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ACCESS TO ESSENTIAL PSYCHOTROPIC MEDICINES IN ADDIS ABABA: A CROSS-SECTIONAL STUDY

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This is to certify that the thesis prepared by Molla Teshager Ayehu, entitled: **Access to essential psychotropic medicines in Addis Ababa: A cross-sectional study** and submitted in partial fulfillments of the requirements for the Degree of Master of Science in Pharmacoepidemiology and Social Pharmacy complies with the regulation of the University and meets the accepted standards with respect to originality and quality.

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List of Abbreviations/Acronyms

AACAHB	Addis Ababa City Administration Health Bureau
AU	African Union
CSA	Central Statistics Agency
ECA	Economic Commission for Africa
EFDRE	Embassy of the Federal Democratic Republic of Ethiopia
EPMs	Essential Psychotropic Medicines
EPSA	Ethiopian Pharmaceuticals Supply Agency
FDRE	Federal Democratic Republic of Ethiopia
FMHACA	Food, Medicines, Health Care Administration and Control Authority
FMOH	Federal Ministry of Health
HAI	Health Action International
IFC	International Finance Corporation
IOM	Institute of Medicine
LMICs	Low- and middle-income countries
LPG	Lowest Price Generic
MeTA	Medicines Transparency Alliance
MHGAP	Mental Health Global Action Program
MSH	Management Sciences for Health
NGO	Non-Governmental Organization
NSW	New South Wales
OB	Originator Brand
OECD	Organization for Economic Cooperation and Development
OPHI	Oxford Poverty and Human Development Initiative
QI	QuintilesIMS Institute
RANZCP	Royal Australian and New Zealand College of Psychiatrists
SRS	Simple Random Sampling
SSA	Sub-Saharan African countries
UN	United Nation
UNDP	United Nations Development Program
UNODC	United Nations Office on Drugs and Crime
USSR	Union of Soviet Socialist Republic
WB	World Bank
WHO	World Health Organization
WTO	World Trade Organization

Abstract

Background: Mental disorders are becoming a growing public health problem worldwide, especially in low- and middle-income countries. To provide quality mental health services, regular and adequate supplies of appropriate, safe and affordable medications are required. However, significant percentages of people with severe mental disorders are not getting the treatment. Availability and affordability of psychotropic medicines, amongst others, are the major barriers for many patients in meeting their medication needs. This study aimed to assess the availability, prices and affordability of essential psychotropic medicines in the private and public health sectors of Addis Ababa city.

Methods: A cross-sectional study design was used in 60 retail medicine outlets. Quota sampling and purposive sampling was applied to select the retail outlets. Data was entered and analyzed by using the pre-programmed WHO/HAI workbook and SPSS version 25. Outcome measures were described as percentage availability, median price and median price ratios, and the number of days' wages needed to purchase medicines by the lowest-paid unskilled government worker. Finally, the results were presented as statements, tables, figures and graphs.

Results: The mean availability of LPG psychotropic medicines was 24.33% in Addis Ababa (28.7% in the public sector and 19.80% in the private sector), and of OB medicines were 2.42 %(2% in the private and 2.8% in the public sectors). Similarly, the public procurement prices for 16 LPGs ranged from 0.25-4.83 MPRs and the median procurement price was 0.96 MPR. The patient prices for the LPGs ranged from 0.52-6.43 MPRs in public and 1.08- 24.28 MPRs in private sectors. The patient prices for OB medicine were 5.21 MPR in public and 11.17 in private sectors. The cost of standard treatment varied from 0.1–7.8 days' wages in public and 0.8-25 days' in private sectors for the lowest-paid government worker to purchase a month's supply.

Conclusions: Essential psychotropic medicines were poorly available with high prices and low affordability in Addis Ababa. To ensure access, an efficient supply across all levels of care and financial protection for key medicines should be in place.

Keywords: Mental disorders, Psychotropic medicines, Availability, Prices, affordability, Addis Ababa, Ethiopia

1. Introduction

1.1 Background

World Health Organization (WHO) defined mental health as a state of well-being in which everyone realizes one's potential, can cope with the normal stresses of life, can work productively, and contribute to one's community (WHO, 2005a). Mental health is equally important as physical health, and understanding mental health conditions are essential (WHO, 2001a). It is central to one's physical health and quality of life, and so it is generally acknowledged as 'there is no health without mental health,' which makes more sense now than ever before in understanding the value of mental health. It is also crucial to the overall well-being of individuals, societies, and countries (WHO, 2001a; WHO, 2005a). This indicates how mental health is vital for everyone to live a successful life of one's choice, but mental illness can adversely affect all these capacities, which are at the individual level and broader welfare losses at the household and societal level (Bruni, 2014).

Mental disorders are defined as any illness that affects a thought, mood, or behavior of a person due to distress and/or impaired functioning of the brain. Mental illnesses such as epilepsy, schizophrenia, depression, anxiety and mood disorders are considered as the common mental health problems of the public (Smith., 2014). Nowadays, mental disorders (also known as mental illnesses) have become a growing public health problem worldwide, especially in low- and middle-income countries. They accounted for 13% of the global burden (the number of healthy years lost due to death and disability worldwide) of disease (WHO, 2013). Although no one is immune to mental disorders, the risk is higher among the poor, homeless, the unemployed, persons with low education, victims of violence, migrants and refugees, indigenous populations, children and adolescents, abused women, and the neglected elderly (WHO, 2003a). Moreover, individuals with severe mental illnesses, such as depression, bipolar disorder and schizophrenia, die, on average, 20 years earlier than their peers in the general population (Knickman et al., 2016; OECD, 2014).

From economical points of view, the larger productivity losses are also due to death and disability from mental health problems compared to other non-communicable diseases

(Bloom et al., 2011). For instance, the global cost of mental illnesses accounted for 2.5 trillion US$ in 2010, with the cost estimated to rise over 6 trillion US$ by 2030 (WB and WHO, 2016). Like any other low-income countries, mental illness in Ethiopia is the leading cause of non-communicable disorders. It accounts for 11% of the total burden of diseases in the country; and about 8000 people commit suicide every year (FMOH, 2012). Also, as evidence from cohort study shows that persons with severe mental health conditions have died about 30 years earlier than that of the general population in Ethiopia (Fekadu et al., 2015). In general, given the indispensability of mental health on the one hand and the multidimensional damaging consequences of poor mental health on the other hand, it is surprising how little attention has been given to maximize mental health while treatments are available for most mental illnesses (WHO, 2003a; Sathiyasusuman, 2011).

There are different treatment options for reducing the burden of mental disorders. Of these, pharmacotherapy accounts for more than 50% of managing the disorders (WHO, 2003a; O'Donnell et al., 2017); and these medicines most commonly used for mental disorders are often referred to as psychotropic drugs because of their specific abilities to produce effects upon emotion and behavior. Several effective medicines are available for mental disorders, but not all "effective" drug therapies are essential (WHO, 2005b). Essential psychotropic medicines are those medicines that satisfy the main mental health care needs of the population, and they should be always available at all levels of the healthcare in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford (WHO, 2009a).

Nevertheless, despite the international and national efforts made so far to realize access to safe and effective medicines as the fundamental human right (Balasubramaniam, 2012; WHO, 2017a); getting essential medicines for people with mental disorders are still a significant challenge and much remains to be achieved globally (WHO, 2013; Padmanathan and Rai, 2016). Particularly in many low-and middle-income countries /LMICs/, overloaded healthcare facilities cannot provide even the most basic mental health care regularly, including essential medicines for mental disorders (Barbui et al., 2016). For example,

WHO's existing data demonstrates that about 80% of people with mental illnesses live in LMICs, but only a minority of patients receive primary treatment. In contrast, more than 76% of people with severe mental disorders do not have access to the required mental healthcare services, including access to medicines for mental disorders (WHO, 2013). Moreover, in the lowest income countries, such as Ethiopia, the mental health treatment gap can be as high as 90% (Alem et al., 2009). Additionally, although 85% of countries have an essential drugs list that countries use to procure these essential medicines, almost 20% of countries do not have at least one common psychotropic medicine from each therapeutic class in health facilities (WHO, 2003a). Compared to other essential medicines generally, the availability and affordability of medicines for mental disorders is even worse for the populations of low-income countries where mental illnesses are the enormous causes of morbidity, disability and mortality (WHO, 2001a; WHO, 2001b; WHO, 2010).

As a result, lack of access to essential psychotropic medicines can substantially contribute to the burden of untreated mental disorders (OECD, 2014). Amongst others, medicines' stock-out, high prices, and unaffordability are the top barriers to access medicines for large numbers of people in need of mental healthcare services in many LMICs where Ethiopia as a nation and particularly Addis Ababa as a capital city could not be an exception (WHO, 2011). Subsequently, the purpose of conducting this research study was to assess whether the essential medicines used for the treatment of mental disorders were sufficiently available with affordable prices across the various medicine retail outlets found in Addis Ababa City.

1.2 Statements of the Problem

Currently, mental disorders are highly prevalent medical problems; they are also a highly disabling disease burden globally. The situation is much worse in LMICs where the resources are inadequate, institutions are not well managed, and limited access to quality mental health and physical care (WHO, 2018a). It affects people of all ages and demographics (Knickman *et al*., 2016). They can also have a terrible impact on people's physical health and economy; these impacts can be very high if individuals cannot access psychotropic medicines at affordable prices when they need them (NSW, 2016).

Many mental disorders can be treated if the necessary psychotropic medications are always available at affordable prices. Availing cost-effective and quality-assured essential psychotropic medicines can create potential benefits not only for the patients themselves but also for employers, through reduced absenteeism and higher productivity; for family members and friends, lowering the burden of care; and for government, through reduced social security benefits (McCrone *et al*., 2008).

In Ethiopia, the number of patients seeking care for a wide range of mental illnesses has grown from time to time and has also increased the need for psychotropic medications (FMOH, 2012; FMOH, 2013; IOM, 2014). However, in our setting, most of the resources (staff, budgets, and beds) for mental healthcare services are located in Addis Ababa City, where the only mental hospital in the country is also found that serves the whole nation as the highest referral and training center in mental health (FMOH, 2012). Moreover, the finding of studies confirmed that the prevalence of the common mental disorders in Addis Ababa is higher than the national prevalence rate (Gelaye et al., 2012; Fekadu et al., 2014; Solomon et al., 2019; Tilahun et al., 2020). This might be attributed to the nature of urbanization and lifestyle changes in the city (WHO, 2001a; Rathod et al., 2017). Having this in mind, ensuring access to basic psychotropic medicines has been considered essential for the success of the mental healthcare services provided to patients in the city (WHO, 2001a). For numerous reasons, however, the accessibility of treatments for mental disorders is quite low despite the huge burden of mental illness globally (WHO, 2003a; WHO, 2017b).

As worldwide evidence showed that access to essential medicines could be mainly affected by stock-out, high prices, and unaffordability, amongst others (WHO, 2011). Especially in the public sector, availability is relatively low. This, in turn, results in medicines being purchased with higher out-of-pocket expenses from private medicine outlets even though securing accessibility of essential psychotropic medicines in both sectors is equally crucial (IOM, 2014; WHO, 2017b). Similarly, in Ethiopia, evidence indicates that due to inadequate budget, centralization of the mental healthcare services, out-of-pocket payments, lack of

human resources, and other factors make medicines for mental illnesses not continually available even if selected psychotropic drugs from the different groups have been included in the national list for essential medicines. Furthermore, this makes most mental health seekers remain under-treated (Sathiyasusuman, 2011; Ayano, 2016; Haileamlak, 2017). Consequently, it increases the risk of relapse, re-hospitalization, comorbidities, and premature death (IOM, 2014).

Likewise, in Addis Ababa, the problem of access to psychotropic medicines is likely to be a matter of concern for mental health seekers. However, the issue of accessibility to essential psychotropic medicines in Addis Ababa city is not well studied. At the local and national level, there are few studies (FMOH and WHO, 2005; Carasso et al., 2009; Abiye et al., 2013; Sado and Sufa, 2016; Gutema and Engidawork, 2018; Abrha et al., 2018) that have examined the availability, price, and affordability of essential medicines in general. However, studies examining the availability, prices, and affordability of psychotropic medicines are minimal. As a result, policy-makers find it challenging to set priority concerns and testing of implementation in improving access to treatments for mental disorders (Bradley *et al*., 2015). Above all, any further efforts to expand access for mental healthcare services can be fruitless without ensuring the sustainable availability and affordability of essential psychotropic medicines (Eaton, 2008).

Thus, this study aims to measure the availability, price and affordability of essential psychotropic medicines at public and private medicine retail sectors in Addis Ababa, where mental health referral hospitals for the whole country are located.

1.3 Research Questions

This research study was aimed to answer the following questions:

1. What was the availability of essential psychotropic medicines in Addis Ababa?
2. How much do the patients pay for essential psychotropic medicines in Addis Ababa?
3. Are the standard treatments affordable to individuals with low income?
4. How efficient was the EPSA procurement system in procuring low-priced psychotropic medicines?

1.4 Significance of the Study

The information obtained from this study can assist in identifying gaps in the availability and affordability of the various essential psychotropic medicines at private and public retail medicine outlets. This will, in turn, helps to create awareness with current evidence among the various supply chain actors, academicians, pharmaceutical policymakers, and other stakeholders; and thereby helping to set an intervention to prevent or reduce stock-outs, inaccessibility, and unaffordability of essential psychotropic medicines to mentally ill patients at all points of the retail healthcare facilities and thus improve the mental healthcare services in Addis Ababa.

2. Review of Literatures

2.1 Overview

Medicines are one of the six essential components for a given healthcare system to function effectively. After the dawn of the 1970s, international originations and countries have made several efforts to ensure access to essential medicines. Furthermore, in 2015, countries worldwide have also agreed to introduce the policy of 'universal health coverage with the aim of all people to obtain the quality health services they need without fear of financial hardship (Wirtz et al., 2017). However, many people worldwide do not have access to essential medicines, especially in the LMICs, where 80% to 90% of medicines are purchased out-of-pocket (WHO, 2014; WHO, 2016). This negatively impacts on the clinical, economical and humanistic aspects of the patient outcomes (Phuong et al., 2019). Thus, as it had been, ensuring access to medicines is continuing as one of the most challenging issues facing the world today (Wirtz et al., 2017).

Furthermore, particularly for various reasons, access becomes more problematic when it comes to the accessibility of medicines for treating mental disorders than other essential medicines used for treating infectious diseases and even other non-communicable diseases (WHO, 2013). Because, access to psychotropic medications are subject to further challenges and these barriers specific to access a mental healthcare service have been outlined by WHO and others in their survey reports (WHO, 2005b; Saraceno et al., 2007; Padmanathan et al., 2014; Barbui and Chattherjee, 2016; WHO, 2017b). Regardless of the existing variations on the definition of access, UN defines access to medicines ‘as having drugs continuously available and affordable at public or private health facilities or drug outlets that are within one hour’s walk of the population’ (UN, 2003). But as per this definition, the current situation of access to essential psychotropic medicines is very far from it due to availability of mental health services is very limited (WHO, 2018b). For example, the number of people served by one facility is highest in African countries (1 outpatient facility per 2, 479, 245 population), implying inadequate mental health facilities with a low number of mental workforces. Because of this, accessibility of mental healthcare service within one hour's

walk is still keeping as the dream for the population of Africa, comparing to European countries where each facility serves a much smaller number of people (1/92, 386) (WHO, 2009b). Moreover, evidence has also indicated that let alone the LMICs, access to mental health care was poor even in high-income countries where well-developed community care systems and universal health care coverage have been ensured (Barbato et al., 2016).

In general, accessibility of medicines depends on rational selection, availability, affordability, and appropriate use of the medicines. Therefore, these are the critical factors that can determine either ensuring or denying access to essential medicines from reaching those who need it in general (WHO, 2014). Whereas in medicines for mental disorders, there are other major components for improving access to essential psychotropic medicines, devised by WHO apart from the parameters mentioned above of access. These are robust mental health policies, mental health legislation that enhances rather than obstructs access, systematic assessment and monitoring for continuous improvement of access to care. As a result, especially for developing countries, considering all these critical components of access in any plan to improve access to psychotropic medicines is very inevitable (WHO, 2005b; WHO, 2017b). However, in the subsequent sections of this literature review, the author has explored the relevant published studies from global perspectives to the local picture of the problem under consideration to have an understanding of the availability, prices, and affordability of the essential psychotropic medicines regardless of other components that are also needed to know for improving access to essential medicines for mental disorders.

2.2 Availability of Essential Psychotropic Medicines

Psychotropic medicines do not completely cure disability associated with mental conditions, yet they have a substantial advantage over no treatment at all (WHO, 2003). For instance, they are helping to alleviate the symptoms of mental illnesses, protecting the course of many disorders, lower disability and prevent relapse (WHO, 2001b; Xavier et al., 2014). Therefore, ensuring their continuous availability in the retail outlets of public and private sectors is a mandatory task (Barbui *et al*., 2017). Despite recent progress, the availability of

medicines for mental disorders remains to be a significant challenge globally. While various aspects of access exist, a significant contributor to lack of access is the unavailability of medicines at retail outlets where the patients can primarily accessing them as needed in a given country (Consilium, 2017; IFC, 2017). The low availability of medicines for mental disorders is mainly attributing to their restricted use because of the lack of qualified health workers with the appropriate authority to prescribe medications (WHO, 2013).

WHO also specifically defines the availability of psychotropic medicines as the obtainability of at minimum one psychotropic medicine from each therapeutic class (such as antipsychotic, anxiolytic, antidepressant, mood stabilizer and antiepileptic medicines) in a given health facility or in a nearby pharmacy at all times (WHO, 2005c). However, for better treatment outcomes, it is not only the consistent availability of at least one essential psychotropic medicine from each therapeutic category but also the availability of various alternative medications for the management of drug tolerance, drug-induced extrapyramidal side-effects, dependence, toxicity, and individual variation of drug responses is equally critical as well (Bradley et al., 2015). Another study also suggested that all medicines for mental disorders have the marginal benefit in terms of clinical improvements due to mental illness being biologically heterogeneous conditions in which patients respond differently to different drugs (Huskamp, 2006).

The shortage of key psychotropic medicines is commonly prevalent in developing countries (WHO, 2003b). For example in a study done among African countries, where there are high out-of-pocket payments and inadequate mental healthcare facilities, found that only 14% of the countries had as a minimum one psychotropic medicine from each therapeutic group in all public health facilities. However, in the remaining 86% of the countries, the availability of essential psychotropic medicines has been reported as severely limited (McBain et al., 2012). Moreover, the unavailability of psychotropic medicines is further worsening by a lack of mental health care professionals in LMICs. For example, the average distribution of psychiatrists and psychiatric nurses has been reported as 0.06 and 0.33 per 100,000 populations, notably in most low-income countries, respectively (WHO, 2018b). Another

WHO study on the availability of psychotropic medicines indicated that 40% of the upper-middle-income countries have essential psychotropic medicines available in all primary healthcare compared with 15% of low-income countries. This implies that when the country's income level is higher, the availability is also better as the integration of mental health into primary care could be more significant at higher income levels than in the low-income countries (WHO, 2009b).

Moreover, a study done by WHO in 14 countries demonstrated that almost all countries had at least one psychotropic medicine in their essential medicine lists from each of the five categories; however, only 36% (five out of 14) of the countries had all of the primary care facilities equipped with essential psychotropic medicines. This study also indicated that all mental hospitals, outpatient facilities, and community-based inpatient units had at minimum one psychotropic medicine from each therapeutic class was available in the facility or in a nearby pharmacy throughout the year (WHO, 2010). The secondary analysis of surveys in 30 countries revealed that the overall availability of amitriptyline, fluoxetine, fluphenazine decanoate, carbamazepine and phenytoin was poor. The same survey reported that medicines for epilepsy and psychiatry disorders were less available than medicines for treating other chronic diseases. As a result, chronic mental disorders may adversely affect the income-generating capabilities of citizens unless governments need to pay particular attention to ensure the availability of medicines for chronic mental patients (Gelders et al., 2006).

Another study conducted in Mozambique across public health facilities reported that only 45.8% (11 of 24) of all health facilities had at least one medicine from each therapeutic class. While more than 83% (n=10 of 12) of the public health facilities with specialized mental healthcare services had at least one medicine from each category. The same study concluded that essential psychotropic medicines were not routinely available in public health facilities. The primary reasons were lack of drug stock at provincial or national levels instead of mismanagement or delays in distributing existing drugs from district warehouses to health facilities (Bradley *et al*., 2015). In many low-income countries, psychotropic

medicines are only offered in specialized mental health facilities than had been found in all healthcare facilities, which contributes to decreased availability (Barbui et al., 2017).

Furthermore, a qualitative study in Dar es Salaam, Tanzania, revealed that as there were many challenges to access essential psychotropic medicines for mentally ill patients. For instance, medicines were not readily available at the facilities for various reasons such as inadequate budget, a lengthy procurement process, and irregular availability of psychotropic medications in the health facilities. Accordingly, lack of medication made patients annoyed and waited for more than four months without medicines, particularly medicines that are most often used by patients with schizophrenia and epilepsy (Iseselo and Ambikile, 2017). Evidence from Ghana also showed as there was a lack of essential psychotropic medicines in the public health facilities due to supply shortages-resulted from an increase in demand after improving the help-seeking behavior of people with a mental health condition through public education had been given, and so patients have to purchase medication privately without means of gaining a refund (Roberts et al., 2013; Oppong et al., 2016). Likewise, the lack of an efficient supply of psychotropic medicines to people with a mental health condition has also been observed in Nigeria after a 15-year effort to scale-up of mental healthcare treatment in primary health cares (Saraceno *et al*., 2007).

A recent study from Saudi Arabia indicated that 15 of the 28 surveyed psychotropic medicines were available in <50% among the visited 248 community pharmacies, and the chain community pharmacies were more likely to have these medications available than the independent community pharmacies. The main reasons cited for the shortage were slow-moving items and low-profit margin, stringent regulations for purchasing and dispensing psychotropic medications regardless of controlled status, difficulty in procuring psychotropic medications from licensed pharmaceutical wholesalers, and high cost of psychotropic medications (Al-Ruthia et al., 2017).

In general, the findings of all the studies showed that the availability of medicines for mental disorders is as commonly low. Moreover, most of the available medicines in the public sector retail outlets were generic versions, while in the private sector, promoting the use of

generic medicines is still challenging due to inadequate information to the private health workers and lack of financial incentives at sales points (WHO, 2017b). For instance, both originator and generic products were available in the public sector facilities of some countries such as in Ghana and Philippines. Although this may give consumers to choose, it would not appear to promote access to quality-assured generics at the lowest possible price (Gelders et al., 2006).

2.3 Prices of Essential Psychotropic Medicines

Even though medicines are available, high prices can also be an obstacle to access these effective treatments by the patients (MSH, 2012). It has been noted that the health expenses of the world poor are devoted mainly to buying medicines, and hence the price of essential medicines is still the concern to poor people and developing countries in particular (WHO and WTO, 2001). In addition to the manufacturers' costs, numerous add-on costs affect the price of medicines until it reaches the final retail outlets. The various add-on costs in the supply chain are the manufacturer's selling price, freight costs, government-collected tariffs and taxes, mark-ups collected by middlemen, procurement execution costs, and local distribution costs. Such fees usually constitute from 30% to 45% of the price of the dispensed medicine. However, they can even go above 100%, and these add-on costs are a problem not only for the final users but also for all actors involved in the supply chains (WHO and HAI, 2008).

Moreover, patent protection of medicines can also raise prices and so this, in turn, impedes access to life-saving medicines, especially for chronic diseases, including mental disorders (Berens, 2016). However, many of the existing medicines for mental disorders have lost their patent protection and their generic versions are available in the market (Silva and Hanwella, 2007; WHO, 2017b). Regardless of this, the prices of psychotropic medicines were reported as more expensive than other drugs used for physical diseases (Huskamp, 2006; Berens, 2016).

WHO reports that the prices of psychotropic medicines differ substantially within and between countries (WHO, 2005b). According to MSH (2012), the reasons for medicine

prices variation among countries could be the use of separate supply chain routes such as the public, the private and non-governmental (not-for-profit) sectors, less price-regulated market within countries, the manufacturer sells the same product with different prices. After the manufacturer, the costs charged by the state, importers, wholesalers, insurances, and retailers are different within the country and across countries (MSH, 2012). For instance, the public sector's medicine procurement has been carried out in large volumes using an international competitive bid, and there should be at least five bids per product to achieve the lowest competitive price for a particular generic medicine (WHO, 1999). By this means, the price of medicines in the public sector is relatively low. However, this purchasing method takes a long lead time, resulting in a long stock-out of medicines (Arney and Yadav, 2014). On the other hand, the private sectors used direct negotiation with medicine suppliers to buy a small volume of medicines with high prices and short lead time, unlike the public sectors (WB, 2010; Ashigbie et al., 2016). Thus, the use of different procurement methods between the public and private health sectors could be one reason amongst other factors for the better availability of medicines with high prices in the private sectors (if they are one of the fast-moving and profitable products in the market) than in the public sectors in all WHO regions (Cameron et al., 2009).

Even though there are several approaches for lowering the price of psychotropic medicines, adhering to the best procurement practices can ensure the best prices for good quality products and achieve considerable savings, which can be used further to improve the availability of medicines in a given country. Nevertheless, when a good procurement practice is not in place, the poor procurement practices can result in poor availability of medicines with high prices and endanger efforts to improve mental health care delivery (WHO, 2005b). For example, a report from African countries discovered that the government of sub-Saharan countries procured large amounts of psychotropic medicines. However, it has been mentioned that these medicines were not always procured in quantities capable of addressing the mental healthcare needs of the populations, which is considered procurement inefficiency. The report also highlighted that lack of the necessary skills to recognize and treat mental disorders is one factor that increases demand for incorrect

medications, which can ultimately lead to low supply and higher costs (IOM, 2014). In general, as the tasks of medicine purchasing need specialist knowledge and skills about procurement, there are different kinds of medicine procurement methods. These are competitive negotiation, open tender, restricted tender and direct procurement. So, each of these methods are differs to each other concerning their effect on the price, delivery times and workload (WHO, 2005b).

A study that assessed the accessibility of antiepileptic drugs among 46 countries showed that the public procurement prices for generic carbamazepine and phenytoin were on average 1.56 and 2.53; whereas the prices of originator brands were 6.19 and 5.19 times higher than the international reference prices, respectively. The study also indicated that in countries where patients pay for medicines in the public sector, on average, the patient prices of generic carbamazepine and phenytoin were 4.95 and 17.50 times higher than international reference prices respectively. Likewise, in the private sector, the patient prices of generic carbamazepine and phenytoin were 11.27 and 24.77 times higher than international reference prices, respectively. Additionally, the originator brand prices of carbamazepine and phenytoin cost 3.1 and 2.1 times more than their lowest-priced generic equivalents in the private medicine retail outlets, respectively. Generally, the highest prices had been observed in the lowest income countries (Cameron et al., 2012).

On the other hand, some countries procure medicines efficiently but charge markedly higher prices to patients. As shown in table 1, for example, in Ethiopia, patient's price of carbamazepine, diazepam, and phenytoin in the public sector was 7.5, 31.3 and 17.12 times the government procurement price of each product, and this fact is also actual for Kenyan and Tanzanian governments too (Cameron et al., 2012). Nevertheless, there can be no justification for generics being so expensive as such, except that these high prices may be due to inefficiencies in the supply system or governments choosing to fund their health system with the profits from the sales of medicines (Gelders et al., 2006). Furthermore, in the analysis of private-sector patient prices between countries income levels, the prices of generic phenytoin in LMICs were two times more than in upper-middle-income countries,

and this suggests as there is a decrease in the prices of medicines with increasing countries income levels, particularly for originator brand products (Cameron et al., 2012).

Table 1: Comparison of various prices across low income countries

Country and Year	Medicine, Strength and dosage form	Medicine type	MPR Prices in local currency		
			Public Procurement	Public retail	Private retail
Ethiopia, 2004	Carbamazepine 200 mg tablet	LPG	0.59	4.45	19.18
	Diazepam 5 mg tablet	LPG	0.37	11.59	41.64
	Phenytoin 100 mg tablet	LPG	0.43	7.36	11.33
Kenya, 2004	Carbamazepine 200 mg tablet	LPG	0.39	2.07	6.16
	Diazepam 5 mg tablet	LPG	0.23	10.58	7.07
	Phenytoin 100 mg tablet	LPG	0.45	4.31	4.31
Tanzania, 2004	Carbamazepine 200 mg tablet	LPG	0.69	2.11	10.57
	Diazepam 5 mg tablet	LPG	0.18	3.22	4.84
	Phenytoin 100 mg tablet	LPG	0.83	----	8.88

Source: (Cameron *et al*., 2012).

Overall, as findings showed, a different component of medical costs contributes to the final patient's prices, as indicated below in the figure-1 (IFC, 2017). However, the two most important factors that amount to the final price are the manufacturer's price and the local add-on costs, such as taxes and mark-ups. Therefore, due to the cumulative nature of price components, a small tax applied early in the distribution chain can significantly impact the final patients' price (WHO and HAI, 2008). Some governments apply several taxes on essential medicines, e.g., in Peru, an import tax of 12% and 18% VAT is applied. Nevertheless, as these costs are a tax on chronically sick persons, there is a strong rationale to free medicines from taxes (Gelders et al., 2006; Cameron et al., 2009).

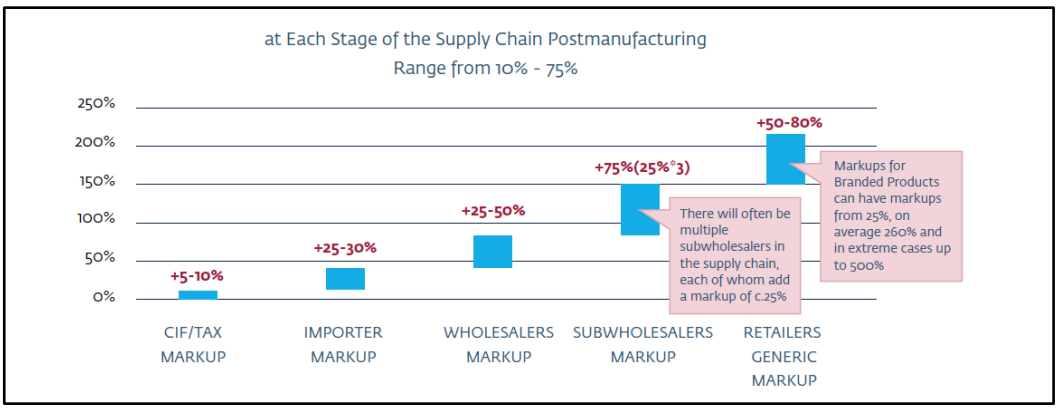


Figure 1: Average Price Mark-Ups for Medicines along the supply chains.
Sources*: International Finance Corporation,(IFC, 2017).*

2.4 Affordability of Essential Psychotropic Medicines

Currently, escalating of medicine prices has inevitably caused affordability problems on many low income populations across the world although the global commitment to ensure affordable essential medicines for everyone who needs them without exposing them to financial hardship has been underway for decades (WHO and WB, 2017). So that, individuals and households who are facing economic hardships have to choose between paying for food or medicine (Kessides et al., 2009). Frequently used essential medicines are too expensive in many settings, and this is especially true for about 90% out of pocket payers in LMICs (Consilium, 2017; Wirtz et al., 2017). Moreover, these affordability problems are likely to be exacerbated in the global financial crisis (Niëns et al., 2012).

Although defining and measuring affordability is considered a complex issue, the word affordability is defined as the “ability to purchase a necessary quantity of a product or level of a service without suffering excessive financial hardship." Furthermore, the essence of affordability is the ability to pay and not the willingness to pay higher utility costs (Kessides et al., 2009). Another report from the Royal Australian and New Zealand College of Psychiatrists (RANZCP) also underscores that affordability comprises not merely the cost of medicines but all the direct costs and the resources available for the daily living of the person and/or one's family. Nevertheless, as the non-medical direct costs and the indirect costs of an illness are not easy to identify and quantify, they are not primarily included in

assessments of the overall costs of mental health care. As a consequence, these costs may also inhibit access to mental healthcare (RANZCP, 2014).

WHO uses the wage of the lowest-paid unskilled government worker to pay for one day of the cheapest available medications in measuring the affordability (WHO, 2010). Although this method is being less data demanding and easy to apply, it may overestimate the affordability of medicines (Niëns et al., 2012). For instance, while the costs of treatments seem affordable, substantial proportions of developing country populations are earning less than the lowest-paid government worker (UNDP and OPHI, 2019). Moreover, even for the lowest-paid worker, the cost of medicines is not affordable, especially in African countries because of low wages and higher prices (Gelders et al., 2006). Also, this affordability measures only medicines and does not account for other treatment costs (e.g., diagnostics, consultation fees). Subsequently, the cost of medicines for many mental disorders may not be affordable when taken on long-term, and in this regard, the actual degree of unaffordability is likely to be underestimated (Barbui and Chattherjee, 2016; Wirtz et al., 2017).

To ensure medicines' affordability, countries have tried to implement various approaches such as tender invitation systems, setting a price ceiling, checking the international reference pricing, and market-based pricing and other interventions (WHO, 2015a). However, the unaffordability of drug costs is continued as a severe challenge of access to medicines in general (Nguyen et al., 2015; QI, 2016). The cost of psychotropic medicines, particularly the newer ones, is very expensive to the majority of the low-income patients, and as a result, the use of these agents at their current costs will lead to catastrophic payments (Ezenduka *et al*., 2014). As per WHO, more than 150 million individuals worldwide face catastrophic expenditure every year, and more than 100 million individuals are pushed into greater poverty due to the compulsory out-of-pocket payment for healthcare services. Thus, the incidence of catastrophic expenditure could be very high in low-income countries (WHO, 2005d). For utilizing the newer medicines in LMICs, during selection, performing

pharmacoeconomic analyses of these new psychotropic medicines is the prime task to determine whether the benefits justify their high costs (Ezenduka *et al*., 2014).

On the other hand, WHO suggests that although cost-effectiveness is a major consideration for choosing medicines, cost alone is no longer a sufficient reason for rejecting an expensive but effective medicine from the essential medicine list of criteria for the benefit and public health relevance are being fulfilled (WHO, 2015b). Another WHO report showed that government budget for mental health is less than 1 US$ per capita in low and lower middle income countries. So, out-of-pocket payments are the primary method of financing mental health in countries of African and South-East Asian Regions (WHO, 2018b).

Notably, a study in America also found that the cost of treatments for mental illness was cited as a key barrier to getting the proper medical care when needed. Besides this, many people with mental health problems were more likely to be uninsured than those without such problems; and hence patients who cannot afford out-of-pocket costs may forgo treatment, which increases the burden of the mental illness (Rowan et al., 2013). However, for health problems other than mental disorders, social insurance is the main source of financing in 38% of high-income and 29% of higher-middle-income countries found in the European Region, unlike the low-income countries (WHO, 2001b). Due to this and other reasons, medicines that are mainly affordable for people of high-income countries could remain out of reach for individuals and households of LMICs (Wirtz et al., 2017).

As per the WHO-AIMS's cross-sectional analysis, affordability is linked with the percentage of the budget directed towards mental health in order to broaden access, i.e., when there is an increase in the amount of money allocated to mental health, there is also an improvement in the affordability of essential psychotropic medicines. Equally, the raise of human resources was related to affordability. For instance, an increase of ten mental health workers per 100,000 populations had been correlated with a 2% decline in wages required to pay for psychotropic medicines (McBain *et al*., 2012). A similar study among 14 countries of the eastern Mediterranean region also reveals that the vast majority of the population (85%) in low-income countries does not have access to free or low-cost psychotropic

medicines. Furthermore, the costs are high for those who have to pay out of their own pockets, especially for countries facing emergencies. People spend 10% of their daily minimum wage on antipsychotics and 8% on antidepressants (WHO, 2010). In addition, people often have to pay for clinical consultations and transportation to health facilities. Health care costs that exceed more than 40% of income are considered "catastrophic," and this can further jeopardize people into greater poverty (WHO, 2005d; Aregbeshola and Khan, 2018).

As analysis of secondary data from 30 LMICs surveys indicate that buying lowest-priced generics in the public sector requires no more than 1 days' wage in each therapeutic group, but medicines for chronic obstructive pulmonary diseases (COPD) and mental disorders in lower-middle-income countries were requiring 1.4 days' wages. On the other hand, the originator brands (OBs) in all three country groups were less affordable than the lowest-priced generics in both sectors. For instance in the lower-middle-income countries, the OBs of psychotropic medicines required 12 and 9 days' wages to purchase 30 days' supply in public and private sectors, respectively. This shows the least affordability of OB psychotropic medicines in both sectors. But the cost of the OB in the public sector was more expensive than the private retail cost of the OBs. This could attribute to the analysis of OBs in the public sector is being based on only a few data points. In general, the lowest levels of meeting the availability and affordability thresholds were also seen for psychotropic medicines in public and private sectors (Ewen et al., 2017).

2.5 The Ethiopian Context

Since 1993, one of the Ethiopian national drug policy objectives has been promising to meet "an equitable access" to essential medicines at prices of drugs compatible with the purchasing power of all citizens who need pharmacological interventions (FDRE, 1993). However, several research studies have reported the shortage of essential medicines, particularly in public healthcare facilities. Because of this, in general, equitable access is continued as a significant barrier of healthcare services to our population, where there is a wide variation between the cost of treatments and income status of the patients without any

financial protecting mechanism to take care of the poor from out-of-pocket payments (FMOH and WHO, 2007; Carasso et al., 2009; Hailemichael et al., 2019). So when a national drug policy such as this fails to achieve its objective practically, it is considered as a mere document no matter how it is carefully formulated (WHO, 2001c).

According to the Ethiopian national survey on availability and affordability of essential medicines conducted in 2004, the median availability of lowest price generics in the public sector was 76.5 %, lower than the median availability in the private sector, 96 %. However, the prices of medicines were lowest in public health facilities and highest in private pharmacies. This might attribute to the efficient use of tender procurement policy of medicines in the public sector (FMOH and WHO, 2005). Similarly, another national survey reported that the median percentage availability of key medicines in the public health institutions' dispensaries and private medicine retail outlets were 72.4% and 67.3%, respectively. This shows a further decline in the availability of basic medicines in both sectors, substantially in private medicine retail outlets compared to the previous national survey finding of 2004 (FMHACA et al., 2017).

Another survey on availability and affordability of key medicines for under-five children in health facilities of Tigray region, northern Ethiopia, documented that the overall availability of priority life-saving drugs in the region was 34.1%, which was very low. Furthermore, about 30% of priority life-saving medicines in the public sector and 50% of them in the private sector were unaffordable to purchase the standard treatment of the prevalent diseases of children. As a result, the authors considered the survey's finding as an indication of a failure to implement the health policy on priority life-saving medicines for children in the region (Abrha et al., 2018). A similar local study conducted in East Wollega Zone, West Ethiopia, also substantiated the poor accessibility of medicines for children because of low availability and high prices; despite the fact that Ethiopia had declared nationally on the achievement of the Millennium Development Goal for reducing child mortality before 2015, which implies access to child healthcare services, including pediatric medicines, were considered as it had been fully achieved (Sado and Sufa, 2016). In general, most of the

available studies have shown that as there have been encouraging efforts in improving availability and lowering the prices of essential medicines by the government. However, equitable access to medicines for the poor people of Ethiopia has not yet been assured as the national drug policy had stated it.

In Ethiopia, the list of essential medicines currently in use was last updated in 2015. The list contains about 490 essential medicines. Among the 490 priority medicines included in the list, about 30 of them are essential psychotropic medicines (FMHACA, 2015). Some of these essential psychotropic medicines like amitriptyline, fluoxetine, phenobarbitone, and chlorpromazine are amongst the list of products that have been identified as priorities that should be locally produced (EFDRE, 2015; GebreMariam et al., 2016). Some of the local manufacturers have already launched producing the aforementioned essential psychotropic medicines to improve availability and lower the prices of medicines. However, as the raw materials have also been importing from abroad, foreign currency is still a challenge for local manufacturers in Ethiopia and Africa generally (McCabe et al., 2011). For instance, one study conducted in 2013 revealed that the prices of locally produced medicines were higher than the prices of imported medicines even though the availability of locally produced medicines was better than the imported medicines (Ewen et al., 2016).

In consequence, the right of the poor patients to use a healthcare service at affordable prices could not be addressed yet by locally producing essential medicines in Ethiopia notably, as the national survey report indicated that the median percentage availability of medicines for non-communicable diseases, including mental illnesses in majority survey areas was less than 50%, which was very low. This study also highlights that buying medicines for treating mental disorders required more than one day's wage of the lowest-paid worker in both the public and private sectors, which leads to a substantial economic burden to patients in the long term (FMHACA et al., 2017).

In general, medicines are brought to the Ethiopian pharmaceutical market through different licensed suppliers based on the national lists of medicines for Ethiopia. Importing of these medicines is mainly carried out by the government suppliers and the private sector importers

(Gebre-Mariam et al., 2016). Most of these essential psychotropic medicines are incorporated in the pharmaceuticals procurement list of the public procurement agency, EPSA (PFSA, 2018). About 85% of pharmaceutical and medical supplies are imported from abroad (EFDRE, 2015). Similar to the reports made by the African Union, which shows that more than 70% of medicines are imported into Africa, and in Ethiopia, local manufacturing meets only less than 30% of the needs of the continent (AU, 2017). Usually, the government imports only generic drugs, so consumers looking to buy originator drugs are forced to use private pharmacies as an alternative source (Porter and Abera, 2012).

There are several challenges in the supply chains for psychotropic medicines (IOM, 2014). Financial constraint to procure psychotropic medicines is one of the critical challenges in the supply chains of psychotropic medicines in LMICs. For instance, at a global level, according to WHO's Mental Health Atlas 2017 survey, governments spend on average 2.5% of their health budgets on mental health, and it is less than 1% in low-income African countries where Ethiopia is one of them (WHO, 2018c). In Ethiopia, low level of local production, lack of healthcare insurance, inadequate mental health budget, shortage of mental health professionals, the limited mental healthcare facilities and neglecting of mental health by the stake holders, and poor forecasting and quantification of demands for essential psychotropic medicines have contributed to the poor availability and unaffordability of these medicines (Alem et al., 1995; IOM, 2014; Ayano, 2016; Gebre-Mariam et al., 2016; Johansson et al., 2016; FMHACA et al., 2017).

Above all, the international and national regulatory requirements in the supply chains of controlled psychotropic medicines are becoming more challenging in the availability of these medicines than others (UN, 2007). As per Proclamation No. 661/2009, a special permit is given by FMHACA, an import permit that could be valid for 90 days from its issuance, which is required to import psychotropic medicines from abroad. Also, their mode of transport matters most as they are controlled medicines; they should not be imported through the post office or by ship; or as packed with other medicines or goods (FMHACA, 2010). Thus, apart from the usual challenges in the medicines supply chain under normal

conditions, these factors further restrict access to essential psychotropic medicines. However, although there are misunderstandings about the controlled status of psychotropic medicines among health professionals, not all psychotropic medicines are subjected to strict regulation, but some of them (FMHACA, 2017; UN, 2018). The various therapeutic classes of essential psychotropic medicines for treating mental and behavioral disorders are described in the national list of essential medicines, including antipsychotics, antidepressants, anxiolytics, mood stabilizers, and antiepileptic (FMHACA, 2015). According to the recommendations made by mhGAP working group of Ethiopia, the national list of essential medicines should incorporate at least three drugs from each of the aforementioned therapeutic categories of essential psychotropic medicines to ensure that essential psychotropic drugs are continuously available and affordable at all health facilities levels (FMOH, 2013). The lists of these medicines that are used in each therapeutic group are depicted in the following tables.

Table 2: List of psychotropic medicines in each therapeutic class

Antiepileptic	**Antipsychotics**	**Antidepressants**	**Anxiolytics**	**Mood Stabilizers**
Carbamazepine	Chlorpromazine	Amitriptyline	Alprazolam	Lithium CO3
Clonazepam	Clozapine	Clomipramine	Bromazepam	Carbamazepine
Lamotrigine	Fluphenazine	Imipramine	Diazepam	Sodium Valproate
Lorazepam	Haloperidol	Fluoxetine	Midazolam	
Magnesium SO4	Olanzapine	Sertraline HCL		
Phenytoin	Risperidone	Quetiapine		
Phenobarbital	Trifluoperazine			
Sodium Valproate				

2.5.1 Supply Chain Route of Psychotropic Medicines

Medicines are procured from manufacturers and moved to the downstream supply chain actors via different channels until it reaches the final user, namely the patients. In the Ethiopian context, the public and private sectors are the two pharmaceutical sectors mainly responsible for importing medicines and distributing them. The diagram below shows the different routes of the psychotropic medicines distribution system in our current supply chain setups. So the prices of medicines are affected by the manufacturer's selling prices, duties, taxes and mark-ups along the supply chain until it reaches to the patients; and this in turn limits the availability and affordability of essential psychotropic medicines in case of out-of-pocket payments with low income (WHO and HAI, 2011).

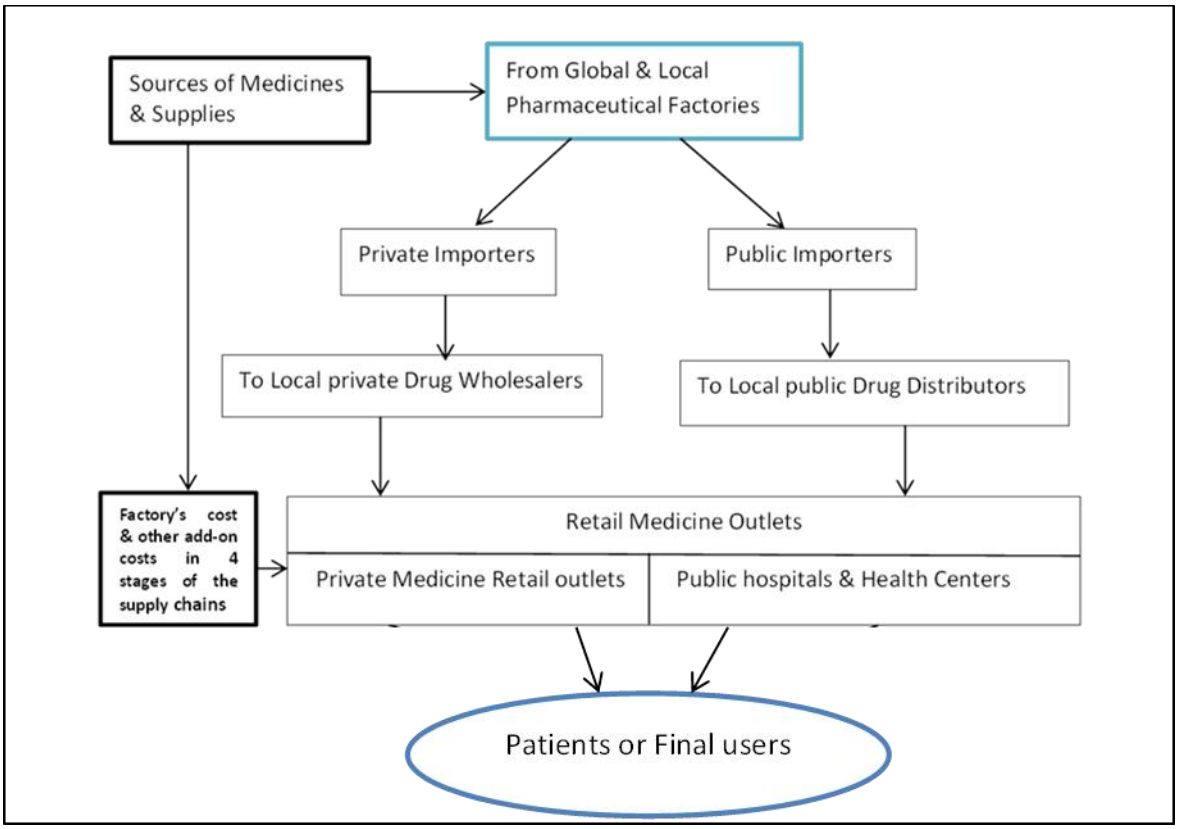


Figure 2: The diagrammatic maps of the various supply chain channels.
Source: (WHO and HAI, 2011).

In summary, all the reviewed studies indicating that the continuous availability of essential psychotropic medicines at affordable costs was not ensured yet globally, and the problem of

inaccessibility to these medicines is much worsened in most economically less developed countries. In African countries, the lack of essential psychotropic medications is one of the common challenges (Saraceno et al., 2007; WHO, 2009b). The reasons behind the poor availability and unaffordability of essential psychotropic medicines were numerous. However, financial constraints, limited numbers of mental healthcare facilities and psychiatrists, poor procurement and distribution practices, and lack of healthcare insurance have been mentioned as the major obstacles to treatment access (Saraceno et al., 2007; IOM, 2014; Barbui and Chattherjee, 2016; Padmanathan and Rai, 2016; Barbui et al., 2017; WHO,2017b; Aryani et al., 2019).

In Ethiopia, the limited available evidence highlighted that the availability and affordability of medicines for mental disorders was deficient, which was far from WHO availability and affordability targets for non-communicable chronic diseases (FMHACA et al., 2017). Some of the factors such as lack of attention to mental disorders, low level of local production, lack of healthcare insurance, inadequate mental health budget, shortage of mental health professionals, the limited mental healthcare facilities, and poor forecasting and quantification of demands for essential psychotropic medicines have contributed to the poor availability and unaffordability of these medicines (Alem et al., 1995; McCabe et al., 2011; IOM, 2014; Ayano, 2016; Gebre-Mariam et al., 2016).

Overall, most of the research studies mentioned in this literature review of the Ethiopian context were conducted at national or local levels concerning the availability, prices and affordability of essential medicines for treating physical diseases in general. Nevertheless, relatively there is very little anecdote about the price, availability, and affordability of essential psychotropic medicines both nationally and locally. Mainly, there is a gap of knowledge about the accessibility of essential psychotropic medicines in Addis Ababa, where most of the resources for mental healthcare services have been located, and many patients who require continuous pharmacological treatments for their mental disorders live in the city. Thus, this study aimed to assess access to psychotropic medicines used to treat

all the five common mental disorders across the public and private health sectors found in Addis Ababa City Administration using a standardized WHO/HAI survey tool.

2.6 Conceptual Framework

This conceptual framework was developed based on the factors that had been identified as key barriers amongst others to access medicines from previously published studies done in Ethiopia and countries elsewhere in the world. Therefore, these factors were assessed in this specific study setting to see if they affect here as well. The outcome of access to essential psychotropic medicines was realized by addressing the availability, prices and affordability of the medicines for mental patients across public and private medicine retail outlets. As shown in figure 3 below the 'dash line' is used to show the procurement price of psychotropic medicines from the private importers as a comparator, have not been included in this study and so it could have an effect on the outcome of the study findings.

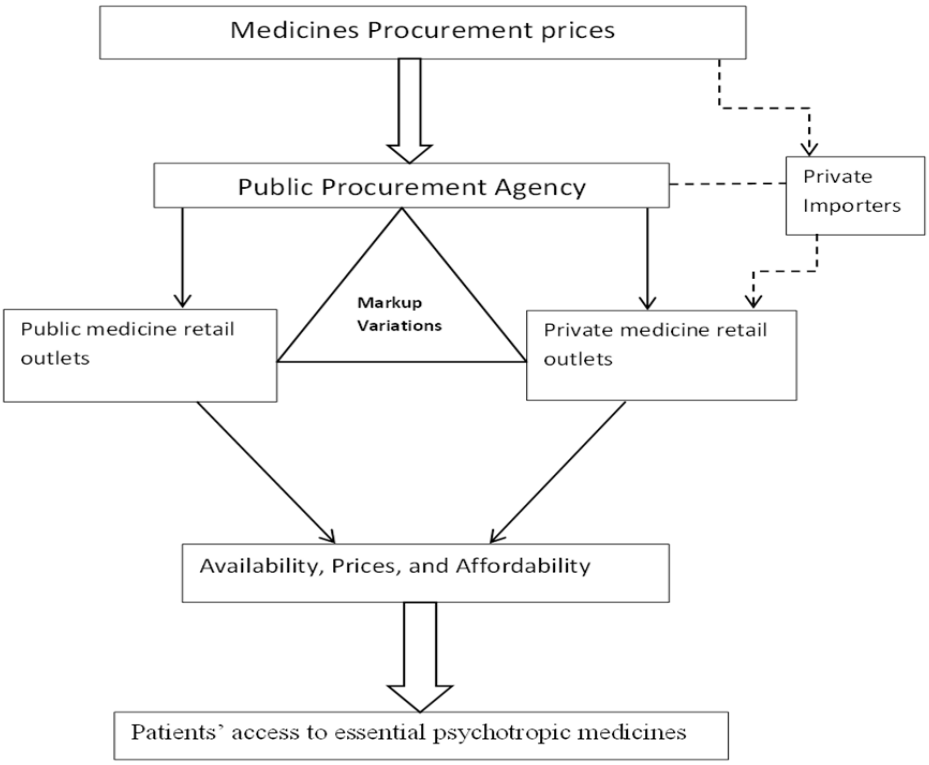


Figure 3: Conceptual framework of access to essential psychotropic medicines

3. Objective

3.1 General Objective

To assess accessibility of essential psychotropic medicines in Addis Ababa.

3.2 Specific Objectives

1. To assess the availability of psychotropic medicines in Addis Ababa.
2. To assess public procurement price of psychotropic medicines.
3. To determine the patient price of psychotropic medicines in public and private retail outlets.
4. To determine the affordability of psychotropic medicines to individuals with low income.

4. Method

4.1 Study Area

The study was conducted in Addis Abba, the capital city of Ethiopia, with a population size of more than 3.8 million (CSA, 2013). According to the unpublished data of Addis Ababa's FMHACA in 2019, there were 1919 health facilities in Addis Ababa, of which 131 are publicly owned (110 of them were public health centers & hospitals), and 1735 are privately owned. There were two public mental hospitals, two privately owned psychiatric clinics, one rehabilitative center in Addis Ababa regarding psychiatric healthcare facilities. However, currently, almost all government hospitals in Addis Ababa have psychiatric units responsible for providing mental healthcare services outpatient. There were 854 private medicine retail outlets, of which 558 are pharmacies and the remaining are drug stores. The specialized mental healthcare facilities are available only in Addis Ababa. So they are not limited to providing services for the people residing in the city but also to a significant number of the population coming from different areas outside the city due to the expectations for better mental healthcare services.

4.2 Selection of Medicines

Despite the variations in their dosage forms and strengths, there are 26 essential generic psychotropic medicines included in the national medicine list of Ethiopia (FMHACA, 2015). Initially, the selection of these medicines specific to dosage forms and strengths has been made in light of WHO Model List of Essential Medicines, the National Essential Medicine Lists and the National Treatment Guidelines of Ethiopia (FMHACA, 2014; FMHACA, 2015; WHO, 2019) along with expert opinion from Addis Ababa University and feedbacks from Health Action International. Although 26 psychotropic medicines with specific strength and dosage forms have been selected for the pilot test, six medicines were not found in any piloted retail outlets. The reasons are that 4 of the six medicines are used only as emergency medicines at the inpatient level and not stocked in most outpatient pharmacies, where their availability is less important for outpatient users. These medicines included: clonazepam 1mg/ml injection, magnesium SO_4 50% in 20ml injection, lorazepam 1mg/ml

injection, midazolam HCL 1ml/ml injection. The other two, namely; bromazepam 3mg and quetiapine 50mg tablets do not have suppliers in Ethiopia. Besides, the price of bromazepam 3mg and quetiapine were not found in the MSH-2015 price indicator. So, the six medicines were excluded from the survey list. Therefore, the total number of medicines included in the final study was 20 essential psychotropic medicines. For each medicine in the survey list only the originator brand (the original patented pharmaceutical product) and the lowest-priced generic equivalent (LPG) were considered. The general categories of medications included in this study were anxiolytics, antipsychotics, antidepressants, antiepileptic, and mood stabilizers. The specific list of the essential psychotropic medicines included is indicated in the Annex-P&Q.

4.3 Study Design

An institution-based cross-sectional study was carried out between July 30 and September 18, 2019, using WHO/HAI tools to collect data on price and availability both in public and private retail outlets in Addis Ababa.

4.4 Source and Study Population

The source population was all of the medicine retail outlets in Addis Ababa (N=964) and the study population were 668 medicines retail outlets from which the sampled outlets had been selected using purposive sampling and fulfilling the inclusion criteria. For details see Annex-L.

4.5 Sample Size

The sample size was determined based on the WHO/HAI manual on medicine price and availability survey methodology (WHO and HAI, 2008). Accordingly, 60 retail outlets, 30 each from the public and private sectors, were included.

4.6 Eligibility Criteria for Medicine Outlets

Inclusion Criteria: Public health facilities that have outpatient pharmacies or dispensaries and private sector licensed retail pharmacies (closer to public health facilities) that are expected to stock psychotropic medicines were included in the study.

Exclusion Criteria: Public Health facilities that only stock a small number of emergency psychotropic medicine; and pharmacies in private clinics and hospitals or health facilities operated by private companies, such as mining companies, were excluded. Furthermore, drug shops were excluded from the study as they are not expected to stock any psychotropic medicines.

4.7 Sampling Strategy

There has been a wide variation in income levels among the residents of Addis Ababa, so the population is economically heterogeneous. During this study, the city was administratively divided into 10 Sub-Cities. As shown in Table 3, the ten sub-cities are stratified into three subgroups based on their relative per capita income and poverty status (Gebre-Egziabher et al., 2015). Accordingly, one sub-city from each sub-group was selected by using a simple random sampling.

Table 3: Grouping of sub cities based on income and poverty status

Burden of poverty	Sub Cities	Per capita income in birr/year	Rank
Group 1: 1%-10%	Bole	15551	1
	AkakiKality	13448	2
	Yeka	12146	4
Group 2: 11%-20%	Kirkos	12265	3
	Gullele	11008	6
	Nefas Silk Lafto	10264	7
	KolfeKeranyo	11059	5
Group 3: >20%	Lideta	8448	8
	Arada	8101	9
	Addis Ketema	7226	10

Source: Gebre-Egziabher et al., 2015.

In addition to economic status, accessibility to essential psychotropic medicines has also been affected by the type of health sector. The two main types of health sectors in Addis Ababa are the private health sector and public health sectors. Also, as the finding of the pilot test showed the availability of the list medicines were below 50% which require taking account of backup outlets to ensure a robust analysis of availability and price data. For the

purpose of estimating the sample size as per WHO Methodology, one sub city was considered as one survey area conceptually. As a result, additional 15 retail outlets per sector were included as backup outlets apart from the first 15 outlets to each sector. Thus, 30 retail outlets to each sector were assigned as an optimal sample size.

Subsequently, using equal quota sampling, a sample size of 30 was allocated to each public sector and private sector. Then proportional quota sampling was also used to determine the required sample size of medicine retail outlets within each sub city. Fortunately, the numbers of the public health facilities found in the sampled sub cities were relatively equal, and the sample size distributed to each sub-city was also equal. As per the total number of private retail pharmacies in each of the three selected sub-cities, proportional quota sampling was used to determine each sub-city's required number of medicine outlets. Besides this, the private outlets were purposively selected (based on their proximity to primary, secondary, and tertiary public health facilities surveyed- because of not to overestimate the poor availability of the medicines by collecting the data from remote private retail outlets) until each sub-city's fixed quota has been achieved.

Table 4: Distribution of health facilities in each sub city of Addis Ababa, 2019.

Subgroups	All Sub Cities	Study Population		Selected Sub cities	Sample Size		Total
		Public	Private		Public sector	Private sector	
Group:1	Bole	10	65	Bole Sub city	10	14	24
	AkakiKality	10	38				
	Yeka	15	71				
Group:2	Kirkos	10	30	Kolfe Sub city	10	8	18
	Gullele	13	130				
	Nefas Silk	10	26				
	KolfeKeranyo	11	38				
Group:3	Lideta	8	20	Addis Ketema	10	8	18
	Arada	13	102				
	Addis Ketema	10	38				
				Total	**30**	**30**	**60**

Sources: Addis Ababa Health Bureau's FMHACA 2019.

4.8 Data Collection Tool, Procedures and Data Collectors

Two pharmacists were appointed for this study as data collectors. They were trained for one day about the purpose of the study, the different names, strengths, dosage forms of medicines, how to complete the data collection form and how to calculate the unit prices. In addition, they were informed about the consequences of poor-quality data, the common data collection and data entry mistakes and problem-solving skills in the field.

Data on the price and availability of psychotropic medicines was collected by physically inspecting the stock of the OB medicines and their generic equivalents on the day of the survey from 30 private medicine dispensaries and 30 public health facilities using a standardized WHO data collection form (WHO and HAI, 2008). The equivalent generic product with the lowest unit price (LPG) was determined at the facility level, whereas the originator brand name and manufacturer of the product were identified in advance. For each medicine listed, information regarding the manufacturer, the pack size, and the pack price was recorded for both products. Public-sector procurement prices were gathered from the procurement unit of EPSA during the last two years. The unit prices of the medicines were defined as price per cap/tab or price per vial/amp/ml. These unit prices were calculated manually using the equation shown below.

$$\textbf{Unit Price} = \frac{\textbf{Price of Package of Medicine found}}{\textbf{Pack size of Medicine found}}$$

Both price lists and prices on the pack of medicine were used to fill the data for each surveyed medicine physically found in each sampled facility. The prices were converted to US dollars using the buying exchange rate, i.e. 1USD = 29.0256 ETB that was taken from the central bank of Ethiopian on July 30/2019, the first day of data collection (see Annex-J).

4.9 Data Quality Assurance

To maintain the quality of information generated from the collected data, a standard medicine price data collection form was used based on the template given and the form was validated in a pilot study undertaken for 20% of the total sample size prior to the actual data collection; namely, six public outlets and seven private outlets in Lideta sub city from July 25-26/2019 (Annex-D). The data in the pilot study was not included in the final study

results. The list of medicines, their strength and dosage forms were reviewed following the pilot test. Furthermore, during the actual data collection the questionnaire were revised for completeness of the forms and accuracy of unit prices in each day after completion of the field work. The principal investigator was regularly supervising the data collection and data entry processes. Information on the medicine price data collection forms have been checked again for legibility and consistency prior to the initiation of data entry. Double data entry has been done. The workbook auto checker was also employed to identify any discrepancies in data entry using the "double-entry" function to ensuring the accuracy of the data entry process. Descriptive statistics were also used to clean the raw data.

4.10 Data Analysis

Analyses were conducted using the recent version of WHO/HAI international price workbook-part I. The Statistical Package for the Social Sciences (SPSS) version 25 was also used to enter, edit and analyze the data. In order to measure the outcomes of this study, the following definitions were used.

4.10.1 Availability

In this study, medicine availability was defined as the presence of the survey medicines at the specified strength and dosage form in selected retail outlets on the day of the survey.

Availability was determined as the mean percentage availability of individual medicines, group of medicines, product types (originator brand vs. generic), of medicines between sectors. The following ranges were used to describe percentage availability (Gelders et al., 2006).

- < 30% very low
- 30–49% low
- 50–80% fairly high
- >80% high

4.10.2 Prices

In the analysis of price data, median prices of individual medicines in local currency; ratios of median local price to the external reference unit price (median price ratio or MPR);

median MPR across a group of medicines; and variations between product types (originator brand vs. lowest-priced generic) and sectors were calculated.

To facilitate national and international price comparisons, the international price guide indicator of Management Sciences for Health (MSH)- median supplier unit prices have been used to reference this study (MSH, 2016). Where no supplier prices were available, median buyer unit price was used in place. The MPR is the ratio of the median local price for each medicine across facilities divided by an international reference price (IRP) that was converted into local currency and the MPRs could not be calculated until at least four retail patient prices were available for the medicine in question from each sector.

$$\text{Median Price Ratio (MPR)} = \frac{\text{Median local price}}{\text{International reference unit price}}$$

Thus, the ratio tells us how much higher or lower the local medicine price is when compared to the international reference price. However, there are no unanimously accepted ways for interpreting MPRs to say that it is high, low, or about right; the medicine price components and the market systems are different among various countries.

So for this study, the following MPRs cut-off points were used to indicate acceptable local price ratios based on the definition used in similar surveys performed in Ethiopia and elsewhere with similar methodology (Wang et al., 2014, FMHACA et al., 2017).

- Public sector procurement price: MPR ≤ 1
- Public sector patient price: MPR ≤ 1.5
- Private retail pharmacy patient price: MPR ≤ 2

4.10.3 Affordability

The standard treatments for five different mental health conditions were obtained from the standard treatment guidelines and the current clinical practices at Amanuel Mental Health Specialized Hospital (FMHACA, 2014). So, the total monthly dose was determined by multiplying the commonly prescribed daily dose by 30 days. The affordability of treatments were assessed by taking into account the recently updated net salary of lowest paid government worker from the Federal Civil Service Authorities of Ethiopia which came into

effect from 8 July, 2019 which was 973 birr/month, or 32.28$/month (see Annex-K) . Accordingly, the daily wage was determined by dividing the net salary for 30 days, which was ETB 32.43/day, or USD 1.12/day. The local median prices of 16 psychotropic medicines were used in estimating affordability and treatment that cost only 1-day income or less was considered affordable to purchase (WHO and HAI, 2008).

4.11 Operational Definitions

For this study, the following definitions of terms had been used.

Originator brand (OB): It is a name given to a product of particular medicine when it was first marketed worldwide as a patented product for that medicine.

The lowest price generic (LPG) equivalent: It includes all versions of a particular medicine other than the originator brand containing the same active ingredient, whether marketed under a brand name ("branded generic") or the generic name.

Psychotropic Medicines: The term Psychotropic Medicines was used in this study as a general name for different types of medicines used to treat mental disorders which includes antipsychotics, antidepressants, anti-anxiety, mood stabilizers, and antiepileptic agents.

4.12 Research Ethics

The ethics review committee of the School of Pharmacy, Addis Ababa University, have approved the research proposal (See Annex-A). An official supporting letter from the department was also provided to the Addis Ababa City Administration Health Bureau /AACAHB/ to get approval to conduct the study (See Annex-B). Besides, ethical approval was also obtained from AACAHB (See Annex: C-H), followed by consent from Managers of each medicine retail outlet. Permission to research within the hospitals and health centers was requested from the medical superintendent and carried out after that. The pharmacists in each of the public medicine dispensing units gave their verbal consent before starting each data collection process. Similarly, in the private retail pharmacies, the data was collected from the medicine outlets after getting their consent through a verbal agreement made with the managers of the outlets. Any identifier of a particular study facility was excluded from

the data collection tools, and anonymity was secured throughout the data analysis and presentation of the results.

5. Results

5.1 Availability of Psychotropic Medicines

In this section, the mean was preferred to the median scale of measurement for reporting as the availability data was considered nearer to a normal distribution (See annex-N). The mean availability of the LPG psychotropic medicines in Addis Ababa city was found to be 24.33%. Out of the 20 psychotropic medicines surveyed, only the originator brand of carbamazepine was found in both sectors, and the mean availability of the OB across the 60 outlets was 2.4%. Generally, as depicted in Table 5, the 60 sampled outlets were categorized based on the stock status of the surveyed medicines. In most of the sampled medicine retail outlets from both sectors, the overall availability of the 20 LPG medicines in each outlet was very low. Especially in most private medicine outlets, these medicines were rarely found, although the number of private retail pharmacies was much greater than the number of the public medicine retail outlets found in Addis Ababa.

Table 5: LPG products (n=20) level of availability per outlet, Addis Ababa, 2019

Type of Medicine Outlets	**LPG Products Availability**				
	Very Low: ≤5	Low: 6-9	Fairly High:10-16	High:≥17	Total
Hospitals	0	2	2	1	5
Health Centers	14	10	1	0	25
Private Pharmacies	23	7	0	0	30
Total	37	19	3	1	60

The overall mean availability of the basket of medicines surveyed across the sample of 30 public medicine outlets was 28.7% for the LPG and 2.8% for the OB. Among the 20 essential psychotropic medicines surveyed, 1 OB and 17 LPG medicines were found across the sampled public sector medicine retail outlets. Medicines like alprazolam 0.5 mg tab, clozapine 25 mg tab and lamotrigine 50 mg tablet were not found throughout the sampled public medicine retail outlets, and the availabilities for most of the surveyed medicines were below 50%. The percentage availability for the OB of carbamazepine was 56.70% which was much greater than the availability of its LPG (3.3%). Besides, only 2 out of 20 LPG medicines had adequate availability, i.e., 80%, as shown in Table 6 below.

Table 6: Availability of medicines in public retails (n=30), Addis Ababa, 2019

Medicine Name	**Originator Brand (%)**	**Lowest Price Generic (%)**
Alprazolam 0.5 mg tab	0.0	0.0
Amitriptyline 25 mg tab	0.0	90.00%
Carbamazepine 200 mg tab	56.70%	3.30%
Chlorpromazine 100 mg tab	0.0	76.70%
Clomipramine 25 mg cap	0.0	3.30%
Clozapine 25 mg tab	0.0	0.0
Diazepam 5 mg tab	0.0	80.00%
Fluoxetine 20 mg cap	0.0	56.70%
Fluphenazine 25 mg/ml inj	0.0	13.30%
Haloperidol 2 mg tab	0.0	46.70%
Imipramine 25 mg tab	0.0	33.30%
Lamotrigine 50 mg tab	0.0	0.0
Lithium CO3 300 mg cap	0.0	6.70%
Olanzapine 5 mg tab	0.0	20.00%
Phenobarbital 30 mg tab	0.0	73.30%
Phenytoin 100 mg tab	0.0	26.70%
Risperidone 1 mg tab	0.0	16.70%
Sertraline 50 mg tab	0.0	13.30%
Sodium Valproate 200 mg tab	0.0	10.00%
Trifluoperazine 5 mg tab	0.0	3.30%
Mean availability	2.8%	28.7%
Median availability	0.0%	20.0%
Standard deviation availability	12.7%	30.6%

Similarly, from the private sector, availability data was also collected for the same list of medicines. Subsequently, the finding showed that neither the LPG nor the OBs of 11 medicines were found in any private medicine retail outlets. However, the remaining 9 medicines were found with availability ranging from 3.3% to 90.0% in medicine retail outlets in this sector (Table 7). The overall mean availability of these psychotropic medicines in the private sector was 19.8% for the LPG and 2.0% for the OB medicines. Besides this, it was only fluoxetine and sodium valproate out of the 20 LPG medicines with adequate availability, i.e., 80%.

Table 7: Availability of medicines in private retails (n=30), Addis Ababa, 2019

Medicine Name	Originator Brand (%)	Lowest Price Generic (%)
Alprazolam 0.5 mg tab	0.0	0.0
Amitriptyline 25 mg tab	0.0	56.70%
Carbamazepine 200 mg tab	40.00%	20.00%
Chlorpromazine 100 mg tab	0.0	13.30%
Clomipramine 25 mg cap	0.0	0.0
Clozapine 25 mg tab	0.0	0.0
Diazepam 5 mg tab	0.0	0.0
Fluoxetine 20 mg cap	0.0	83.30%
Fluphenazine 25 mg/ml inj	0.0	0.0
Haloperidol 2 mg tab	0.0	0.0
Imipramine 25 mg tab	0.0	0.0
Lamotrigine 50 mg tab	0.0	50.00%
Lithium CO3 300 mg cap	0.0	0.0
Olanzapine 5 mg tab	0.0	3.30%
Phenobarbital 30 mg tab	0.0	33.30%
Phenytoin 100 mg tab	0.0	0.0
Risperidone 1 mg tab	0.0	46.70%
Sertraline 50 mg tab	0.0	0.0
Sodium Valproate 200 mg tab	0.0	90.00%
Trifluoperazine 5 mg tab	0.0	0.0
Mean availability	2.0%	19.8%
Median percentage availability	0.0%	46.0%
Standard deviation availability	8.9%	29.7%

As shown in Table 8, based on the level of healthcare facilities sampled in the public sector, essential psychotropic medicines' availability was also analyzed. The mean availability of the LPG medicines in the health centers and hospitals were 24.2% and 51.0%, respectively. Similarly, the mean availability of the OB was 2.4% and 5% for health centers and hospitals, respectively. Besides, about 85% of the surveyed LPG medicines were observed only in one specialized mental hospital much higher than the mean availability of the LPGs in the 29 non-mental healthcare facilities (26.7%). Despite the number of public health facilities found at various healthcare levels, the mean availability of OB medicines was meager. Whereas the availability of LPG medicines was improved as the level of care has increased.

Table 8: Availability at various levels of care in public sector, Addis Ababa, 2019

Measurements	Product type	Health centers	Hospitals
Mean Availability	LPG	24.2%	51%
	OB	2.4%	5%
Median percentage Availability	LPG	24%	60%
	OB	0%	0%

Regarding availability of medicines across therapeutic groups, anxiolytics took the highest mean availability in the public sector, while mood stabilizers showed the lowest mean availability. However, in the private sector, antiepileptic and anxiolytics showed the highest and lowest mean availability, respectively. In general, the pooled mean availability has demonstrated that antidepressants were showing the highest mean availability and antipsychotics were indicating the lowest mean availability in Addis Ababa (Figure 3).

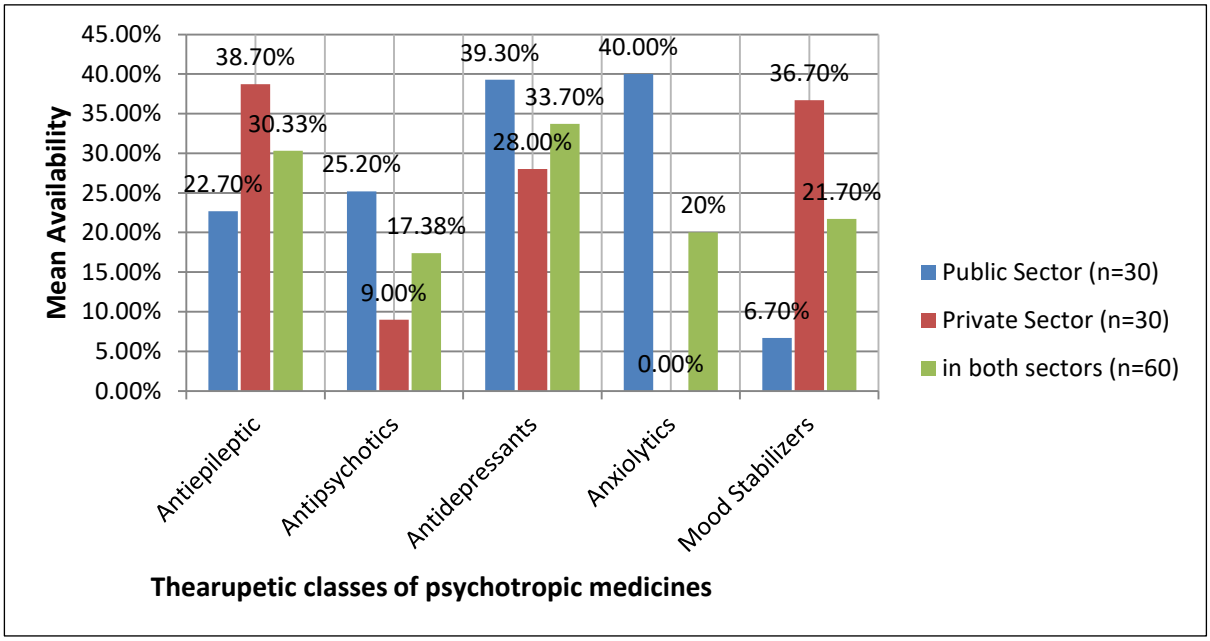


Figure 4: Mean availability of medicines by therapeutic classes, Addis Ababa, 2019

As shown in figure 4 below, the availability of at least one essential psychotropic medicine from each therapeutic class was only observed only in six public medicine retail outlets, and no retail outlet was found in the private sector that stock at least one psychotropic medicine

from each of the five therapeutic classes. The majority of the retail outlets in both sectors (n=28/60) were stocking at least one medicine from the three classes alone.

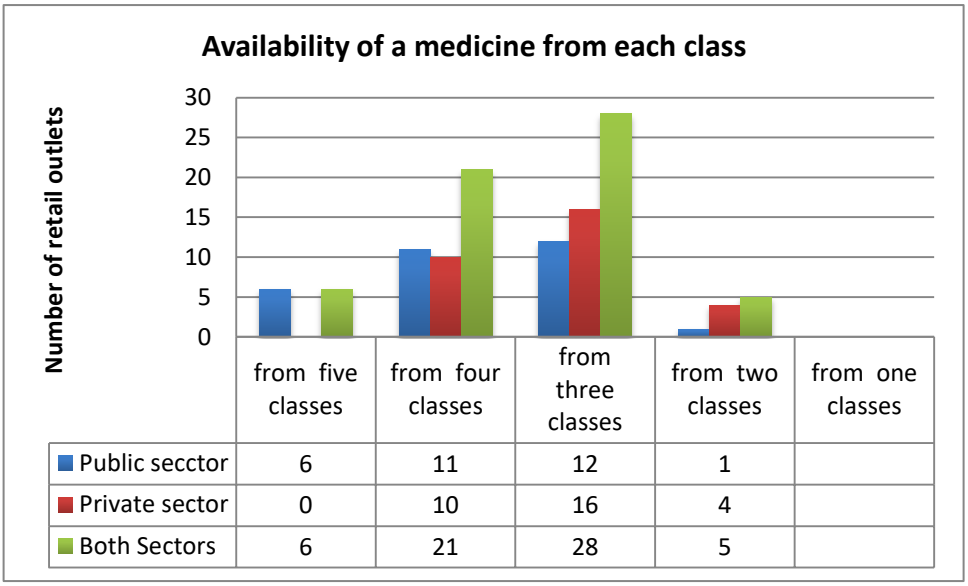


Figure 5: Availability of at least one medicine from each class, Addis Ababa, 2019

5.2 Price of Psychotropic Medicines

5.2.1 Public Procurement Prices

The procurement prices of one originator brand and 16 lowest price generic medicines were obtained. About half of the LPG medicines (n=8/16) were being procured more competitively at less than the international reference prices. Accordingly, the MPRs of clomipramine, diazepam, fluphenazine, imipramine, olanzapine, phenobarbitone, sertraline and sodium valproate were found to be less than one; whereas, the MPRs of alprazolam, amitriptyline, tegretol, carbamazepine, fluoxetine, lamotrigine, lithium and phenytoin were more than one. The MPRs for OB and LPG of carbamazepine 200mg tab were 4.36 and 1.68 times the international reference price, respectively. Also, as shown in table 9, the procurement price data of 4 LPG medicines were not found during the survey.

Table 9: Public sector procurement prices of medicines, Addis Ababa, 2019

No.	Medicine Name	Medicine Type	Median Price Ratio	Median Price
1	Alprazolam 0.5 mg tab	LPG	1.78	0.83
2	Amitriptyline 25 mg tab	LPG	1.94	0.47
3	Carbamazepine 200 mg tab	**OB**	4.36	2.34
3	Carbamazepine 200 mg tab	LPG	1.68	0.90
4	Chlorpromazine 100 mg tab	LPG		
5	Clomipramine 25 mg cap	LPG	0.39	0.54
6	Clozapine 25 mg tab	LPG		
7	Diazepam 5 mg tab	LPG	0.25	0.07
8	Fluoxetine 20 mg cap	LPG	2.66	0.80
9	Fluphenazine 25 mg/ml inj	LPG	0.65	15.77
10	Haloperidol 2 mg tab	LPG		
11	Imipramine 25 mg tab	LPG	0.73	0.38
12	Lamotrigine 50 mg tab	LPG	4.83	2.69
13	Lithium CO_3 300 mg cap	LPG	1.03	0.85
14	Olanzapine 5 mg tab	LPG	0.26	0.72
15	Phenobarbital 30 mg tab	LPG	0.45	0.10
16	Phenytoin 100 mg tab	LPG	1.54	0.47
17	Risperidone 1 mg tab	LPG	3.08	3.35
18	Sertraline 50 mg tab	LPG	0.89	0.60
19	Sodium Valproate 200 mg tab	LPG	0.60	1.22
20	Trifluoperazine 5 mg tab	LPG		

The summary findings of the procurement prices for 16 LPG showed that the minimum MPR was 0.25, the maximum MPR was 4.83, and the median MPR was 0.81, see table 10.

Table 10: MPRs for medicines in the public procurement, Addis Ababa, 2019

Statistics	LPG	OB
Number of medicines included	16	1
Median MPR	0.96	4.36
25 %ile MPR	0.44	4.36
75 %ile MPR	1.7	4.36
Minimum MPR	0.25	4.36
Maximum MPR	4.83	4.36

5.2.2 Retail Prices of Medicines in Public and Private Sectors

The patient prices of the surveyed psychotropic medicines in both sectors were depicted in table 11 below. In both sectors, the MPR of alprazolam 0.5 mg tab, clomipramine 25 mg cap, clozapine 25 mg tab, lithium CO_3 300 mg cap, and trifluoperazine 5 mg tab were not

calculated. This is because either these medicines were found in less than four outlets, or else these medicines might not be found at all in any one of the sample outlets in both sectors. For similar reasons in the public sector alone, the MPR of carbamazepine 200 mg tab, lamotrigine 50 mg tab and sodium valproate 200mg tab were not determined. In the same way to the public sector, diazepam 5 mg tab, fluphenazine 25 mg/ml inj., haloperidol 2 mg tab, imipramine 25 mg tab, olanzapine 5 mg tab, phenytoin 100 mg tab and sertraline 50 mg tab were not found in the private sector retail pharmacies as well.

Table 11: Prices of medicines in public and private retails, Addis Ababa, 2019

No.	Medicine Name	Medicine Type	Public (n=30)		Private (n=30)	
			MPR	Median Price	MPR	Median Price
1	Amitriptyline 25 mg tab	LPG	2.54	0.62	9.02	2.20
2	Carbamazepine 200 mg tab	LPG			4.89	2.63
3	Carbamazepine 200 mg tab	**OB**	5.21	2.8	11.17	6.00
4	Chlorpromazine 100 mg tab	LPG	0.6	0.25	1.08	0.45
5	Diazepam 5 mg tab	LPG	0.64	0.18		
6	Fluoxetine 20 mg cap	LPG	3.51	1.05	10.37	3.10
7	Fluphenazine 25 mg/ml inj	LPG	1.43	34.73		
8	Haloperidol 2 mg tab	LPG	1.64	1.04		
9	Imipramine 25 mg tab	LPG	1.33	0.7		
10	Lamotrigine 50 mg tab	LPG			24.28	13.53
11	Olanzapine 5 mg tab	LPG	0.52	1.42		
12	Phenobarbital 30 mg tab	LPG	0.92	0.2	6.89	1.50
13	Phenytoin 100 mg tab	LPG	2.74	0.83		
14	Risperidone 1 mg tab	LPG	6.43	7	4.64	5.05
15	Sertraline 50 mg tab	LPG	1.63	1.11		
16	Sodium Valproate 200mg tab	LPG			3.97	8.00

In the public sector, the summary findings in table 12 below showed that the median MPR amongst the 12 LPG medicines included in the price data analysis was 1.53. In contrast to the LPG, the MPR price for the OB of carbamazepine was 5.21, the same value throughout the remaining summary statistics since this patient price data was computed for one OB product only. In the private sector, 8 LPG medicines were included to analyze patient prices, and the median MPR amongst the 8 LPG medicines was 5.89. The median MPR price for the OB of carbamazepine was 11.17. Like the public sector, only the OB of the carbamazepine was also found in the private sector.

Table 12: Summary of patient prices in both sectors, Addis Ababa, 2019

Summary statistics	**Public Sector**		**Private Sector**	
Type of Medicines	LPG	OB	LPG	OB
Number of medicines included	12	1	8	1
Median MPR	1.53	5.21	5.89	11.17
25 %ile MPR	0.85	5.21	4.47	11.17
75 %ile MPR	2.59	5.21	9.36	11.17
Minimum MPR	0.52	5.21	1.08	11.17
Maximum MPR	6.43	5.21	24.28	11.17

Regarding the 'matched pair' MPR analyses, it was done for the OB and LPG of carbamazepine found in the private sector alone, which shows 11.17 median MPR for the OB and 4.89 median MPR for the LPG carbamazepine. As a result, the price of the OB showed a mark-up difference of 128.43% additional cost, more than the price of its LPG. While in the public sector, 'matched pair' analysis (which considers the available MPRs for only those survey medicines which existed in OB-LPG pairs) was not done for the OB and LPG carbamazepine on account of the LPG carbamazepine was found in less than four public outlets.

5.2.3 Inter-sectorial Comparisons of Price Mark-ups

In table 13 below, the comparison of the procurement prices and the public patient prices of about 10 LPG medicines showed an 89.4% mark-up difference between the procurement price and the patient price in the public sector. On the other hand, the patient price for the OB of carbamazepine in the public sector added a 19.7% mark-up from its procurement price. Above all, the mark-up difference between the procurement price and private patient prices was the highest mark-up. Similarly, on average, a 171.0% mark-up difference was observed in the private sector retail outlets compared to the patient price in the public sector.

Table 13: Comparisons of price mark-ups, Addis Ababa, 2019

Type of prices	Number of medicines found in both Sectors		Price Mark-up differences in %	
			LPGs	OB
Procurement price Vs. Public retail price	10 LPGs	1 OB	89.4%	19.7%
Procurement Price Vs. Private retail price	7 LPGs	1 OB	256.1%	156.5%
Public retail price Vs. Private retail price	5 LPGs	1 OB	171.0%	114.3%

5.3 Affordability of Psychotropic Medicines

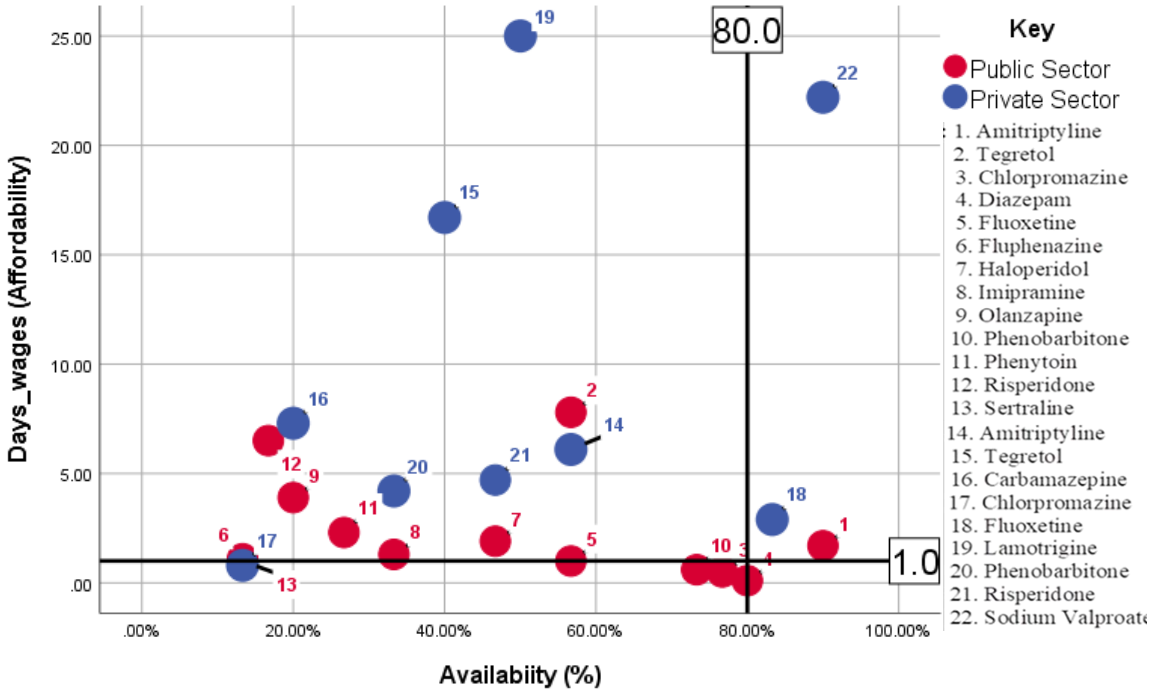
As table 14 below shows, in general, the LPG of fluoxetine, chlorpromazine, phenobarbitone, sertraline and diazepam tablets in the public sector was costing less than or equal to one day's wage for treating the specified mental disorders. However, the remaining LPG required more than one day's wage to buy the standard treatments in the public health facilities. For treating epilepsy, the OB of carbamazepine was not affordable in both the public and private medicine retail sectors. Similarly, some LPG treatment costs were surprisingly high when purchased in the private sector. For instance, treating epilepsy with lamotrigine 50 mg tablets required 25 days' wages, while treating bipolar disorders with sodium valproate cost 22.2 days' wages in the private retail pharmacies. In the private sector, only the cost of chlorpromazine was affordable.

Table 14: Affordability of standard treatments, Addis Ababa, 2019

Mental Disorders	Standard Treatments				Public Sector		Private Sector	
	Medicine, its Strength and Dosage Form	Treatment Duration (in Days)	Total doses per Treatment	Product Type	Median Treatment Price	Days' Wages	Median Treatment Price	Days' Wages
Depression	Amitriptyline 25 mg tab	30	90	LPG	55.80	1.7	198.00	6.1
	Fluoxetine 20 mg cap	30	30	LPG	31.50	1.0	93.00	2.9
	Imipramine 25 mg tab	30	60	LPG	42.00	1.3		
	Sertraline 50 mg tab	30	30	LPG	33.18	1.0		
Epilepsy	Carbamazepine 200 mg tab	30	90	Brand	252.00	7.8	540.00	16.7
				LPG			236.25	7.3
	Lamotrigine 50 mg tab	30	60	LPG			811.80	25.0
	Phenobarbitone 30 mg tab	30	90	LPG	18.00	0.6	135.00	4.2
	Phenytoin 100 mg tab	30	90	LPG	74.43	2.3		
Psychosis	Chlorpromazine 100 mg tab	30	60	LPG	15.00	0.5	27.00	0.8
	Fluphenazine Inj 25 mg/ml	30	1	LPG	34.73	1.1		
	Haloperidol 2 mg tab	30	60	LPG	62.40	1.9		
	Olanzapine 5 mg tab	30	90	LPG	127.58	3.9		
	Risperidone 1 mg tab	30	30	LPG	210.00	6.5	151.50	4.7
Anxiety	Diazepam 5 mg tab	10	10	LPG	1.78	0.1		
Bipolar	Sodium valproat 200 mg tab	30	90	LPG			720.00	22.2

When the analysis was made within each therapeutic class of medicines, fluoxetine and sertraline were the cheapest antidepressants. Similarly, phenobarbitone and chlorpromazine were the cheapest antiepileptic and antipsychotics, respectively, concerning their therapeutic group of medicines found in the public health facilities. Nevertheless, no medicines were found to estimate affordability in this sector for treating mood /bipolar disorders.

As shown in graph-1 below, availability was analyzed with the affordability of medicines. More than 88% (n=8 of 9) of medicines found in the private sector retail outlets were unaffordable. Furthermore, only fluoxetine and sodium valproate achieved the WHO availability target above 80% but with unaffordable prices. The availability of most LPG in the public sector was less than 80%, except amitriptyline and diazepam, which had ≥80% of availability.



Graph 1: Comparative Analyses of availability and affordability, Addis Ababa, 2019

6. Discussion

Access to mental healthcare services would substantially gain healthy life years and economic benefits (Johansson et al., 2016). In particular, pharmacological treatments have an essential role in reducing the large treatment gap of mental disorders in LMICs (WHO, 2017b). Regular access to medicines requires that all components of access frameworks must be fulfilled. The failure in one part of the framework poses a problem on the other components of access frameworks that leads to a malfunction of all domains of the access as they are interlinked and functioning jointly (MSH, 2012). Inaccessibility to medicines is widely considered as a weakness in the health-care system and a failure of governments to discharge their minimum obligations towards their citizens' right to health (WHO, 2011; Balasubramaniam, 2012). There are multiple barriers to access to essential medicines (Bigdeli et al., 2013). But in most of the time, poor medicine availability, high prices, and low affordability are key determinants of poor access to treatment in many LMICs. These three measures serve as key indicators of access to treatment (WHO, 2011). In the subsequent sections, the findings of this study on the medicines' availability, prices and affordability have been discussed.

This study found that the overall mean availability of the LPG psychotropic medicines in Addis Ababa was 24.3%. This value of mean percentage availability is below 30%, indicating a very low availability of essential psychotropic medication for the study area population (Gelders et al., 2006). Because of differences in dosage forms and strength of medicines included in each study, comparisons across studies in strict senses might be difficult. Moreover, the lack of similar studies locally or nationally on access to medication for mental disorders has made comparison challenging. However, a national pharmaceutical sector assessment in 2016 indicated a very low availability of medicines for non-communicable diseases, including mental disorders (FMHACA et al., 2017).

Furthermore, this figure was far from the optimum availability indexes recommended by WHO, above 80% (WHO, 2008). So, the finding implied that there had been a wide gap between what was done and ought to be done in ensuring access to essential psychotropic

medicines to reduce premature mortality and achieve universal health care coverage. This might be due to a lack of attention to mental health problems and the availability of limited resources for improving access to essential psychotropic medicines (WHO, 2009b; Cameron et al., 2012; WHO, 2018c). In the public sector, the mean availability of the LPG psychotropic medicines was 28.7%. So this availability figure was generally very low but higher in hospitals (51%) than in health centers (24.2%). Comparing this result to the previous study, the median availability of medicines for chronic illnesses, including mental disorders in the hospitals (81.81%), was more than two times the median availability in the health centers (36.36%). In comparison, the median availability for other medicine groups, for instance, anti-infective medicines were 87.5% in both the health centers and hospitals (FMHACA et al., 2017). This might imply an inequity of access to essential medicines for mental disorders at all healthcare levels.

Also, when comparing the percentage availability of individual medicines (carbamazepine, diazepam, and phenytoin) with their availability data of 2004, lower availability was observed in this study than the previous survey (Cameron et al., 2012). This implies no improvement in the supply side of access to essential psychotropic medicines while increasing demands for more mental health medicines were evident (Johansson et al., 2016). Poor availability of medicines in the public sector might be attributed to inadequate government funding to mental health and poor integration of the mental healthcare services at all levels of the healthcare (Alem et al., 1995; WHO, 2009b; McBain et al., 2012). In selected medicines (such as amitriptyline 25 mg tab, carbamazepine 200 mg tab, diazepam 5 mg tab, and fluoxetine 20 mg cap), the present study reported a better availability when compared with a study conducted in the public sector of Sudan (Kheder and Ali, 2012). Psychiatric health facilities were excluded in the Sudanese study, which might have contributed to decreased availability. The availability of amitriptyline, carbamazepine, diazepam, fluoxetine, and fluphenazine decanoate, was better than a study conducted in Pakistan except for the availability of carbamazepine tablet (Saeed et al., 2019).

On the other hand, this result is similar to a survey conducted among selected medicines for mental illnesses in the public sector of Brazil, where the average availability of these psychotropic medicines was low (32.2%) (Nascimento et al., 2017). The shortage was mainly due to inadequate budget and inefficient procurement processes of psychotropic medicines (Saraceno et al., 2007; Roberts et al., 2013; Oppong et al., 2016; Iseselo and Ambikile, 2017).

Similarly, in the private sector, the mean availability of LPG psychotropic medicines was 19.8%, which is lower than what was found in the public sector covered in this study. This was also similar to the finding of a previous national study conducted in Ethiopia (FMHACA et al., 2017). However, a study conducted in private sector of Malawi, which included selected psychotropic medicines, reported that the availability of these medicines was higher than the private retail outlets of this study. For instance, the availability of diazepam in the private sector in Malawi was 100% (Khuluza and Haefele-Abah, 2019). But, in the present study, diazepam was not found in all private facilities of Addis Ababa. The highly controlled nature of the medications and the fact that these medications are less prescribed in the private sector, might have contributed to their lower availability. Furthermore, when compared to another study, the mean availability in the private sector in Addis Ababa was less than the finding in the private sector of Saud Arabia (Al-Ruthia et al., 2017). This variation might have resulted from the dose and strength specific feature of this study. The overall mean availability in both sectors was very far from the recommended minimum availability of 80% (WHO, 2008). This entails that these medicines were not widely available across retail outlets and their lower availability were also accountable for the prices of medicines being relatively expensive (see Annex-O).

Concerning availability from each therapeutic class, only 20% of the public retail outlets (n=6/30) having at least one medicine from the five therapeutic groups of psychotropic medicines. Of these public retail outlets that stock at least one medicine from each class, most were hospitals (n=5/6). Most retail outlets were stocking at least one essential psychotropic medicine from the three classes alone from both sectors. This result was lower

than the result found in the public sector of Mozambique, where 45.8% of the health facilities had at least one medicine from each class (Bradley et al., 2015). This implies that the minimum availability of at least one medicine from each therapeutic class suggested by WHO (WHO, 2001a; WHO, 2005c) was not achieved yet. So, this limits the minimum care that could be provided to mental patients; despite of ensuring the availability of all psychotropic medicines is critical for better treatment outcomes (Huskamp, 2006). Besides, about 85% of the surveyed LPG medicines were observed only in one specialized mental hospital compared to mean availability in non-mental healthcare facilities (26.7%). This was similar to a WHO study and a study done in Mozambique which indicated that psychotropic medicines from each therapeutic category were more readily available in the mental health facilities than in non-specialized healthcare settings (WHO, 2010; Bradley et al., 2015). This showing the non-decentralization of the mental healthcare service to all levels of the healthcare in country's health systems.

Regarding procurement prices, out of the 20 LPG medicines surveyed, the prices of 16 LPG medicines were found in EPSA. Based on this procurement price data, the median MPR for the 16 LPG was 0.96 MPR, which was within the range of acceptable public procurement prices. However, when looking at the MPRs of each medicine, there were medicines purchased ≥1MPR. That means, while eight medicines were procured below 1 MPR (ranging from 0.25-0.89), the other halves were procured above 1 MPR (ranging from 1.03-4.83) compared with the IRPs (MSH, 2016). This data suggests the public procurement agency was showing an efficient procurement in 50% of the LPG medicines for which prices were obtained. Again, when compared the procurement prices of selected medicines (carbamazepine, diazepam, and phenytoin) with the previous study, the MPRs of carbamazepine=1.68 and phenytoin=1.54 in this study was increased by 184.75% and 258.14% respectively from the MPRs of carbamazepine=0.59 and phenytoin=0.43 in 2004 (Cameron et al., 2012). For some of the medications indicated, the purchasing efficiency of the public procurement sector in 2004 was better than in 2019. The need to explore the underlying factors that cause such expensive medicine procurement prices is imperative. Maintaining the public procurement prices within the acceptable range (≤1MPR) is very

decisive, particularly for low-income countries like Ethiopia, in improving access to key medicines for mental disorders (Gelders et al., 2006).

About the OB medicines, only the OB of one medicine was procured by EPSA. It was the OB of carbamazepine, and its median MPR was found to be 4.36 times the IRPs. This was above the acceptable public procurement price cut-off point used in this study (≤1MPR), and this price of the OB cost 159.5% more than the price of its LPG.

Concerning patient prices, the median patient price for 12 LPG out of the 20 surveyed psychotropic medicines in the public sector retail outlets was found to be 1.53 MPR. This price was slightly above the acceptable MPR price cut-off point used in this study (≤1.5MPR), but it was generally showing an improvement in the public sector retail outlets. However, for 6 LPG, the public patient prices were clearly above 1.5MPR (ranging from 1.63-6.43 MPRs). These high prices are resulted from the same medicines purchased with costs above 1MPR during the procurement, except sertraline 50mg tablet that was expensive due to the excessive markup (83.15%). This data substantiated that not only procurement prices that directly affect the patient prices of medicines in the public health facilities but also the markups that significantly affects the patient price (WHO, 2011). The MPR prices data for selected medicines such as diazepam, and phenytoin showed an improvement in the public retail outlets when compared with 2004 data (Cameron et al., 2012). Similarly, in this report, the MPR price data for amitriptyline (2.54 MPR) decreased while the price of fluoxetine (3.51 MPR) increased compared to the previous 2017 data, which were 3.78 MPR and 2.21 MPR, respectively. The cost of fluoxetine showed an increase by 58.82% from the previous national survey (FMHACA et al., 2017). Inflation of the local currency during this study might have contributed for the increase.

The median MPR price of the OB for carbamazepine in the public sector was 5.21 MPR. However, the markup difference between the procurement price and patient price of the OB was 19.7% which is below the average markup of the study area (22.04%) (FMHACA et al., 2017). This might indicate that the government seems to apply a regressive markup pricing

strategy (using lower markup for higher-priced products rather than fixed percentage markups) in the public retail outlets (WHO, 2015a).

Furthermore, as per the unpaired MPR analysis, the median MPR of patient prices in the private sector across 8 LPG medicines was 5.89 MPR which was more than the acceptable cut-off price used in this study and higher than four MPR of the IRPs (WHO, 2008). Then, this median MPR price showed 284.97% higher prices in the private sector than the median MPR of the patient price in the public retail outlets (1.53 MPR). Again, the MPR prices for 7 LPG out of 8 LPG (87.5%) were ranging from 3.97 MPR- 24.28 MPR, which were > 2 MPR. So, obviously it was only the MPR price of chlorpromazine 100 mg tablet (1.08 MPR) found within the acceptable price range for private retail outlets (≤ 2 MPR). Consequently, this implies that the low availability of medicines at public medicine retail outlets could directly impact access to essential psychotropic medicines as patients are then forced to buy these medicines from private pharmacies. By the same token, the better availability in the public sector would pressure the private sector to lower the price of these generic medicines due to competition (UN, 2015). In addition, the higher mark-up prices in the private sector might be due to the lack of medicine price regulating mechanisms (FDRE, 1993), and the variation in the type of procurement methods used between the two sectors (WHO, 1999; MSH, 2012; Ashigbie et al., 2016). Similarly, the MPRs for amitriptyline and fluoxetine were increased by 215.38% and 625.17%, respectively compared to the result of previous study in the private sector (FMHACA et al., 2017).

When looking at the outcomes of affordability analysis, the costs of the standard treatments were calculated using the lowest salary of the unskilled government workers as a proxy for the affordability of medicines to the mental disorders in Addis Ababa city. Most of the psychotropic medicines found across both sectors were less affordable. However, 5 of 12 LPG medicines were found to be affordable in the public retail outlets meeting the affordability targets of WHO (WHO and HAI, 2008). The other 7 LPG were unaffordable, requiring from 1.1 to 6.5 days' wages to cover a month of treatment. This shows that more than 58% of LPG found in the public outlets were unaffordable for the lowest paid unskilled

government workers in Addis Ababa. So patients who could not afford such out-of-pocket costs would forgo the treatment that leads to increasing the burden of mental illness (Rowan et al., 2013; Johansson et al., 2016). For unaffordability of medicines at least in the public sector were not only the medicine prices but the low income of the lowest paid workers have been also a contributing factor (Khuluza and Haefele-Abah, 2019). The need to employ one of the feasible price-reducing interventions on generic medicines in the public sector retails has been considered the only way to access medicines for many low-income patients (WHO, 2015a).

In the private outlets, only the cost of chlorpromazine 100 mg tablet was affordable out of the 8 LPG medicines found in this sector. The present study showed that 87.5% of the existing treatments for mental disorders in private retails were non-affordable to a vast majority of people with a mental health conditions in Addis Ababa City. The cost of amitriptyline and fluoxetine in this report was higher than the national survey (FMHACA et al., 2017). Equally, the cost of medicines in private retail outlets documented in this study required more days' wages than previous studies done in different countries (Cameron et al., 2012; Saeed et al., 2019).

This may be due to the market system we have followed. Nevertheless, the prices of key medicines, including essential psychotropic ones, cannot be left solely to market forces (WHO, 2005b). Otherwise, in a population with low-income levels and high medicine prices, it would mean that access to medicines is only affordable to the wealthy persons (UN, 2013). Moreover, costs of the OB were unaffordable in both sectors, which required 16.7 days wage and 7.8 days wage to buy 30 days' supply from private and public retail outlets, respectively. This data was similar to a study done by WHO expert groups (Ewen et al., 2017). However, as the affordability data in this study was estimated from one OB alone, this report might be less conclusive about the affordability of OBs for psychotropic medicines in this study.

In the present study, to assess affordability, only a month supply was considered. However, mental disorders are chronic diseases that require lifelong treatment, consequently leading

for higher costs and catastrophic expenditures (Hailemichael et al., 2019). It is, therefore, impossible to solve such chronic health problems in short-term financial coping strategies (Cameron et al., 2012; Obembe et al., 2020). In addition, the affordability metric used in this study does not include other expenditures such as costs for basic needs, transportation, diagnosis and consultation, other comorbidities, etc., which would cause treatment to be even more unaffordable. Still, there are on average, 18.9% and 23.5% of the population living under the absolute poverty line in Addis Ababa and Ethiopia, respectively (Gebre-Egziabher et al., 2015; FDRE, 2018). Thus, even treatments that seem affordable in this report are very expensive for the poorest part of the population in Addis Ababa that puts people at risk of impoverishment-where the already poor people are likely to sink even further into poverty due to the impact of mental illness on their incomes since poverty and mental illness are directly correlated (WHO, 2007). On account of this, alternative financing mechanisms like community based health insurance (CBHI) in Addis Ababa are indispensable to ensure access to essential medicines for mental illness by removing financial barriers, especially out-of-pocket payments (WHO, 2003b; Ethiopian Health Insurance Agency, 2015).

Finally, this study would provide important picture about access to psychotropic medications. Stakeholders such as MOH, AACAHB, and Amanuel hospital were involved during the proposal development and their suggestions were included in the actual study. Additionally the clinical importance of the surveyed medicines has also been triangulated between the national essential list, the national standard treatment guideline, the procurement list of EPSA, MSH 2015 price lists, and WHO essential lists. Moreover, variations on the type of health sectors and the economic status of the general population for access to medicines in the study area were considered. Generally, all the feasible efforts have been made for ensuring the quality of data presented in this report to be reliable and valid information. However, this study has not been without limitations. The data on the availability of medicines was collected at a specific day. Consequently, it does not indicate the average monthly or yearly availability of essential psychotropic medicines at the individual pharmacy outlets. Besides this, some psychotropic medicines studied, such as

carbamazepine, phenobarbitone, phenytoin, risperidone, and sodium valproate, were found in different strengths and formulation types other than what was specified in the medicine price data collection form. As a result, such medicines found with other dosage forms and strengths were excluded from this study. Therefore, the non-availability and lower availability of these medicines may not give sense because they are available but with different strengths and dosage forms. Moreover, an outdated MSH 2015 medicines price list has been used to estimate the medicines' MPR price. Therefore, the price analysis made from the prices data of MSH 2015 and excluding the availability of surveyed medicines in less than four outlets may also make the outcome of the MPRs less robust. Lastly, when other costs were also considered, treatments that appear relatively affordable in this study might represent an overestimation of affordability. Thus, all of these shortcomings need to be known while considering for generalizing the outcomes of this study to the entire population of Addis Ababa or Ethiopia.

7. Conclusion

Results from the observed data have revealed that the mean availability of the LPG psychotropic medicines was generally very low in Addis Ababa–yet it was better in the public health facilities than in private retails. Availability was lower in health centers than in hospitals. In both sectors, most retail outlets were stocking at least one medicine from three classes alone. In all medicine outlets, only the OB of carbamazepine was found with extremely low availability.

The public procurement prices for half of the surveyed psychotropic medicines were found high. Moreover, in both sectors, the patient prices for more medicines were high and the costs for most of the standard mental treatments were considered unaffordable not only to the lowest-paid government workers but also to most populations living under poverty line in Addis Ababa, especially in the private outlets.. Consequently, they are inaccessible, especially to chronically mentally ill patients with low income.

8. Recommendation

Based on the conclusion, the following inductive inferences have been made to stakeholders. Recommendations for practices:

1. The mean availability of essential psychotropic medicines in public retail outlets should be more than 80%. The sufficient availability of these medicines with the lowest prices in the public dispensing units will also help enforce the private retail outlets to reduce the prices through the competition when patients have free options to buy the lowest priced psychotropic medicine at public medicine dispensaries.
2. Equitable access to essential psychotropic medicines should be ensured at all public healthcare levels.
3. There should be at least one psychotropic medicine from each therapeutic class in the private medicine retail outlets.
4. By adhering to the principles for good procurement practices, public medicine procurement efficiency should be improved to decrease procurement prices.
5. The existing psychotropic medicines procurement and distribution systems should be examined and updated to improve availability and affordability.

Recommendations for policy:

6. The government should allocate an adequate budget for essential psychotropic medications in stable financing ways.
7. Any cost of treatments for chronic mental disorders is becoming unaffordable to most patients in the long run. Hence the government should strengthen the existing community based healthcare financial risk protection mechanisms in the general population to reduce premature mortality and achieve universal healthcare coverage instead of relying on out-of-pocket payments that lead to catastrophic expenditure and/or under-treatment, particularly for the lower-income population.
8. The government should give free mental healthcare services in the public sector and subsidization of treatment in the private sector for patients living below the poverty line.
9. As mental disorders are chronic diseases and directly related to poverty, the government should work on reducing poverty and improving the people's income at least to the level that can afford the price paid for a more significant number of essential psychotropic medicines sold in public medicine dispensaries apart from securing subsistence needs.
10. In the private sector, the government should apply suitable price controlling mechanisms that can prevent excessive markups along the supply chain of psychotropic medicines to ensure the affordability of treatments in this sector.

Recommendations for Research:

11. Understanding the reasons for the inaccessibility of essential psychotropic medicines must be clear. Hence more in-depth research will be required to identify the determinants of high medicine prices, low availability and poor affordability specific to essential psychotropic medicines in Addis Ababa to develop evidence-based interventions.

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10. Annexes

Annex-A: Letter of Ethical Clearance from School of Pharmacy, AAU

በ ፋርማሲ ት/ቤት
የኢቲካል ሪቪው ቦርድ

አዲስ አበባ ዩኒቨርሲቲ
Addis Ababa University

School of Pharmacy
Ethical Review Board

ቀን Date: June 26, 2019

ቁጥር Ref. No.: ERB/SOP/110/06/2019

To: **Molla Teshager**

School of Pharmacy

Re: **Ethical Clearance**

It is to be recalled that you submitted a study proposal entitled ***"Measuring availability price and affordability of essential Psychotropic medicines in Addis Ababa"*** for ethical approval by the School's Ethical Review Board (ERB). The Board thoroughly reviewed the proposal based on its operational guidelines and found it to fulfill all ethical requirements stipulated in the guidelines. This is, therefore, to inform you that the proposal is ethically approved for implementation.

With best regards,

Arebu Issa

Chairperson, ERB

☎ 00251156 02 12 ✉ 1176 ቴሌክስ Telex: 21205 ፋክስ Fax: 00251(11)1558566 ቴሌግራም Cable: AAUNIV

Annex-B: Letter from the Department of Pharmaceutics & Social Pharmacy

Addis Ababa University
አዲስ አበባ ዩኒቨርሲቲ

በፋርማሲ ት/ቤት
የፋርማሲዩቲክስና ሶሻል ፋርማሲ
ትምህርት ክፍል

School of Pharmacy
Department of Pharmaceutics
and Social Pharmacy

ቁጥር፡ ph/ceutics/370/11/2019
ቀን፡ ሰኔ 27 ፣ 2011 ዓ.ም

ለሚመለከተው ሁሉ

ጉዳዩ፡ትብብርን ይመለከታል

ከላይ በርዕሱ ለመግለጽ እንደተሞከረው በአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮሌጅ የፋርማሲ ት/ቤት የፋርማሲዩቲክስና ሶሻል ፋርማሲ የ2ኛ ዓመት Pharacoepidemiology & Social pharmacy ተማሪ የሆነው ሞላ ተሻገር አየሁ በ"Measuring availabiity, price & affordability of essential psychotropic medicines in Addis Ababa"በሚል ርዕስ ላይ የማስተርስ ቲሲስ ጥናት ለመስራት ስለፈለጉ አስፈላጊውን መረጃ በመስጠት ትብብር በናንተ በኩል ይደረግላቸው ዘንድ በትህትና እንጠይቃለን ። ለመማር ለማስተማር ስራችን ለምታደርጉት በጎ አስተዋጽኦ ከልብ እናመሰግናለን።

ከሰላምታ ጋር

ብሩክ ሞሲሶ (ዶ/ር)
የፋርማሲዩቲክስና ሶሻል ፋርማሲ ትምህርት ክፍል ኃላፊ

☎ +251118697102 ✉ 1176 ቴሌክስ telex: 21205 ፋክስ Fax : oo251(11)1558566 ቴሌግራም Cable: AAUNIV

Annex-C: <u>Ethical Approval Letter from Addis Ababa Health Bureau</u>

አዲስ አበባ ከተማ አስተዳደር ጤና ቢሮ
City Government of Addis Ababa Health Bureau

Ref.No. ጽ/ጤ/ጤ/411/22
Date 15/11/2011

TO:

- **Addis Ketema Sub-City Health Office**
- **Kolfe Keranio Sub-City Health Office**
- **Bole Sub-City Health Office**
- **Lideta Sub-City Health Office**
- **Yekatiti 12 Medical College Hospital**
- **Ras Desta Hospital**
- **Menilik II Referral Hospital**

Addis Ababa

Subject: Request to access Health Facilities to conduct approved research

The letter is to support **Molla Teshager Ayehu** to conduct research, which is entitled as ''**Measuring Availability, Price & Affordability of Essential Psychotropic Medicines in Addis Ababa** .'' The study proposal was duly reviewed and approved by Addis Ababa Health Bureau IRB, and the principal investigator is informed with a copy of this letter to report any changes in the study procedures and submit an activity progress report to the Ethical Committee as required. Therefore we request the Health facility and staffs to provide support to the principal investigator.

The Addis Ababa City Administration Health Bureau

With Regards

Dr. Yohannes W/kidan

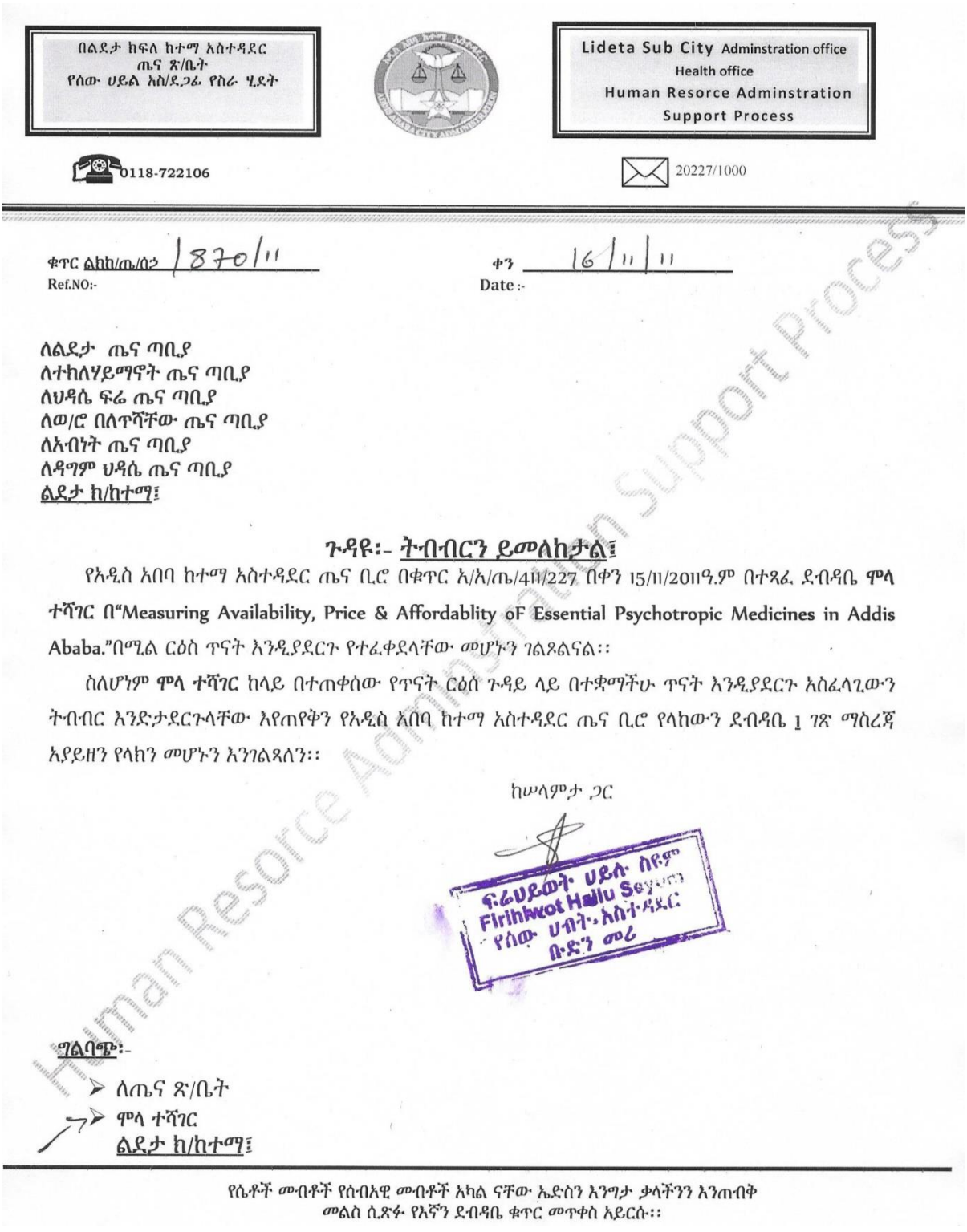
Ethical Clearance Committee

Cc

- **Molla Teshager Ayehu**
- **To Ethical Clearance Committee**

Addis Ababa

Annex-D: Supporting Letter From Lideta Sub City Administration Health Office



በልደታ ክፍለ ከተማ አስተዳደር
ጤና ጽ/ቤት
የሰው ሀይል አስ/ደጋፊ የስራ ሂደት

Lideta Sub City Adminstration office
Health office
Human Resorce Adminstration
Support Process

0118-722106

20227/1000

ቁጥር ልክከ/ጤ/ሰኃ 1870/11
Ref.NO:-

ቀን 16/11/11
Date :-

ለልደታ ጤና ጣቢያ
ለተክለሃይማኖት ጤና ጣቢያ
ለሀዳሴ ፍሬ ጤና ጣቢያ
ለወ/ሮ በለጥሻቸው ጤና ጣቢያ
ለአብነት ጤና ጣቢያ
ለዳግም ሀዳሴ ጤና ጣቢያ
ልደታ ክ/ከተማ፤

ጉዳዩ፡- ትብብርን ይመለከታል፤

የአዲስ አበባ ከተማ አስተዳደር ጤና ቢሮ በቁጥር አ/አ/ጤ/411/227 በቀን 15/11/2011ዓ.ም በተጻፈ ደብዳቤ **ሞላ ተሻገር** በ"Measuring Availability, Price & Affordablity oF Essential Psychotropic Medicines in Addis Ababa."በሚል ርዕስ ጥናት እንዲያደርጉ የተፈቀደላቸው መሆኑን ገልጾልናል፡፡

ስለሆነም **ሞላ ተሻገር** ከላይ በተጠቀሰው የጥናት ርዕሰ ጉዳይ ላይ በተቋማችሁ ጥናት እንዲያደርጉ አስፈላጊውን ትብብር እንድታደርጉላቸው እየጠየቅን የአዲስ አበባ ከተማ አስተዳደር ጤና ቢሮ የላከውን ደብዳቤ 1 ገጽ ማስረጃ አያይዘን የላክን መሆኑን እንገልጻለን፡፡

ከሠላምታ ጋር

ፍሬህይወት ሀይሉ ስዩም
Firihiwot Hailu Seyoum
የሰው ሀብት አስተዳደር ቡድን መሪ

ግልባጭ፡-
- ለጤና ጽ/ቤት
- ሞላ ተሻገር

ልደታ ክ/ከተማ፤

የሴቶች መብቶች የሰብአዊ መብቶች አካል ናቸው ኤድስን እንግታ ቃላችንን እንጠብቅ
መልስ ሲጽፉ የእኛን ደብዳቤ ቁጥር መጥቀስ አይርሱ፡፡

Annex-E: Supporting Letter From Bole Sub City Administration Health Office

በቦሌ ክፍለ ከተማ አስተዳደር
ጤና ጽ/ቤት

Bole Sub city Administration
Health Office

ቁጥር ቦ/ክ/ከ/ጤ/ጽ/1.5/ሰ 6ት2 /11

ቀን 23/11 /11

በቦሌ ክ/ከተማ አስተዳደር ጤና ጽ/ቤት

- ለ17 ጤና ጣቢያ
- ለቦሌ ቡልቡላ ጤና ጣቢያ
- ለመሪ ጤና ጣቢያ
- ለገርጂ ጤና ጣቢያ
- ለሰሚት ጤና ጣቢያ
- ለጎሮ ጤና ጣቢያ
- ለ17/20 ጤና ጣቢያ
- ለድልፍሬ ጤና ጣቢያ
- ለአሞራው መታሰቢያ ጤና ጣቢያ
- አራብሳ ጤና ጣቢያ

አዲስ አበባ

ጉዳዩ ትብብር እንዲደረግላቸው ስለመጠየቅ፤

ከላይ በርዕሱ ለመግለጽ እንደተሞከረው አቶ ሞላ ተሻገር አየሁ ከአዲስ አበባ ከተማ አስተዳደር ጤና ቢሮ በቁጥር አ/አ/ጤ/ጽ/411/227 በቀን 15/11/2011 በተፃፈ ደብዳቤ መሠረት " Measuring Availability, Price & Affordability of Essential Psychotropic Medicines in Addis Ababa, በሚል ርዕስ ጥናታቸውን ለማድረግ ዝግጅት ላይ ይገኛሉ። በእናንተ በኩል አስፈላጊውን መረጃ እንዲያገኙ ትብብር ታደርጉላቸው ዘንድ እናሳውቃለን።

ከሠላምታ ጋር

ደመቀ ዋንው
ጤና ጽ/ቤት ኃላፊ

ግልባጭ፡-

በቦሌ ክፍለ ከተማ አስተዳደር

- ለጤና ጽ/ቤት
- ለአቶ ሞላ ተሻገር አየሁ

አዲስ አበባ

Annex-F: Supporting Letter From Kolfe Keranyo Sub City Administration Health Office

የኮልፌ ቀራንዮ ክ/ከተማ ጤና ጽ/ቤት

KOLFE KERANYO SUB - CITY HEALTH OFFICE

ቁጥር፣ ክ/ቀ/ክ/ከ/ጤ/ፅ/ 708/72

ቀን፣ 30/11/2011

በኮልፌ ቀራንዮ ክ/ከተማ አስተዳደር

- ለወረዳ 1 ጤና ጣቢያ
- ለወረዳ 03 ጤና ጣቢያ
- ለወረዳ 05 ጤና ጣቢያ
- ለወረዳ 06 ጤና ጣቢያ
- ለወረዳ 09 ጤና ጣቢያ
- ለቀራንዮ ጤና ጣቢያ
- ለፊሊጶስ ጤና ጣቢያ
- ለሱሚ ሜዳ ጤና ጣቢያ
- ለኮልፌ ጤና ጣቢያ
- ለሚኪሊላንድ ጤና ጣቢያ
- ለአለም ባንክ ጤና ጣቢያ

አዲስ አበባ

ጉዳዩ፡- ትብብር እንዲደረግላቸው ስለማሣወቅ፣

ከላይ በርእሱ ለመግለፅ እንደተሞከረው ሞላ ተሻገር አየሁ በቁጥር አ/አ/ጤ/411/227 በቀን 15/112011 በተፃፈልን ደብዳቤ መሠረት " Measuring Availibility,Price & Affordability of Esential Psychotropic Medicines in Addis Ababa., ≤ በሚል ርእስ ጥናት እንዲያደርጉ ኘሮፖዛላቸውን በአዲስ አበባ ከተማ ጤና ቢሮ ኢትካል ሪቪው ኮሚቴ ተረጋግጦ እንዲያካሂዱ ተፈቅዶላቸዋል። በመሆኑም ጤና ጣቢያችሁ ለጥናቱ የተመረጠ በመሆኑ አስፈላጊውን ትብብር ታደርጉላቸው ዘንድ እናሳውቃለን።

ከሠላምታ ጋር

አልፍኝሽ [illegible] ሃላሁን

ጤና ማኅልበትና በሽታ መከላከል ዋና የሥራ ሂደት አስተባባሪ

City Government of Addis Ababa Kolfe Keraniyo Sub-city Health Office

ግልባጭ፣

- ለሞላ ተሻገር አየሁ
  አዲስ አበባ
- ለጤና ማኅልበት በሽታ መከ/የሥራ ሂደት
  ጤና ፅ/ቤት

☎ 0118 – 35 12 11

ADDIS ABABA - ETHIOPIA

" አንድም እናት ስምን ትጡት "

Annex-G: <u>Supporting Letter From Addis Ketema Sub City Administration Health Office</u>

በአዲስ አባባ አስተዳደር የዲስከተማ አስተዳር ጤና ጽ/ቤት

City Government of Addis Ababa Addis ketema sub city Health Office

ቀን 07/12/11 ቁጥር :- አ/ከ/ክ/ክ/ጤ/ጽ/317/2011

በአዲስ ከተማ ክፍለ ከተማ አስተዳደር ጤና ጽ/ቤት

- ለግንቦት 20 ጤና ጣቢያ
- ለአቢሲኒያ ጤና ጣቢያ
- ለወረዳ 3 ጤና ጣቢያ
- ለአዲስ ከተማ ጤና ጣቢያ
- ለአበበ ቢቁላ ጤና ጣቢያ
- ለፊሰገ መለስ ጤና ጣቢያ
- ለአዲስ ራዕይ ጤና ጣቢያ
- ለአፎይታ ጤና ጣቢያ
- ለሚሊኒየም ጤና ጣቢያ
- ለኳስ ሜዳ ጤና ጣቢያ

<u>አዲስ አበባ</u>

ጉዳዩ I <u>ትብብር እንዲደረግላቸው ስለመጠየቅ</u>

ከላይ በርሱ ለመገለጽ እንደተሞከረው አቶ ምላ ተሸንር አየሁ ከአዲስ አባባ አስተዳር ጤና ቢሮ በቁጥር አ/ከ/ጤ/ጽ/ጽ/411/227 በቀን 15/11/2011 በተጻፈ ደብዳቤ መሰረት Measuring Availabilitiy price affordability of essential PSYCHOTRIPHIC medicine inAddis Abeba በሚል ርዕስ ጥናታቸውን ለማድረግ ዝግጅታቸውን ላይ ይገኛሉ :: ስለሆነም በአናንተ በኩል አስፈላጊውን ትብብር እንድታደርጉላቸው እንጠይቃለን::

ከሰላምታጋር!

መንግስቱ ከበበደጎይ

ኤች አይ ቪ ኤድስ መ/መ ዋና ሂ/አስተባባሪ

<u>ግልባጭ</u>

ለ አቶ ምላ ተሸንር

Annex-H: Supporting Letter From Amanuel Mental Specialized Hospital

ኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
የጤና ሚኒስቴር
የአማኑኤል ስፔሻላይዝድ ሆስፒታል
Federal Democratic Republic Of Ethiopia
Ministry of Health
Amanuel Mental Specialized Hospital

Ref No. ፖሚ/1481/26

Date 24-12-11

To: Molla Teshager

The Ethical Review committee of the Amanuel Mental Specialized Hospital has gone through your project proposal **"Measuring availability, price and affordability of essential Psychotropic Medicines in Addis Ababa".** The committee found nothing unethical in the methodology of acquiring data or in the overall content of the project proposal. The committee informs you that you are allowed to continue your research in the hospital and the service staff are here by informed for giving you the necessary support required.

With Regards

ቶለሳ ፋንታ ጂልቻ
Tolesa Fanta Jilcha
የምርምር ዳይሬክተር
Research Director

CC//

- CEO
- Research and Training Directorate
- Medical Director Office
- Research Directorate

AMSH

Federal Democratic Republic Of Ethiopia Ministry of Health Amanuel Mental Specialized Hospital

Annex-I: Consent Soliciting Letter to Study Participants

Date: 30 July 2019

To: Study Participants

Re: Seeking Informed Consent

Dear Participants,

My name is Molla Teshager Ayehu, a Master student in Pharmacoepidemiology and Social Pharmacy at School of Pharmacy, College of Health Sciences in Addis Ababa University. As part of this degree course requirement, currently I am undertaking a research on the topic of **Access to Essential Psychotropic Medicines in Addis Ababa City: A Cross-sectional Study**. To help you make an informed decision regarding your participation, this letter will explain what the study is about, the possible risks and benefits, and your rights as a research participant. If you do not understand something in this letter, please ask one of the contact persons mentioned below prior to consenting to the study.

The research proposal has been reviewed & approved by Addis Ababa University Ethical Review Board of Pharmacy School (ERB/SOP/110/06/2019) and this work is carrying out in accordance with methods promoted by the World Health Organization & Health Action International. The research team consists of the principal investigator with the data collectors begin to collect information from private registered pharmacies and public medicine dispensing outlets on the price and availability of selected essential psychotropic medicines in your area. As you are aware, availability & price of psychotropic medicines is one of the great concerns to mentally ill patients who are leading their life with the help of these medicines. So that your medicine retail outlet, which is expected to stock most of the listed medicines, is selected as a possible participant in this study. The primary purpose of your participation in this research is to provide the required data about the accessibility of the originator brand and their least price generic version of each of the 20 psychotropic medicines considered in this survey. And the data you give will be used as an input for completing my MSc thesis research study. It will also help policy makers & stakeholders to

understand the challenges of access to essential psychotropic medicines and so that to find ways of addressing inaccessibility at the level of medicine retail outlets.

There will be no risks happen to you because of joining in this study. By the same token, there will be no direct benefits to you while participating in this research but the findings of this study will be useful in improving the science and practice of Supply Management & Pharmacoeconomics for essential psychotropic medicines at retail healthcare facilities in Addis Ababa, Ethiopia and elsewhere in the worldwide.

Outside of the research team, this research findings will be presented & submitted as a thesis work for marking to award a Master degree of Pharmacoepidemiology & Social Pharmacy at School of Pharmacy and made publicly available in the College Library & will also be published in academic journals in order that other interested people may learn from this research results. However, the anonymity of individual pharmacies and individual respondents will be strictly maintained. No names or identifiers will be collected at any stage during the study and codes will be used instead. All the information we will collect from you will be used purely for academic research purposes and not for any reason other than mentioned in this letter.

Taking part in this study is completely your choice. By providing your agreement to join in the study, you are not waiving your legal rights or releasing the investigator or involved institutions from their legal and professional responsibilities. If you choose not to participate or if you decide to stop participating in the study, you will continue to be treated normally. You can stop participating in this study at any time without necessarily giving a reason for your withdrawal even if you have already given your consent. If for any reason you would wish to come back into the study after withdrawal, we will be ready to accept you to continue with the study. With all this in mind, I will encourage you to fully participate in this study since the data you provide us are important to better know the accessibility of essential psychotropic medicines at retail outlets in the City of Addis Ababa. If you agree to take part in this study you will be required to give the necessary information requested by the data collectors. The study will involve providing data about availability and prices of originator

brand and generic psychotropic medicines from a two-page questionnaire. Each outlet visit will probably take about 20 minutes and we will try to ensure that the timing of the visit is convenient for you and your staff. The data collectors have specifically been informed to avoid arriving at peak times, when the outlet is busiest.

If you need further information or have questions to assist you in reaching a decision about your participation in this study, please contact:

- Me directly via phone +2519111662293, E-mail: molla.teshager@gmail.com or
- My Advisor, Prof Teferi Gedif, Professor of pharmacoepidemiology at School of Pharmacy, Addis Ababa University, E-mail: tgedif@gmail.com or
- The Ethical Review Board of the Pharmacy School, Telephone: +251-1560212, Telex: 21205, P.O.Box 1176, Telegram: AAUNIV, Fax: +251-111558566.

I would be indebted for your participation in this study & for your cooperation to the data collectors in carrying out their work. Sincerely,

Moll Teshager Ayehu, Principal Investigator/PI/

Consent Form

You are making a decision whether or not to participate in this research study. Your signature below indicates that you have decided to participate in the study after reading all of the information above and you understand the information in this form, have had any questions answered and have received a copy of this form for you to keep.

Signature _____Date _____
Research Participant

I have explained the research to the participant and answered his/her questions to the best of my ability. I confirm that consent has been given freely.

Signature _____ Date _____
The Researcher/Data Collector

Annex-J: The Buying exchange rate of US dollar on July 30/2019

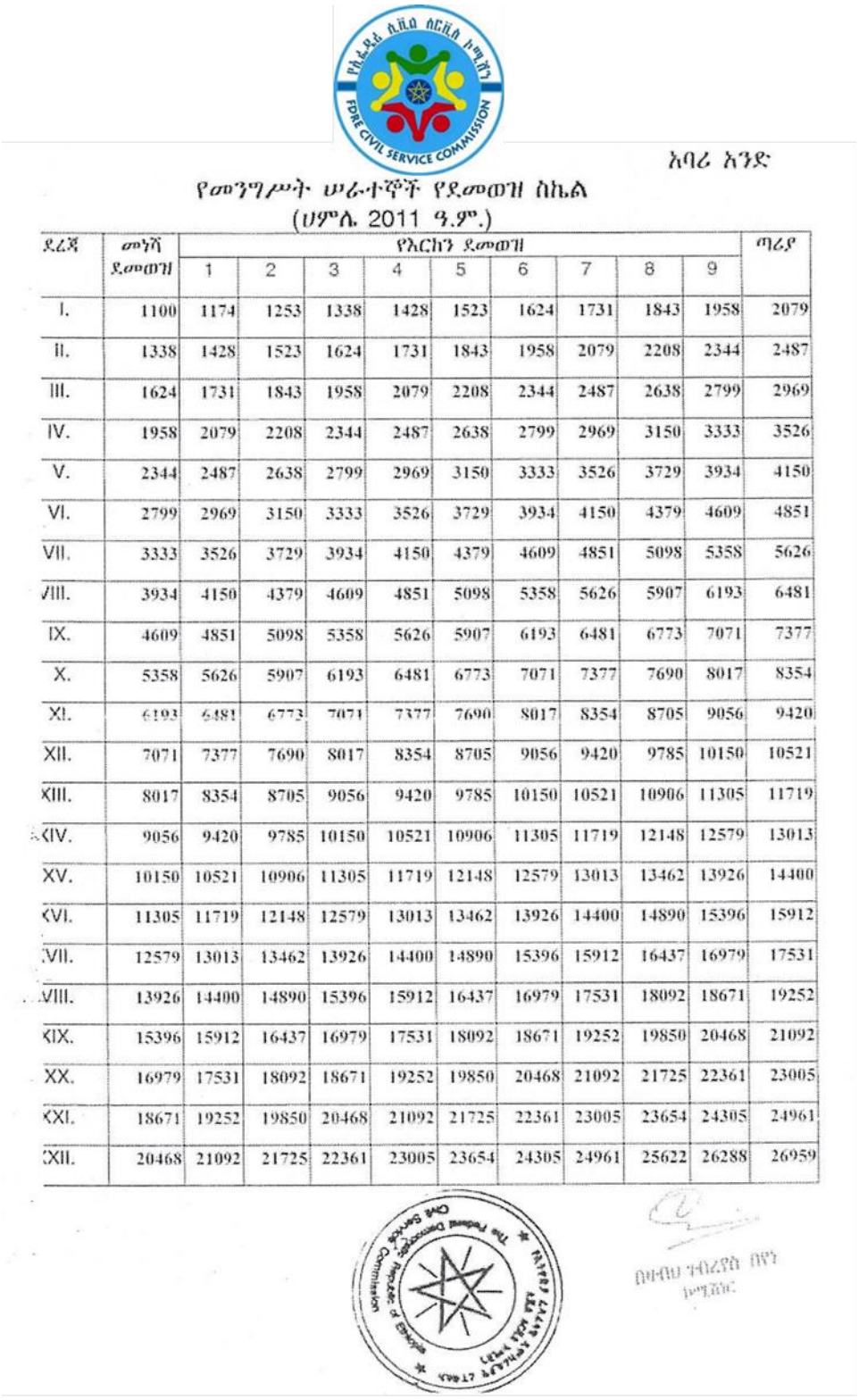
EXCHANGE RATES APPLICABLE
July 30, 2019

CURRENCY	CODE	CASH		TRANSACTION	
		BUYING	SELLING	BUYING	SELLING
US DOLLAR	USD	29.0256	29.6061	29.0256	29.6061
POUND STERLING	GBP	34.4497	35.1387	36.0730	36.7945
EURO	EUR	32.3084	32.9546	32.3084	32.9546
SWISS FRANK	CHF	27.9261	28.4846	29.2420	29.8268
SWEDISH KRONER	SEK	2.7687	2.8241	3.0593	3.1205
NORWEGIAN KRONER	NOK	3.0165	3.0768	3.3331	3.3998
DANISH KRONER	DKK	3.9158	3.9941	4.3269	4.4134
DJIBOUTI FRANK	DJF	0.1613	0.1645	0.1613	0.1645
JAPANESE YEN	JPY	0.2417	0.2465	0.2671	0.2724
CANADIAN DOLLAR	CAD	19.9228	20.3213	22.0141	22.4544
SAUDI RIYAL	SAR	7.0037	7.1438		
UAE DIRHAM	AED	7.1507	7.2937		
CENTRAL AFRICAN FRANC	XAF	0.0120	0.0122		
INDIAN RUPEE	INR			0.4208	0.4292
KENYAN SHILLING	KES			0.2792	0.2848
AUSTRALIAN DOLLAR	AUD	18.1986	18.5626	20.1089	20.5111
SPECIAL DRAWING	SDR			40.020500	40.8209
SOUTH AFRICAN RAND	ZAR			2.0474	2.0883
CHINESE YUAN	CNY	3.8185	3.8949	4.2193	4.3037

N.B:
-The above Birr is expressed in terms of one unit of each foreign currency

FUND MANAGEMENT DEPARTMENT

Annex-K: The Salary Scales of the Lowest Paid Government Worker

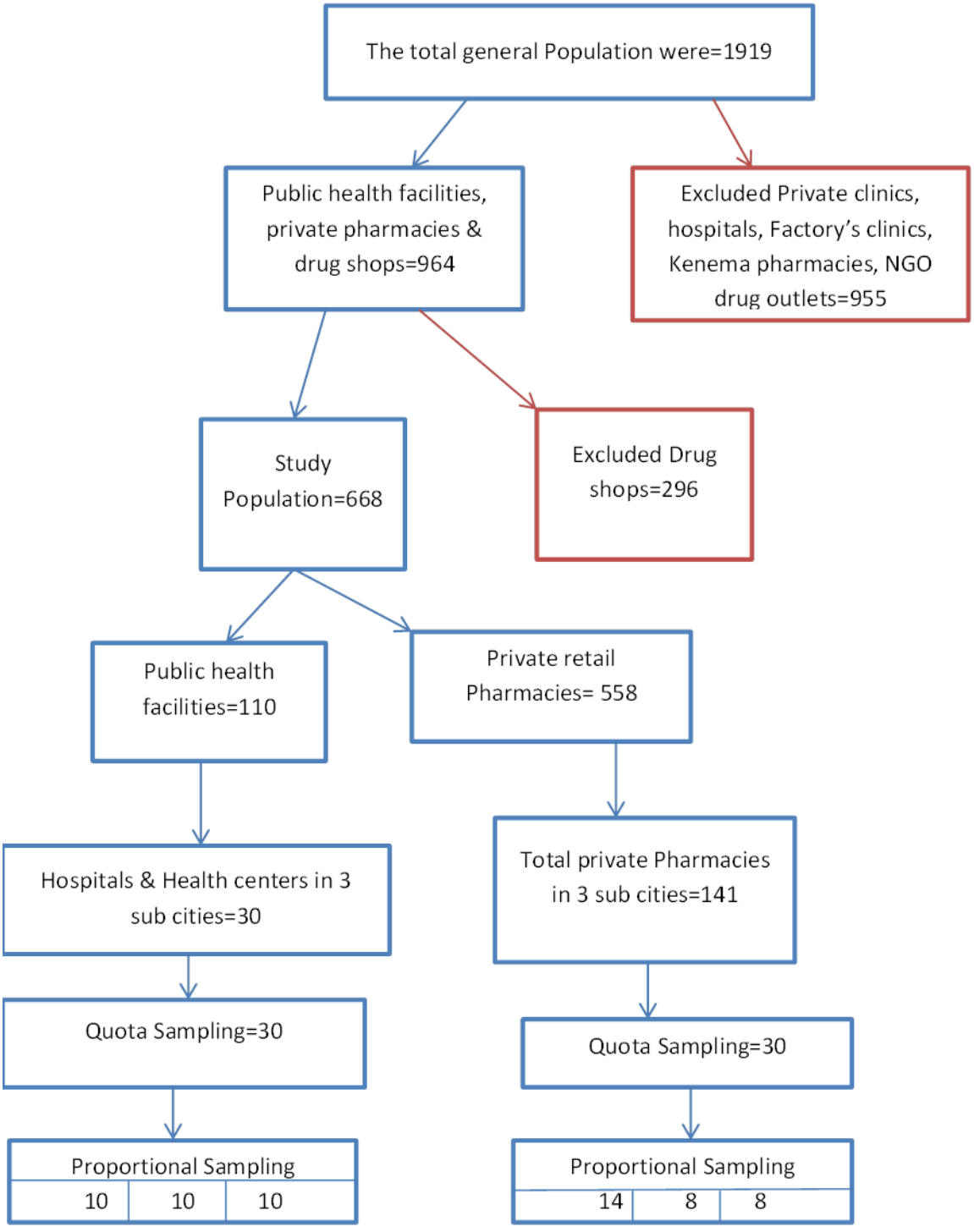


አባሪ አንድ

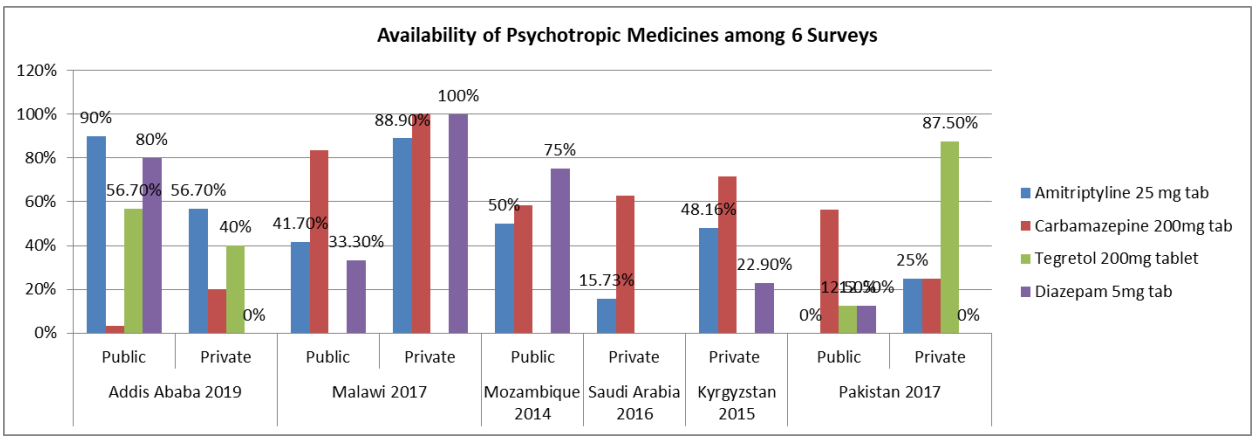
የመንግሥት ሠራተኞች የደመወዝ ስኬል
(ሀምሌ 2011 ዓ.ም.)

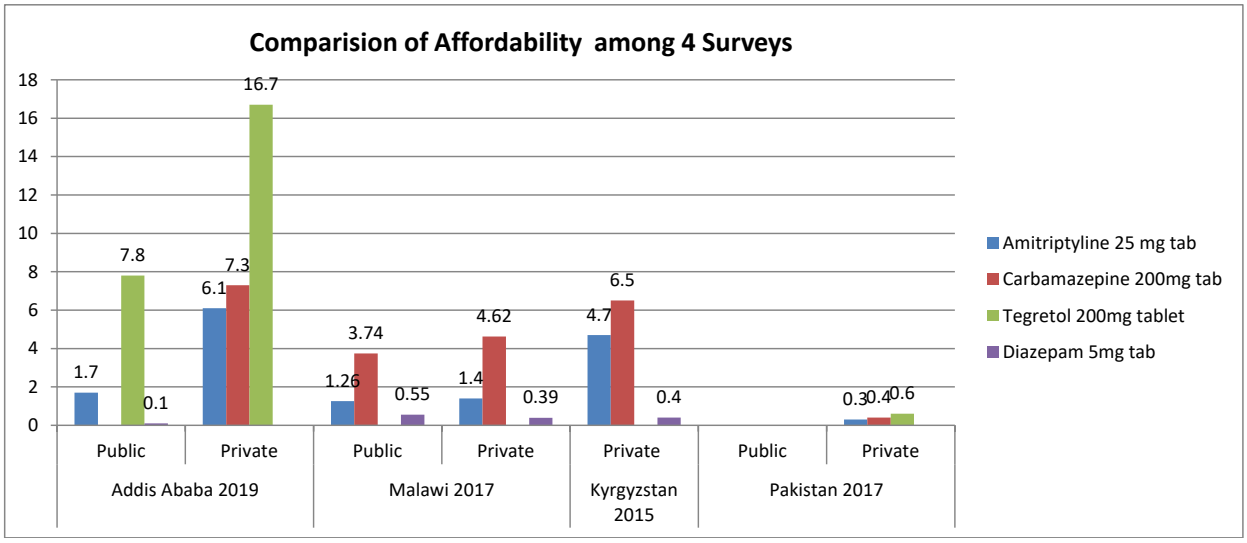
ደረጃ	መነሻ ደመወዝ	የእርከን ደመወዝ									ጣሪያ
		1	2	3	4	5	6	7	8	9	
I.	1100	1174	1253	1338	1428	1523	1624	1731	1843	1958	2079
II.	1338	1428	1523	1624	1731	1843	1958	2079	2208	2344	2487
III.	1624	1731	1843	1958	2079	2208	2344	2487	2638	2799	2969
IV.	1958	2079	2208	2344	2487	2638	2799	2969	3150	3333	3526
V.	2344	2487	2638	2799	2969	3150	3333	3526	3729	3934	4150
VI.	2799	2969	3150	3333	3526	3729	3934	4150	4379	4609	4851
VII.	3333	3526	3729	3934	4150	4379	4609	4851	5098	5358	5626
VIII.	3934	4150	4379	4609	4851	5098	5358	5626	5907	6193	6481
IX.	4609	4851	5098	5358	5626	5907	6193	6481	6773	7071	7377
X.	5358	5626	5907	6193	6481	6773	7071	7377	7690	8017	8354
XI.	6193	6481	6773	7071	7377	7690	8017	8354	8705	9056	9420
XII.	7071	7377	7690	8017	8354	8705	9056	9420	9785	10150	10521
XIII.	8017	8354	8705	9056	9420	9785	10150	10521	10906	11305	11719
XIV.	9056	9420	9785	10150	10521	10906	11305	11719	12148	12579	13013
XV.	10150	10521	10906	11305	11719	12148	12579	13013	13462	13926	14400
XVI.	11305	11719	12148	12579	13013	13462	13926	14400	14890	15396	15912
XVII.	12579	13013	13462	13926	14400	14890	15396	15912	16437	16979	17531
XVIII.	13926	14400	14890	15396	15912	16437	16979	17531	18092	18671	19252
XIX.	15396	15912	16437	16979	17531	18092	18671	19252	19850	20468	21092
XX.	16979	17531	18092	18671	19252	19850	20468	21092	21725	22361	23005
XXI.	18671	19252	19850	20468	21092	21725	22361	23005	23654	24305	24961
XXII.	20468	21092	21725	22361	23005	23654	24305	24961	25622	26288	26959

Annex-L: Sampling Procedures of Medicine Retail Outlets

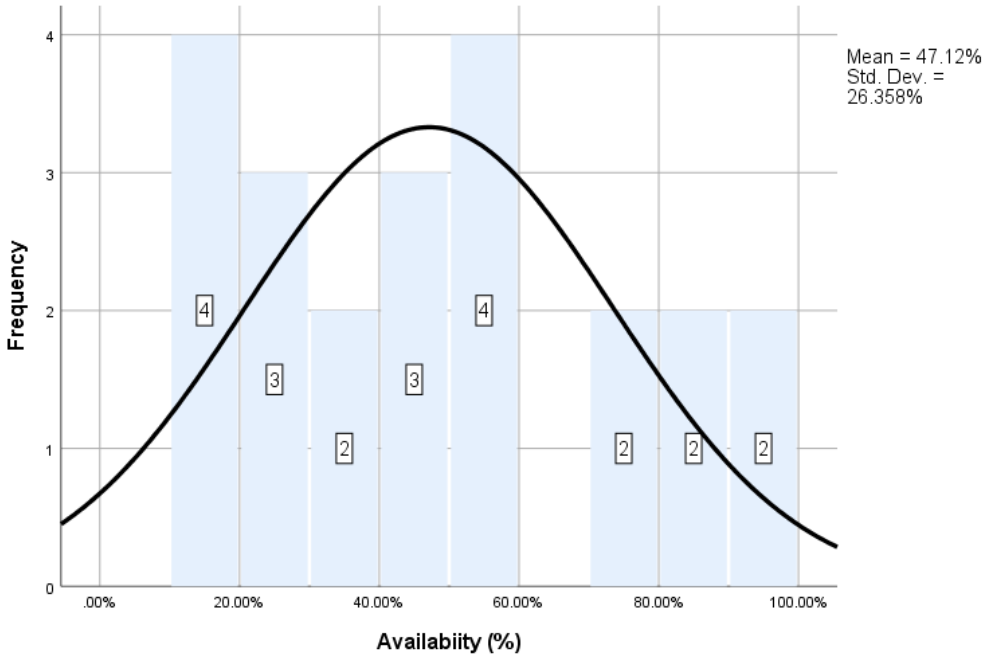


Annex-M: International Comparison of Availability & Affordability of Selected Psychotropic Medicines in the Public & Private Sectors Respectively

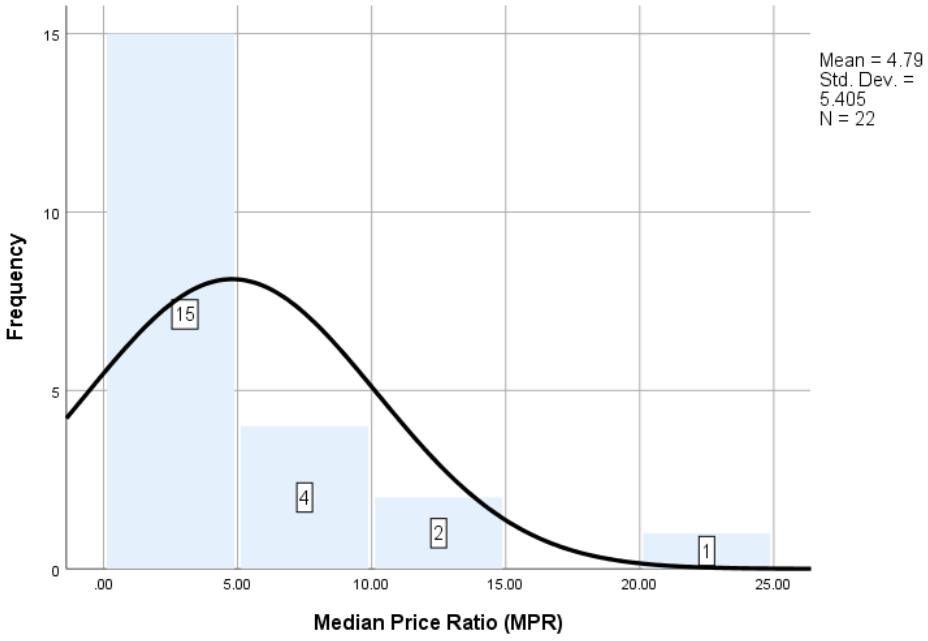




Annex-N: <u>the distribution of availability & price data of psychotropic medicines</u>

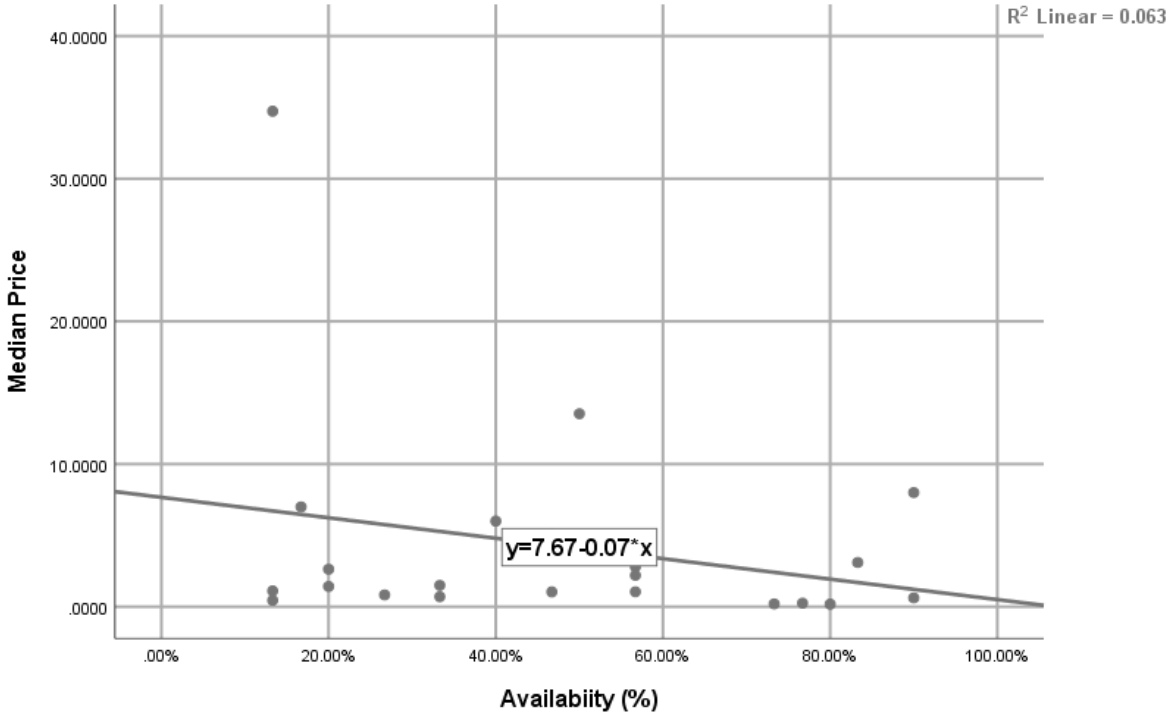


This availability data in the sample is nearly showing as normal distribution.



Shows the price data in the sample is positively skewed distribution. The frequency was decline as the price increases.

Annex-O: Shows the relationship of Availability with Retail Price in all outlets



The linear regression model shows as availability increases by one unit then price will be approximately decreased by 0.07 units. So that as the availability increases, price of essential psychotropic medicines become decreased. While R^2=0.063*100%=6.3% states that the availability of medicines can explain only 6.3% of variation observed in the price data of medicines which suggests as there are other factors that can be accountable for the price variation of medicines.

Annex-P: The Customized WHO Medicine Price Data Collection form

Research Questions

This research study was aimed to answer the following questions:

1. What was the availability of essential psychotropic medicines in Addis Ababa?
2. How much do the patients pay for essential psychotropic medicines in Addis Ababa?
3. Are the standard treatments affordable to individuals with low income?
4. How efficient was the public procurement system in procuring low-priced psychotropic medicines?

Survey Questions

Date: _____

Sub City: _____

Name of town/village/Woreda: _____

Name of medicine outlet (optional):_____

Medicine outlet unique survey ID (mandatory):_____

Type of medicine outlet:

- □ Public sector facility (specify level of care below):
  - □ Primary care facility
  - □ Secondary care facility
  - □ Tertiary care facility
- □ Private sector medicine outlet

Type of price:

- □ Price the patient pays
- □ Procurement price

Type of data:

- □ Sample outlet
- □ Backup outlet
- □ Validation visit

Name of person(s) who provided the medicine prices & availability data:

_____

Name/Code of data collectors: _____

Verification

To be completed by the principal investigator at the end of the day, once data have been verified,

Signed:_____Date:_____

S/N	A	B	C	D	E	F	G	H	I	J
	Generic name, dosage form & strength	Medicine Type	Brand or Product name(s)	Manufacturer	Available "Yes" or "No"	Pack size recommended	Pack size found	Price of pack found	Unit price (4digits)	Comments
1	Alprazolam tablet, 0.5mg.	OB	Xanax,	Pfizer		10x3			per tab	
		LPG				10x3			per tab	
2	Amitriptyline tablet, 25mg.	OB	Tryptizol	MSD		10x10			per tab	
		LPG				10x10			per tab	
3	Carbamazepine tablet, 200mg.	OB	Tegretol	Novartis		5x10			Per tab	
		LPG				10x10			Per tab	
4	Chlorpromazine Hydrochloride - 100mg - Tablet	OB	Largactil	Sanofi		100x10			Per tab	
		LPG				100x10			Per tab	
5	Clomipramine capsule, 25mg	OB	Anafranil	Patheon Inc		25x10			Per cap	
		LPG				25x10			Per cap	
6	Clozapine tablet, 25mg	OB	Clozaril	Novartis		5x10			Per tab	
		LPG				10x5			Per tab	
7	Diazepam tablet, 5mg.	OB	Valium	Roche		10x10			Per tab	
		LPG				10x10			Per tab	
8	Fluoxetine 20 mg cap.	OB	Prozac	Eli Lilly		10x2			Per cap	
		LPG				10x2			Per cap	
9	Fluphenazine decanoate 25mg/ml in 1ml ampoule	OB	Prolixin	Novex Pharma		10			Per ml	
		LPG				10			Per ml	
10	Haloperidol tablet, 2mg	OB	Haldol	Janssen Pharma Inc.		10x10			Per tab	
		LPG				10x10			Per tab	
11	Imipramine tablet, 25mg.	OB	Tofranil	Excellium Pharma Inc.		20x5			Per tab	
		LPG				20x5			Per tab	
12	Lamotrigine tablet,50mg.	OB	Lamictal	GSK		10x3			Per tab	
		LPG				10x3			Per tab	

13	Lithium Carbonate tablet, 300mg.	OB	---------	----------	---------	--------	-----	---	---	no O.B
		LPG				10x10			Per tab	
14	Olanzapine tablet 5mg.	OB	Zyprexa	Eli Lilly & Company		10x10			per tab	
		LPG				10x10			per tab	
15	Phenobarbital tablet, 30mg	OB	Luminal	AstraZeneca		100			per tab	
		LPG				100			per tab	
16	Phenytoin tablets, 100mg.	OB	Dilantin	Pfizer		100			Per tab	
		LPG				100			Per tab	
17	Risperidone tablet, 1mg	OB	Risperdal	Janssen Pharma Inc.		10x10			Per tab	
		LPG				10x10			Per tab	
18	Sertraline tablet, 50mg.	OB	Zoloft	Pfizer		10x10			Per tab	
		LPG				10x10			Per tab	
19	Sodium Valproate tablet, 200mg	OB	Depakote,	Abbott Laboratories;		10x10			Per tab	
		LPG				10x10			Per tab	
20	Trifluoperazine HCL, 1 mg tablet	OB	Stelazine	Vianex SA		10x10			Per tab	
		LPG				10x10			Per tab	

Annex-Q: International Medicines Reference Price Data

Exchange Rate: $US 1.00 in local currency =				29.0256				Number of Medicines Surveyed		
Name of local currency:				ETB				Global :		2
Date of exchange rate:				7/30/2019				Supplementary :		0
Source of exchange rate:				National Bank Of Ethiopia				Regional		1
Price Data Used:				MSH 2015				EML :		20
Med. No.	Medicine Name (Name must be unique)	Medicine Strength	Dosage Form	Target Pack Size	National Essential Medicine List	MSH 2015 Unit Price ($US)	Price of Target Pack ($US)	Price of Target Pack (local currency)	Reference Unit Price (local currency)	Level of care (for which medicine is available)
1	Alprazolam	0.5mg	tab	100	yes	$0.0161	$1.6100	46.7312	0.4673	1
2	Amitriptyline	25 mg	tab	100	yes	$0.0084	$0.8400	24.3815	0.2438	1
3	Carbamazepine	200 mg	tab	100	yes	$0.0185	$1.8500	53.6974	0.5370	1
4	Chlorpromazine	100 mg	tab	100	yes	$0.0144	$1.4400	41.7969	0.4180	1
5	Clomipramine	25 mg	cap	250	yes	$0.0477	$11.9250	346.1303	1.3845	1
6	Clozapine	25 mg	tab	50	yes	$0.0560	$2.8000	81.2717	1.6254	1
7	Diazepam	5 mg	tab	100	yes	$0.0096	$0.9600	27.8646	0.2786	1
8	Fluoxetine	20 mg	cap	100	yes	$0.0103	$1.0300	29.8964	0.2990	1
9	Fluphenazine Inj	25 mg	ml	10	yes	$0.8340	$8.3400	242.0735	24.2074	1
10	Haloperidol	2 mg	tab	100	yes	$0.0218	$2.1800	63.2758	0.6328	1
11	Imipramine	25 mg	tab	100	yes	$0.0181	$1.8100	52.5363	0.5254	1
12	Lamotrigine	50 mg	tab	30	yes	$0.0192	$0.5760	16.7187	0.5573	1
13	Lithium Carbonate	300 mg	cap	100	yes	$0.0287	$2.8700	83.3035	0.8330	1
14	Olanzapine	5 mg	tab	100	yes	$0.0937	$9.3700	271.9699	2.7197	1
15	Phenobarbital	30 mg	tab	1000	yes	$0.0075	$7.5000	217.6920	0.2177	1
16	Phenytoin	100 mg	tab	100	yes	$0.0104	$1.0400	30.1866	0.3019	1
17	Risperidone	1 mg	tab	30	yes	$0.0375	$1.1250	32.6538	1.0885	1
18	Sertraline	50 mg	tab	100	yes	$0.0234	$2.3400	67.9199	0.6792	1
19	Sodium Valproate	200 mg	tab	100	yes	$0.0695	$6.9500	201.7279	2.0173	1
20	Trifluoperazine	5 mg	tab	100	yes	$0.0577	$5.7700	167.4777	1.6748	1