


BMJ Open Assessment of the Global Fund-supported procurement and supply chain reforms at the Ethiopian Pharmaceuticals Supply Agency: a mixed-methods study

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ABSTRACT

Objective The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) partnered with the Ethiopian Pharmaceutical Supply Agency (EPSA) in 2018–2019 to reform procurement and supply chain management (PSCM) procedures within the Ethiopian healthcare system. This assessment sought to determine the impact of the reforms and document the lessons learnt.

Design Mixed-methods study incorporating qualitative and quantitative analysis. Purposive and snowballing sampling techniques were applied for the qualitative methods, and the data collected was transcribed in full and subjected to thematic content analysis. Descriptive analysis was applied to quantitative data.

Setting The study was based in Ethiopia and focused on the EPSA operations nationally between 2017 and 2021.

Participants Twenty-five Ethiopian healthcare decision-makers and health workers.

Intervention Global Fund training programme for health workers and infrastructural improvements

Outcomes Operational and financial measures for healthcare PSCM.

Results The availability of antiretrovirals, tuberculosis and malaria medicines, and other related commodities, remained consistently high. Line fill rate and forecast accuracy were average. Between 2018 and 2021, procurement lead times for HIV and malaria-related orders reduced by 43.0% relative to other commodities that reported an increase. Many interview respondents recognised the important role of the Global Fund support in improving the performance of EPSA and provided specific attributions to the observed successes. However, they were also clear that more needs to be done in specific critical areas such as financing, strategic reorganisation, data and information management systems.

Conclusion The Global Fund-supported initiatives led to improvements in the EPSA performance, despite several persistent challenges. To sustain and secure the gains achieved so far through Global Fund support and make progress, it is important that various stakeholders, including the government and the donor community, work

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The study employed a mixed-methods approach to provide a comprehensive assessment of the observed trends in pharmaceutical procurement and supply chain management, and their implications in the broader healthcare system.
- ⇒ The study pooled data from multiple sources available across the Ethiopian health system in order to provide a consistent assessment of the reforms.
- ⇒ This study focused on procurement and supply chain management of health commodities as a key pillar of the health system framework; critical for progress towards universal health coverage, in low-income and middle-income countries.
- ⇒ This study only focused on national-level assessment, which could have missed important trends at the subnational levels where actual service delivery occurs.

together to support EPSA in delivering on its core mandate within the Ethiopian health system.

INTRODUCTION

The Ethiopian Pharmaceutical Supply Agency (EPSA) is a government organisation under the Federal Ministry of Health (FMOH), which has the mandate of ensuring steady and reliable access to medicines and other health technologies as outlined in national health policy. More specifically, its role includes establishing pharmaceutical procurement and distribution systems; instituting a modern storage management system; supplying essential pharmaceuticals that meet quality, safety and efficacy standards; and delivering pharmaceuticals directly to hospitals and health facilities via an effective transport network system. EPSA is also responsible for coordinating sector-wide efforts aimed at



significantly improving the availability of quality-assured pharmaceuticals at affordable prices to the public and promoting the rational use of medicines.¹⁻⁴

Since its founding in 1947, the EPSA (and its preceding entities) has been restructured several times, with the aim of meeting the health needs of the country's population.^{2,5} EPSA's mission has most recently been defined as ensuring a sustainable supply of quality-assured pharmaceuticals to health facilities at affordable prices. This is to be accomplished by establishing committed demand, pooled procurement, robust inventory management and distribution, efficient financial management, an integrated management information system, and attracting and retaining a motivated and competent workforce.^{1,4}

EPSA operates within the context of the larger Ethiopian healthcare system, which focuses on decentralisation and expansion of the primary healthcare system, and encourages broader multistakeholder participation in its National Health Sector Development Programme, which was implemented over a 20-year period. After 2015, the country embarked on the Health Sector Transformation Plan (HSTP-I), which was a 5-year strategic plan to improve the quality and equity of health services and make progress towards universal health coverage (UHC). The subsequent HSTP-II covering the period 2020/2021–2024/2025, provides a clear framework for improving population health through accelerated progress towards UHC.⁶

According to the latest National Health Accounts study findings, Ethiopia's total health expenditure (THE) was estimated at US\$3.63 billion, accounting for approximately 6.3% of the country's GDP.⁷ This translates to a per capita health expenditure of US\$36.4 which is below the regional average of US\$38.0.⁷ It was estimated that of THE, 32% was covered by the government, 31% was from out-of-pocket expenditure and 34% was from development partners.⁷ Considering the resource limitations, HSTP-II underscores the centrality of harnessing efficiency through strategic purchasing and performance-based financing as a pathway towards UHC.⁷

Therefore, EPSA's reform agenda reflects a growing need for improved and optimised pharmaceutical delivery systems to respond to the current and emerging population health needs in Ethiopia. Invariably, many healthcare systems in low-income and middle-income countries face a common set of pharmaceutical health challenges including lack of coordination, inventory management, absent demand information, human resource dependency, order management, shortage avoidance, expiration, warehouse management, temperature control and shipment visibility.^{8,9} To address these challenges, different healthcare systems have worked on optimising supply chain structures to reduce complexities, experimenting with outsourcing the distribution of pharmaceuticals and plugging emerging loopholes.¹⁰⁻¹³

Further, these reforms have been informed by the need for health systems to be cost-effective and efficient in their pharmaceutical supply chains while being

responsive to prevailing population health needs and emerging global epidemics and pandemics, as recently occasioned by COVID-19.¹⁴⁻¹⁸ Despite recent progress, the 2019 Global Burden of Disease study estimates show that communicable, maternal, neonatal and nutritional diseases still contribute significantly to the disease burden in the country.¹⁹ Additionally, HIV, tuberculosis (TB) and malaria are still classified among the top 10 causes of health loss in the country.¹⁹

As such, in the years 2018–2019, the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) supported EPSA through a series of capacity-building workshops to improve procurement and contract management practices for HIV, TB and malaria commodities (programme commodities).²⁰ Handling of programme commodities was the main priority as opposed to the revolving drug funds (RDFs), which cover other disease areas beyond those supported through the Global Fund. The RDFs are funded through a self-sustaining healthcare financing system, in which user fees are collected to cover the cost of the procurement and supply of pharmaceuticals in a given healthcare system.^{21,22}

The training workshops were offered in a modular fashion comprising 5-day blocks, with practical sessions where EPSA programme management staff gained hands-on experience using procurement tools available through the online Global Fund-supported platform; wambo.org.²³ The specific focus was on effective procurement strategies anchored on long-term framework agreements with suppliers as well as evidence-based performance assessment and contract management procedures.²⁴⁻²⁶ A total of 47 programme management staff involved in overseeing key procurement functions at EPSA were trained by Global Fund personnel.

Since its launch in January 2016, wambo.org has been deployed in 65 countries and processed over 1600 procurement orders for a total value of over US\$2.2 billion.²³ This experience has generated significant experience and identified best practices that were shared by the Global Fund at the training workshops. These were aimed at maximising value through data-driven supplier relationship management with the overarching goal of sustainably improving population access to medicines and other health commodities. The training initiative was further supported by strategic efforts to build data infrastructural capabilities for enterprise resource planning (ERP) at the EPSA's central hub, to facilitate reporting and accountability across the system.^{20,27,28} The ERP is a data management software system that helps organisations automate and manage core business processes for optimal performance. The software coordinates the flow of data from key processes and functional areas, streamlining them into a single platform to support decision-making.

Considering the importance and relevance of procurement and supply chain management (PSCM) reforms to health systems in low-income and middle-income countries,²⁹ the proposed assessment aims to determine the effects of the project and document lessons learnt. More

specifically, it would be instructive and demonstrative to decision-makers in Ethiopia, in terms of gaining a fuller understanding of the impact of the EPSA reform, as well as existing gaps that should be addressed to make progress. The assessment would also be informative to the other countries that are grappling with similar challenges in the PSCM sphere, as has recently been revealed by the advent of the COVID-19 pandemic. Overall, this assessment would provide an investment case for various health stakeholders to align their funding and implementation priorities in such a way that they strategically strengthen health systems.

METHODS

The assessment project employed a convergent mixed-methods study design where qualitative and quantitative analytical methods were implemented simultaneously, and the insights merged to provide a fuller picture.³⁰ Briefly, the quantitative part of the study entailed the collection and analysis of time trend data covering priority indicators derived from the routine operational reporting at EPSA. Meanwhile, the qualitative part comprised 25 key informant interviews (KIIs) that collected and analysed data from various stakeholders within the healthcare system, to give perspective to the observed trends. The KII guide is available as online supplemental file 1 and the questionnaire used is available as online supplemental file 2. Insights from both quantitative and qualitative analysis were merged and subjected to comparative interpretation to ensure that a consistent picture emerges. More details about the two parts (quantitative and qualitative) of the mixed-methods design are provided in the latter sections.³⁰

Analytical framework

The overall analytical approach espoused in this project was anchored on the logical relationships of the six building blocks of the health system as described by the WHO health system framework.³¹ In this case, the specific focus is on the access to medicines component. Figure 1 illustrates the results chain cascading from the intervention (sharing of best practices on procurement) to the expected improved knowledge and practices at EPSA; better supplier relationship management, which translates to improved availability of medicines and reduced wastage; ultimately leading to improved performance at EPSA.

Assessment preparation procedures

PricewaterhouseCoopers (PwC), the Local Fund Agent for the Global Fund's Ethiopia, grants commissioned this study. The initial contact and planning for the study entailed in-depth discussions between the consulting team (Africa Institute for Health Policy), PwC and the Global Fund team to define the scope of the assessment, expected deliverables and timelines.

To gain a better understanding of the procurement reforms and contextualise them to the Ethiopian health system, an extensive literature review was conducted by the consulting team. This specifically focused on the policy and strategic documents, produced by EPSA, Global Fund and the FMOH, which included but were not limited to the assessment and progress reports related to the project.

The literature review also helped in the mapping and identification of critical health system stakeholders from whence the key informants were drawn, as well as priority data sources to be considered in the analysis. Further, the analytical framework, described in figure 1, is based on the interpretation of the project documents that provided detailed descriptions of the procurement reforms as implemented at the EPSA.

Quantitative research

The quantitative component of this assessment entailed a detailed analysis of the operational data that is routinely reported by EPSA covering priority programmatic details over time.^{32 33} Online supplemental table 1 shows some of the key performance indicators (KPIs) that were examined, with many corresponding to the results levels shown on the analytical framework in figure 1. Most analyses covered sufficient duration, of not less than 3 years before and after the implementation of the procurement reforms in order to fully assess the temporal trends. All the programme data in Ethiopia is reported following the Ethiopian calendar, but this was converted to the Julian calendar in order to align with the broader readership of this article.

The EPSA monitoring and evaluation framework specifies the cadence in which routine programmatic data is collected to measure performance. For lower-level process indicators, many of these are collected at a monthly or quarterly frequency, while the higher-level indicators are collected at an annual frequency.³³ These data were obtained from EPSA in the form of spreadsheets, cleaned and collated into a database that was password protected. The database was examined for completeness and accuracy by cross-referencing with the corresponding progress reports for specific periods of time. Various time series analyses were attempted for the different key performance indicators to generate temporal trends that are informative.

Qualitative research

The qualitative research part of the assessment entailed KIIs with health system stakeholders shown in online supplemental table 2 that were knowledgeable and were intimately involved in the procurement reform initiative at EPSA. As previously stated, the literature review helped in the mapping and identification of critical organisations that were involved in the PSCM space in Ethiopia, and more specifically, those that were involved in the procurement reforms supported by the Global Fund.

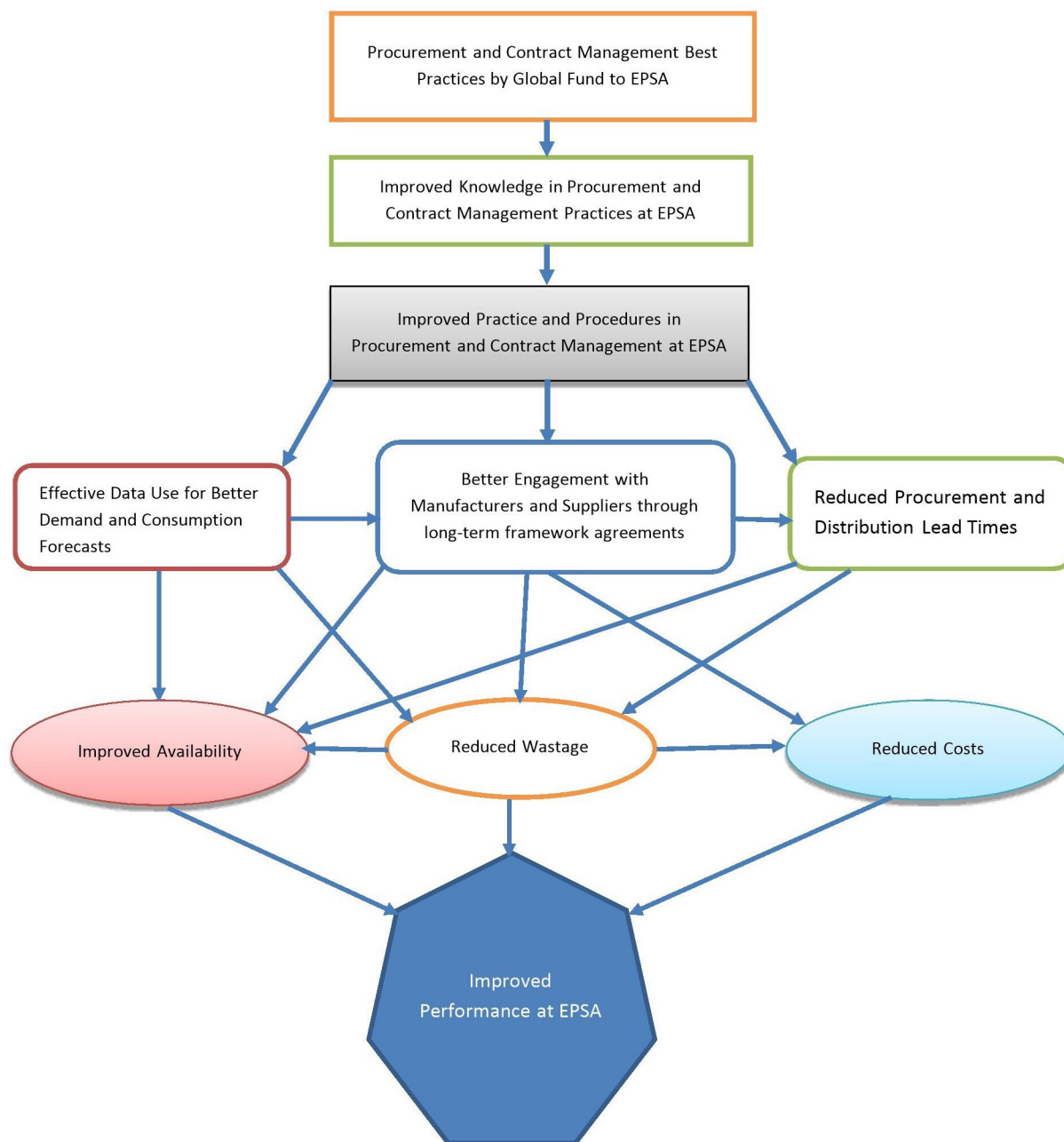


Figure 1 Analytical framework. EPSA, Ethiopian Pharmaceutical Supply Agency.

Convenience purposive sampling was used to select participants for the key informant and in-depth interviews. Our sample was supplemented using snowball sampling methods (also referred to as chain sampling), whereby the initial respondents referred us to the other potential respondents until no new information is forthcoming or achieved saturation.³⁰ Efforts were made to be all-inclusive involving various stakeholder groups and organisations that were intimately linked to the operations of EPSA.

KIIs were the mainstay of data collection. This used a structured questionnaire and covered various thematic areas relevant to the assessment in order to get a comprehensive perspective. The key informant questionnaire was pretested and adapted to ensure that it was suitable for

data collection. In view of the travel restrictions imposed due to the COVID-19 pandemic and the security situation in Ethiopia at the time of undertaking this study,³⁴ KIIs were conducted online using multimedia channels such as Zoom, Skype and telephonically. No field visits were conducted in this assessment. After each interview, all questionnaires were checked to ensure the completeness, and readability of the entered data, to minimise recording errors. In addition, a tape recorder was used for interviews to assist with reference postdata collection.

Qualitative data obtained from the KIIs were transcribed in full and then analysed by applying thematic content analysis. In this approach, data from interview transcripts were grouped into similar concepts. This approach is appropriate for semistructured expert

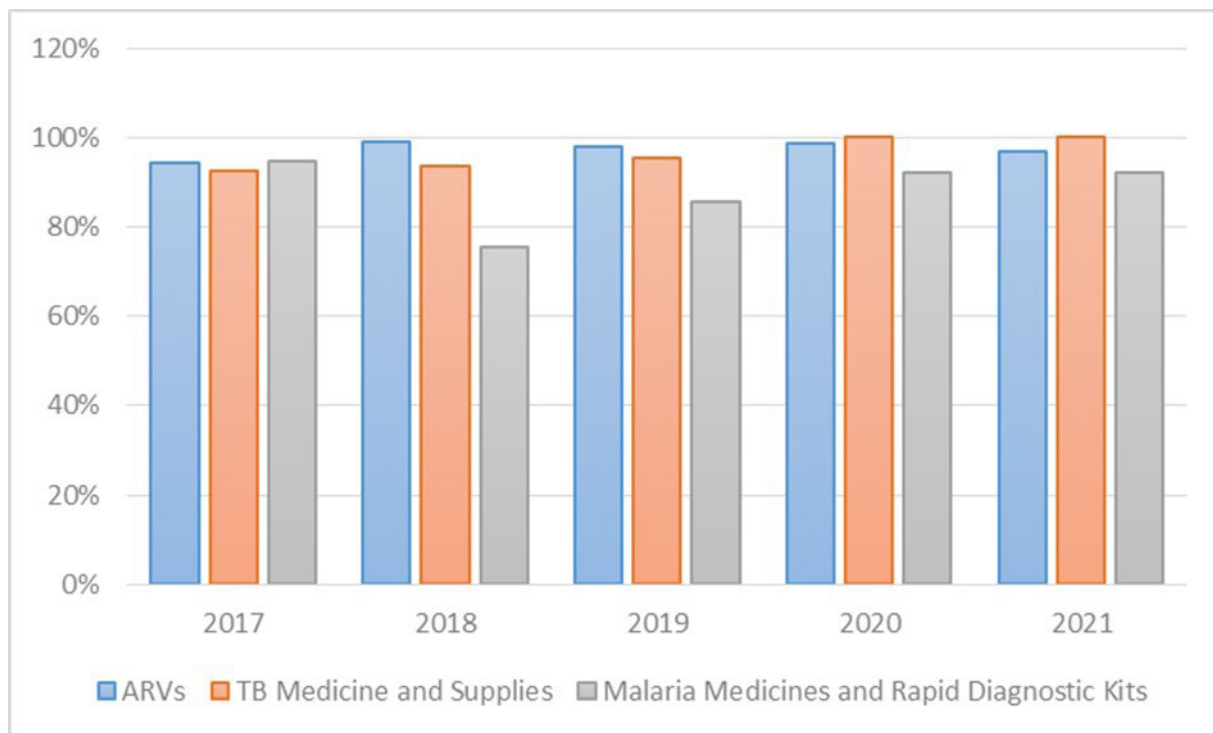


Figure 2 Availability of medicines and other health commodities. ARVs, availability of antiretrovirals; TB, tuberculosis.

interviews as it is used for coding text with a predefined coding system which can then be refined and completed with new themes emerging.^{30 35} Our initial coding system was defined during the desk review stage and continuously updated in the successive phases of data collection.

Patient and public involvement

Patients and the public were not involved in designing this study. We plan to produce a dissemination presentation to help to disseminate the findings to the health system decision-makers and the public.

RESULTS

Figure 2 shows that the availability of antiretroviral (ARV) drugs, TB medicines and supplies, as well as malaria medicines and rapid test kits were consistently high between 2017 and 2021. Overall, the two categories (ARV and TB) were the best performing remaining consistently above the 90% availability, while malaria was below the 80% availability threshold in 2018 but showed gradual improvements over time. On average, ARV drugs availability was 98%, while TB and Malaria were at 96% and 84%, respectively.

Figure 3 shows the procurement lead times in days for two types of commodities that are handled by EPSA. On average, procurement lead time was estimated to be 506 days over the 5-year period, with the highest being 661 days in 2020 and the lowest being 396 in the year 2017. However, focusing specifically on HIV and malaria-related commodities, procurement lead time was reduced by 43% between 2018 and 2021. The blue arrow approximates the time of onset of the Global Fund-supported reforms.

Demand forecast accuracy for HIV commodities had an average performance of 62% over the 5 years; while the malaria commodities reported the highest increase from a low of 15% to 72%. Meanwhile, the demand forecast accuracy for TB commodities was average at 53% over the 5-year period. In the latter 3 years, malaria and TB commodity demand forecast accuracy continued to improve, while HIV remained steady at around 60%.

Table 1 shows a combination of annual performance indicators related to inventory management. The pharmaceutical wastage rate, which is an efficiency measure for health commodity handling is consistently low, averaging 1.5% for the 5-year period. The cost-to-income ratio, another efficiency measure shows how well EPSA is using its assets to generate revenues and income. Overall, the cost-to-income ratio is low, averaging around 0.15, for the 5 years in consideration, with the highest estimate being 0.21 which is a pointer to an efficient operation.

The inventory turnover rate is also shown in **table 1**. This rate averaged 1.2 for the 5 years in consideration, with the highest rate being 1.36 in the year 2018 and the lowest being 1.1 in the year 2020. Another closely related metric to the inventory turnover rate is the cash-to-cash cycle time. This measures how efficiently an organisation manages its working capital assets, through payments of bills, collection of payments and selling of inventory. On average, it takes EPSA 359 days to complete the cycle, with the longest time being 464 days in the year 2020, and the shortest time being, 202 days in the year 2018.

There was consensus from the participants interviewed that the Global Fund-supported initiatives resulted in significant improvements in the PSCM landscape in

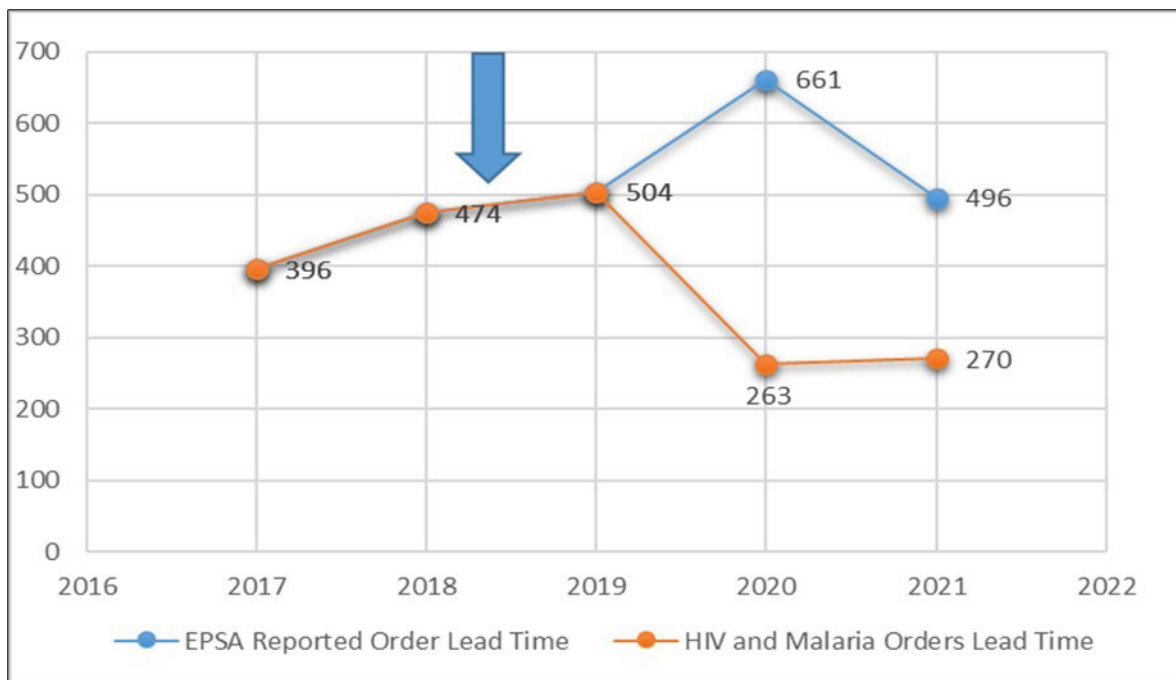


Figure 3 A comparison of procurement lead time across different commodities. EPSA, Ethiopian Pharmaceutical Supply Agency.

Ethiopia. Many cited the availability of essential health commodities for critical programmes such as HIV/AIDS, TB and malaria as having reported improvements across the value chain. The emerging themes from the interviews with the various participants are summarised on [table 2](#).

In addition to sharing of best practices and introduction of framework contracts by the Global Fund which is the main focus of this study; other interventional areas included infrastructure related support such as warehouse floor maintenance, installation of security cameras and fire alarm systems to enhance security; as well as the funding of eight incinerators for the disposal of pharmaceutical waste in the country. All these investments were identified as positively contributing to the performance of EPSA.

More specifically, according to various participants from the EPSA management, the sharing of best practices in procurement and contract management, resulted in overall improvements in operational and financial efficiency across the PSCM value chain. Many agreed that the knowledge and practices adopted helped EPSA to become better equipped in handling commodities, as well as engaging and monitoring supplier performance.

.... the best practices shared have really helped us [EPSA] become experts in negotiating contracts with suppliers and we get preferential terms. This has really helped in improving availability of essential commodities Participant, EPSA.

.....GF [Global Fund] has facilitated and introduced framework agreements to EPSA which is a revolutionary move for the agency..... And they [Global Fund] supported experience sharing with high-income countries that are advanced in the implementation of contracts. EPSA has adopted the agreements 4 years ago, and now continuous support from GF is essential. We are still on the learning curve. What is clear is that the framework agreements have lifted the burden of yearly tendering and evaluations which has significantly reduced lead time Participant, CCME.

Further, it was reported by various participants that the knowledge and skills gained, and practices adopted by EPSA, had greatly improved visibility, streamlined the ordering process and delivery of health commodities, enhancing service delivery across the health system. The majority of the participants also observed that the

Table 1 Annual performance indicators

Year	2017	2018	2019	2020	2021	Average
Pharmaceutical's wastage rate	1.43%	0.94%	1.02%	1.90%	2.32%	1.5%
Cost to income ratio	0.16	0.12	0.21	0.14	0.13	0.15
Cash to cash cycle time (in days)	311	202	371	464	446	359
Inventory turnover rate (in years)	1.11	1.36	1.29	1.1	1.19	1.2

Table 2 Codes and emerging themes

Codes	Emerging themes	Global themes
Availability of essential medicines was a challenge before	Limited availability disrupted service delivery	Improved availability of essential health commodities
Many health facilities used to experience stockouts due to delays in delivery		
The quantification and ordering procedures were cumbersome	Quantification and demand forecast has improved	Streamlined ordering and delivery of health commodities
It was difficult to accurately forecast demand	Need for accurate demand forecasts to guide procurement decisions	
Piecemeal orders for health commodities from suppliers without existing contracts were expensive and hindered service delivery	Working with suppliers and manufacturers directly is faster and more efficient	Cost-effective and cost-efficient procurement procedures
Overall administrative costs linked to the procurement of commodities were high		
Limited supplier capacity to fulfil orders		
Suppliers were often not on time in fulfilling the orders	Order fulfilment challenges	Improved order fulfilment
Some suppliers did not have the capacity to meet the order fulfilment requirements that hindered service delivery		
Lengthy procurement processes when dealing with suppliers and manufacturers	Long procurement lead times	Long-term framework contracts reduced procurement frictions
Delays in payment often became costly and reduced capacity for negotiation of preferential procurement terms		
Lack of a price reference system	Cancellation of orders due to global price increase	

procurement procedures had improved to be timely, less costly and reduced wastage, with the adoption of long-term framework contracts. This was largely attributed to dealing with suppliers with a proven track record.

The quantification department [EPSA] was previously challenged when there were sudden changes in consumption patterns. It would be difficult and near impossible to communicate with the procurement team to increase ordered quantities or cancel the orders in line with the demand. The introduction of framework agreements has given us the flexibility to revise supply plans which play a significant role in reducing wastage and stock outs Participant, EPSA

Long term framework contracts with suppliers are cost-effective and cost-efficient. We [EPSA] can negotiate preferential terms with established suppliers and get better deals, than we used to have previously Participant, EPSA.

It was also reported by stakeholders that the availability of HIV and malaria medicines improved, and lead time was reduced within long-term framework contracts.

There were frequent anti-malaria medicines stock shortage and stock out reports from health facilities that was even being reported through local medias and affecting program implementation, where the major cause was the long procurement lead time.

The incorporation of Artemether+Lumefantrine formulations into long-term framework agreement by EPSA has tremendously improved the lead time and product availability of anti-malaria medicines. Participant, FMOH

It was further clarified by a participant from a technical partner organisation, that EPSA personnel have better visibility in terms of health commodity demand forecasts and are better able to make procurement decisions within the framework of long-term contracts with suppliers. It was also noted that performance evaluation of suppliers is being conducted specially for framework orders and as part of EPSA's strategy to modernise the procurement system.

Reporting quality has greatly improved, and is now fairly timely, accurate, and complete. This really helps in accurate forecasting of [health commodity] demand, which in turn avoids unnecessary wastage and expiries Participant, Technical partner organisation.

.....performance of ARV suppliers in framework agreements were calculated using the lead time, fill rate and responsiveness. However, this is not regularly done nor effectively used for decision making. Participant, EPSA

However, despite the progress, some participants cautioned that the global supply chain disruptions



that were occasioned by COVID-19 as well as the country's security situation could have eroded some of the gains achieved. They urged that more support from different stakeholders would be needed to ensure that the improvements are sustained. A participant from the EPSA management team, specifically mentioned that the procurement lead times could not have been that high were it not for the disruptions of COVID-19.

Like everyone else in the world, Covid-19 [pandemic] really affected our [EPSA] operations. There were delays in the delivery of essential commodities from suppliers. Some commodities were not moving [utilised] at health facilities which resulted in some wastage. However, I think we were better prepared to respond accordingly... Participant, EPSA

The lack of reference price index was also quoted as one of the major reasons for the failure of long-term framework orders that resulted in the increase in the recent procurement lead times.

We [EPSA] use the Global Fund's reference pricing for HIV and malaria products, but for other essential medicines EPSA doesn't have a reference price index. So, if the price of product increases globally which was seen during COVID-19 and suppliers ask for a price adjustment for orders, we are forced to cancel the contract and start tendering process again which takes a long time. Participant, EPSA

Other participants also cited access to foreign exchange constraints as limiting the capacity of EPSA to implement speedy procurement process particularly when dealing with international suppliers whose transactions need to be settled in foreign currency. It was revealed that this situation often led to delays resulting in lengthy procurement lead times.

Normally, there is a limited budget for RDF products to open a letter of credit for purchase orders; and often, this is only prioritized for very vital products, once [the] budget is secured. This ultimately results in lengthy lead time, affecting product availability and also discourages suppliers, Participant, EPSA

A limited supplier base was also identified by some participants as a challenge for EPSA. It was observed that the majority of essential medicines supplied through EPSA do not have an adequate number of suppliers registered by the country's regulatory authority—the Ethiopian Food and Drug Authority (EFDA). Despite the EFDA accepting WHO and Global Fund prequalified suppliers for HIV, TB and malaria commodities, it does not extend similar privileges to suppliers of RDF commodities. This translates to a situation whereby many RDF products do not have a sufficient number of locally qualified and registered suppliers participating in the tendering process.

We [EPSA] have recently done a supply base analysis of items with the number of registered suppliers in Ethiopia by EFDA where we found that over half of

the commodities EPSA supplies, have less than 4 registered suppliers at EFDA. This is one of the reasons for frequent retendering and order cancellations of essential medicines Participant, EPSA

Challenges notwithstanding, participants from a multilateral development organisation revealed that the Global Fund support had greatly benefited the overall operating and financial position of EPSA, by tapping into efficiencies harnessed through the knowledge and best practices. More specifically, they focused on the handling of commodities in a timely and efficient manner as a pathway to reducing costs and making the overall operations of EPSA sustainable.

Improved quantification and demand forecasts are essential to ensure that health commodities at the right quantities are procured. Otherwise, it becomes costly and wasteful. In fact, low inventory turnover can result in higher carrying costs because of storage and handling costs, Participant, Multilateral organization

EPSA's management has also stated that there are numerous planned initiatives like the implementation of an electronic government procurement system, incorporation of a price database system, strengthening market shaping and intelligence activities, the introduction of a supplier's relationship management system, conducting item categorisation and supply base analysis for commodities, developing a sourcing strategy and strengthening capacity of procurement staff.

.....as part of PSTP II strategies to strengthen EPSA, the in-bound team has planned several activities to modernize the procurement system efficiency like eGP, strengthening relationship with suppliers and stakeholders, implementing sourcing strategies and also collaborating with other similar regional procurement organizations Participant, EPSA

.....most of the procurement staff are pharmacists, and laboratory professionals therefore building the staff's capacity in terms of procurement and supply management is crucial. Some staff is CIPS certified which improves their skill and performance. We plan on providing similar capacity building opportunities which need partners' support Participant, EPSA

DISCUSSION

Overall, the Global Fund-supported initiatives resulted in positive improvements in the performance of the Ethiopian PSCM system, and in particular the operations of EPSA. This is despite the disruptions occasioned by various factors including the COVID-19 pandemic that greatly disrupted global supply chains, with effects reverberating across national health systems.^{34 36} The COVID-19 pandemic further affected health utilisation patterns, with far-reaching consequences across health systems.^{36 37} All these factors might have directly or

indirectly influenced the observed trends and participant sentiments that have been reported in this study.

In interpreting these findings, it is important to recognise some of the important limitations of the study. First, the results reported are for a brief period of observation and were for a limited set of national-level indicators, rather than drilling down to the subnational levels for a fuller picture of the health system performance. It is well known that aggregate national-level measures often mask important subnational differences.³⁸ Second, this study was not conceptualised before the onset of the intervention reported here (ie, Global Fund-supported initiatives), and therefore, no specific steps were taken to develop an appropriate prospective research design and data collection strategy to support a more rigorous assessment. Therefore, the study relied on secondary programmatic data with significant missingness, covered a limited period of time and only focused on national trends that could mask subnational or facility-level differences. Efforts to obtain subnational and facility-level data were unsuccessful, partly due to the security situation in the country at the time of this assessment. Third, the study could be subject to confounding relationships with other concurrent interventions which could complicate the attribution of impact to specific interventions. Fourth, the nature of the intervention implemented requires significant time to mature and for the system and population-level effects to be fully discernible. This means that this assessment might miss capturing the full impact of the intervention at maturity. However, despite these limitations, every effort has been made to use the most up-to-date and complete information available, with validation using official reports and collaborating reported data with KIIs.

The improved performance of EPSA is largely evidenced by the high availability of antiretroviral drugs, TB and malaria medicines, and other related supplies. According to the WHO health system framework, improved availability of essential medicines and other health commodities is recognised as a central pillar of any performing health system. This is a fundamentally important consideration as various health systems, including those in low-income and middle-income countries, such as Ethiopia are striving towards UHC.³¹ The HSTP-I mid-term review (2018) documented relatively high availability of programme medicines in line with the set national targets.^{6 39} According to a WHO African Region report, Ethiopia had a health product score of 0.51, which was slightly higher than the regional average of 0.48.⁴⁰

Other intermediate measures that are fundamentally essential to making progress, in service delivery and ultimately UHC also showed improvements as a result of Global Fund-supported initiatives. For example, the reduced wastage of health commodities that was reported supports the efficiency objectives of the health system as outlined in the WHO health system framework.³¹ This was also validated through the HSTP-I mid-term review which reported progress in reduction of pharmaceutical wastage. Invariably, resources saved through improved

efficiency could be effectively harnessed to improve the capacity of the health system to finance its operations and expand public health. Similarly, despite not achieving the 75% national target,³² commodity forecast accuracy rate reported improvements, particularly for malaria and TB commodities over the period of observation. This indicator measures the percentage difference between the quantity of forecasts that have previously been made for a specific period and the quantity of actual consumption for that very period. The indicator describes the degree of fidelity of the forecast to the actual consumption patterns. This indicator was identified as priority in determining the right quantity of commodities to procure in order to avoid wastage and expiry of commodities.^{27 32 33} Certainly, there is much room for improvement, considering the reported performance.

The low cost-to-income ratio that was reported, could be attributed to various factors related to Global Fund support, such as improved procurement practices through long-term framework contracts with suppliers and commodity handling procedures, resulting in further savings. Through the best practices shared by the Global Fund, EPSA was sensitised towards effective vetting of suppliers and strategies for negotiating preferential terms and monitoring of contract performance to harness value.^{20 24 25} Further, better commodity visibility and handling across the value chain could have translated to relatively stable and predictable inventory turnover, avoiding shocks related to storage and handling costs.

Despite this picture of progress, other indicators are on a worrisome trajectory. For example, while the items procured through the Global Fund mechanisms reported improved performance, the declining trend for the RDF commodities put into question the organisational capacity and responsiveness of the supply chain in terms of warehousing, order management and commodity distribution. For instance, the cash-to-cash cycle time is long, pointing to delays in collecting the payments for the health commodities delivered or sold. This largely affects the RDF products, which are essential in the expansion of coverage to include other health needs areas such as non-communicable diseases that are increasingly becoming significant contributors to health loss in Ethiopia.¹⁹ The protracted time it takes to complete the cycle is largely indicative of constraints that require urgent resolution in order to build a self-sustaining EPSA.

On a positive note, the procurement lead time for programme commodities, showed significant improvement over time, after the introduction of framework contracts and other related best practices that were shared by the Global Fund. The fact that there was a sustained drop of approximately 43.0% in procurement lead time, between 2018 and 2021; which was soon after the intervention supported by the Global Fund, is a clear demonstration of impact. However, the average procurement lead time for other commodities, particularly those related to the RDF continued to increase, pointing to delays in the delivery of health commodities needed within the broader



health system. This situation could be attributed to the vertical funding approach espoused by the Global Fund that focuses on specific disease programme areas rather than the holistic healthcare system. There is evidence from various settings showing the deleterious effects of such vertical funding systems that are often counterproductive to the broader healthcare system.^{41–43}

Additionally, the increasing procurement lead times for RDF commodities could be attributed to, among other factors, the recent disruptions occasioned by COVID-19, the lack of a price reference system which resulted in the cancellation of framework contracts for RDF orders, a modest pool of registered supplier base for essential medicines in the country, as well as the security situation in the country. Health system decision-makers need to understand the specific drivers of these trends and institute remedial action. For example, one of factors identified as slowing down the procurement of medicines and health commodities from international suppliers is EPSA's lack of ready access to foreign currency to settle transactions. Therefore, government regulatory support to EPSA to readily access foreign currency to facilitate speedier negotiations and transactions would be welcome.

The WHO health system framework recognises that well-trained and motivated health workers are essential for progress towards UHC.³¹ The Global Fund-supported initiatives were recognised as instrumental in training key personnel to support the EPSA operations. More specifically, improved demand forecasting capabilities are essential for effective procurement and distribution decisions across the value chain. This requires that the system has both the capacity to generate and analyse data, as well as the requisite technical expertise to generate credible forecasts to support decision-making. Despite an improving trend, with respect to forecasting capabilities, there are still gaps indicating that there is still room for improvement.

Just like the effective health workforce pillar, data and effective information management systems are recognised as crucial ingredients for a well-functioning health system.^{3 31} The Global Fund-supported initiatives focused on cultivating strong data-driven supplier relationship management with the overarching goal of sustainably improving population access to medicines and other health commodities. However, considering the dissonance around the reported indicators, whereby some reported measures do not necessarily support each other, giving rise to an inconsistent and contradictory picture, it is clear that more effort needs to be made in this regard. For instance, the high levels of availability do not necessarily correspond to the low levels of line fill rate across the system.

Some of the major data handling gaps could be attributed to a range of factors, including limited linkages between the health facility data systems (which are largely manual) and the Health Commodity Management Information System systems at the hub level. This means that there is limited visibility in tracking medicines and

commodities at the last mile of the health system, which could lead to data discrepancies. Other constraints would be due to data quality challenges, and these could readily be remedied through routine data quality assessments and effective supervision.

To sustain and secure the gains achieved so far it is fundamentally important that various stakeholders, including the government and the donor community, work together to support EPSA deliver on its mandate within the Ethiopian health system. In order to meet the expanding population's health needs and make progress towards UHC, EPSA must have the capacity to procure an expanded portfolio of commodities and ensure high levels of availability of essential commodities as a way of improving population coverage and making progress towards UHC.^{3 31 44}

Further, in order to make progress, it would require that EPSA cultivates a strong organisational and financial position. This would among other things allow for preferential procurement terms directly from manufacturers or suppliers at negotiated rates through long-term framework contracts.^{24–26} This would allow for lower costs; improving operational and financial efficiency, as well as building surplus funds that could be ploughed back to improve the availability of health commodities. In addition, it is important that over time, EPSA is supported to become, a fully financially self-sustaining entity. This approach would be more sustainable and emphasise on less reliance on grants.

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