

**SELF-MEDICATION PRACTICES WITH
ANTIBIOTICS AMONG URBAN DWELLERS OF
BAHIR DAR TOWN, NORTH WEST ETHIOPIA**



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This is to certify that the thesis prepared by Tena Mekonnen, entitled “SELF-MEDICATION PRACTICES WITH ANTIBIOTICS AMONG URBAN DWELLERS OF BAHIR DAR TOWN, NORTH WEST ETHIOPIA” and submitted in partial fulfillment of the requirements for the Degree of Master of Science (Pharmaco epidemiology and Social Pharmacy) complies with the regulations of the university and meets accepted standards with respect to originality and quality.

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Abstract

Self-medication practices with Antibiotics among urban dwellers of Bahir Dar town, North West Ethiopia

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Self-medication is becoming a common type of self-care behavior among the population of many countries. Many international studies have investigated the prevalence and nature of self-medication practices at the population level. In Ethiopia, some workers have also looked at the population prevalence of self-medication in general; however the prevalence of antibiotic self-medication not been well described. In addition, an increase trend in antibiotic resistance that calls for exploring the underlying factors. This study was performed to estimate the prevalence of self-medication with antimicrobial drugs and to record the stored medicine at home. The study employed a community based cross-sectional survey on a sample of 595 households. Both quantitative and qualitative data collection methods were used in the study. The quantitative data was collected by structured and pre-tested questionnaire and analyzed using SPSS/PC version 17.0 and the qualitative data was collected through in-depth interview and analyzed using thematic analysis. The prevalence of self medication with antibiotics in this study was 12.8%. Respiratory 58.8% and diarrhea 41.2% were most frequently reported symptoms of illness. No significant associations were observed in the practice of self medication with antibiotics and socio demographic variables. From all visited households, 17% were found to store drugs at home. Self-medication with antibiotics is prevalent among urban dwellers of Bahir Dar town, North West Ethiopia. Therefore, there is a need for an intervention to address this practice.

Key words: self medication, antibiotics, Ethiopia

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List of abbreviations

AAU	Addis Ababa University
AMR	Anti Microbial Resistance
IDI	In-depth interview
KIs	Key informant interview
OTC	Over the Counter
SMA	Self Medication with Antibiotics

Operational definitions

- **Community pharmacy** is a licensed drug retail outlet lead by a pharmacist.
- **Drug retail outlets:** pharmacy, drug shop, or rural drug vendor.
- **In appropriate drug use:** Characterized by any of the following: the use of in appropriate dosage (too high or too low; in correct duration (too short or too long), in correct selection (mismatch between organisms); unnecessary expense (the selection of newer and more expensive drugs when older, cheaper drugs are clinically adequate (WHO, 2000).
- **Over-the-counter or non-prescription drugs** are those drugs that can be legally purchased from a drug retail outlet without having a prescription from a licensed health care provider. These drugs do not include prescription only drugs.
- **Self-medication:** use of modern drugs without the advice of a health professional.

1. Background

Throughout human history the dominant paradigm of healthcare was individual self-care in the family and local community. People themselves were responsible for their own health, and that of their families. Self-care is probably not only as old as mankind but also most widely used (WSMI, 2010).

Self-care may be defined as the care taken by individuals towards their own health and well being, including the care extended to their family members and others. It is a broad concept encompassing hygiene, nutrition, lifestyle, environmental factors, socioeconomic factors and self-medication. Self-medication, as one element of self-care, is the selection and use of medicines by individuals to treat self recognized illnesses or symptoms. It is also defined as obtaining and consuming medication without professional supervision regarding indication, dosage, and duration of treatment (WHO, 1998; WSMI, 2006).

Medicines for self-medication are often called ‘nonprescription’ or ‘over the counter’ (OTC) medicines which are approved as safe and effective for use and are available without a doctor’s prescription through pharmacies. In some countries, OTC products are also available in supermarkets and other outlets. Medicines that require a doctor’s prescription are called prescription products (Rx products) (FIP and WSMI, 1999; WSMI, 2006).

In most economically deprived countries including Ethiopia, many drugs are dispensed OTC and majority of health related problems, nearly 60- 80%, are treated through self-medication as lower cost alternative (Worku and G/Mariam, 2003; Gutema *et al.*, 2011; Khan, 2011; Mossa *et al.*, 2012). Recently, this practice is widely accepted and successfully integrated into many health care systems throughout the world (WHO, 2000). If it is used appropriately, self-medication could lighten the demand on doctors and make people more health conscious (DACA and MSH/SPS, 2009).

However, the practice of self-medication with OTC medicines is different from the practice of purchasing and using a prescription medicine without a doctors' prescription. This is a potentially dangerous one 'self-prescription'. Such type of self medication is common in many developing countries. This facilitates the emergence of Anti Microbial Resistance (AMR) (Hussain *et al.*, 2011). As a result, the national drug regulatory authority should approve and list medications that are safe for self-medication.

Antibiotics are antimicrobial agents or chemicals produced by microorganisms to kill or to inhibit the activities of other microorganisms. AMR is a natural consequence of exposure to antimicrobials and is not a new phenomenon. Even with appropriate antimicrobial use, the rates of AMR can increase. The progress, however, is likely to be more rapid when there is inappropriate use. Much evidence also supports the view that the total consumption of antimicrobials is the critical factor in selecting resistance. In particular, abuse of antibiotics, easy availability of antibiotics over the counter, inadequate dose and time are mainly held responsible for development of resistance (WHO, 2009; Jain *et al.*, 2011; Ameko *et al.*, 2012).

Patient-related factors are also major drivers of inappropriate antimicrobial use and therefore contribute to the increasing prevalence of AMR. One of the patient-related factors that are thought to contribute to the problem of AMR is self medication with antimicrobials (Cars and Nordberg, 2008).

2. Statement of the problem

Over the last 50 years, antibiotics are among the most commonly prescribed drugs used in human medicine. And it has saved the lives and eased the suffering of millions of people (Sahoo, 2008). Antibiotics, when appropriately targeted to a susceptible pathogen, improve outcomes for patients. However, up to 50% of all the antibiotics prescribed for people are not needed or are not optimally effective as prescribed. Therefore, the use of antibiotics is the single most important factor leading to antibiotic resistance around the world (Jain *et al.*, 2011; CDC, 2013).

Nowadays, antibiotic resistance is becoming an existing worldwide problem, mainly in developing countries (Khan, 2011; Osemene and Lamikanra, 2012). New forms of resistant pathogens can cross international boundaries and spread between continents with ease. World health leaders have described antibiotic-resistant microorganisms as “nightmare bacteria” that “pose a catastrophic threat” to people in every country in the world (CDC, 2013). Therefore, the issue of its availability, selection, and proper use is of critical importance to the global community (Sahoo, 2008).

The availability and distributions of these drugs have improved in many developing countries, especially after the introduction of essential drug programme concepts (Kiyingi and Lauwo, 1993). Even though, its availability and distributions are increased, global irrational use is still on a rise (50% to almost 100%) (Khan, 2011; Auta *et al.*, 2012). Moreover, the availability of information about rational handling and use is also inadequate in many developing countries (Auta *et al.*, 2012; Mossa *et al.*, 2012).

Illegal purveyors of drugs are also common in many developing countries. Thus, the use of these drugs from informal sectors encourages the practice of self-medication and home drug storage. This easy access to home-stocked medicine has enabled a high consumption rate of medicine for self-limiting diseases. Therefore, in order to handle unnecessary health risk and bacterial resistance due to improperly obtained drugs, it is important to consider the manners of drug availability to consumers (Gutema *et al.*, 2011; Mossa *et al.*, 2012).

On the other hand, the use of antibiotics without medical guidance could result missed diagnosis and delays in appropriate treatments and adverse effects (Jassim, 2010; Gutema *et al.*, 2011; Mossa *et al.*, 2012). In addition, medicines in households lead to medicine wastage which has an economic impact on the health care system. Worldwide, unused (leftover) medicines cost billions of dollars (Auta *et al.*,2012).

These rampant irrational uses of antibiotics not only lead to wastage of medical resources, but also contribute to the emergence of multi-drug resistant pathogens. This is potentially dangerous for both individuals and societies (WHO, 2009; Khan, 2011; CDC, 2013)

Although most of the focus regarding inappropriate antibiotic use has been directed at physicians, some researchers have proposed that the role of patients also be assessed. Self Medication with Antibiotics (SMA) is possible via several avenues such as they are legally available OTC, antibiotics initially prescribed by physicians are saved and subsequently used without a medical consultation, antibiotics are obtained through friends or relatives, and they can be acquired via the Internet (Raz *et al.*, 2005; Pan *et al.*, 2012).

Therefore, antibiotic resistance is associated with antibiotic abuse through self medication. For example, a study done in Ghana showed that, pathogens isolated from the urine of patients who self medicated show high percentage of resistance than those isolated from urine samples of patients who did not self medicate prior to the test. Even the broad spectrum antibiotics suffered some form of resistance from pathogens isolated from urine samples of self medicated patients (Ameko *et al.*, 2012).

Studies also revealed that SMA is widely practiced both in developed and developing countries, and its prevalence ranges from 3% to 75% (Widayati *et al.*, 2011). The prevalence is higher in developing countries due to poor supervision of antibiotic prescription and loose regulatory systems. The frequency ranges from 24% to 73.9% in Africa, 36.1% to 45.8% in the Middle East, 29% in South America and 4% to 75% in Asia (Pan *et al.*, 2012).

In addition, the prevalent trend in the developing world has been associated with other several factors, particularly, lack of access to health care, availability of antibiotics as over the counter drugs and the relatively higher prevalence of infectious diseases (Donkor *et al*,2012). Whereas, some developed countries because of their strict regulations on antibiotic use; the prevalence of SMA is lower. For example: in Northern Europe 3%, in Central Europe 6% and 19% in Southern Europe (Pan *et al.*, 2012).

Although irrational use of antibiotics through self medication tends to carry more significance in the developing world, the problem has been investigated in only a few of these countries. In Ethiopia, a wide range of antibiotics are available on the market and acquiring those drugs OTC is a very common practice, even if it is legally categorized as prescription-only medicines and whose sale is restricted to pharmacies and drug stores(DACA and MSH/ SPS, 2009; Mossa *et al.*, 2012).

Some recent studies also revealed antibiotics can be easily purchased without prescription and are accessible from kiosk. In addition, SMA is still more often for self-limiting illnesses and antibiotics are the most commonly known drug by the consumer. All these indicative assessments have shown that not only high consumption but also its irrational use. It also indicates Ethiopia still faces some challenges related to regulatory enforcement (Worku and G/Mariam , 2003 ; Goredema *et al.*, 2006 ; DACA and MSH/ SPS, 2009; Gutema *et al.*, 2011; Mossa *et al.*, 2012).

On the other hand, large scale studies and documentations do not exist on the problem of AMR in Ethiopia. The available studies have shown that there is a high level of drug resistance among pathogens to many of the antibiotics available on the market (Moges *et al.*, 2002; Beyene and Haile Amlak, 2004; Biadlegne and Abera , 2009; DACA and MSH/ SPS, 2009) .

In Ethiopia, the magnitude of general self medication practice was widely studied and results showed that the majority of illnesses were treated without consultation of professionals. However, only few of them showed the extent of SMA practice (Kitaw, 1987; Abula and Worku, 2001; Worku and G/Mariam , 2003; Abay and Amelo, 2010 ; Mossa *et al.*,2012).

In addition, the previous general self-medication studies showed, the practice of self-medication is higher in urban than rural areas (Kitaw, 1987; Abula and Worku ,2001;Worku and G/Mariam ,2003). Thus, this population-based survey was conducted in Bahirdar town, North West Ethiopia. Since it is one of the large and fast growing cities, and ethnically and geographically it is the second largest town in Ethiopia. In addition, there is limited data addressing such practices in this study area.

Generally the main reason to undertake this study was due to the fact that the increasing health issues associated with inappropriate use of antibiotics, which is increasingly becoming a challenge in Ethiopia. Therefore, knowing the prevalence and nature of these practices in the community level is important to devise appropriate educational, regulatory and administrative measures.

3. Literature review

3.1. Self medication with Antibiotics

The importance of the provision of an effective health care in the community is unquestionable, as good health is the basic requirement of life. In developing countries, particularly the rural population has no or very limited access to the modern health care infrastructure as well as to appropriate and affordable drugs. In this case most episodes of illness are treated by self-medication (WHO, 2009; Donkor *et al.*, 2012).

Even though self medication is a useful tool to treat minor ailments, but in many developing countries, self-medication usually leads to inadequate drug utilization patterns and is especially worrying when it involves in specific diseases (e.g. diarrhoea or common cold) or prescription drugs such as antibiotics (Hussain *et al.*, 2011)

Community based studies in Africa, Asia and Latin America have found that up to 70% of illness episodes are self-treated with modern pharmaceuticals including antibiotics. Several studies in United States (US) and in Europe also revealed SMA is commonly encountered (Grigoryan *et al.*, 2008; Afolabi, 2012).

For example, a community based survey in Israel that was aimed to enumerate the use of non-prescription antimicrobials showed; the frequency of antimicrobial use was 37 % within the past year. Of the antimicrobials used, nonprescription use was 5.1%. These were obtained from leftovers from previous courses and from relatives (Raz *et al.*, 2005).

Another study in Poland, which is intended to assess the prevalence of antibiotic self-medication for respiratory tract infections in patients presenting to 5 family medicine clinics, showed that 41.4% of participants reported taking antibiotics without consulting a physician.

The great majority of respondents acquired this antibiotic as tablets left over from previously used packs kept in their home medical kits, or, less often, from friends and family members (Muras *et al.*, 2012). Studies in US have also shown considerable SMA obtained from leftovers from previous courses, at a local pharmacy or outside the country (Grigoryan *et al.*, 2008).

Several surveys in Asia also revealed SMA are commonly encountered and the following percentages were reported for one month before each survey: peri-urban area of Southern Kerala State, India 11% (Saradamma *et al.*, 2000), urban areas of Peshawar, Pakistan 69% (Khan *et al.*, 2011) Yogyakarta City Indonesia 7.3% (Widayati *et al.*,2011) and among the university students in china 47.8% (Pan *et al.*, 2012). The main source of non-prescription antimicrobials was community pharmacies.

In African countries, SMA prevalence has been reported as 73.9% in urban areas of Khartoum state, Sudan within one-month of the study period. From those self medicated individuals, 68.8% of the respondents obtained drugs directly from private pharmacies. Other sources of medicines included relatives and friends, and left over drugs from a previous treatment (Awad *et al.*, 2005).

A study done in the out-patient pharmacies in South-eastern Nigeria found that, from 4,128 outpatients visited the shops for antimicrobial agents, 57.8% came without a prescription within a period of 90 days (Esimone *et al.*, 2007). Another two recent studies, among medical students of the Bayero University and a study in six hospitals/clinics, four community pharmacies and at the campus of University of Port Harcourt, Rivers state, in Nigeria showed that the prevalence of SMA were 38.8% and 65% in the preceding two and one month period respectively (Enato and Uwaga ,2011; Fadare and Tamuno, 2011). The other more recent study among university Students in Southwestern Nigeria found that 53.8 % of the students used antibiotics for self medication (Osemene and Lamikanra, 2012). The major sources of drugs for self medication for the above all studies were patient medicines store and community pharmacies and drug shops.

A study done in Yemen among children presented to Sam hospital also showed that the prevalence of SMA was 60% within two week recall period. From this 26% of patients used the previous prescription paper to obtain antibiotics, while 74% patients obtained antibiotics from pharmacies and drug stores without any need for a prescription (Mohanna, 2010).

A more recent study was conducted in Ghana to determine the prevalence of self-medication among patients presenting at a clinical diagnostic laboratory prior to clinical prescription of antibiotic treatment. From the total collected 150 urine samples, 34.7% of patients had self medicated (Ameko *et al.*, 2012). A similar study done among tertiary level students revealed that the prevalence was 70 % (Donkor *et al.*, 2012).

In Ethiopia, studies on self-medication practices have been done in different areas of the country. For example, previous studies in Addis Ababa and central Ethiopia showed that, the magnitude of self-care was as high as 50% (Kitaw, 1987). Another study in southern part of Ethiopia also showed that 28.5% of the persons with perceived illnesses performed self-medication within two week recall period. From this 57.2% were modern drugs. Of the non-prescription drugs, 74.8% were obtained from health institution and 14.4% were from drug shops (Gedif, 1995).

A study done in the three Gondar towns, North West Ethiopia found that, the prevalence of self medication was 27.5% in two week recall period. From these, 13.8% of the self-medicated persons used modern drugs obtained from pharmacy or drug shop (Abula and Worku, 2001). Another community based survey done in Jimma town showed that the prevalence of self-medication was 27.6%. Most of the drugs for self-medication were obtained from drug retail outlets (52.4%) (Worku and G/Mariam, 2003).

Few of general self medication study results showed the extent of SMA practice. Such as a recent study which was done in Gondar College of Medicine and Health Sciences students found that 38.5% of study participants practiced self-medication in the two month recall period from those 4.8% of drugs were antibiotics (Abay and Amelo, 2010).

Another more recent study among Health Science students in Mekelle University showed, the prevalence of self-medication was 43.24% and 17.2 % of self medicated drugs are antibiotics (Gutema *et al.*, 2011). For the above two studies drug retail outlets were the main source of drug for self-medication.

A more recent community based survey in Silte Zone, South Ethiopia was conducted which directly assessed the practice of SMA. The aim of this study was to estimate the prevalence of self-medication with antibiotics and antimalarials and evaluate factors associated with this practice. The result showed that the prevalence of SMA /anti malarias was 14.5% (Mossa *et al.*, 2012).

3.2. Types of illnesses treated with self-medication with Antibiotics

Quantitative studies on medication taking behavior indicate that self-medication is a popular preference as "first response to illness" particularly for symptoms viewed as non-serious. (Tenaw and Gebre-Mariam , 2004).

Several studies in Europe and USA have shown considerable practice of SMA. And the most common reasons were colds and upper respiratory tract symptoms which are self-limiting and mostly caused by viruses. Among the commonly used drugs Penicillins were the most frequent antibiotic used, followed by cephalosporins and macrolides (Raz *et al.*, 2005; Grigoryan *et al.*, 2008; Khan *et al.*, 2011; Widayati *et al.*, 2011; Pan *et al.*, 2012).

Studies done in Africa showed, cough/cold/influenza, digestive disorders were the most frequently reported health problems for SMA. Penicillin group (amoxicillin and ampicillin) ciprofloxacin and Trimethoprim-sulfamethoxazole are commonly used drugs (Mohanna, 2010; Fadare and Tamuno, 2011; Donkor *et al.*, 2012; Mossa *et al.*, 2012). However, a study done on Nigerian university students showed that urinary tract infection was the prominent disease conditions that predisposed respondents to self-medication practices with antibiotics (Osemene and Lamikanra, 2012).

3.3. Determinants of Self-Medication with Antibiotics

Self-medication and health seeking behavior pattern varies among different populations and affected by socio demographic and socio-economic factors (Hussain *et al.*, 2011). The determinants of SMA in low income countries also include over-the-counter sale of antibiotics, the cost of medical consultation, low satisfaction with medical practitioners, and misconceptions regarding the efficacy of antibiotics (Grigoryan *et al.*, 2008).

One of the documented predictors of self medication is level of education and income. People least likely to follow this practice are from higher income families, having more education and higher status occupations (Saradamma *et al.*, 2000; Awad *et al.*, 2005; Mossa *et al.*, 2012).

The other documented factors for SMA were sex and age. A significant difference was seen between the prevalence of SMA and the sex of the patients in studies conducted in Sudan and Yemen, i.e. the risk of self-medication with antibiotics was higher among females compared to males or the female gender was found to have higher risk of self medication behaviour compared to males (Awad *et al.*, 2005 ; Mohanna, 2010). A similar study in Sudan revealed that SMA practice was least common among age of ≥ 60 years compared to youngest age group (Awad *et al.*, 2005).

Another study in china showed that older age, higher allowance, and prior knowledge of antibiotics were risk factors for SMA. The general pattern of SMA was higher in medical students or better SMA-related knowledge and in older students (Pan *et al.*, 2012). By contrast, a study in Ghana among tertiary level students showed the practice was significantly lower among medically inclined students (Donkor *et al.*, 2012).

A study done in Indonesia found that there were no socio-demographic variables significantly associated with the actual practice of using non-prescribed antibiotics. However, gender, health insurance, and marital status were significantly associated with the intent to self medicate with antibiotics and having no health insurance is associated with the intent to self medicate with antibiotics (Widayati *et al.*, 2011).

Study in Ethiopia showed that the level of monthly income and educational status significantly influence pattern of antibiotics and anti malarial self medication. While age and sex have no statistical association with self prescription (Mossa *et al.*, 2012).

3.4. Drug hoarding

Drug hoarding practice is common in many developed and developing countries. Easy access of medicines at home enabled to a high consumption rate of medicine by self medication. Studies in different countries also support this fact (Jassim, 2010). For example a study done in Israel found that 24.4% of respondents stored antibiotics at home and from those hoarders, 26.3% would take antibiotics without a medical consultation and 8% would give their children antibiotics without a medical consultation. Of all respondents, 81 (18.7%) would take antibiotics without a medical consultation (Raz *et al.*, 2005).

A community based survey in Iraq also showed that the majority of households (94%) stored drugs at home and the mean being 14.26 products/ household. The results also showed that only 31% of the total drugs were for current use, while 45% were leftovers and 23% of the drugs were kept for future use (Jassim , 2010).

A more recent study which was conducted at the Faculty of Pharmaceutical Sciences, University of Jos, Nigeria to identify the types of medicines found in pharmacy students' residence, revealed that a high proportion of students (66%) had medicines in their rooms with an average of 2.56 medicines per student room (Auta *et al.*, 2012).

Studies on drug hoarding in Ethiopia are rare. Limited researches however, revealed that it is apparently quite low. Two studies in Addis Ababa showed that on the average only 0.8 (Kitaw, 1987) and 0.5 (Kloos *et al.*, 1987) items were found in the studied households. A study done in Butajira revealed that 14% of household store drugs and traditional medicines were most commonly stored medicines. Among modern drugs anti-infective (antibiotics and antimalarials) and pain killers ranked first and second respectively (Gedif, 1995).

A more recent study in Silte zone south Ethiopia also showed from those self medicated individual 14.57% of them used to store drugs. In other words, many of those with antibiotics stored at home also intend to use them without a prescription (Mossa *et al.*, 2012).

4. Objective

4.1. General objective

- To assess the practice of self-medication with antibiotics in Bahirdar town, North West Ethiopia.

4.2. Specific objectives

- To assess the prevalence of self medication with antibiotics among urban communities
- To identify the common types of perceived illness /symptoms that necessitate self-medication with antibiotics
- To determine major antibiotics used for self medication
- To identify the determinants of self medication with antibiotics
- To explore the drug hoarding practice at households level in the community

5. Method

5.1. Study area

The study was conducted in Bahir Dar town, the capital city of Amhara National Regional State, Ethiopia. It is located at 11°36'N latitude and 37°23'E longitude on the southern side of Lake Tana and with an elevation of 1,840 meters above sea level. Administratively, Bahir Dar is classified as a Special Zone and 565 km away from Addis Ababa, the capital city of Ethiopia. It has an estimated area of 28 square kilometers and an estimated population density of 5,973.60 people per square kilometer. The city is divided into 9 kebeles (the lowest administrative level), and these are Sefene selam, Gishabay, Fasilo, Belay Zeleke, Hidar 11, Shimabo, Shimbit, Ginbot 20 and Tana (UNEP, 2010; HFH, 2011).

Based on the 2007 Population and Housing Census of Ethiopia, Bahir Dar Special Zone has a total population of 221,991 /including rural kebeles/ of whom 180,174 are urban inhabitants. The average household size of the town is 3.3 and annual population growth of the city is about 6.6%. While the town's birth rate was estimated at 2.6%, the migration rate, on the other hand, was slightly higher i.e. 2.8% (FDREPCC, 2007).

During the study time, the city had 3 hospitals; one government and the rest two are private hospitals, 32 clinic /health care centers and 33 drug retail outlets, each of which is normally manned by a qualified druggists or pharmacist (Bahir Dar City Administration, 2011).

5.2. Study Design

A descriptive cross sectional survey in selected sample households in Bahir Dar town was conducted from July 10 to July 31, 2013. The study used both quantitative and qualitative methods.

A two-stage cluster sample design was employed in order to identify required sample households. Kebeles and households were chosen in the first and second stages of sampling. Then the questionnaires were administered to all sample households.

5.3. Source and study population

The source population for this study was all population residing in Bahir Dar town. The study population was residents of sampled household population in Bahir Dar town.

5.4. Sampling frame

The list of all kebeles along with their respective household number was used as a frame to select sample kebeles. The lists were obtained from respective kebele administration offices. A list of all households from each sample kebeles was used as a frame to choose sample households.

5.5. Sample size determination and allocation

Out of 9 kebeles in Bahir Dar town, four were involved in the study. Each Kebele was chosen using simple random sampling method. Households, on the other hand were selected using a systematic random sampling technique.

The number of households to be involved in the survey was determined using the single proportion formula (Gelman ,2007). According to the study conducted in Seltie zone, south Ethiopia in 2013, the prevalence SMA is 24.4%. Therefore, setting the population proportion (p) equal to 0.244, and using the formula,

$$n = deff \frac{(Z_{\alpha/2})^2 * p(1-p)}{\epsilon^2}$$

Where,

n = required sample size

$Z_{\alpha/2}$ = the $\alpha/2$ standard normal distribution score, usually 95% value (1.96) is considered as appropriate

p = estimated value for the particular indicator (0.244 in our case)

ε = margin of error, 5% for our purpose

d = anticipated design effect, the default value for a complex design is 2

A minimum sample of 567 households is found to be sufficient to attain a 95% confidence with an absolute error of 5%. Considering a 5% non-response rate and incorporating minor adjustment for maintaining uniformity in field operation, a final sample size of 595 households was determined to be optimum.

Allocation of the 595 households among the four sample kebeles were accomplished proportionally. Thus, kebeles that have the highest number of households was received the highest share of the samples and vice versa.

For the qualitative part of this study, ten chief pharmacists at private pharmacies were selected purposively as key informants. And an interview was done by the principal investigator.

5.6. Data collection tools

For the cross-sectional survey, structured and pre-tested questionnaire was used. The questionnaire consisted of both closed- and open-ended questions. In addition to questions on socio demographic information, the questionnaire was include questions on general information on self- treatment with antibiotic and other associated conditions such as sources of the antibiotics, storage of drugs at home, sources of information on antibiotics and reasons for self prescribing of antibiotics (AnnexI).

Six pharmacy technician students, attending in Bahir Dar health Science College were recruited as data collectors and prior to data collection; one day training was given for the data collectors.

The training focused on how to approach clients, secure their consent and administer the interview. Since the interview was done in Amharic (major local language of the study area) the training was made in the Amharic language. The interview was conducted with the head of the household in the sample households. If there is more than one sick members in the household a separate questionnaire was used. In addition, health education was given after the interview especially for those household heads that practice self medication.

Qualitative data was collected by an in-depth interview with head of private community pharmacy. Semi-structured interview guide was used for this purpose and it included questions on the general knowledge and practice in selling antibiotics and their overall view on antibacterial resistance. Interview guide was open-ended, and made use of probes (Annex-II).

Before the interview, information was given about the purpose of the study to the interviewee and an informed consent was obtained. All the interviews were carried out in complete privacy and the name of interviewees are confidential. The interview was recorded on tape and lasted approximately 20 to 25 minutes.

5.7. Data processing and analysis

The quantitative data collected was entered and cleaned in CSPro version 4.1 and analyzed using SPSS (Statistical Package for Social Sciences) version 17.0. The analysis was employed both descriptive and inferential techniques, including frequencies and percentage distribution, bivariate analysis using chi-square tests and multi variate analysis. The qualitative data was transcribed and analyzed through ‘descriptive thematic analyses’.

5.8. Data quality management

The questionnaire for the quantitative study was pre-tested in outside the sample kebele households prior to the actual data collection. Moreover, the questionnaire was translated to Amharic and back translated into English to check for consistency. Data collectors were trained prior to data collection. Supervision was made by the principal investigator during the data collection process and any inconsistencies amended on time. The data was checked for completeness every time and it was cleaned after entry.

5.9. Study variables

Dependent variables

- The practice of self medication with antibiotics (Yes/ No)

Independent variable

- Socio demographic characteristics (sex, age, ethnicity, educational level, occupation, marital status, average monthly income and drug hoarding).

5.10. Ethical considerations

Ethical approval was obtained from the Ethics Review Committee of the School of Pharmacy, Addis Ababa University and the Amhara Regional Health Bureau. Then the study was conducted in the selected kebele households after obtaining the permission from the relevant bodies in the respective kebeles.

Participants of the study were asked for consent before participating in the study. During the consent process, they were provided with information regarding the purpose of the study, why and how they are selected to be involved in the study, and what is expected of them and that they can withdraw from the study at any time. Participants were assured about confidentiality of the information obtained in the course of the study in that: no personal identifiers were used and the data was analyzed in aggregates.

6. Results

6.1. Socio-demographic characteristics of the respondents

This population-based survey examined five hundred and ninety five households which were sampled from four kebeles. There was no active resistance from interviewers. Thus, all sampled households in the selected kebeles were included in the study. The mean age of the respondent was 37.8 years (SD = 12.2). The minimum age was 17 and the maximum was 77. Since the interview was conducted with female house hold heads, 95.6% of respondent were females. Regarding the respondents' family monthly income, the majority 33.6% reported monthly income of \leq 550 Eth. Birr (Table 6.1.1).

Table 6.1.1 Socio demographic characteristics of respondents (head of the household), Bahir Dar town, August 2013 (N=595)

Socio-demographic Profile		N (%)
Sex	Female	569 (95.6)
	Male	26 (4.4)
Age	≤ 18	9 (1.5)
	19-35	287 (48.2)
	36-59	255(42.9)
	≥ 60	44 (7.4)
Marital status		
	Married	411 (69.1)
	Never married	81(13.6)
	Divorced	48(8.1)
	Widowed	55(9.2)
Educational status		
	Illiterate	158(26.6)
	Read and write	7(1.2)
	1-8	152(25.5)
	9-12	175(29.4)
	Above 12	103(17.3)
Religion		
	Orthodox	552(92.8)
	Muslim	29(4.9)
	Protestant	13(2.2)
	Other	1(0.2)
Ethnicity		
	Amhara	583(98)
	Tigray	10(1.7)
	Oromo	1(0.2)
	Other	1(0.2)
Monthly income*		
	≤ 550	132(33.6)
	551-1000	189(31.8)
	1001-1700	78(13.1)
	>1700	128(21.5)

*68 respondents who were not willing to disclose their monthly income were excluded

6.2. Socio-demographic characteristics of the sick person

From a total of 595 households, one hundred thirty three household members had faced health-related problems within the last two weeks prior to the study. No households reported more than one ill person. Therefore, the proportion of illness per house hold was 22.4%. About 41% of sick individuals were respondent themselves (house heads). The average age (\pm SD) of persons with reported illnesses was 29 (\pm 18.3) years. Females 66.2% reported more illness than males 33.8%. Table 6.2.1 shows socio demographic characteristics of the sick person in the specified recall period.

Table 6.2.1 Socio demographic characteristics of those who reported an illness within 2 weeks recall period, Bahir Dar town, August 2013 (N= 133)

Socio-demographic Profile		N (%)
Sex	Female	88(66.2)
	Male	45 (33.8)
Age	0-5	14 (10.5)
	6-18	25 (18.8)
	19-35	32(24.1)
	36-59	10 (7.5)
	≥ 60	52(39.1)
Marital status¹		
	Married	46 (46.9)
	Never married	30(30.6)
	Divorced	9(9.2)
	Widowed	13(13.3)
Educational status²		
	Illiterate	24(20.5)
	Read and write	3(2.6)
	1-8	34(29.1)
	9-12	29(24.8)
	Above 12	27(23.1)
Religion		
	Orthodox	119(89.5)
	Muslim	11(8.3)
	Protestant	3(2.3)
Ethnicity		
	Amhara	126(94.7)
	Tigray	7(5.3)
Occupation³		
	Housewife	42(35.9)
	Daily laborer	10(8.5)
	Government/NGO	23(19.7)
	Merchant	10(8.5)
	Student	32(27.4)

1. Exclude children(N=35.) who are not married
2. Exclude children(N=16.) who are not illiterate
3. Exclude children(N=16) who are not students

6.3. Extent and reason for self medication with Antibiotics

Out of one hundred thirty three sick individuals, 112 of them took an action (took medicine) for their illness. The remaining 15.8% of those reporting illness did not take an action. Self-medication with modern drug was employed in 31(23.3%) cases whereas in 6(4.5%) cases homemade (traditional) remedies were used.

Out of those 23.3% self-medicated individuals 17 (12.8%) of them use antibiotics for self medication. Therefore, the prevalence of SMA among those who reported an illness was 12.8%. Among 17 respondents who practiced SMA, 14 (82.4%) obtained drugs from private pharmacy or drug shop without prescription and 3 (17.6%) from their friends or relatives.

The reasons for the choice of SMA are given in Figure 6.3.1. The most frequent reason for making use of SMA is previous experience with similar illness and the perception that the disease is minor (Figure 6.3.1).

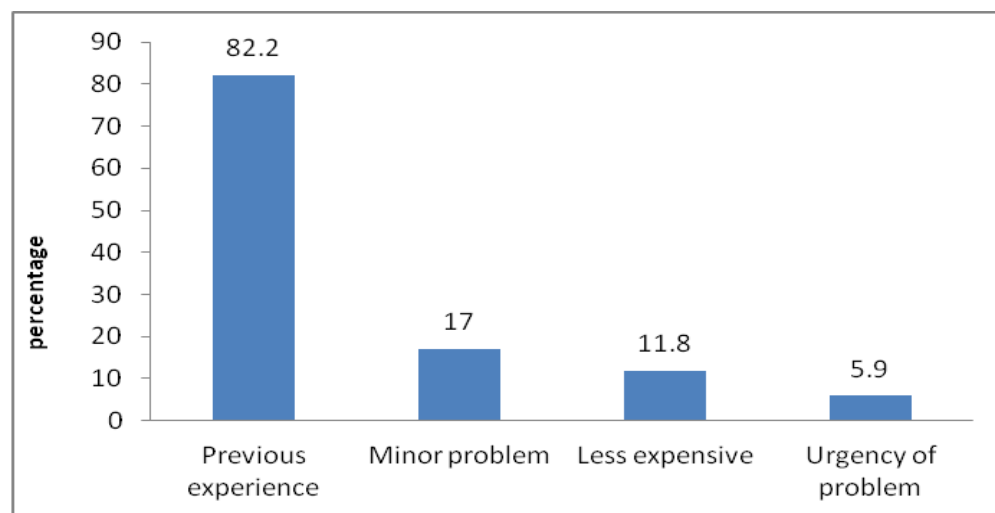


Figure 6.3.1. Reasons given by respondents for self medication with antibiotics, Bahir Dar town, August 2013

6.4. Perceived illness treated with self medication with antibiotics

Table 6.4.1 summarizes data on reported illness in the previous two weeks. In most cases single illnesses were reported. The most common symptoms that led to indulge in SMA were respiratory tract diseases 58.8% (Table 6.4.1). Among self medicated female individuals none of them were either pregnant or breast feeding.

Table 6.4.1. Medical conditions that pushed the sick person to self medicate with antibiotics in Bahirdar town, 2013 (N=17)

Perceived illness	N (%) *
Respiratory tract disease	10(58.8)
Diarrhea	7 (41.2)
Fever	3 (17.6)
Headache	2 (11.8)
Gastro Intestinal Tract disease	1 (5.9)

*Multiple responses, total does not add to 100%

6.5. Major antibiotics used for self medication

The antibiotics that were most frequently used for self medication were also investigated. Overall, four types of antibiotics were used in self medication by the respondents. The most commonly used antibiotic was amoxicillin 11(61.1%) (Figure 6.5.1). Majority of respondents reported that antibiotics used for self medication were helpful for their illness 11(64.7%). While the rest 4(23.5%) stated that the drug have no effect and 2 (11.8%) of them reported that it worsen the condition.

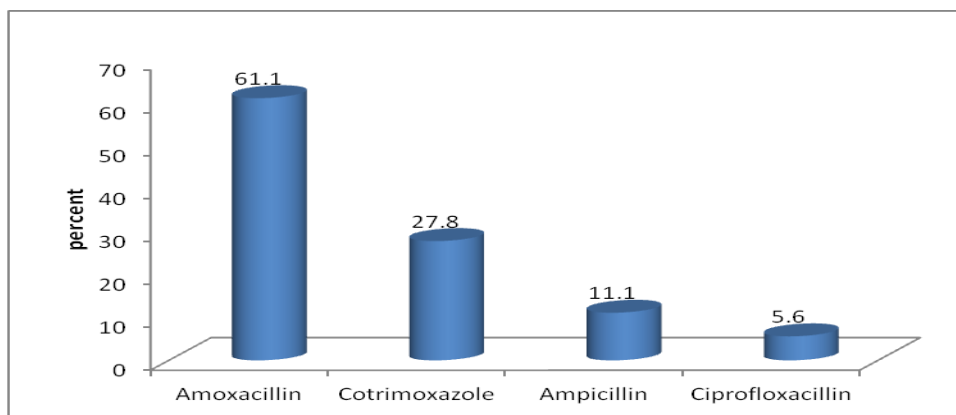


Figure 6.5.1 Antibiotics used for self medication, Bahir Dar town, 2013

6.6. Sources of information for the practice of self medication with Antibiotics

Information sources to practice SMA were also analyzed and are shown in Table 6.6.1. Respondents who practiced self-medication because of advice given by the physician / nurse, but without prescription covered 17.6% of those who practiced SMA, and the percentage of those who practiced self-medication because of advice from a pharmacist was 82.4%. Respondents who practiced SMA within the last two weeks prior to study because of advice from their friends or relatives constituted 17.6% and rest self-medicators who reported that they did it following information obtained from reading material.

Table 6.6.1. Information source for those who practiced self-medication with antibiotics, in Bahirdar town, 2013 (N=17)

Sources of information	N (%) *
Physician / nurse	2(11.8)
Pharmacist	14 (82.4)
Friends or relatives	3 (17.6)
Reading	2(11.8)

*Multiple responses, total does not add to 100%

6.7. Attitude towards self-medication practices

Data regarding attitude toward self-medication was collected from 595 respondents. The proportion of individuals agreed with the practice of self-medication was 113(19%). while majority of them 482(81%) disagreed with this practice. In addition, the respondents were also asked whether checking expiry date of drugs during purchasing or before taking. The result showed that 304 (51.1%) of them check expiry date of drugs during purchasing or before taking, while 291 (48.9%) responded that they didn't check it.

6.8. Determinants of self medication with antibiotics

As shown in Table 6.8.1 The result of crosstabs analysis revealed that no significant associations were observed on the practice of SMA and socio demographic variables.

Table 6.8.1. Association of self medication with antibiotics with socio-demographic characteristics in Bahir Dar town, 2013. N= 51

Socio-demographic Profile		Not Self medicated N=76	self medicated N=31	P value
Sex	Female	23(67.6%)	11(64.7%)	0.834
	Male	11(32.4%)	6(35.3%)	
Religion				0.086
	Orthodox	32(94.1%)	13(76.5%)	
	Muslim	2(5.9%)	2(11.8%)	
	Protestant	0(0%)	2(11.8%)	
Marital status				.350
	Married	13(38.2%)	3(17.6%)	
	Never married	15(44.1%)	12(70.6%)	
	Divorced	3(8.8%)	1(5.9%)	
	Widowed	3(8.8%)	1(5.9%)	
Educational status				0.058
	Illiterate	10(29.4%)	0(0%)	
	Read and write	1(2.9%)	1(9.1%)	
	1-8	16(47.1%)	1 (9.1%)	
	9-12	3(8.8%)	4(36.4%)	
	Above 12	4(11.8%)	5(45.5%)	
Monthly income				0.054
	≤ 550	9(29%)	5(29.4%)	
	551-1000	8(25.8%)	2(11.8%)	
	1001-1700	8(25.8%)	2(11.8%)	
	>1700	6(19.4%)	8(47.1%)	
Ethnicity				0.610
	Amhara	33(97.1%)	16(94.1%)	
	Tigray	1(2.9%)	1(5.9%)	
Occupation				0.094
	Housewife	12(36.4%)	2(11.8%)	
	Daily laborer	3(9.1%)	0(0%)	
	Government/NGO	2(6.1%)	4(23.5%)	
	Merchant	2(6.1%)	2(11.8%)	
	Student	14(42.4%)	9(52.3%)	

6.9. Drug hoarding

Out of 595 visited households, 103 (17.3%) of the respondents stored drugs at their home. The larger proportion 72.8% was modern medicine. On the average, household possessed 0.17 products. Antipyretic/ analgesics were the leading household stored drugs 74.3% (Figure 6.9.1).

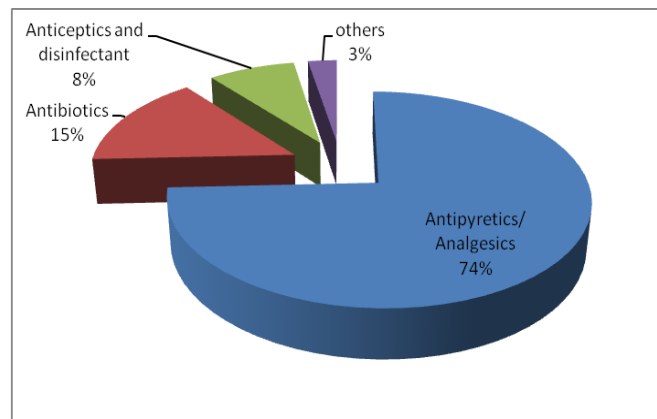


Figure 6.9.1 Classes of medicines found in the respondents home, Bahir Dar town, 2013

Private pharmacies were the leading source of drugs stored at home 77%. On the other hand, relatives and friends were the least common source of drugs 5.4% (figure 6.9.2).

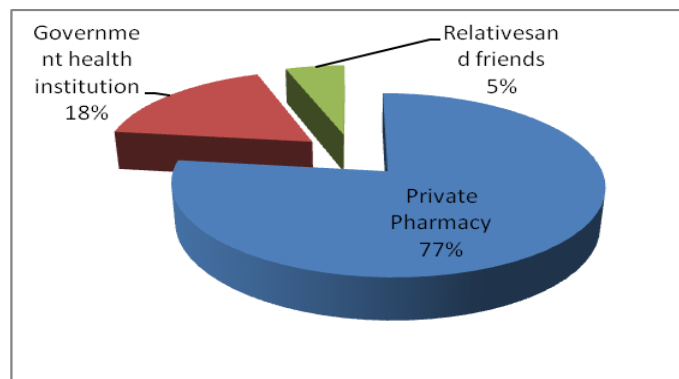


Figure 6.9.2 Sources of medicines present in respondents home, Bahir Dar town, 2013

Common reasons given by respondents for having the medicines in their homes were keeping the medicine for emergency use or in an event of a similar illness; leftover drugs were also kept for future needs. The results also showed that 8.1% of the drugs were out of date (expired) [Figure 6.9.3].

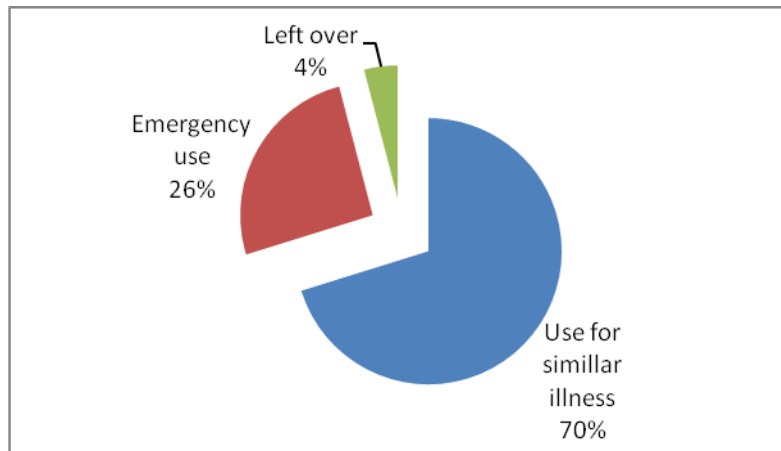


Figure 6.9.3 Reasons given by the respondents for storing medicines in their homes, Bahir Dar town ,2013

6.10. Findings of Key Informant Interviews

In-depth interviews (IDIs) were held with chief pharmacists from private community pharmacy (total of ten). All selected pharmacies were from Bahir Dar town and had worked in their current position for a period ranging from 6 to 20 years. Two of the key informants were female and the rest male.

IDIs were conducted to gather information about their attitudes and practice regarding dispensing antibiotics without doctor's prescription and factors influencing self-medication with antibiotics. Each IDIs were held at their own facilities.

6.10.1. Factors influencing self-medication with Antibiotics

Several reasons were mentioned by the key informants why many customers prefer self medication as treatment option for their perceived illness. Patient perception for their illness, time and convenience, the attitudes of private health medical staff and poor control of prescribed drugs on the market were among the reasons mentioned by the key informants. A statement made by one key informant demonstrated this fact:

“Our customers come to us and order the medicine directly because they have come across the same type of disease as well the physician prescribe the same type of medicine .So, going to physician is not important as much rather than expending additional expense and wastage of time. In addition, when they go to especially in private hospital or clinic improper medical examinations and laboratory tests were requested by the physicians that also leads customer's frustration incurring costs”.

All the key informants agreed with the availability of antibiotics without doctor's prescription in private pharmacies were one of the leading factors for customers to self medicate with antibiotics for their perceived illness. Most of key informants reported that people could buy antibiotics without a prescription in this town. When antibiotics are requested by consumers, requests are neither refused nor questioned. The key informant testified this:

“If someone asks me to sell an antibiotic I will sell it, because if I am not giving today, I have lost other customers on the other day. Most of drug stores and pharmacies near to this pharmacy and at the center of the town dispensing antibiotics without prescription. Now a days most of pharmacy personnel tend to be businessmen rather than professional”.

6.10.2. Types of perceived illness and Antibiotics

Various types of antibiotics were mentioned during the IDIs as commonly requested antibiotics for self medication. Amoxicillin was often used, and also other antibiotics such as ampicillin, tetracycline, chloramphenicol, penicillin and a combination of sulfamethoxazole and trimethoprim, seemed to be a commonly used drug for treating different types of diseases.

Respiratory tract infections (sore throat, cold, and others), stomach ache, eye diseases and wounds are the most common health condition treated by the above mentioned antibiotics.

6.10.3. Antibiotic use and antibacterial resistance

Key informants were asked for their opinion on the effect of self medication on anti bacterial resistance. All key informants asserted that mishandling and abuse of antibiotics in patients appears to be the major cause of development of resistance to antibacterial agents. All of them argued that most of customers do not have awareness for appropriate use of antibiotics. In addition, the use of antibiotics for short treatment durations and or wrong route and the purchase of antibiotics with insufficient quantities are the imperative factors of antibiotic resistance. This was exemplified by a statement made by one key informant:

“Recently it is accustomed to treat external wounds by using powders of Ampicillin or TTC capsule. Most of them also prefer TTC capsule for treating eye diseases than TTC ointment. The other most concerning thing is not taking complete course, they are asking 1 or 2 capsules or tablets or a maximum of one strip. When we are trying to negotiate them to take full dose of it, they go to other pharmacy and informing us they have getting it as they needed.”

Another one adds on this:

“You are surprised by amoxicillin and ampicilline but the reality is third generation cephalosporins and even Azitomaxine is sold in one or two capsules or tablets“.

All of the respondents also mentioned weak legislation and implementation of health system is responsible for antibiotic resistance. They also suggest there is a need of strong drug policy for improving the rational use of drug. In addition most of them selling of drug without authorized medical prescribers’ prescription should be banned.

7. Discussion

Self-medication is extensively used all over the world. Mainly the increasing health care cost and the shift in the pattern of disease towards chronic ones (from 30% to 80% in 40 years) leads a more person-centric approach involving self-care and responsible self-medication (Kitaw, 1987; WSMI, 2010; Gupta *et al.*, 2011).

Recent reports from the developed countries clearly show its extensive use. Worldwide studies also showed that a range of self-medication practices between 15% to 80% (Omolase *et al.*, 2007; Pankaj *et al.*, 2011; Santos *et al.*, 2011; Banerjee and Bhadury, 2012; Donkor *et al.*, 2012;).

In this study, the prevalence of self-medication was found to be 23.3%, which is almost similar with what has been reported in South Ethiopia (Mossa *et al.*, 2012) and more or less similar with other studies in the country (Gedif, 1995; Abula and Worku, 2001; Worku and G/Mariam, 2003). However, this result is lower than some other studies done in Ethiopia (Abay and Amelo, 2010; Gutema *et al.*, 2011). Even though the practice of self medication is vary within the countries, it is difficult to make any comparative analysis since the definition of self-medication, the recall period, the questions asked and the general study conditions have not been standard. Therefore, the percentage differences observed among different groups and in different countries might not reflect actual variations in use or non use of self-medication.

The percentage of persons who did not take any action against their illness was relatively lower in this study (15.8%) than in the previous one (Gedif, 1995; Abula and Worku, 2001). This difference clearly shows the degree to which people perceive their health-related problems and knowledge about where to go to get relief.

This study also showed that, 12.8 % of the study population used antibiotics without medical prescription. Recent reports from the developed countries clearly show SMA is commonly encountered. In Israel of 37% antimicrobial used within the past year, 5.1% was nonprescription use (Raz *et al.*, 2005). In Northern Europe 3%, in Central Europe 6% and 19% in Southern Europe (Pan *et al.*, 2012). And in Poland the percentage goes up to 41.4% (Muras *et al.*, 2012).

The same phenomena could be discerned from the studies in developing countries. The following percentage of SMA have been reported from Mexico (2-week period prevalence 18%) (Calva and Bojalil ,1996), Pakistan 69% , china, 47.8% (Khan *et al.*, 2011; Pan *et al.*, 2012), Sudan (one-month period prevalence 73. 9%) (Awad *et al.*,2005), Yemen 60% within two week recall period (Mohanna, 2010) and in Ghana 70 % (Donkor *et al.*,2012).

Many other studies done in Nigeria also showed that high prevalence of self-medication with antibiotics indifferent recall periods; South-eastern Nigeria (a three-month period prevalence of 57.8%), among medical students of the Bayero University (a two-month period prevalence of 38.8%), among university Students in Southwestern Nigeria (a one-month period prevalence of 53.8%) and a study in six hospitals/clinics, four community pharmacies and at the campus of University of Port Harcourt,65% (Esimone *et al.*, 2007;Enato and Uwaga ,2011; Fadare and Tamuno, 2011; Osemene and Lamikanra, 2012).

Higher period prevalence has been reported in the most of developing countries. This has been associated with several factors, particularly, lack of access to health care, availability of antibiotics as over the counter drugs and the relatively higher prevalence of infectious diseases (Donkor *et al.*, 2012). In this study, the two week period prevalence of SMA is higher than the previous recent studies done in Ethiopia (a three-month period prevalence of 6.7%) (Mossa *et al.*, 2012) and (a two-month period prevalence of 4.8%) (Abay and Amelo, 2010). This variation could be attributed to the recall period used in the studies or variation in the study areas.

Even if a direct study on the availability of antibiotics without prescription in pharmacies in Ethiopia is scarce, several studies have shown that the main source of drugs that is used for self medication was pharmacies (Worku and G/Mariam ,2003;Abay and Amelo, 2010;Gutema *et al.*, 2011;Mossa *et al.*,2012).

The present study result also showed that 82.4% individuals who practiced SMA reported that they obtained drugs from a private pharmacy. This indicated that most of the self-medicated persons had obtained drug-related information (at least when to take, and what should never be taken with the drug) from the dispensers. This is not in agreement with studies done in most developed countries where leftovers from previous courses and from relatives were main sources of drug for the practice of SMA (Raz *et al.*, 2005; Muras *et al.*, 2012; Pan *et al.*, 2012).

While it was consistent with what has been reported in previous studies in Africa (Awad *et al.*, 2005; Nyazema *et al.*,2007; Mohanna, 2010; Fadare and Tamuno, 2011; Donkor *et al.*, 2012; Osemene and Lamikanra, 2012) and Similar study in India also found that 20% of the antibiotics are purchased without doctor's prescription (Saradamma *et al.*,2000).

Finding from KIs with private community pharmacist also showed private pharmacies were the major source of drug for self medication. All KIs reported that people could buy antibiotics without a prescription and when antibiotics are requested by consumers, requests are neither refused nor questioned. Though antibiotics are prescription only drugs, community pharmacists were dispense this drugs without doctor's perception. These might lead to misuse or over use of antibiotics. This irrational use of antibiotics promotes antibiotic resistance (Vila and Pal, 2010). The consequence of this is the switch from relatively cheap drugs to new drugs, which will be more expensive for developing countries such as Ethiopia. Over all this indicates there is weak regulatory system in study area. In addition, pharmacists should have to respect their professions.

Previous experience with similar symptoms and mildness of the illness were the two major reasons for SMA in this study. The main reasons for SMA in developing countries include; OTC sale of antibiotics, high cost of medical consultation, low satisfaction with medical practitioners, and misconceptions regarding the efficacy of antibiotics (Saradamma et al.,2000; Radyowijati and Haak, 2003; Grigoryan et al.,2008).

Similar reasons were also frequently reported in SMA in other studies, where previous experience with similar symptoms and mildness of the illness were the reason for SMA (Fadare and Tamuno, 2011; Widayati *et al.*, 2011; Pan *et al.*, 2012). While long waiting time at the overburdened health facilities and mildness of disease were the two major reasons reported in the study conducted in the Community of Silte Zone, South Ethiopia (Mossa *et al.*, 2012).

Similar reasons were also mentioned by the key informants why many of their customers prefer self medication as treatment option for their perceived illness. The majority of them mentioned that patient perception for their illness (such as previous experience with similar symptoms and mildness of the illness) and time and convenience were the major reason for SMA.

Respiratory tract infections (sore throat, cold, and others) are the most common health condition treated by antibiotics on self medication basis in this study. Other studies in developed countries documented similar indications (Ras *et al.*, 2005; Grigoryan *et al.*, 2008 ; Muras *et al.*, 2012). Although most respiratory infections are known to be mostly due to viral infection, requiring no antibiotic treatment, antibiotics were used for treating such cases. Findings from IDIs with private community pharmacy heads also showed similar indications.

The main antibiotics used in self medication were penicillin in general, particularly Amoxicilline, which was reported by 11 (61.1%) of the respondents. Similar results are reported by other studies done in some developing countries where amoxicillin have been widely used for self medication (Awad *et al.*, 2005; Mohanna , 2010; Widayati *et al.*, 2011; Mossa *et al.*, 2012 ; Pan *et al.*, 2012;). This is also supported by KIs result as Amoxicillin were the most requested drug by their customer without doctor's prescription.

In general, several studies revealed that the increase in SMA in developing countries was due to a number of factors. These included socioeconomic factors, lifestyle, over-the-counter sale of antibiotics, the cost of medical consultation, low satisfaction with medical practitioners, and misconceptions regarding the efficacy of antibiotics (Saradamma *et al.*, 2000; Radyowijati and Haak, 2003; Grigoryan *et al.*, 2008; Abay and Amelo, 2010).

The present study results showed that socio demographic variables had no significant association with the practice of SMA. This finding is not consistent with several study results in Africa and Ethiopia where educational level are a significant factor for the practice of SMA (Gedif, 1995; Saradamma *et al.*, 2000; Awad *et al.*, 2005; Mossa *et al.*, 2012). Similar research conducted in Sudan and Yemen also showed that the risk of SM was higher among females compared to males or the female gender was found to have higher risk of self medication behaviour compared to males (Awad *et al.*, 2005; Mohanna, 2010).

Among the total 595 respondents, 113(19%) agreed on self-medication practice and 81% disagreed on the practice. The proportion of respondents from the present study is relatively low as compared to the report from other studies. For example, 76.90% of respondents in Bahrain (Al Khaja *et al.*, 2006), 85% of respondents in India (Kayalvizhi and Senapathi, 2010), 55.50% of respondents in Gondar (Abay S and Amelo W, 2010) and 36.7% respondents in Mekele (Gutema *et al.*, 2011) had positive attitudes towards self medication practices. Because self-medication is one component of self-care, more awareness about the responsible self-medication is needed to foster the level of individual attitudes towards self medication practices.

Drug hoarding is another issue which was considered in this study. And the proportion of households with drug hoarding in this study is higher than studies done in different parts of Ethiopia (Ketaw, 1987; Kloos *et al.*, 1987; Gedif, 1995; Mossa *et al.*, 2012). This difference may show the degree to which people knowledge about drugs and its use. However, the result of this study was lower than community based survey done in Israel, Iraq and three towns of North West Ethiopia (Abula and Worku, 2001; Raz *et al.*, 2005; Jassim, 2010).

The majority of drugs stored were modern medicine. Although antipyretic/ analgesics were the leading household stored drugs, antibiotics also ranked second place in terms of frequency. These may lead to misuse of these potent drugs. The two major reasons for storing these drugs in this study were for treating similar illness in the future and emergency use. The same reason was mentioned by Mossa *et al.* (2012). However, a study conducted in Iraq by Jassim (2010) mentioned that the reason for storage could be due to leftovers and for future use. The duration of storage and the manner they are used should be considered seriously.

The study has some shortcomings potential for recall bias including the probability that the self-medication practicing. The respondents had forgotten which medication and when and for which ailment the sick person had been used as well as the fact that the scientific name of the drug might not be known by the respondent, and bias by the professionals who collected the data.

8. Conclusion

In conclusion, although appropriate self-medication can be advantageous without proper education of the public and proper regulation of potent drugs dispensary, it may cause tragic consequences. Thus, Public education regarding the dangers of self-medication must also be given due attention.

This study demonstrated that the drug storage practice at the community level and SMA practices is low. No relationship exists between socio demographic characteristics and SMA practices. Analgesics and antibiotics were the most common types of household stored medicines. There is therefore need for education on appropriate handling and use of medicines.

9. Recommendations

Based on the findings of this study the following recommendations can be made:

- Drug law enforcement authorities need to have clear and effective legislation on drug handling and dispensing, and necessary measures should be taken on illegal surveyor of drugs.
- Pharmacy personnel must demonstrate their willingness to be responsible for the patient's drug therapy and should effectively counsel/provide drug information when dispensing drugs.
- Drug regulatory and health authorities have to dedicate some resources used to raise awareness of the general public on the pros and cons of responsible self-medications
- Future research that aim at assessing factors affecting the practice of SMA should be done on regular intervals and plan should be done based on the results.

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ANNEXES

**Addis Ababa University
School of Pharmacy
Department of Pharmaceutics and social Pharmacy**

Verbal consent form before conducting interview

Greeting

Hello, my name is _____. I am working with the research team of the Department of Pharmaceutics and Social Pharmacy, School of Pharmacy, Addis Ababa University. I would like to ask you a few questions regarding your drug use practice. The interview would take 15-20 minutes of your time. The purpose of this study is to assess the practice of self medication with antibiotic in Bahir Dar town. This will be helpful in improving the quality of the drug use in the community. Your participation is completely voluntary. You can refuse to answer any questions and/or withdraw from the study at any time without a problem to you. All your responses will remain strictly confidential: your name will not appear on the interview guide (will not be recorded), and your responses will not be linked to your identity at any time. Do I have your permission to continue?

If Yes, Continue to the Next Page

If No, Skip to the next Respondent

**Annex I- Questionnaire for data collection on self medication with antibiotics
in Bahir Dar town, North West Ethiopia, 2013.**

- Questionnaire number _____
- Household identification _____
- Region: Amhara
- Zone: Bahir Dar especial
- Town: Bahir Dar
- Kebele (Sefer Name) _____
- Interviewer name _____
- Date of interview (day/Month/Year) _____

Note:

✚ *If there is more than two sick members in the household use separate questionnaire.*

Respondent profile

Sex _____

Age _____

Religion _____

Ethnicity _____

Level of education _____

Marital status _____

Average monthly house-hold income _____

No	Questions	coding categories	Skip to
1.	Was there any member of the house hold who has been ill in the last two weeks?	A. Yes B. No	→25
2.	Sex of the sick person	A. Male B. Female	
3.	Age of the sick person	_____year	
4.	Religion of the sick person	A. Orthodox B. Protestant C. Muslim D. Other(specify)____	
5.	Ethnicity of the sick person	A. Oromo B. Amhara C. Tigray D. Other pecify) ____	
6.	Current marital Status of the sick person	A. Single B. Married C. Divorced D. Widowed	
7.	Educational status of the sick person	A. Illiterate B. Read and write C. Primary D. Secondary E. College and above	
8.	Current main work/occupation of the sick person? • <i>Choose only one response</i>	A. Housewife B. Daily labourer C. Government/NGO D. Trader E. Student F. Other(specify)____	
9.	Relationships with the family	A. Child B. Husband/ wife C. Relative D. Other	

10	<p>What were the health problems /symptoms that you /the sick person experienced in the last two weeks?</p> <ul style="list-style-type: none"> • Multiple responses possible and circle all responses that apply • Probe for possible answers (Anything else?) 	<p>A. Fever B. Headache C. Diarrhea D. Malaria E. Cough, cold and other respiratory system problem F. Others, please specify____</p>	
11	Did you/ the sick person take any drug?	<p>E. Yes F. No</p>	→ 25
12	What was the reason for not taking the drug?	_____	
13	What was the type of drug that you/sick person took?	<p>A. Modern B. Traditional</p>	→ 15
14	Can you tell me the name of the traditional drug you used?	_____	
15	Can you tell me the name of the modern drug you used?	_____	
16	Could you show me please?	<p>1. Yes, write its name from the package 2. No</p>	
17	<p>Condition of the drug consumer</p> <ul style="list-style-type: none"> • Multiple responses possible and circle all responses that apply 	<p>B. Pregnant C. Breastfeeding D. Has a chronic disease such as liver, kidney, cardiac, etc. E. Other(specify)_____</p>	
18	How many days did you use this drug?	_____days	
19	Do you forget to take a dose of a drug?	<p>A. Yes B. No</p>	

20.	Where did you obtain these drugs?	A. Government health institution B. Private health institution C. Pharmacy/drug shops D. Friend/relatives/neighbors E. Market/ any shop F. Others, please specify_____	
21.	Was it with prescription?	A. Yes B. No	→25
22.	What were your reasons to use these drugs without prescription? • Multiple responses possible and circle all responses that apply	A. Emergency use B. Disease is not serious C. Previous successful experiences D. Less expensive in terms of time/money Other (specify).....	
23.	Did the drug you/ sick person took help full?	A. Yes B. No C. Worsen the illness	
24.	Source of information for self medicated drugs? • Multiple responses possible and circle all responses that apply	A. Advised by Doctors, Nurses, Health workers but without prescription B. Recommended by Pharmacists C. Advised by neighbors, friends or relatives D. Read label or leaflet or promotional material of the drug E. Others specify.....	
25.	Do you believe that self medication is a good treatment alternative?	A. Yes B. No	
26.	Do you check expiry date of drugs during purchasing or before taking?	A. Yes B. No	

27.	Do you have currently any other drugs stored at home for emergency or other use?	A. Yes B. No	
28.	Could you show me please?	A. Yes B. No	
29.	What type of drug it is?	A. Modern B. Traditional	

- If it is modern medicine fill the information in the table below

No	Name of drugs	Purpose of storage	Source of drug	Type of illness treated	Expiry date	Storage condition	Dose and duration of therapy
1							
2							
3.							
4.							
5.							

Thank you!!!

Annex II. Semi structured questionnaire for an in depth interview with head of community Pharmacy

Good morning/Good afternoon. I want to thank you for taking the time to meet with me today. My name is Tena Mekonnen; I came from Addis Ababa University School of Pharmacy attending a post graduate study in Pharmaco epidemiology and Social Pharmacy. I am here today to ask about type of antimicrobials that commonly requested for self medication and associated factors. You are free to talk whatever information you thought based on the topic guideline prepared. In order not to miss any points of the discussion, we will use a tape recorder. I assure you that you will not face any kind of harm for your participation in this study. Whatever information that you give me will be very useful for the study. This information will help policy makers and other organizations to design intervention activities based on research findings. I thank all of you for your willingness to participate. Are you voluntary to participate in the study? If yes continue

In-Depth Interview Guide

1. Do your clients ask to provide antibiotics without prescription?
Probe: - which age groups and sex types commonly ask?
2. What type of illness/symptoms of illness commonly asked for self-medication with antibiotics?
3. What types of antibiotics the community requested for their illness without prescription?
4. What is your opinion on the main reasons that drive for self medication?
5. What do you do when your client/patient directly come without prescription?
Probe: - Do you supply antibiotics for his illness?
- Are they complete their full course?
6. There are lot of Pharmacy Company and various brands with same composition in the market. How you choose your medicine from stock list (Antibiotics)?
7. What are the antibiotics available in your pharmacy or drug store?
- Which are most common?
- Which antibiotics are sold maximum in your counter?

What is your view regarding antibiotic use and antibacterial resistance (role of self-medication)?