medicine Facility for malaria program was introduced in several African countries, including Ghana to make effective ACTs available and affordable in both the public and private sectors.

It is expected that with the availability of subsidized ACTs, the use of ACTs will increase and people will stop using antimalarials that are not recommended such as artesunate monotherapy, and pyrimethamine –sulphadoxine (fansidar). Even though these AMFm-ACTs are effective, distributing them through the private sector will also require training of the chemical sellers on the use of these medicines. The training is needed because if patients do not take the correct dose of the medicine, they will not be cured. The chemical sellers should also be able to use rapid diagnostic test (RDTs) because not all patients with fever have malaria. Trails done in Kenya, showed an improvement in prescribing behavior of private medicine

sellers after they were trained.⁹ It was also found that when rural health workers were trained in Cambodia, they always use the rapid diagnostic test for malaria before giving treatment.¹²

Several studies have been done on the level of utilization of ACTs in African countries where there had not been any subsidies of ACTs. Other studies have also shown the utilization of ACTs in countries that had some degree of subsidization of ACTs.

Cost of unsubsidized artemisinin-based combination therapy

The use of ACTs in Africa has remained low because of the high price of ACTS. The least expensive ACTs cost more than \$ 1 and this is about ten times the price of monotherapy antimalarials. Many people in Africa do experience malaria several times during the year and the cost of treatment can become expensive for both the household and the government.¹³ In a study in rural Tanzania, the amount that patients were willing and able to pay was less than the real cost of the ACTs.¹⁴ As a result of this study, a decision was taken in Tanzania to fully subsidize coartem in public facilities and to subsidize it at a consumer price of (USD0.28- 0.46) in specially accredited private drug outlets. This shows that the cost of the drug has a great effect on its demand especially in the private sector.

With regards to affordability, a study done in Kenya on barriers to prompt and effective treatment with antimalarials, it was found that 40% of people who treated themselves with medicines bought in private shops and 42% of people who visited formal health facilities reported that they did not have enough money to pay for the medicines. Some people were borrowing money and taking treatment on credit.

Even though artemisinin-based combination therapy is expensive, in countries where there is malaria parasite resistance to artesunate monotherapy, it is cost effective to use artemisinin-based combination therapy. This is because effective treatment of less severe malaria will prevent further expenditure by preventing more severe illness and admissions

Utilization of unsubsidized artemisinin- based combination therapy

The utilization of artemisinin-based combination therapy has been low in Africa. On the utilization of antimalarials

in a peri-urban town in Kenya, the level of use of ACTs was low, only 32.% of the antimalarials used were artemisinin-based combination therapy, 37% were sulphadoxine -pyrimethamine, 7.3% chloroquine and 7.1 % quinine.¹⁵ In Tanzania it was found that 69 % of patients using antimalarials in the public sector were using ACTs while in the private sector, only 14% of the patients received ACTs. During this study in Tanzania, the use of ACTs was low in the private sector.

Utilization of Subsidized artemisinin-based combination therapy

Subsidization of the cost of ACTs has been associated with increased use of this medicine in many countries. It was shown in a pilot study in Uganda, Angola and Tanzania that with subsidization, the utilization of ACTs rapidly rose from 0-1% at base line to (38-51%) after one year of introduction of subsidies.

Data from UNICEF and ACTWatch on the utilization of subsidized ACTs revealed that in the Democratic Republic of Congo after one year of subsidies, the use of ACTs in private shops was 1 % and in Senegal the use of ACTs was 4% after 2-3 years of subsidies while in Madagascar ACT use was 2.4% after 5 years of subsidies. On the utilization of subsidized artemisinin –based combination therapy, a study was done to assess the impact of subsidized ACTs on the treatment of malaria in young children in western Kenya. An intervention was carried out in three districts in Western Kenya in which subsidized ACTs were distributed to retail outlets in nine sub locations, in three districts and another nine locations in these three districts did not receive subsidized ACTs. Data was collected four month prior to the intervention and after eight months of the intervention. The percentage of children who received ACTs increased by 42% in the areas where ACTs were subsidized and only increased by 14.2% in the control areas where no subsidized ACTs were distributed. In this study, subsidizing artemisinin–based combination therapy also significantly increased access to these medicines in remote areas.¹⁶ Subsidy on ACTs is expected to increase the demand for these medicines. In Tanzania, subsidized ACTs were distributed in order to test the effect of subsidies on the demand for the ACTs. The subsidized ACTs were distributed in one district while the other district received the normal cost ACTs. The demand for the subsidized ACTs was then higher than the demand for ACTs in the non subsidized district.¹⁷

Availability of subsidized artemisinin-based combination therapy

It is expected that more medicine shops will stock the ACTs when its price is low. In remote areas in Senegal, the availability of ACTs remained low after one year of implementation of subsidies of ACTs. Only 11% of private outlets stocked adult ACTs and 29% stocked infant ACTs and in Cambodia 22% of pharmacies stocked adult ACTs and 6% stocked child ACTs after one year of implementation of subsidies. These studies did not show much increase in shops stocking ACTs. In a pilot study at a sub national level in Uganda, Tanzania and Angola, the drug shops stocking ACTs rapidly increased from 0% at base line to 69%-81% one year after the introduction of subsidized ACTs. In the control districts without subsidized ACTs in Tanzania the proportion of shops with ACTs after the one year decreased from 1% to 0%. There was no data for controls in Uganda and Angola. The availability of AMFm-ACTs in pharmacies and chemical shops will affect the use of these medicines. If there is stock out of the drug, the proportion of AMFm-ACTs bought will be low since only other antimalarials will be present to be purchased.

Insufficient funds and inadequate planning can lead to stock out of these medicines. Artemisinin-based combination therapy tends to be less common in remote areas where people are poor. Report from a study in Tanzania showed that shops in district town and along main roads tend to stock ACTs more than shops in more rural communities. In two districts in Tanzania, 229 shops were surveyed and 47 (20.8 %) of them never stock ACTs while 179 (79.2%) stocked ACTs during the study period from November 2008 to November 2009. The 47 or 20.8 % of the shops that never stocked ACTs were found to be in areas that were more rural with an average population density of 91.2 people/Km², while those that stocked ACTs were in more urban areas with a population density of 113.0 people /Km².¹⁸

The cost of the medicine also influences the ability of shops to purchase and stock the medicines. In six districts in Zambia only 7% of antimalarials sold in the market were ACTs. Fifty-one percent of those that did not stock ACTs reported that it was due to the high price of the ACTs. With subsidization, it is expected that ACTs will become widely available even in remote areas and this is expected to lead to a reduction in the use of other less effective antimalarials. The means by which retailers get their drugs and how quickly they receive the ACTs also

influences the availability of the medicine in the pharmacies and chemical shops. In some countries in Africa example Nigeria, sales representatives of large companies supply drugs to all types of private outlets – pharmacies, general shops and drug stores.¹⁹

The profit margin from the sales of the AMFm-ACT will influence the decision of pharmacists and chemical sellers to stock the AMFm-ACT and to continue selling it in their shops. The retail price of the AMFm-ACT has been set at GHc 2.00 for adults and GHc 1.50 for children dose. This is lower than the price of other non AMFm artemisinin-based combination therapy.

If the profit margin is too low, people will not be financially motivated to continue selling these medicines. In Benin, an assessment of the antimalarials supply chain was done in 2008 to determine how well drugs were distributed within the country. During the survey on the availability of drug, pharmacist expressed concern that the planned sale price of the ACTs that were to be subsidized was too low. A profit margin of 9.00 CFA and 10.5 CFA was expected for wholesalers and pharmacies respectively. This was seen as too small even to offset the costs of transportation. The pharmacists then expressed concern that with such profit margins people will be less willing to stock the drugs in their shops.²⁰

Pharmacies and chemical shops stocking drugs also depend on how easily and readily they can get the drug from the wholesalers. Frequent stock out of the drug at whole sale level will make it difficult for retailers to access the drug. Several studies in Africa have shown problems with the supply chain. Example, in a study on the pharmaceutical supply chain in Ghana, in which the dynamics and detrimental factors affecting the supply chain were examined, it was found that information technology which was an important factor in making the supply system work better was absent in the system. This resulted in frequent delays and sometimes disruption of the supply chain. A break in the supply chain was found to have the greatest detrimental effect on the supply and availability of the medicines. The distribution chain of malaria medicines in Benin was also found to be good and stock out of drugs in wholesale shops was rare because the lead time was short and wholesalers stocked large quantities of the drug.²¹

Role of AMFm-ACTs

The AMFm-ACTs were introduced in several African countries, because cost was acting as a financial barrier to

the availability of ACT. The AMFm-ACTs are expected to result in a reduction in the stocks of other less effective antimalarials that are in the market. Because these AMFm-ACTs are cheaper and effective, the use of these ACTs is expected to increase markedly and people will stop or reduce the use of other antimalarials. However, it has been experienced in different countries that subsidies on ACTs alone do not completely displace other less effective antimalarials from the market.²² It is important for the AMFm-ACTs to displace other substandard ACTs and artesunate monotherapy from the market because the use of these substandard ACTs and artesunate monotherapy can lead to the development of drug resistance. Thirty-five percent of antimalarials in Africa are estimated as substandard. A study was done in urban Ghana to determine the pattern of utilization of artesunate in the treatment of uncomplicated malaria in 2008 and it was found that 33.1% of patients were treated with artesunate monotherapy. This shows the need for the AMFm programme to succeed in order to change this practice. There are substandard, counterfeit ACTs and other less effective anti malaria medicines that are present in the market together with the AMFm -ACTs that people are likely to buy because their costs are also low. In a study done in Kumasi, it was found that 64.7 % of ACTs sold were substandard.²³

Perception of quality of ACTs

The AMFm program also helps countries in doing other accompanying interventions, example training of health workers, including pharmacists and chemical sellers, and behavior change communication on AMFm-ACTs.²⁴ It is during these behavior change communication campaigns that awareness on AMFm-ACTs should be raised. The perception of the quality of medicines influences the type of malaria medicine that a person will buy from the pharmacy or chemical shop. Evidences have shown that ACTs are effective, well tolerated in children and their use results in rapid reduction in fever and clearance of parasitemia.²⁵ Patients were treated for malaria with ACTs and other artesunate monotherapy in rural Tanzania and a study was then done to assess patient's perception on the quality and effectiveness of ACTs compared to the other antimalarials. The majority of patients had a favorable experience, in terms of perceived rapidity of symptoms resolution, compared to previous experience with other therapies for malaria. When parents of children treated with ACTs were compared with parents of children treated with artesunate monotherapy, those of children treated with ACTs were more satisfied with treatment and were

willing to pay more for the treatment. They therefore had a better perception of ACTs when it was introduced into the community. The study also showed that 57.4% had preference for artemisinin-based combination therapy compared to 32.7% who expressed preference for single drug therapy shows that patients do hold certain perceptions about medicines which influence the medicines they prefer. A study in Ghana of parents whose children were treated with ACTs also showed that the perception of effectiveness of the medicine was higher for parents whose children were treated with ACTs compared to those whose children were treated with artesunate monotherapy. Therefore it also shows that patients have different perceptions on the effectiveness of the different types of antimalarials medicine. In a qualitative study that was done in Tanzania comparing perception on the quality of artesunate –lumefantrine and pyrimethamine- sulfadoxine (Fansidar), over two-thirds of mothers were not satisfied with the improvement they had when their children were treated with fansidar. However, 97.5% gave a satisfactory response to treatment with the artemisinin-based combination therapy, artemether –lumefantrine. They stressed that with artemether- lumefantrine, their children recovered rapidly with little side effect experienced.²⁶

With the introduction of subsidized AMFm-ACTs in the market, utilization and availability of artemisinin-based combination therapy is expected to increase especially in private medicine outlets. Many people first visit private medicine store for treatment when they are sick. Most of these shops have cheap less effective and substandard antimalarials like pyrimethamine-sulphadoxine, and artemisinin monotherapy. Thirty-five percent of antimalarials in Africa are estimated to be substandard. The artemisinin-based combination therapies in private shops are very expensive and only few people can afford them. The literature showed that fewer people in the private sector have been receiving ACTs compared to the public sector. The use of artemisinin-based combination therapy in pilot studies in some areas in Africa has been shown to increase with subsidization. In Uganda and Tanzania a pilot study showed significant increase in the utilization of artemisinin –based combination therapy to level of between 38% to 51% following subsidization. The review of literature has shown that the increased use of artemisinin-based combination therapy is not only due to reduction in price but to perception on the effectiveness of these medicines and the increased availability of these medicines with subsidization. In several African countries, mothers whose children were treated with artemisinin-

based combination therapy reported that their children recovered faster with the ACTs compared to treatment with artesunate monotherapy and other non-artemisinin drugs like pyrimethamine-sulphadoxine. They therefore had preference for the ACTs. The perception that people have about the effectiveness of the AMFm-ACTs will also influence the utilization of these medicines.

On the availability of the medicines, the literature shows that fewer shops in rural areas with lower population density were stocking artemisinin-based combination therapy compared to shops in urban areas. The availability of medicine in shops depends on several factors e.g. the owner of the shop deciding to stock the drug, the lead time, availability of the medicine for whole sale and the stock management in the retail shop etc. From the literature, a survey in Nigeria prior to introduction of AMFm-ACTs, pharmacists expressed concern that with a small profit margin, there will not be enough financial incentives for shops to stock the subsidized ACTs.

Materials and Method

This chapter deals with the methods used in achieving the objectives. The study was divided into several parts.

Study Design

The study was a descriptive, cross sectional quantitative and qualitative study. The quantitative aspect involved people who bought antimalarials from pharmacies and chemical shops in Ho municipality. It also involved those selling in the pharmacies and chemical shops. The qualitative part involved in-depth interviews of nine people, one pharmacist in a pharmacy with AMFm-ACTs, two chemical sellers, one with AMFm-ACTs and the other without AMFm-ACTs from the Ho Shia sub-district and two chemical sellers from each of the other three sub districts.

Study area

The study was conducted in the Ho Municipality (figure 2). The Ho Municipality is one of 18 political/administrative districts in the Volta region with a population of 214,612 according to 2000 census and an annual growth rate of 1.7%. The present estimated population is 225,026. Ho municipality lies between latitude 6° 20'N and 6° 55'N and longitude 0° 12'E and 0° 53'E and covers a land area of 2,660 sq km. The municipality is bounded by Adaklu-Anyibe district to the south, the Dayi district to the west, Hohoe district to the north and the Republic of Togo to the east. Ho town is the district capital and also serves as the capital of the Volta region. Ho Municipality has an urban community, Ho town with a population of 84,253 and a rural area with 67% of the municipal population. There are four sub districts in the municipality. The Ho-Shia, Kpedge-Vane, Abutia and the Tsito sub districts. Ho town, the capital of the municipality is in the Ho-Shia sub-district.

There are fifty health facilities in Ho municipality eight of these are privately owned and forty-two are government owned. In the district capital Ho town, there is one government owned regional hospital, one district or municipal hospital and two clinics. Economic activities in the area include formal employment in the public service, few large trading companies and petty traders. The main economic activities in the rural areas where 63% of the population live are subsistence farming, animal rearing and petty trading. Agriculture employs about 64% of the total labour force in the municipality. The crops that are mainly planted include maize, cassava, plantain etc.

There were 11 pharmacies and 122 chemical shops in the municipality. Eleven pharmacies and sixty-four chemical shops were located in Ho-Shia sub-district. Twenty-seven chemical shops were in the Tsito sub-district, twenty-eight chemical shops in the Kpege-Vane sub district and 3 in Abutia sub district.

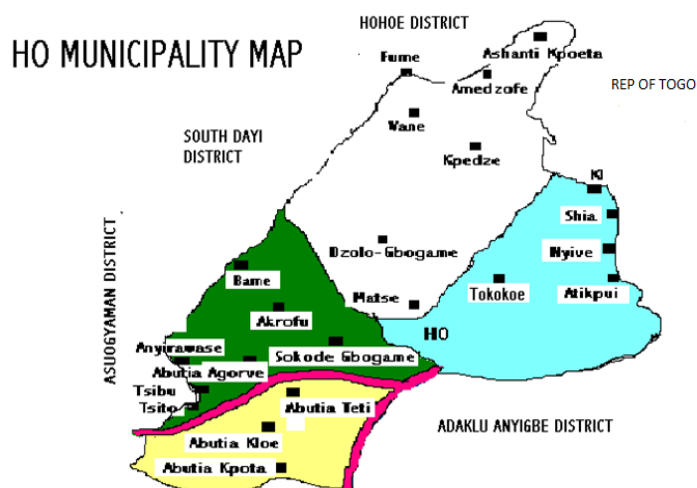
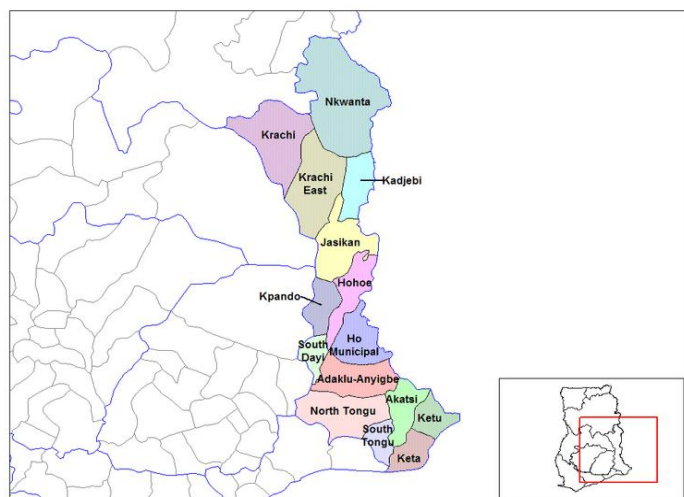


Figure 2: below shows a map of Ho Municipality

Study population

The study populations were categorized as follows. Exit interviews: people who bought antimalarials from the pharmacies and chemical shops.

The pharmacists and chemical sellers in shops in the Ho municipality were also part of the study population.

3.6 Sample size calculation

For determining the proportion of AMFm-ACTs bought from pharmacies and chemical shops.

$$\text{Sample size } n = Z^2 \times p \times q$$

$$d^2$$

P=Proportion of people buying AMFm-ACTs from pharmacies and chemical shops in Ghana is not known.

d = margin of error is 5%.

$$q = 1-p$$

Z =Level of confidence of 95%.

$$\text{Sample size} = n = \frac{1.962 \times 0.5 \times 0.5}{0.05^2} = 384.16 = 385$$

$$\text{Non response rate } 5\% = 19.25 = 20$$

$$\text{Sample size} = 405$$

Sampling method

For determining the proportion of AMFm-ACTs bought by those buying antimalarials, data was collected from people who bought antimalarials from a total of 15 shops. Four shops were randomly selected from each of three sub districts in the municipality. The three shops were selected from the fourth sub-district. This is because there were only three chemical shops in the fourth sub-district. These shops were chosen by simple random sampling from the list of shops in these sub-districts. Two pharmacies and two chemical shops were chosen from the Ho-Shia sub-district in which Ho town the capital is located. Four chemical shops were chosen from each of the other two sub district, Tsito and Kpedge/Vane and three chemical shops from Abutia sub-district as there were only three shops in this sub district. From a list of pharmacies and chemical shops and their addresses in Ho Municipality obtained from the pharmacy council, there were eleven pharmacies and sixty-four chemical shops in Ho-Shia, 27 chemical shops in Tsito, 28 chemical shops in Kedge-Vane and 3 chemical shops in Abutia sub districts. These were used as sampling frames for randomly selecting the shops from each sub district. A survey of all the people who bought antimalarials over a period of eight days was done in each of the selected shops. One person stayed in front of the shop from the opening hour about 8.30 am to 2.30pm then another person stayed in the shop from 2.30pm to the closing hour. People who bought medicines from the pharmacies and chemical shops were asked the type of medicine they bought and those who bought antimalarials were asked to take part in the study. Those who gave consent were then interviewed. A total of 394 people were interviewed during the study period.

For determining the proportion of pharmacies and chemical shops with AMFm-ACTs, a census of all the pharmacies and chemical shops in the district was done. Semi-structured questionnaires on the availability of AMFm-ACT were administered to the pharmacists and chemical sellers in their shops in the municipality.

For the in-depth interview, one pharmacy with AMFm ACT was chosen from Ho town and two other chemical shops were chosen from the Ho-Shia sub-district. One of these chemical shops had AMFm-ACT and the other did not have AMFm-ACT. Two chemical shops were also chosen from each of the other sub-districts. One chemical shop with AMFm-ACT and the other without AMFm-ACT in each sub-district. These shops were chosen by simple random sampling from the number of shops with AMFm-ACTs and without AMFm-ACTs respectively from each sub-district. The in-depth interviews were conducted with pharmacists and chemical sellers in a total of nine shops. The data was collected between 9th May 2011 and 7th June 2011.

Data collection Techniques /Methods &tools

Data collection was done by exit interview of patients buying antimalarials from pharmacies and chemical shops. The tools used for the exit interviews were semi-structured questionnaires (Appendix 2). Semi-structured questionnaires were also administered to the pharmacists and chemical sellers. Open-ended questionnaires (Appendix 2) and a recorder were used for the in-depth interview.

Results

Limitations

There were almost equal numbers of males 51% and females 49% in the sample. Those in the sample who attained primary and Junior Secondary School levels were 10.5% and 32.1% respectively. The proportion of people in the sample who were receiving less than GHc 150.00 per month was 49.08% and the unemployed accounted for 20.07% of the sample population.

Table1: Variables and operational definitions

Variable	Operational definition
Age	How old the person is at last birthday
Gender	Male or Female

Quality control

Data collectors were trained on what the study was about and how the data should be collected before they started collecting the data. Pre-testing of the questionnaires was done in Accra and Madina and corrections were then made on the questionnaire. The data was entered into the SPSS software version 16.

Data processing and Analysis

Data entry was done in SPSS and data cleaned and analyzed using SPSS.

The data was analyzed by descriptive statistics - using frequencies and cross-tabulation and getting frequencies, proportions, and confidence intervals and presented as tables, graphs, charts.

The in-depth interview was transcribed and analyzed under themes.

Limitations

The study involved only pharmacies and chemical shops in the private sector. For the in-depth interviews not all the pharmacists and chemical sellers were owners of the shops. In few cases the owners who could have provided more information were not around. However, enough information was obtained to answer the objectives.

Educational level	Highest educational level attained
Type of malaria medicine bought	AMFm ACT, Non AMFm ACT, Non ACT
Factors affecting choice of AMFm ACT	Reasons why the person bought AMFm ACT
Availability of AMFm ACT in pharmacy or chemical shop.	Presence of AMFm ACT that is ready for sale
Type of AMFm ACT in the facility	Artesunate- Amodiaquine or Artesunate-Lumefantrine, or both
Factors affecting availability of AMFm-ACTs in shops	Reasons why AMFm ACT is stocked or not stocked in the shops

Table2: Background characteristics of the respondents.

Category		Frequency	Percentage (%)
Gender	Male	200	51
	Female	194	49
	Total	394	100.00
Educational level		Frequency	Percentage (%)
	Primary	41	10.5
	JSS	126	32.1
	SSS	107	27.3
	Tertiary	105	26.8
	Other e.g.no formal education	13	3.3
	Total	392	100
Age of respondents (years)	Mean age y(years)	36	
	Median age(years)	34	
	Modal age(years)	28	
Monthly income	Amount	Frequency	Percentage (%)
	Less than GHc 150	187	49.08
	GHc 151-399	138	36.22
	GHc 400-999	44	11.55
	GHc ≥ 1000	12	3.15

	Total	381	100.00
Occupation	Unemployed	83	21.07
	Trader	81	20.56
	Farmer	61	15.48
	Teacher	32	8.12
	Nurse	13	3.3
	Other	124	31.47
	Total	394	100

Table 3: Antimalarials in pharmacies and chemical shops in Ho Municipality

Types	Name of malaria medicine	
AMFm ACTs	-Tabs Artemether -Tabs Artefan -Tabs Artesunate Amodiaquine	
Non-AMFm- ACTs	-Tabs Lonart -Tabs Amodiaquine -Tabs Lofart	-Tabs Artesunate –Amodiaquine -Tabs P- Alaxin
Non-ACTs	-Tabs Malareich -Tabs malafan -Tabs maladoxine - Inj Artemether - Inj. Quinine	-Tabs quinine -Tabs Chloroquine

Proportion of AMFm-ACTs bought in pharmacies and chemical shops

The proportion of the different types of antimalarials - AMFm-ACTs, non AMFm-ACTs and non ACTs that were bought in pharmacies and chemical shops in Ho municipality is shown in table 4 below.

Table 4: Proportion of the different malaria medicine purchased in pharmacies and chemical shops in Ho Municipality

N=393

Type of facility	Type of malaria medicine bought			
	AMFmACT n (%)	Non-AMFm ACT n (%)	Non-ACT n (%)	Total count n (%)
Pharmacy	91 (56.2)	40 (24.7)	31 (19.1)	162 (100)
Chemical shop	108 (46.8)	35 (15.2)	88 (38.1)	231 (100)
Total	199 (50.6)	75 (19.1)	119 (30.3)	393 (100)

The proportion of AMFm ACT bought in pharmacies and chemical shops in Ho Municipality was 50.6% with 95% CI (45.7-55.6) (Table4). The difference in proportion of AMFm-ACTs bought between pharmacies and chemical shops was 5.5% and the 95% CI for the difference in proportion of AMFm-ACTs bought in pharmacies and chemical shops was (-10.8%) – (10.8%). This confidence interval include zero. There was no significant difference between the purchase of AMFm-ACTs between pharmacies and chemical shops.

Table 5: Proportion ACTs and non-ACTs bought in pharmacies and chemical shops.

Facility	ACTs n (%)	Non ACTs	Total	CI (P1-P2) 95% Diff. (%)
Pharmacies	131 (80.9)	31 (19.1)	162 (100)	4.4 (34.1-51.5)
Chemical shops	143 (61.9)	88 (38.1)	231 (100)	1
Total	274 (69.7)	119 (30.3)	393 (100)	

The proportion of ACTs bought in the pharmacies (80.9%) with 95% CI (74.9-87.0) was significantly higher than the proportion of ACTs bought in the chemical shops (61.9%) with 95% CI (55.6-68.2) (Table 5). Of the antimalarials bought in both the pharmacies and chemical shops, the proportion of the total ACTs (AMFm-ACTs and non AMFm-ACTs) was 69.7% with 95% CI (65.2%-74.2%) while the proportion of non-ACTs was 30.3% with 95% CI (25.8%-34.8%).

Reasons for buying the AMFm-ACTs

The reasons that influenced people’s decision to buy the AMFm-ACTs and the proportion of respondents who gave a particular reason are shown in table 6 below.

Table 6: Reasons for buying the AMFm-ACTs in pharmacies and chemical shop in Ho Municipality

N=199

Factors influencing the choice of AMFm-ACTs	Frequency	Percentage (%)
Low price	46	23.12
Good quality of the medicine.	41	20.60

Good quality and low price	9	4.52
Prescribed by health worker	23	11.56
Prescribed by pharmacist	15	7.54
Prescribed by pharmacist and low price.	8	4.02
Prescribed by prarmacist and good quality.	4	2.01
Prescribed byhealthworker, good quality.	13	6.53
Knows AMFm-ACTs, low price, good quality	34	17.09
Others	6	3.02
Total	199	100

Low price and the effectiveness of the medicine were the main reasons contributing to people’s decision to buy the AMFm-ACTs. The low price and the effectiveness of the medicine were reasons given by 26.12% and 20.6% of the respondents respectively. A high proportion of respondents also indicated that knowing the AMFm-ACTs, low price and good quality of the medicines are factors influencing their choice of AMFm-ACTs (Table 6).

Proportion of pharmacies and chemical shops with AMFm-ACTs

In determining the proportion of pharmacies and chemical shops with AMFm-ACTs in the district, it was possible to administer semi-structured questionnaires to 11 pharmacists and 111 chemical sellers in their shops. All the 11 pharmacies were in the urban area, Ho town.

There were more chemical shops in the rural than the urban areas (Table 7).

The table below shows the proportion of pharmacies and chemical shops with AMFm-ACTs.

Table 7: Distribution of pharmacies and chemical shops in which the study was conducted Ho Municipality.

Location in the district	Pharmacy n (%)	Chemical shop n (%)	Total n (%)
Urban	11 (100)	25 (22.5)	36
Rural	0	86 (77.5)	86
Total	11 (100)	111 (100)	122 (100)

Table 8: Pharmacies and chemical shops with AMFm-ACTs in Ho Municipality

Facility	Proportion of shops with AMFm-ACTs n (%)	Total number of facilities n (%)	CI(p1-p2) 95% Diff
Pharmacies	10 (90.9)	11(100)	24.2 CI(5.1-43.3)
Chemical	74(66.7)	111(100)	1

shops			
Total	84(68.9)	122(100)	

Where P1 is the proportion of pharmacies with AMFm-ACTs. P2 is the proportion of chemical shops with AMFm-ACTs.

A significantly higher proportion of pharmacies (90.9%) had AMFm-ACTs compared to chemical shops (66.7%) (Table 7). The proportion of the pharmacies and chemical shops with AMFm-ACTs was 68.9% with 95% CI (60.7-77.1). The distribution of shops with AMFm-ACTs is shown in figure 3 below.

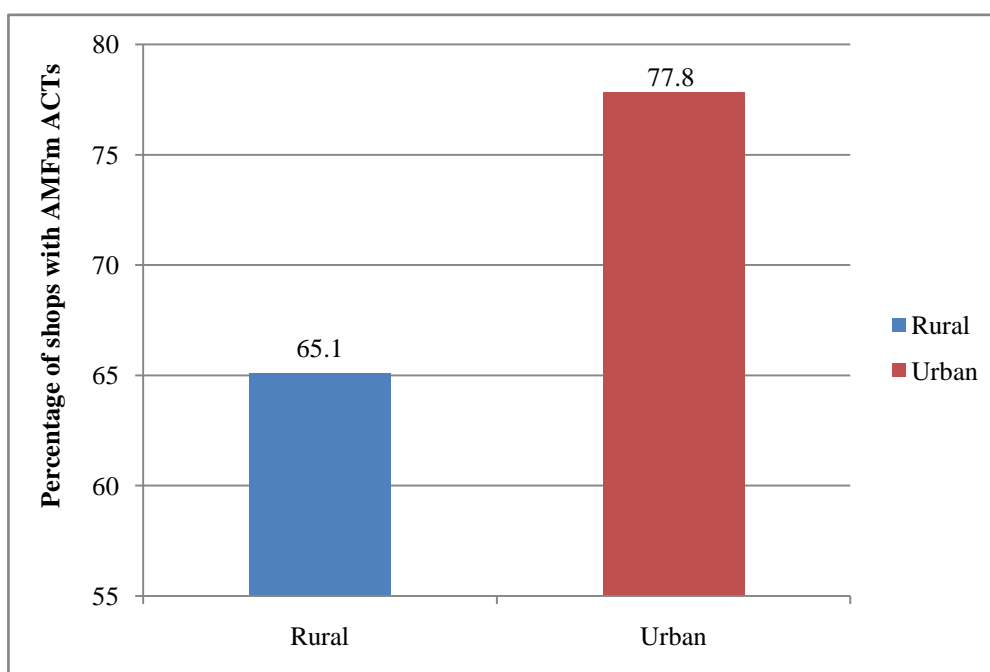


Figure 3: Distribution of pharmacies and chemical shops with AMFm-ACTs

There were a total 36 pharmacies and chemical shops in the urban area and 86 shops in the rural areas. The difference in proportion of shops in urban area and rural areas was 10.4% and the 95% CI of this difference was (-20.4%) - (20.4%). The difference between proportion of shops with AMFm- ACTs in urban and rural areas was therefore not significant.

On the awareness of the pharmacists and chemical sellers of AMFm-ACTs, all the 11 pharmacists knew the AMFm-ACTs. Of the 111 chemical sellers in chemical shops, 16 (14.4%) did not know about the AMFm-ACTs.

Factors influencing the availability of AMFm-ACTs in pharmacies and chemical shops

Table 9: Reasons for not having the AMFm-ACTs in pharmacies and chemical shops

Reasons for not having AMFmACT	Number of respondents	Percentage of respondents
Does not know the AMFm ACT	16	42.1

Does not know where it is sold	5	13.2
Not available locally in the district	12	31.6
Not available locally and don't know where it is sold	1	2.6
Other	4	10.5

A high percentage (42.1%) of the pharmacists and chemical sellers indicated that they did not have the AMFm-ACTs because they did not know them while (31.6%) of these respondent said they did not have the AMFm-ACTs because they were not able to get the AMFm-ACTs locally in the district (Table 9). All the chemical sellers who indicated that not knowing AMFm-ACTs was a reason for them not having them were in the rural areas. Other reasons were given for not having the AMFm-ACTs eg. The chemical seller not being well and therefore unable to go and buy the medicines.

During the in-depth interview on factor influencing the availability of AMFm-ACTs, a chemical seller said, "I went to Accra to get it but I could not get it, so I have to go again but now I am not feeling well". This shows that people in rural areas have to prepare to come to Ho town to buy the medicine and if they do not get it they return and

it may take some time before they go back to buy the medicines. In urban areas in the district, the main reason given for not having the AMFm-ACTs in pharmacies and chemical shops was that the medicines were not available on wholesale in the district. In rural areas the main reasons were that the chemical seller did not know the AMFm-ACT and the chemical seller was not able to get the medicines in the district on wholesale (Table 9).

Several reasons were given for deciding to stock the AMFm-ACTs by pharmacists and chemical sellers that had the AMFm-ACTs in their shops. Below is a table of reasons for having AMFm-ACTs in pharmacies and chemical shops.

The main reasons given for continuing to sell the AMFm-ACTs were that the medicines were effective in curing malaria and that they were selling fast (Table 10).

Table10: Reasons for stocking AMFm-ACTs in pharmacies and chemical shops in Ho municipality may 2011

Reason	Number of respondents	Percentage of respondents (%)
Profit margin and fast sales	4	4.8
Fast sale of AMFm ACT	32	38.1
Effectiveness	24	28.6
Profit margin	3	3.6
Fast sales and effectiveness of drug	16	19.0
Other	5	5.9

Key findings

The main findings of the study are that the proportion of AMFm-ACTs bought from pharmacies and chemical shops in Ho Municipality was 50.6% with 95% CI (45.7-55.6). The proportion of total ACTs bought, that is both AMFm-ACTs and Non AMFm-ACTs was 69.7%. On the availability of AMFm-ACTs, a total of 68.9% of the shops had AMFm-ACTs during the study.

The effectiveness of the medicine and its low price were given by 20.6% and 23.12% of people who bought antimalarials from pharmacies and chemical shops as contributing to their decision to purchase the AMFm-ACTs.

For the pharmacists and chemical sellers, the main reasons for continuing to stock the AMFm-ACTs in their shops were because the medicines were selling fast and they believed that the medicines were effective.

In shops without AMFm-ACTs, the main reasons given for not stocking the AMFm-ACTs in pharmacies and chemical shops were because pharmacist or chemical seller did not know the medicine, given by 42.1% of respondents and the medicine was not available locally on wholesale in the district, this reason was given by 31.6% of the respondents.

Discussion

Utilization of AMFm-ACTs

From this study, the utilization of the AMFm-ACTs has increased markedly from zero at the time of introduction of the AMFm-ACTs to 50.6%. This study also shows that other non-subsidized ACTs were being used in the district. The proportion of non AMFm-ACTs used in the district was 19.1 % (Table4). This has resulted in ACTs having 69.7% of the market share of the total antimalarials sales in the district. Studies have been done in different African countries where some degree of subsidies of ACTs had been implemented. These studies show different levels of success compared to the findings from Ho Municipality. In a pilot study done in Uganda, Angola and Tanzania to assess the impact of subsidized ACTs, the use of ACTs in private medicine shops was found to have increase from 0% to (38-51%) after one year of subsidies. The upper limit of this result compares with the proportion of AMFm-ACT utilization in Ho municipality after about ten months of subsidies. However taking the lower limit of the proportion of ACT use in the study in Uganda, Tanzania

and Angola, the proportion of AMFm- ACT use in Ho Municipality is higher.

Data from UNICEF on the utilization of ACTs following subsidies in several African countries show lower rate of utilization of ACTs compared to the level of utilization determined during the study in Ho Municipality. The data from UNICEF shows that in the Democratic Republic of Congo, utilization of ACTs was 1 % after one year of subsidy, in Senegal the ACT utilization of was 4% after 2-3 years of subsidy and the use of ACTs in Madagascar was 2.4% after about five years of introduction of subsidy. Before the introduction of the AMFm-ACTs, studies done in hospital pharmacies in Ghana showed that 57.8% of the antimalarials received by patients visiting the public health facilities were ACTs.⁷ Studies in Africa have also shown that a higher proportion of patients visiting public health facilities for treatment of malaria received artemisinin-based combination therapy compared to those who visited private pharmacies. Therefore even though the study in Ghana showed that ACTs received from the public pharmacies was 57.8%, the level of utilization of ACTs in the private sector could have been lower. Before the introduction of subsidized ACTs in the private sector in Tanzania, it was found that only 14% of patients from private pharmacies received ACTs compared to 69% who received ACTs in the public sector. This study in Ho was however done in private pharmacies and chemical shops. Having a level of utilization of the total ACTs in Ho being 69.7% is therefore a high level of use.

The aim of the AMFm program is not only to increase the use of ACTs, but to crowd- out other less effective antimalarials from the market. In Ho Municipality, 30.3% of the antimalarials purchased were non-ACTs and these include medicines like artesunate monotherapy, pyrimethamine-sulphadoxine eg malafan, malariech etc. Therefore the non-ACTs have not been completely displaced from the market. Some people were buying these non ACTs because they did not know about the subsidized AMFm-ACTs. Others bought non-ACTs like pyrimethamine- sulphadoxine because they considered them to be cheaper than the AMFm-ACTs. A dose of malafan or malareich costs Gp 0.60 while the subsidized AMFm-ACTs was sold at GHc 1.50 and GHc 2.00.

More of the non AMFm-ACTs such as lonart which were more expensive were purchased from the pharmacies 24.7% compared to the chemical shops 15.2% (Table 4). This could be explained by the fact that the pharmacies

were all in the district headquarter town where people could afford more expensive non-AMFm-ACTs. The price of the non-AMFm ACT called lonart was GHc4.50. Some people preferred the non subsidized ACTs because they probably believed that these were more effective than the subsidized AMFm-ACTs.

Availability of AMFm-ACTs

On the availability of the AMFm-ACTs, 68.9% of pharmacies and chemical shops had got the AMFm-ACTs after about ten months of introduction of subsidies. This increase in the availability of the subsidized ACTs is higher than that recorded in some parts of Africa. In remote areas in Senegal, the availability of ACTs remained low after one year of implementation of subsidies of ACTs. Only 11% of private outlets stocked adult ACTs and 29% stocked infant ACTs one year after subsidies were introduced in Senegal. Other studies showed comparable level of increase in availability of ACTs. In the pilot study in Uganda, Tanzania and Angola, medicine shops stocking ACTs rapid increased from 0% at base line to 69%-81% one year after the introduction of subsidized ACTs. These levels are comparable or slightly higher than that in Ho Municipality.

The reasons that were given by pharmacist and chemical sellers during this study for not having the AMFm-ACTs were, that the medicines were not available locally in the district and the chemical sellers did not know the AMFm-ACTs. Of those who did not have the AMFm-ACTs, 42.1% said it was because they did not know the AMFm-ACTs while 36.1 percent indicated that it was because the medicines were not available in the district capital town Ho (Table 9). All the chemical sellers who did not know the AMFm-ACTs were living in the rural areas. They were mainly located in very remote areas.

People in the rural areas usually come to the district capital to buy the medicines on whole sale. When they do not get the AMFm-ACTs, they go back and have to come later. Some people will then take some time before coming again to the district capital Ho town. During this period the shops may be out of stock of the ACTs. A study in Ghana found that a break in the supply chain was causing major problems with the supply and availability of the medicines.

For shops that had the AMFm-ACTs the main factors encouraging them to continue stocking the AMFm-ACTs were that the medicines were selling fast and the chemical sellers and pharmacists consider the medicine to be effective in the treatment of malaria (Table 10). Of the

pharmacists and chemical sellers that had the AMFm-ACTs in their shops, 38.1% indicated that fast sales was a reason for them continuing to sell the AMFm-ACTs while for 28.6% of them, the medicine being effective was the main reason for them selling the AMFm-ACTs.

Financial incentive is an important factor influencing the decision to stock the AMFm-ACTs. A survey conducted in Tanzania on availability of subsidized ACTs after a price was set that allowed a profit margin of only 10.5 CFA. Pharmacists expressed concern that with a profit margin of only 10.5 CFA, there will not be enough financial motivation for them to continue selling the medicines. In this study in Ho municipality, even though the profit margin was small compared to profits from non ACTs, the fact that the medicines were selling fast encouraged the pharmacists and chemical seller to continue selling them. From the in-depth interview, the pharmacists and chemical sellers want to have an effective medicine that is recommended by authorities in their shops. An effective medicine for malaria ensures that their patients recover rapidly. This builds the confidence of the patients in them so that in future, these people will continue to buy from them when they are ill.

Conclusion

The utilization of AMFm-ACTs in Ho Municipality after about eight months of its introduction in the market was fairly high 50.6%. The use of all ACTs was also high, as the proportion of total ACT use was 69.7%.

The increase in utilization of the subsidized ACTs in this study is more than that observed in most studies in Africa. More people were buying these medicines because they believed it was effective and the price was low compared to other medicines for the treatment of malaria.

The availability of the AMFm-ACTs was also high especially in the pharmacies in the urban area where 90.9% of the pharmacies had AMFm-ACTs. However, there were challenges to the ready availability of these medicines especially in the rural areas where some chemical sellers did not know about the AMFm-ACTs. Some of these pharmacists and chemical sellers did not have the medicines because they were not able to get it in the district. However, the pharmacists and chemical sellers were motivated to continue selling these medicines because they believed these medicines were effective and they were selling fast. They therefore wanted to get them in their shops. In general, people in the district are willing and ready to use these medicines and the pharmacist and

chemical seller are also ready to sell these medicines in their shops. Therefore with the subsidization, the use of ACTs will continue to be high and continue to increase.

Recommendation

There is the need to increase the awareness and knowledge of the chemical seller on AMFm-ACTs. Training and sensitization on AMFm strategy and its importance in the community should be conducted. This training should cover especially the chemical sellers in the rural areas. When more chemical sellers become aware of the AMFm-ACTs, more shops will be stocked with the AMFm-ACTs.

Educate the community on the effectiveness of the AMFm-ACTs compared to other antimalarials. In rural areas emphasizing that the ACTs are more effective in the treatment of malaria than the non-ACTs especially malafan. This will let people know that these medicines are not only cheap but are also very effective

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