Original Article

Availability of Essential Medicines at a University Hospital in Addis Ababa, a cross-sectional study

Muluwork Sahile Berassa¹, Seblewengel Getachew Worku²

Abstract

Background: Though access to essential medicines (EMs) is a universal human right and the World Health Organization (WHO) recommends at least 80% availability of EMs in healthcare facilities, about one-third of the world population does not have access to EMs, particularly in Africa and Asia. In these regions, this figure reaches 50%. Studies in Ethiopia have also indicated frequent EMs shortages in public health facilities. The current study aimed to assess the availability of EMs and the facility’s ability to provide the needed necessary medicines in Tikur Anbesa Specialized Hospital (TASH).

Methods: An institutional-based cross-sectional study design was employed in TASH from August to November 2020. Observational checklists were used to assess the availability of 26 tracer medicines that are expected to be available in tertiary hospitals. Additionally, 125 outpatient encounters were prospectively assessed to determine the percentage of medicines dispensed from outpatient pharmacies. SPSS 21.0 was utilized for the analysis.

Result: The availability of EMs and the facility’s ability to provide the required medication were found to be 65.3% and 66.7%, respectively. Among the 26 tracer medicines assessed, 13 (50%) experienced stockouts in the past six months. Specifically, Quinine injection, Z-KM(AM)-LF-Eto-Cs, and Glucose 40% were out of stock for six months, while Magnesium sulfate injection, Propranolol tablet, and Ketamine injection were stocked out for three months.

Conclusion: The availability of EMs in TASH was found to be low, with fifty percent of tracer medicines being stocked out in the past six months. Thus, it is crucial for policymakers, pharmacy directors, hospital administrators, and logistic managers to work in harmony to ensure a continuous supply of these essential medicines to the patients. [Ethiop. J. Health Dev. 2023; 37(3): 00-00]

Keywords: Essential medicine, stock-out, availability, Tikur Anbesa Specialized Hospital, Ethiopia

Background

Essential medicines are products that satisfy the priority healthcare needs of the population, and should be readily available in the healthcare facilities at all times in adequate amounts with affordable prices for the community (1). Though access to essential medicines is a universal human right, and WHO recommends at least 80% availability of essential medicines in healthcare facilities, about one-third of the world population does not have access to essential medicines, particularly in Africa and Asia. This figure staggers 50%. The availability of generic medicines in public sectors of developing and middle-income countries ranges from 29.4% to 54.4% (2-4).

Similarly, there are frequent drug shortages in the public health facilities of Ethiopia. A national survey estimated that only 70% of key essential medicines were available in the public warehouse and 72.4% were available in the public health facility dispensaries. The median availability of a basket of medicines used for chronic illnesses, including hypertension, diabetes, and mental illnesses, was found to be low (54.55%). The length of stock-out duration was 19.6 and 26.6 days for public health facility dispensaries and warehouses supplying the public sector, respectively (5). Likewise, studies conducted in different parts of Ethiopia indicated poor availability of essential medicines ranging from 26%-73% (6-8).

The availability of essential medicine largely influences the quality of healthcare and patient satisfaction with services provided in public health facilities. The percentage of clients who get all of the prescribed drugs from dispensaries is one of the indicators of continuous availability of medicines and quality of pharmaceutical care in the country. Therefore it is important to measure the availability of essential medicines in Tikur Anbesa Specialized Hospital (TASH) as core components to assess the readiness of facilities to deliver quality pharmaceutical services and to increase patient satisfaction. Hence, this study aimed to assess the availability of essential medicines and the facility’s ability to provide the needed medication in TASH: Addis Ababa, Ethiopia.

Methods

Study Design

An institutional-based cross-sectional study design was employed to assess the availability of essential medicine in TASH. In addition, 125 outpatient encounters were prospective assessed to determine the percentage of medicines dispensed from outpatient pharmacies of the hospital.

Study Setting and Period

An Institutional-based cross-sectional study was conducted in TASH from August to November 2020.

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The hospital is located in central Addis Ababa near the Emigration office. TASH is the largest education-affiliated referral Hospital in the country. It provides a full range of health care services, including outpatient, inpatient, surgical, referral, and teaching medical services that are not available in other public or private institutions. The hospital has about 700 beds and provides health care services for 370,000–400,000 clients a year. It has 1204 healthcare professionals, of which 85 are pharmacy professionals. There are more than ten pharmacy departments in the hospital, which include OPD pharmacy, pediatric oncology, adult oncology, oncology day care pharmacy, operation room pharmacy, intensive care unit pharmacy, adult emergency pharmacy, pediatric emergency pharmacy, diabetes clinic pharmacy, Anti-retroviral clinic pharmacy, and orthopedic clinic pharmacy.

**Study Population and Sampling**

TASH was selected purposively because it is the largest hospital in the country and faces significant challenges in ensuring the availability of essential medicines in Tertiary hospitals (9). All pharmacies giving outpatient pharmacy service in the hospital, pharmaceutical and medical supplies stores, and all outpatient encounters were the target population. The main outpatient pharmacy, main pharmaceutical store, and Prospective 125 outpatient encounters were included in the study.

Twenty-six tracer drugs (TDs) that were selected by the federal ministry of Health of Ethiopia and expected to be available in tertiary hospitals, were used as a tool to assess the availability of essential medicines. The TDs assessed include Ciprofloxacin 500mg tablet, Ceftriaxone 1gm injection, Fluconazole capsule/tablet, Metronidazole injection, Quinine injection, rifampicin/isoniazid/ethambutol/pyrazinamide fixed-dose combination, Ethambutol /Pyrazinamide /Kanamycin (Amikacin)/Levofloxacin/Ethionamide/Cycloserine( E-Z-Km(Am)-Lfx-Eto-Cs) fixed-dose combination, Tenofov/ Zidovudine+Lamivudine+Efavirenz /Nevirapine (TDF/ZDV+3TC+EFV/NVP) adult combination, Magnesium Sulphate injection, Oxytocin 10units/ml injection, Isophen insulin N/R suspension/solution, Hydralazine injection, Nifedipine tablet, Adrenaline (Epinephrine) injection, Aminophylline injection, Propranolol tablet, Furosemide injection, Glucose 40%, Dextrose in normal saline/Ringer lactate, Dexamethasone/Hydrocortisone injection, Dopamin/Dobutamine, Atropine (injectable), Ketamine injection, Morphine injection, Doxorubicin Powder for injection, Cyclophosphamide powder for inj./tab(10).

Patient encounters that come to the outpatient pharmacy at the time of data collection and essential medicines that have at least 6 months of data on bin cards during the year under review were included in the study. Patient encounters in dispensaries other than the outpatient pharmacy unit, medical supplies, laboratory reagents, and documents with incomplete information were excluded from the study.

The outcome variables of the study were the availability of essential medicines and the facility’s ability to provide the needed medicine in a study setting. Data were collected on patient age, sex, drug availability on the day of the visit, number of medicines prescribed, number of medicines dispensed, and months out of stock.

**Data collection tools and procedures**

An observational checklist developed from the World Health Organization operational package for assessing, monitoring, and evaluating country pharmaceutical situation level II survey forms and the HMIS indicators reference guide prepared by Ethiopia Ministry of Health, was utilized(9,11). Components of the checklist include availability of essential medicine, percentage of drug dispensed, and average stock out duration of essential medicine within the last 6 months were assessed based on WHO’s recommendation.

A product is said to be available if it is available in the health facility on the day of the visit. The annual availability of essential medicines is the proportion of months in the period under consideration for which a given tracer drug was available when needed. Any month in which drug unavailability is experienced, even for only 1 day, is reported as months out of stock. The following ranges were used for describing availability(13): ≤50% very low, 51-65% low, 66-80% fairly high, >80% high). The percentage of drugs actually dispensed also measures drug availability; it is measured by dividing the number of drugs actually dispensed at the health facility by the total number of drugs prescribed, multiplied by 100(12).

Three trained pharmacy professionals collected data. The quality of data was assured by pre-testing the data collection tool at St. Paul Hospital and by providing training to data collectors on techniques of data collection. All the data were examined for completeness and consistency during data collection.

**Data Analysis and Presentation**

The collected data was entered and analyzed using Statistical Package for the Social Sciences (SPSS) Version 21. Descriptive statistics, including mean, percentage, and frequency were used to describe the data. The results were then summarized and presented through tables and graphs.

**Results**

**Availability of essential medicine**

In this study, we evaluated the availability of 26 essential medicines and determined, that the overall availability of essential medicine was 17(65.3%) on the day of the visit.

**Percentage of Medicines Dispensed**

The percentages of medicines dispensed were analyzed by assessing 125 patient prescriptions containing 378 medicines in the outpatient pharmacies of TikurAnbesa Specialized Hospital. Out of 378 medicines prescribed only 252 were dispensed on the day of the visit, indicating that TikurAnbesa Specialized Hospital was able to provide the required medicines at a rate of 66.7%.

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Stock out Duration of Tracer drugs
Assessing stock-out duration helps to measure the annual availability of essential medicines. Among 26 tracer drugs (TD) assessed, 13(50%) were stocked out in the past six months. Three of the TDs namely quinine injection, Z-KM(AM)-LF-Eto-Cs, and Glucose 40%, experienced a high level of stock-out, with durations lasting for six months. The remaining 10 tracer drugs had stock-out duration ranging from 1-3 months. Magnesium sulfate injection, Propranolol tablet, and ketamine injection were unavailable for 3 months (see Table 1).

Table 1: Tracer drugs stock out duration in the past six months in TASH, Addis Ababa, Ethiopia, 2020.

<table>
<thead>
<tr>
<th>List of tracer drugs</th>
<th>Stock out any time in the past 6 months</th>
<th>Months out of stock(1/2/3/4/5/6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinine injection</td>
<td>April-October</td>
<td>6</td>
</tr>
<tr>
<td>E-Z-Km(Am)-Lfx-Eto-Cs</td>
<td>April-October</td>
<td>6</td>
</tr>
<tr>
<td>Magnesium Sulphate injection</td>
<td>June, July, September</td>
<td>3</td>
</tr>
<tr>
<td>Ketamin injection</td>
<td>July, August, October</td>
<td>3</td>
</tr>
<tr>
<td>Oxytocin 10units/ml injection</td>
<td>June, September</td>
<td>2</td>
</tr>
<tr>
<td>Ciprofloxacin 500mg tablet</td>
<td>July, October</td>
<td>2</td>
</tr>
<tr>
<td>Isophen insulin N/R suspension /solution</td>
<td>April, August</td>
<td>2</td>
</tr>
<tr>
<td>Adrenaline (Epinephrine) injection</td>
<td>April, May</td>
<td>2</td>
</tr>
<tr>
<td>Propranolol tablet</td>
<td>August, October</td>
<td>2</td>
</tr>
<tr>
<td>Glucose 40%</td>
<td>April, October</td>
<td>2</td>
</tr>
<tr>
<td>Morphine injection</td>
<td>September-October</td>
<td>2</td>
</tr>
<tr>
<td>Fluconazole capsule/tablet</td>
<td>September</td>
<td>1</td>
</tr>
<tr>
<td>Dopamine/Dobutamin</td>
<td>August</td>
<td>1</td>
</tr>
</tbody>
</table>

Discussions

The current study aimed to assess the availability of essential medicines and the facility’s ability to provide the needed medication in TASH: Addis Ababa, Ethiopia. The unavailability of drugs largely influences the healthcare quality, while getting prescribed medicines within the facility pharmacy improves patient satisfaction and overall trust in the healthcare system. The unavailability of pharmaceuticals at the hospital pharmacies results in increased expense to purchase medications from external pharmacies, delayed treatment outcomes, and psychological stress. Access to essential medicines can be measured in different ways, including the availability of essential medicine, the percentage of prescribed medicines dispensed to patients at public health facility dispensaries, and the average stock-out duration in public health facility dispensaries. In this current study, the overall availability of essential medicine in TikurAnbesa Specialized Hospital was found to be 65.3%, which is far lower compared to the minimum requirement of WHO (80%) to be available in public health facilities and the national percentage availability in public health facilities of Ethiopia (72.4%) (2, 5, 14, 15). However, the findings from this study are better than the findings from Malawi (48.5%) and Ghana (64.1%) (16, 17). The reasons for such low availability in TASH might be attributed to the low stock status of the pharmaceutical fund and supply agencies, low budget allocation to the hospital pharmacy, and issues in procurement and stock management.

The percentage of clients who get all the prescribed drugs from the dispensary serves as an indicator of access to quality and affordable medicines. In this study, the overall percentage of medicines dispensed in the outpatient pharmacies of TikurAnbesa Specialized Hospital, which was found to be 66.7%, which is very low compared to the WHO Recommendation (100%), as well as studies conducted in public health facilities of Ethiopia (92.43%), and Pakistan (90.9%) (5, 18, 19). This finding is alarming since the unavailability of prescribed medicines in the hospital pharmacy forces the patient to purchase them from outside pharmacies, where the costs are nearly 20 times higher than those at TASH pharmacy.

Delays in treatment and complications are a significant outcome of the stock of drugs in the hospital pharmacy, and patients are challenged to buy the drugs outside. Essential medicine is considered available when it is not stocked out even for a single day in the month; it should be available in the health facilities at all times in adequate amounts with affordable prices by the community (15, 20). Among 26 tracer drugs assessed, 13(50%) were stocked out in the past six months. Three of the TD that are quinine injection, Z-KM(AM)-LF-Eto-Cs, and Glucose 40%, experienced a high level of stock-out, which is six months duration, and the remaining ten tracer drugs experienced stock-outs duration ranged from one to three months. Additionally, Magnesium sulfate injection, Propranolol tablet, and ketamine injection were unavailable for a period of three months.

The findings of this study indicate a higher stock-out duration compared to previous research conducted in Adama, Ethiopia (40.6 days) and Gondar (30.5 days) (21, 22). Several factors may contribute to this discrepancy, including low or irregular consumption, issues with quantification and procurement, absence or incompleteness of logistic data, and logistical challenges that exceed the hospital’s capacity.
The strength of the current study was using the World Health Organization’s operational package for assessing, monitoring, and evaluating the country’s pharmaceutical situation level-II survey form and the federal Ministry of Health HMIS reference guide, which allows for measuring the availability of essential medicine in a reliable and standard way. However, this study did not assess factors affecting the availability of essential medicine. Though the study was conducted at TikurAnbessa Specialized Hospital, which is the largest education affiliated referral Hospital in the country hospital, care should be taken while generalizing the result to hospitals in Ethiopia.

Conclusion
The availability of essential medicines and the percentage of medicines dispensed in the outpatient pharmacies of TikurAnbessa Specialized Hospital were found to be low. Besides, it was observed that fifty percent of tracer medicines had been stocked out in the past six months. Among 26 tracer drugs assessed, four priority life-saving medicines, quinine injection, Z-KM(AM)-LF-Eto-Cs, and Glucose 40% were consistently stocked out for six months period, while Dopamine/Dobutamine was stocked out for one month. Thus, it is imperative for policymakers, pharmacy directors, hospital administrators, and logistic managers to work in harmony to improve the availability of essential medicines. This can be achieved through strict inventory control, capacity building of staff responsible for logistics, increased budget allocation for medicines, and strengthening of Drug and Therapeutics Committees.

List of Abbreviations
TASH: TikurAnbessa Specialized Hospital
E-Z-Km(Am)-Lfx-Eto-Cs:Ethambutol-Pyrazinamide-Kanamycin(Amikacin)-Levofloxacin-Ethionamide-Cycloserine
TDF/ZDV+3TC+EFV/NVP-Tenofovir/
Zidovudine+E Lamivudine+Efavirenz /Nevirapine

Declarations
Ethics approval
Ethical clearance and approval were obtained from the ethics review committee of the School of Pharmacy, Addis Ababa University. Permission to conduct the research was obtained from the administrative office of TikurAnbessa Specialized Hospital. The pharmacy coordinator, store manager, and pharmacist working in outpatient pharmacies of the hospital were informed about the purpose of the study and the documents required for the study. Before the data collection, verbal consent was obtained from pharmacists working in each pharmacy unit.

Consent for publication
Not applicable.

Availability of data and material
The datasets used during the current study are available from the corresponding author upon reasonable request.

Competing interests
The authors declare that they have no competing interests.

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Authors’ contribution
All authors participated, starting from the conception of the research idea to the interpretation of the result and manuscript authorization. All authors have read, agreed to the final manuscript and approved the final manuscript.

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Reference


