



RESEARCH ARTICLE

AVAILABILITY OF ESSENTIAL MEDICINES IN PUBLIC HEALTH FACILITIES OF JIMMA ZONE, SOUTHWEST ETHIOPIA

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Abstract

Background: Availability is the relationship between the type and quantity of product or services needed and the type and quantity of product or services provided. Availability of essential medicines at facility level is an important factor to address patients' satisfaction and increase their health seeking behavior. The objective of this study is to determine the availability and associated factors of essential medicines in public health facilities of Jimma zone, South West Ethiopia.

Methods: Facility-based cross-sectional study design was employed. Based on WHO recommendation, thirty health facilities were selected from five districts and six health facilities were chosen from each district of the zone. Availability of 29 key essential medicines that were selected from 2014 Ethiopian national essential medicine list were checked in stores and dispensaries as well as the store keepers, head of health facilities and dispensaries were selected for interview. The data were checked for completeness, edited, and coded then entered and analyzed using excels 2016 and SPSS version 23. Descriptive statistics were computed and tables, graphs and numerical summary presented results.

Result: Average availability of selected core essential medicines (n=29) was 78.6% in surveyed health facilities. With regard to stock level, 8% of the surveyed medicines were in critical level, 55.2% were in safe level and 36.8% were in over stock level. Six hundred six patients were participated in the study with a response rate of 97%. Among total respondents, 77.7% left the facility with all of their prescribed medicines while 22.3% received only part of their prescribed medicines.

Conclusion: The availability of essential medicines was fairly high in surveyed health facilities during the study period. In this study, many patients seeking treatment in public health facilities failed to obtain significant proportion of prescribed medicines.

Keywords: Availability, Essential medicines, Jimma zone, Public facilities.

INTRODUCTION

Availability is defined by the relationship between the type and quantity of product or services needed and type and quantity of product or services provided¹. Essential medicines are intended to be available within the context of functioning health systems at all times, in adequate amounts, in appropriate dosage forms, with assured quality and adequate information, and at a price, the individual and the community can afford².

World Health Organization (WHO) first introduced the concept of essential medicines in 1977, which contains about 200 drugs and vaccines. It is a land mark step towards Millennium Development Goals (MDGs) of the health care for all and this brings considerable

progress across the countries but the benefits have been unequally distributed across global population³. Access to essential medicines is also one of the United Nations Millennium Development Goals under MDG-8, and specifically target-8 E, which explains provision of access to affordable essential drugs in developing countries incorporation with the pharmaceutical companies⁴. Target 3.8 of SDG put a forward plan for access to quality, safe and effective and affordable medicines and vaccines for all⁵.

Availability of essential medicines at facility level is an important factor to address patients' satisfaction and increase their health seeking behavior⁶. Health experts and policymakers want people to have access to affordable and high-quality medical care. However, in

some developing countries, making quality healthcare available may first necessitate ensuring that essential medicines are available. The constant availability of essential and vital medicines at public health facilities is important for credible health services and the need to meet the health requirement of a community⁷. Measuring the availability of essential medicines at health facilities is one of the core components of the assessment of readiness of health facilities to deliver quality services⁸. The health facility assessments, however, employ a wide variety of tools and approaches to measure availability of essential medicines. For example, rapid assessments employ the reported availability by respondents without verification as a measurement of availability of EDs, while in-depth facility assessment methods validate the reported response by observing the medicines, verifying the expiration dates and collecting further data on stock-out over an extended period. As a result, medicine availability estimates may vary across definitions, and need to be interpreted with careful consideration of the methods used⁹.

Around the world most leading causes of death such as malaria, infectious diseases, and HIV/AIDS can only be prevented or treated effectively by having appropriate medicines consistently available¹⁰. Shortages of essential drugs are becoming increasingly frequent globally, burdening health systems that have been reported from high, middle, and low-income countries. Medicines shortages pose risks for patient health as a result of non-treatment, under treatment and possible medication errors from attempts to substitute missing medicines¹¹. Millions of people worldwide die or face disability each year due to diseases that need adequate pharmaceutical treatments¹². About 30% of the world's population lacks the medicines they need and the situation is worse in the poorest parts of Africa and Asia where half of the population is unable to obtain the essential medicines¹³. Many of those who do have access are often receive the wrong treatment, too little medicine for their illness, and do not use the medicine correctly¹⁴. Approximately 1.6 million of Africans died of malaria, tuberculosis and HIV related illnesses in 2015. These diseases can be prevented or treated with timely access to appropriate, quality and affordable medicines. However, less than 2% of drugs consumed in Africa are produced in the continent, meaning that many sick patients do not have access to locally produced drugs and may not afford to buy the imported ones¹⁵. The Ethiopian health care system is among the one those suffer from a limited availability of health resources, overreliance on out-of-pocket payments, and inefficient and inequitable use of resources, which limit universal coverage of health care¹⁶. Ethiopia has developed a strategy to ensure a regular and adequate supply of effective, safe, and affordable high-quality drugs through the development of essential drugs lists for all health service levels. This list of medicines were done with the approval of the National Drug Policy in February 1994 of the Master Plan for the Ethiopian National Drugs Program after which the availability of essential drugs has improved but shortages of drugs in public facilities are still

common due to budgetary, procurement, and logistical problems¹⁷.

Therefore, this study is aimed to assess the availability and associated factors of medicines in public sector health facilities in Jimma zone with the aim of reflecting the baseline situation on availability of essential medicines that can be used by the local management body for planning and management decisions in the field. It will also serve as a reference to evaluate the performance of the local health system with regard to identification of locally demanded essential drugs.

MATERIALS AND METHODS

Facility based cross-sectional study design was used using questionnaires and checklist for quantitative study and interview guide for qualitative study. The study was conducted in public health facilities of Jimma zone. The zone was found in Oromia region and it is one of the 17 zones in the region and about 352 KM far from Addis Ababa. It is classified in to 20 districts and two-town administrations with 545 Kebeles and has projected population of 3,345,112 from which 89.69% are rural inhabitants. In this zone, there are one tertiary hospital (Jimma University specialized and teaching hospital), 5 primary hospitals, 119 health centers and 513 health posts. The study was conducted from January 1 to February 30, 2019. The source population comprised of all public health facilities in Jimma zone and patients visiting those health facilities while study population comprised of selected public health facilities that were found in five districts of the zone and selected patients visiting those health facilities during the study period.

Health facilities sample size was determined based on WHO recommendation, operational package for assessing, monitoring and evaluating country's pharmaceutical situations¹⁸. Based on this guideline, six public health facilities were selected from each selected five districts making 30 health facilities and patients sample size was calculated using single population proportion formula for descriptive cross-sectional study with the assumptions of level of confidence 95%, 5% margin of error, and 49% of proportion of patients who were able to obtain all their prescribed medicines in public health facilities in Amhara region, Ethiopia¹³. Considering 10% of non-response rate and using a design effect of 1.5 for multistage sampling, the final sample size was $n=633$. One capital city (center of study area), one remote district and three randomly chosen middle level districts were selected based on WHO recommendation. Similarly health facilities were chosen but six health facilities, four middle level health facilities, one big health facility or hospital and one remote health facility included in the study¹⁸. Data were collected by using interviewer administered a structured questionnaires, key informant interview guide and a checklist. Based on selected 29 key medicines, availability and stock status were checked by reviewing bin cards and going through the shelves and identifying the listed key medicines in stores and dispensaries on the day of data

collection. These lists of medicines were taken from 2014 national essential drug list (EDL) of Ethiopia and national standard treatment guideline (STG) to treat the most common health problems in the study area. Purposively selected heads of health facilities, dispensaries, and store-keepers were interviewed about factors that affect availability of essential medicines. Six data collectors of diploma pharmacy technicians and two health officers (supervisors) were recruited from health centers outside of study area and the training was given to them by the principal investigator on the aim of study and methods of data collection for two days. The supervisors were informed about the strict supervision and the cross checking procedures. Data collection tools were pretested in 10% of sample size prior its actual use in data collection. Yebu H/C and hospital, and Sarbo H/C were taken outside the study area to pretest the tool to identify any weakness in the structuring of the research instruments. The data were checked for completeness, edited, and coded then entered and analyzed using excel version 2016 and SPSS version 23.

Dispensed medicines were assessed whether they were available or not during prescription and medicines were available when any quantity of the medicines with the specified dosage form and strength is in stock on the day of the data collection in the surveyed facilities^{13,18,19}. Availability was classified as very low, low, fairly high and high when it was <30%, 30-49%, 50-80% and >80% respectively¹³. Descriptive statistics were computed using frequency and percent and tables, graphs and numerical summary presented results. The qualitative data was analyzed manually using thematic analysis method.

Ethics approval and consent to participate

Ethical clearance was obtained from the Ethical review committee of Institute of Health, Jimma University. A formal letter of cooperation was written from Jimma Zone Health Department to respective districts and town administrations. Verbal consent was obtained from each study participants. To maintain confidentiality the interview was anonymous, i.e. interviewees' name identifiers were withheld.

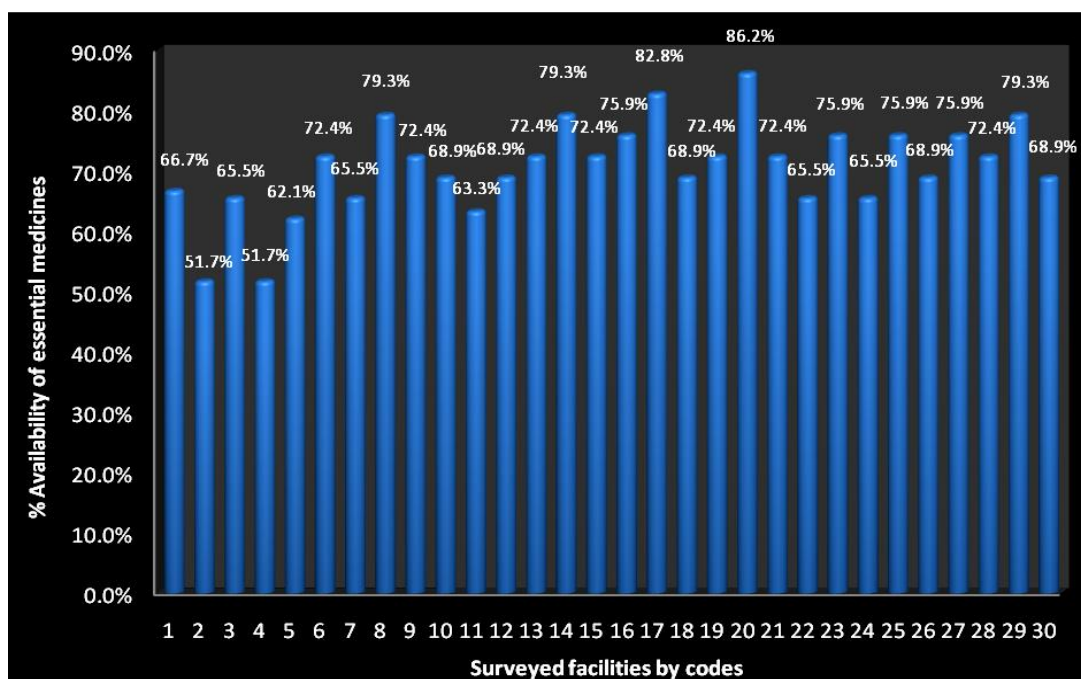


Figure 1: Percentage of medicines availability in surveyed health facilities of Jimma zone.

RESULTS

Availability of essential medicines

Availability of selected core essential medicines

Based on 29 core lists of essential medicines in stock, average availability of generic medicines was 78.6%. Average availability was found to be 68.1% and 80.2% in hospitals and health centers respectively (Table 1). None of the surveyed health facilities had all the 29 core lists of medicines during the study period. The facility with the least number of medicines over six months found had 17 medicines, representing 58.6% while highest number of medicines found had 27 medicines representing 93.1% of the selected medicines (Figure 1).

Out of the surveyed essential medicines, the most commonly stock out medicines were Hydrochlorothiazide 25 mg (average availability of 33.3%), Glibenclamide 5 mg (average availability of 33.3%) and Artemether lumefantrin 20/120 mg (average availability of 43.3%) in the surveyed health facilities. Other four medicines Paracetamol 500 mg tab, Ciprofloxacin 500 mg tab, Doxycycline 100 mg tabs and ORS were found in all the surveyed facilities at the time of data collection (Table-1). With regard to level of individual medicines, 17(58.6%), 9(31.1%) and 3(10.3%) lists of medicines were surveyed as high (>80%), fairly high (50-80%) and low (39-49%) but none of medicine were less than 30% which was classified as very low.

Table 1: Average availability of individual essential medicines by level of facility in public health facilities.

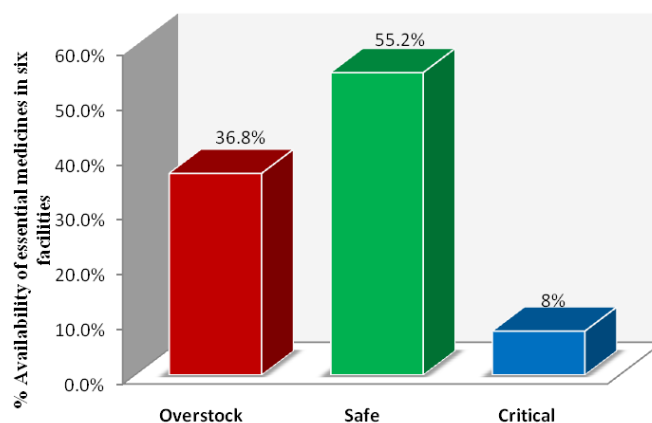
| S.N. | Names of essential medicines, strength and dosage (N=30) | Average availability in descending order (%) | Average availability by level of facility (%) | |
|------|--|--|---|----------------|
| | | | HCs(N=26) | Hospitals(N=4) |
| 1 | Ciprofloxacin 500 mg tab | 100 | 100 | 100 |
| 2 | Paracetamol 500 mg tab | 100 | 100 | 100 |
| 3 | ORS sachet | 100 | 100 | 100 |
| 4 | Doxycycline 100 mg cap/tab | 100 | 100 | 100 |
| 5 | Metronidazole 250 mg cap | 96.7 | 96.2 | 100 |
| 6 | Cotrimoxazole 480 mg tab | 96.7 | 96.2 | 100 |
| 7 | Mebendazole 100 mg tab | 96.7 | 100 | 75 |
| 8 | Diclophenac 75 mg/3 ml | 96.7 | 96.2 | 100 |
| 9 | Cotrimoxazole 240 mg/5 ml | 93.3 | 96.2 | 75 |
| 10 | Amoxicillin 125 mg/5 ml | 93.3 | 96.2 | 75 |
| 11 | Amoxicillin 500 mg cap | 90.0 | 92.3 | 75 |
| 12 | Chloroquine 250 mg | 86.7 | 88.5 | 75 |
| 13 | Paracetamol 120 mg suppository | 86.7 | 92.3 | 50 |
| 14 | Norfloxacin 400 mg tab | 83.3 | 88.5 | 50 |
| 15 | Omeprazole 20 mg cap | 83.3 | 80.8 | 100 |
| 16 | Praziquantel 600 mg tab | 80.0 | 84.6 | 50 |
| 17 | Tetracycline 1% eye ointment | 80.0 | 84.6 | 50 |
| 18 | Chloramphenicol 500 mg cap | 76.7 | 76.9 | 75 |
| 19 | Ceftriaxone 1gm IV | 76.7 | 84.6 | 25 |
| 20 | Clotrimazole vaginal suppository | 73.3 | 76.9 | 50 |
| 21 | Glucose 40% solution | 70.0 | 76.9 | 25 |
| 22 | TAT injection 150,000 IU | 70.0 | 73.1 | 50 |
| 23 | Cloxacillin 500 mg, tab | 63.3 | 69.2 | 25 |
| 24 | Salbutamol 0.1 mg/dose, aerosol/puff | 63.3 | 61.5 | 75 |
| 25 | Hydrocortisone cream/ointment | 60.0 | 61.5 | 50 |
| 26 | Chloroquine 50 mg/5 ml susp | 53.3 | 30.8 | 50 |
| 27 | Artemether lumefantrin (20/120 mg) | 43.3 | 42.3 | 50 |
| 28 | Glibenclamide 5 mg tab | 33.3 | 50.0 | 75 |
| 29 | Hydrochlorothiazid 25 mg tab | 33.3 | 30.8 | 50 |
| | Average percent availability | 78.6 | 80.2 | 68.1 |

With regard to stock level, 8% of the surveyed medicines were in critical level, 55.2% were in normal (safe) level and 36.8% was in over stock level in seven public health facilities, which had adequate data with automated Electronic Logistic Management Information System, (eLMIS) (Figure 2).

Percentage of prescribed medicines actually dispensed or administered to patients

Patients were asked whether they obtained the prescribed medicines or not from the health facilities they visited. The responses of patients were categorized into two, those who received all the prescribed medicines and those who received partially the prescribed medicines. Totally 1643 medicines were

prescribed for the total respondents and 1491(90.7%) of the prescribed medicines were dispensed to patients hence 9.3% of prescribed medicines were not provided to patients. On average 2.71 medicines per patient were prescribed and 2.46 medicines were dispensed to patients. Among the thirty surveyed public health facilities, only four rural health centers were able to provide all the prescribed medicines to their patients. Unavailability and price of medicines in the facilities is the main reason for the study subjects who could not obtain the full range of prescribed medicines. Among the total respondents, 471 (77.7%) left the facility with all the prescribed medicines, while 135 (22.3%) received only part of their prescribed medicines.



Stock levels of essential medicines in seven surveyed health facilities of

Figure 2: Average availability of essential medicines by stock level in seven public health facilities.

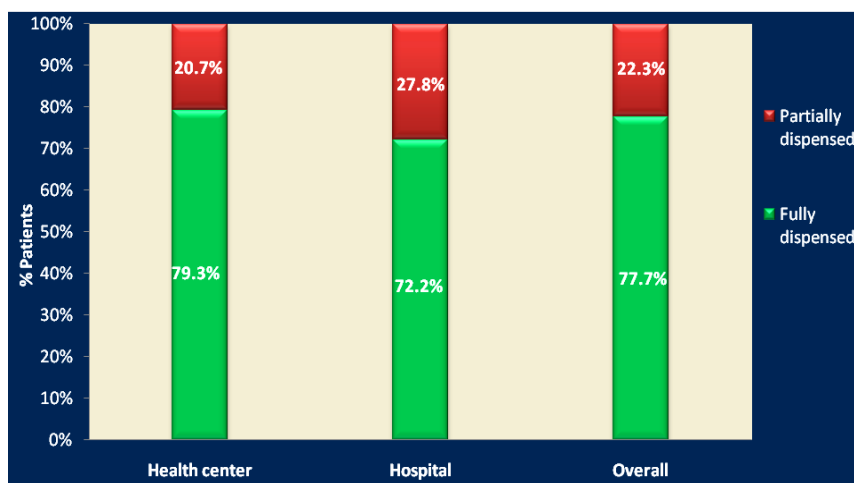


Figure 3: Percentage of prescription fulfillment by Jimma zone public health facilities.

In health facilities category, 79.3% of patients in health centers and 72.2% of patients in hospitals had taken all the prescribed medicines (Figure 3).

Factors Affecting Availability of Essential Medicines

Most of the service delivery facilities procure medicines from the pharmaceutical Fund and Supply Agency (PFSA) through tendering system. Most of the health facilities and dispensaries managers and storekeepers complained about the reasons that they did not have some medicines.

Some said:

"... You may need some drugs, but they may not be available in PFSA... [So,] we select those drugs that will be available at PFSA. Other times they are close to expiry. You bring it and it is expired on you."

"... Sometimes we make requisition but it delays at the PFSA and so we ran out of stock completely. Other times, some of the medicines meant for our health centre are given to some other place and you have to start tracing to get them back. When you are stock out, you don't serve your clients, and therefore you don't get the actual consumption data at the end."

Some KIs (key informants) mentioned that PFSA sometimes provide drugs that have short expiry date. As a result, the HCs purchased only a quantity less than what they planned to purchase. As one respondent said: "PFSA offers you to purchase some drugs that have only 1 or 2 months of expiry date. If you refuse to purchase, it will not give you a permit to purchase from private suppliers. If you purchase that, it may expire before it is consumed."

Majority of KIs as a barrier also identified lack of reliable transportation system after procurement of drugs. One KI explained that:

"... During purchasing the medicines from regional PFSA, we face some challenges during transporting the medicines. After you received the drugs, you go out to find a private vehicle while you put the drugs on veranda at PFSA which is a risk for the drug..."

Many KIs reported that they had shortage of budget to avail drugs based on facilities demand since little budget was allocated from government for procurement of drugs and insufficient internal budget that can be obtained from the reselling of medicines. 28

years old head of hospital complaining that "...we do not obtain all the medicines based on our demand since the regional health office (Oromia regional health office) funded PFSA and ask them to supply the items, hence most of those medicines which were pushed might be those that we have in our stock, or irrelevant medicines."

Other KIs also said that:

"The major problem of our HC is that there is shortage of budget for drugs ... it is about 250,000 Birr per year allocated for drugs ... it was 250,000 5 years back; it is also 250,000 today ... after you serve for certain months, you will be run out of them."

To improve the selection process, some respondents recommended the strengthening of DTC can prevent frequent stock out. One of KI explained as:

"DTC members do not attend DTC meetings ... after procurement, however, they suggest the inclusion of some drugs; it is recommended to meet regularly to prevent frequent stock out."

Consistent and accurate use of bin cards is essential for inventory management. Unavailability and utilization of bin cards is a common problem in most of surveyed health facilities. Negligence of using the LMIS, storekeepers and dispensaries units' commitment, supervision, and training were also mentioned by some KIs as factors affecting availability of medicines.

In connection to this, one KI said that:

"... In our health center, dispensary unit do not consider the activity of LMIS as their responsibility, but the responsibility of the pharmacy case team.... The utilization of bin cards was poor in both dispensary unit and drug store and most of these bin cards were not updated as well as we have no computerized logistic management information system which poses difficulties on control of medicines and sometimes medicines can be easily expired..."

In some facilities especially in health centers, shortage of pharmacy professionals was common problem while in other facilities absence of training on supply chain management is common problem for those working in both dispensing units and drug stores. A 32 years old head of health center complaining that

"... Here you can see the public nurse is dispensing the medicines; we assign her since we have no pharmacy

professional or pharmacists that were employed and assigned to us so we faced challenges during the development of the list of drugs; purchasing, storing, distributing and dispensing of the drugs and necessary supplies....”

DISCUSSION

Improving the availability of essential medicines is one of the most important objectives for any national medicines policies, but poor availability and less affordability of them remains a major problem for the majority of the population; especially for the poor who need essential medicines to be accessible for them¹. For patients to be able to access to essential medicines adequately, medicines must be 100% available in the public health facilities sectors²⁰. The findings of this study revealed that the average availability of essential medicines (n=29) was 78.6% in selected public health facilities. This finding is comparable with study conducted in Kaliro district of Uganda which reported average availability of 79.5% at the spot of data collection in public health facilities²¹. However, the finding of this study is higher than study conducted in Jimma health center seven years back which reported 55.65% average availability of essential medicines at the time of data collection²². The variation of the findings might be because of presence of long time interval between two studies and seasonal variation, which influences consumption level of medicines in surveyed health facilities. The finding is also higher as we compared to study conducted in Builsa district of Ghana where average availability of 29 selected essential medicines reported to be 64.1%²³. The mean variation might be due to inclusion of community-based health and planning services in the sample that assumed to serve local areas of district and only specified list of medicines were recommended to use in the case of previous study. Without community based health and planning services in the sample, the average availability became 85%, which is slightly higher than current study. However, the finding of this study is lower than study conducted in rural area of Amhara region which reported average availability of 91% in public health facilities²⁴. The variation might be due to few and different type of essential medicines selected in the case of previous study and difference in the prevalence of disease conditions in both study area. In this study, it was observed that 10% of essential medicines were in critical level in seven surveyed health facilities. This finding was comparable by study conducted in Gonder town, North West Ethiopia which reported 12% of surveyed essential medicines were in critical level in 6 public health centers. In that study, author also found that 15% and 73% of surveyed stock was in normal (safe) and overstock level respectively²⁵. This is in contrast to our finding which reported 55.2% and 36.8% of surveyed stock were in safe and overstock level respectively. This substantial disparity might be due to poor inventory management practices in the case of previous study. In this study, outlets of public health facilities dispensed 90.7% of the prescribed medicines and 77.7% left the facilities with

all the prescribed medicines. This finding is lower than study conducted in South Wollo, Ethiopia, where 97 % of the prescribed medicines in public health facilities were dispensed to patients and 94.3% of the respondents obtained all the prescribed medicines¹³. The variation might be because of higher availability of selected essential medicines in previous study and the difference in the prevalence of disease conditions in both study area. However, it was higher than other surveys conducted in rural area of Amhara region where 49% of patients left the budget pharmacy with all the prescribed medicines and in Kenya where 86% of the prescribed medicines were actually dispensed to the patients^{24,26}. The variations might be the nature of disease conditions, irrational prescription practices of professionals and reliance on special pharmacies to provide medicines for patients at the time of the previous studies.

In health facility categories, 79.3% of patients in health centers and 72.2% of patients in hospitals had taken all the prescribed medicines. Patients seeking treatment in hospitals were less likely to receive all prescribed medicines compared to those treated in health centers. The variation might be because of high cost incurred by patients to buy medicines that made them to go to private facilities and forgo treatment in hospitals as compared to health centers.

CONCLUSIONS

The average availability of essential medicines was fairly high based on classification of availability. However, some basic and low priced key medicines and price free anti -malaria medicine, Coartem were low in surveyed health facilities. In this study many patients seeking treatment in public health facilities fail to obtain significant proportion of prescribed medicines as a result of unavailability and non-affordability of prescribed medicines.

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AUTHOR'S CONTRIBUTIONS

Beyene W: writing original draft, literature survey, acquisition of data. **Gebissa F:** methodology, conceptualization. **Mathewos E:** formal analysis, review. **Ololo S:** investigation, data interpretation. **Melese D:** critical review. **Dagne T:** data curation, investigation. **Getachew M:** data curation, investigation. All authors revised the article and approved the final version.

DATA AVAILABILITY

The data supporting the findings of this study are not currently available in a public repository but can be made available upon request to the corresponding author.

CONFLICT OF INTEREST

None to declare.

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