

ADDIS ABABA UNIVERSITY

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Devolution versus centralization of various logistic functions of Ethiopian pharmaceutical supply Agency; Qualitative study

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June, 2020

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A Thesis submitted to School of Pharmacy, Department of Pharmaceutics and Social Pharmacy, in Partial Fulfillment of the Requirements for the Degree of Master of Science in Pharmacoepidemiology and Social Pharmacy

June, 2020

Addis Ababa, Ethiopia

Addis Ababa University

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This is to certify that the thesis is prepared by Micheale Gebrehans, entitled Devolution versus centralization of various logistic functions of Ethiopian pharmaceutical supply Agency, and submitted in partial fulfillments of the requirements for the degree of Master of Science in Pharmacoepidemiology and Social Pharmacy complies with the regulations of the university and meets and accepted standards with respect to originality and quality.

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Abstract

Devolution versus centralization of various logistic functions of Ethiopian pharmaceutical supply Agency; Qualitative study

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Background: The logistic system in most developing countries including Ethiopia is centralized where the central government has excessive responsibility over various logistic functions such as planning/budgeting, forecasting, procurement, warehousing and distribution of essential medicines and medical supplies. However, these countries are suffering from poor stock availability of essential medicines at service delivery point, shortage of storage space and high work load in their central warehouses.

Objective: The aim of the study is to explore perception of pharmaceutical supply chain professionals on devolution versus centralization of various logistic functions of Ethiopian Pharmaceutical Supply Agency (EPSA).

Method: Qualitative study design was employed. Two cluster offices of EPSA such as Adama and Northern cluster offices including the head office along with their respective regional health bureaus and Ministry of health were purposively selected. Accordingly key informants who have high expertise on pharmaceutical logistic system were selected from designated study sites. The key informant interview was conducted using tape recorder by federal working language (Amharic). Finally, the data was analyzed manually using thematic analysis.

Result: Ethiopian public pharmaceutical supply system has raised lots of complaints particularly over revolving drug fund (RDF) supply. Availability of RDF drugs was highly affected by centralization of the pharmaceutical supply system. Budgeting, direct receiving and warehousing, inventory control system were among logistic functions which were chosen to have low degree of centralization, while procurement was preferred to have high degree of centralization particularly for small and expensive items.

Conclusion and recommendation: Serving pharmaceutical demand of over hundred million populations through the current system particularly for RDF products was perceived as difficult. Hence, either empowering cluster offices to exercise within central guidance of head office or devolution of central EPSA to autonomous regional offices was demanded.

Key words: Devolution, Decentralization, Pharmaceutical supply system.

Acknowledgment

First and above all I would like to glorify the almighty of God, who is the very reason for my accomplishment of this research. My sincere and deepest gratitude goes to my instructor Professor Teferi Gedif, and my Advisors Dr. Matiwos Ensermu, Dr. Bruck Messele and Mr Dawit Teshome (Msc, B.pharm) for their unreserved assistance and constructive comment from the beginning of title selection up to the realization of the final thesis.

In addition, I would like to thank my friends especially Yared Belete and Meles Tekie for their precious time and unreserved assistance starting from the development of the research proposal to final accomplishment of this thesis. Moreover, my sincere gratitude will goes to EPSA head office, EPSA cluster offices, Oromia and Tigray Regional health bureau workers for their participation and cooperation on providing me all necessary information.

I would like to pass my sincere thanks to the school of graduates, Addis Ababa University for the financial support conveyed to realize this study. Finally, I would also like to greatly thank Mekelle University for granting me to attend this program.

Abbreviation/ Acronyms

AAU	Addis Ababa University
CMS	Central Medical Store
DSAS	Decision Space Assessment Survey
EPSA	Ethiopian Pharmaceutical Supply Agency
EPSS	Ethiopian pharmaceutical supply system
HRM	Human Resource Management
IPLS	Integrated Pharmaceutical Logistic System
KEMSA	Kenya Medical and Supply Agency
LIAT	Logistics Indicators Assessment Tool
LMIS	Logistics Management Information System
MOH	Minister of Health
MSD	Medical Store Department
RDF	Revolving Drug Fund
RHB	Regional Health Bureau
SDG	Sustainable Development Goal
WHO	World Health Organization

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1 INTRODUCTION

1.1 Background

The World Health Organization (WHO) refers human beings access to medicine as a vital health care service. Beside this, peoples always demand quality drug products at an affordable price, when they need it, at the right place, in amount and dosage necessary for their therapy (Lu et al., 2011). However, the provision of safe, effective, quality and affordable medicines requires establishment of strong pharmaceutical supply chain management system which is convenient to country's geographical location, population size and political system (McCord, 2011). Pharmaceutical supply chain system was evolved from traditional central medical stores where, the central government take major responsibility and authority to procure and distribute pharmaceuticals solely, to advanced primarily private supply system where private pharmacy provide medicines to patients from public health facility (Embrey, 2012).

Effectiveness of health commodity supply chain system plays a key role in the success or failure of any health care service. For this reason Sustainable Development Goal(SDG) 3 emphasizes on major health priorities like "*reproductive, maternal and child health; ending communicable diseases; reduce non-communicable diseases and other health hazards by enhancing universal access to safe, effective, quality and affordable medicines and vaccines as well as health coverage"*(UN, 2018). Hence, Ethiopia is striding towards the implementation of SDG 2030 goals by integrating into the national development framework (FDRE, 2017).

In spite of these goals recently health care decentralization was also emerged as a major health reform in many developing countries (Berkley, 1993). Decentralization in the health sector could have various features including financial, managerial or political authorities (Bossert and Beauvais, 2002). Although, developing countries have decentralized health system their pharmaceutical supply system remained centralized in which the central government/agency take major responsibility over several logistic activities such as planning/budgeting, forecasting, procurement, warehousing and distribution of essential medicines and medical supplies (Bates et al., 2000, Bossert et al., 2007).

The term decentralization has broad definition which entails handover of decision making power or authority from the central government, to regional or district officials in order to satisfy health care demand of local populations and improve access to medicines and treatments throughout all areas of a nation (Berman and Bossert, 2000). Based on the range of decision power transferred to lower level officials decentralization were classified into four such as Deconcentration, Devolution, Delegation and Privatization (Rondinelli et al., 1983, Mills et al., 1990). Different countries use one or more type of decentralization based on their wealth, political system, availability of skilled man power and technologies. However, countries which use mixed mechanism to manage various categories of pharmaceuticals have more efficient system (Embrey, 2012).

Deconcentration as one style of decentralization requires transfer of limited administrative power to local offices while major decision making power was retained at central offices. Locally recruited individuals are employees of central office and they have a very limited autonomy (Williamson et al., 2014). The second form of decentralization, devolution which requires relatively extensive sometimes full power and/or authority transfer of a range of important governmental functions from national/central government to subordinate, regional offices/local governments while Policy and regulatory functions were retained at the national level (Frenk, 1994). Likewise, within pharmaceutical supply system devolution requires the transfer of decision making power, responsibility and accountability over various logistic functions (Byl et al., 2013). Thirdly, delegation involves shift of responsibility over specific public task to parastatal or semi-autonomous organization within the health system (Williamson et al., 2014). Fourthly, privatization unlike the other three types of decentralization totally shifts the ownership of public task to private sector.

Essentially, pharmaceuticals were supplied to lower level health care service delivery point using different model including central supply model where pharmaceutical procurement and distribution are primarily managed and coordinated by national institution. Whereas, decentralized pharmaceuticals supply system allow regions or subordinate offices to take responsibility for receiving, storing, distributing and sometimes procurement of essential medicines and medical supplies based on their demand (Embrey, 2012).

1.2 Statement of the problem

Ethiopia is one of the countries with fast growing demand of pharmaceuticals which is expected to reach almost USD1 billion expenditure by 2020 (EPSA, 2018). In accommodation of these vast demands, the country has been made several efforts particularly in the last two decades by establishing an agency called PFSA (PFSA, 2015). The agency implement an Integrated Pharmaceuticals Logistics System (IPLS), increasing the number of branch offices throughout the country and delivering extensive training to efficiently increases the pharmaceutical supply performance of the country (Shewarega, 2015).

Unfortunately, the agency was unable to satisfy essential medicine demand of the country because it has complicated and protracted business process derived from poor utilization of available resources and unnecessarily spending of too much capital in distribution networks rather than working in the efficiency of operations. Beside of this, the role of most cluster/branch offices over several logistic functions like financing, budgeting/planning, procurement, transportation, warehousing and human resource management (HRM) were limited as a result their efficiency and responsiveness to local demands remains circumscribed (EPSA, 2018).

In addition, pharmaceuticals procured from international suppliers was primarily stored in the central warehouse before reaching to branch offices which causes pharmaceutical cost increment related with unloading/loading and transport cost, prolong the resupplying time of branch offices, increased work load and demand more storage space in the central warehouse (Embrey, 2012). For instance, in Ethiopia to send high volume of pharmaceuticals from EPSA head offices to branch offices large vehicles have to collect these items from 23 different warehouses located in Addis Ababa and Adama. In addition to this 32% of high load pharmaceutical request of branch offices were served by rental vehicles. On the other hand, delivery vehicles were also goes to Addis Ababa for repair and maintenance as manufactures recommendation and this result in decreasing the number of vehicles available in branch offices for customer delivery (EPSA, 2018).

Consequently, most branch offices were exposed to frequent stock out of supplies particularly RDF products meanwhile, health facilities were also forced to purchase pharmaceuticals from private wholesales which is relatively much costly than EPSA. For instance according to the

national survey conducted in 2015 out of 270 health facilities only 37% were received program pharmaceuticals based on their request with the correct products and quantity. Similarly for RDF products only 14% of hospitals and 29% of health centers were received products based on their request. Overall this causes for frequent emergency orders of many health facilities for instance, 68% of hospitals, 43% of health centers and 38% of health posts were requested at least one emergency order from EPSA branch offices (Shewarega, 2015).

Most importantly EPSA has tremendous problems in management of various core logistic activities including a very complicated financial management system which sometimes causes operations to cease up to one month to make reconciliations of financial and stock discrepancies (EPSA, 2018). Furthermore, due to limited supply decision power of branch offices and highly centralized pharmaceutical supply chain system of EPSA, the logistic system also faces difficulty in adapting the decentralized health system of Ethiopia. Overall, some regional health bureaus (RHB) remain concerned on the efficiency of the agency to avail essential medicines (Ageze, 2012).

Therefore, studying different strategies to increase the efficiency of current supply system was found essential. Accordingly this study emphasizes on exploring the perception of pharmacy supply chain professionals on devolution versus centralization of various logistic functions of EPSA in order to optimize the workload, storage requirement at central office and fully utilize resources available in branch office.

Finally, this study provide an input to the health commodities supply system of Ethiopia and inform policy makers, logistic experts, managers about the benefit and risk of devolving logistics system. Lastly, it helps as a preliminary study and reference for other researchers to further conduct research in the area of decentralized pharmaceutical management system since only limited attempts/researches have been done in the area of decentralization of logistics so far.

2 LITERATURE REVIEW

Globally around two billion peoples do not have access to medicines. Although several efforts and researches have been done in pharmaceutical logistic system to improve access to essential medicines so far the number of literatures conducted on decentralization of logistic functions were very limited (Chan, 2018). Accordingly, theoretical perspective on centralization and decentralization of pharmaceutical supply system, Ethiopian healthcare system and EPSA and literature conducted on decentralization of pharmaceutical managements were thoroughly reviewed.

2.1 Theoretical background on centralization versus decentralization

There is endless argument on how to organize supply chain system and at which structural level should decisions made. Different literatures suggest either centralized or decentralized approach of pharmaceutical supply chain based on their merit/demerits. Some advocates for centralized approach of pharmaceutical supply chain because it's an advantageous on providing economies of scale during bulk procurement as it enhances bargaining power of centrally established institutions. In addition, it also lessens the number of sellers and improves the efficiency of negotiation with limited suppliers. Moreover, centralization of decision making brings homogeneity of works through all structural levels (Harrison, 2001). Conversely, centralization has its own several limitations for instance it is incompatible to meet locally existed unique public demands because most of the time central executives don't have full information to make timely good decisions (Stroh et al., 2003). Centralization by its nature reduce local officials control over key decisions like inventory or transportation, thereby local officials have to wait for decisions to be made at central (Lee and Whang, 1999).

On the other hand, decentralization has been emerged and implemented broadly in several developing countries as a means of addressing political, economic and technical demand of society. Besides this, decentralization paves a way for enhancing accountability, transparency responsiveness and decision making power at local government/ subordinate institutions. Moreover it ensures equity of resource distribution by decreasing inappropriate concentration of power and authority at central government (Pius Kulipossa, 2004, Bossert and Beauvais, 2002). However, when decentralization were poorly designed and implemented some programs could

face shortfall of services and loss of advantages over centralization because of procedural weakness and lack of practical execution of strategies (Pius Kulipossa, 2004). Similarly, while decision making power was decentralized conflict of interest could exist between higher officials who transfer the authority and lower officials who receive new authority for pursuit of personal drive (Omar, 2002). Overall, decentralization of pharmaceutical supply system needs a high political reform and commitments because it demands high financial resource allocation, financial management and human resource capacity (Conn et al., 1996).

2.2 Ethiopian healthcare system versus pharmaceutical supply system

Ethiopia as a federal state has adopted decentralized health care system including 9 autonomous RHBs and two administrative city health offices since 1995. The country has shared decision making power among the federal minister of health, RHBs and woreda health offices on the design, development and implementation of the health system. Beside this, the country has three tier health delivery system including primary level (health post, health center, primary hospital), secondary level (general hospitals) and tertiary level (specialized hospitals). However, health sector performance of the country was constrained by lack of autonomy, administrative complexity, lengthy and unresponsive pharmaceutical logistic system. In other words, the country has inefficient and centralized pharmaceutical logistic system (Ageze, 2012).

Ethiopian pharmaceutical supply system has long history i.e. near to 70 years on service with different missions and names. Ethiopian public healthcare supply chain system was changed from profit-making Pharmaceutical and Medical Supplies Import and Distribution Agency into service-providing Pharmaceutical Fund and supply agency (PFSA) in 2007 by Proclamation No. 553/2007 (HPR, 2007). PFSA currently known as Ethiopian Pharmaceutical Supply Agency (EPSA) is semi-autonomous institution responsible for bulk procurement, storage, quality assurance, distribution of pharmaceuticals and financial management under the Ethiopian federal ministry of health (EPSA, 2018). The agency is governmental entity which works in line with guidelines and principles of the country.

Recent supply performance of the agency based on the IPLS survey conducted in 2018 in 456 health facilities including specialized hospitals, general hospitals, primary hospital, health centers and health posts shows that health centers and hospitals have 79.2% of stock availability

out of 37 selected indicator medicines on the day of visit. In addition, EPSA's perceived order fill rate of program products were 89.7% for hospitals and 88% for health centers. In contrary, only 34% of hospitals and 45.4% of health centers perceive that EPSA has refilled their request timely with the right quantity. While, 88.9% of tertiary hospitals, 81.4% general hospitals and 50.0% primary hospitals request an emergency order from EPSA. Furthermore, EPSA supply share has been declining from 86.7% in 2014/15 to 77.4% 2016/17(EPSA, 2019).

2.3 Literatures on decentralization of pharmaceutical supply system

A case study conducted on decentralization of reproductive health commodity of Ethiopia shows that lack of commitment at regions to highly engage in developing their own strategies and absence of stewardship by central level contraceptive security exposes regions to shortfall of commodities. Since, most of regions don't know their pharmaceutical budget while they merely conduct annual commodity forecast and send to the head office to be financed by stakeholders. As a result misreading between central offices and regions occur because initially regions don't have actual budget. As a result regional managers were failed to take timely corrective actions like mobilizing fund (USAID, 2012).

In relation with this, a qualitative case study conducted on Kilifi County of Kenya using decision space assessment survey (DSAS) shows that shift of substantial decision making power to county with minimal central government controlling role helps county government to have their own budget to quantify, order and procure essential medicine for health facility located within the county, primarily from KEMSA otherwise from any other alternative supplier. Thus, devolution of budget to county government improves order servicing of KEMSA and increases the refill rate of health facility to around 95% compared to Pre-devolution which was challenged by long stock out period, low refill rate and delayed delivery (Tsofa et al., 2017).

Similarly, study conducted in KEMSA using primary data collected from one focus group which consist of six participants including supervisors, managers and directors, and secondary data from 285 hospitals and 4950 Rural Health facilities using data of one financial year prior to devolution and one financial year after devolution indicates that the mean on-time delivery for hospitals after devolution was reduced from 2.3 days to 1.6 days while on time delivery on rural health facilities was also reduced from 5.5 days to 4.2 days. However, distribution cost was

slightly increased in hospitals from KES 101,454.78 to KES 105,807.83 following devolution. When, it was reduced from KES 991,994.58 to KES 976,312.20 in rural health facilities. In addition, decisions previously made by KEMSA don't consider cost reduction since most decisions were made centrally but, following devolution counties start to make independent decisions to meet their customer demand (Onyancha, 2015).

In Tanzania following the shift from the Central medical store (CMS) to autonomous medical store department (MSD) that comprises 8 zonal stores the supply of essential medicines were dramatically improved. Despite of this, in recent years the MSD was challenged by high workload, small storage space, poor stock availability and limited managerial capacity. Hence, the stock availability of essential medicines in central MSD was gradually decreased from 80% in 2001 to reaches only 49% in 2003, while the availability of tracer items in the zonal stores of MSD reduce to 50 percent. Correspondingly, survey conducted in 2007 reveals that only 33 percent of health facilities were exclusively procured from MSD, whereas the rest of the health facilities were forced to purchase from private pharmaceutical wholesalers. As a result the number of private wholesales doubled to reach 200 between 2000-2007 (Tanzania, 2007).

Providing this, among the few study conducted in low income countries Ghana had also significant experience with decentralization. In view of that, a study conducted in 72 facilities from 5 regions of Ghana including key participants interview using a DSAS showed that decentralization of higher decision space was associated with better performance in planning/budgeting and financing i.e. the more decentralized system allows lower level to get more financial capacity. In contrary, decentralization of higher decision space was associated with low performance in various logistic functions like procurement, storage, logistic management information system (LMIS), inventory control, training and client contact (Bossert et al., 2007).

In the same way, study done in 281 facilities of Guatemala, representing 23% of the country total facilities using DSAS and logistics indicators assessment tool (LIAT) showed that more centralization was related with better performance of LMIS and inventory control system. However moderate to high logistic decision space given to local authorities was related with better performance in planning/budgeting, quantification, transportation and procurement of essential medicines (Bossert et al., 2007).

Among, the various countries that have been implemented different type of decentralization particularly in their health care system Philippines and Uganda have adopted devolved health care system since these countries have relatively high fiscal and administrative capacity. Beside they prefer to exercise moderate to wide degree of local autonomy on financing, human resource management and service organization while, Ghana and Zambia has undertaken delegation of their health care management to semi-autonomous public institution and they choose to have a narrow degree of autonomy over several functions (Bossert and Beauvais, 2002).

Furthermore, eastern Caribbean countries that have different political status, legal system and population size prefer to integrate their pharmaceutical supply system. These countries establish pharmaceutical procurement service an agency which comprises nine member countries and responsible for pooled procurement mainly for large volume class A and B items. Where, each country was expected to deposit revolving drug fund at the eastern Caribbean central bank. Accordingly eastern Caribbean central bank deal with hard currency exchange which is necessary to make international procurement. Finally, member countries were anticipated to place their orders based on purchasing schedule set by the agency (Embrey, 2012).

3 OBJECTIVE

3.1 General Objective

The main aim of the study was to explore perception of pharmaceutical supply chain professionals on devolution versus centralization of various logistic functions of EPSA.

3.2 Specific Objectives

- ✓ Explore the perception of pharmaceutical supply chain professionals on devolution versus centralization of EPSA
- ✓ Explore various factors that influence devolution vs. centralization of logistic functions of EPSA
- ✓ Explore the degree of centralization required over specific logistic functions

4 METHODS AND MATERIALS

4.1 Study Area and Period

This study was conducted primarily in EPSA which is the sole public pharmaceutical supply agency where the head office is located in Addis Ababa the capital city of Ethiopia. The agency was established in 2007 by Proclamation No. 553/2007 by the name Pharmaceutical Fund and Supply agency (PFSA, 2015). Currently, EPSA has a total of 305,910 m^3 storage capacity, USD750 million value of products distribution capacity and 19 branches all over the country under seven clusters which are Adama cluster, Northern cluster, North western cluster, Central cluster, Eastern cluster, Western cluster and Southern cluster (PFSA, 2018). In addition, the EPSA stakeholders like Ministry of Health (MOH) and RHBs were also included in this study. Consequently, EPSA Adama cluster which was located in Adama city, Oromia regional state 92.5 km northwest of the capital Addis Ababa. It serves as center of excellence beside to supplying of 342 governmental health facilities from three regions including Oromia, Amhara and Afar. While northern cluster located in Mekelle city Tigray regional state 783 km north of Addis Ababa. It mentors two branch offices of EPSA i.e. Shire and Semera, and simultaneously serves 377 public health facilities mainly found in Tigray region. The study was conducted from April to May 2019 G.C.

4.2 Study Design

Qualitative study design was employed to explore perception of pharmacy supply chain professionals on devolution of various logistic functions of EPSA.

4.3 Researcher's position and reflexivity

The investigator prefers to implement qualitative research method because the research topic has not been studied clearly before. Hence, to gain familiarity with the research topic exploring participants' perception was found essential. As qualitative studies frequently expose to biases by principal investigators there by describing positionality of the researcher to see how his identity (age, sex, ethnicity), and experience could affect the result of the study was necessary.

The researcher is an Ethiopian male who permanently reside in Mekelle city, Tigray regional state of Ethiopia, fluent Amharic and Tigrigna speaker and employees of Mekelle University academic staff. In addition, the researcher has worked in Ayder referral hospital and PFSA

Mekelle branch as hospital pharmacist and forecasting officer respectively. Hence, these backgrounds couldn't bring discords because participants were considered as educated professionals who have a minimal of bachelor degree in pharmacy and noble understanding of Ethiopian pharmaceutical supply system. In spite of that, most of participants have not prior relationship with the researcher there by, participants didn't know the researchers background except those who work in EPSA Mekelle branch. As this could have impact on response of limited number of participants the researcher has tried to use his maximum effort to allow participants' express their opinion freely. In addition, the researcher doesn't have any inclination rather than exploring how participants perceive about decentralization/devolution of pharmaceutical management system of Ethiopia. Furthermore, data collection was conducted in Amharic language which is federal working language and description about the subject area of the study i.e. devolution was given during the interview session to remove ambiguity.

4.4 Sampling and recruitment

Purposive sampling technique was employed to select relevant study areas from the seven cluster offices of EPSA which are geographically distributed throughout the country. Accordingly, two cluster offices (Adama and northern cluster of EPSA) which are located in different regional states and geographic area of the country along with head office of EPSA were selected in consideration of budget, time constraints. In addition, EPSA stakeholders' such as MOH and RHBs who are interested in EPSAs' pharmaceutical logistic system and located near to sampled EPSA cluster offices were also included to understand healthcare deliverer perspective on devolution versus centralization of EPSA. Providing this, to obtain information rich participants' who have more experience and broad knowledge in the pharmaceutical supply system of Ethiopia, professionals who have an executive position and more than 5 years' work experience for supply decision making such as managers, directorates, case team coordinators on EPSA head offices, EPSA cluster office, MOH, Oromia and Tigray RHBs were included in this study. However, professionals who work in contract agreement were excluded. Then after, although the numbers of participants were not predetermined a total of 25 study participants were approached for interview. Meanwhile, only five participants did not participate in this study for several reasons such as workload since participants have high managerial position they were too busy. Despite of that, data collection at each site were terminated based on point of saturation since

following the interview of each participants the data was instantly coded and checked for any redundancy of opinions among participants.

Participants of this study have broad knowledge on the pharmaceutical supply system of the country with work experience ranges from 5-25 years and minimal of bachelor educational status. Therefore considering the organogram of EPSA individuals from different directorates and teams were incorporated on this study as depicted in Table 1.

Table 1: Characteristics of key informant

Place of work	Number of participants	Managerial level	Work experience(Yrs)	Educational status
EPSA head office	1	Pharmaceutical Forecasting	6	Msc
	1	Pharmaceutical and medical equipment tender administration	9	Msc
	1	Inventory control system	10	Msc
	1	Pharmaceutical distribution	8	B.pharm
EPSA cluster office	2	Cluster coordinators (branch managers)	7, 12	Msc, MPH
	1	Pharmaceutical distribution	9	B.pharm
	1	Forecasting and capacity building	19	B.pharm
	1	Deputy manager	6	B.pharm
	1	Warehouse and inventory management	5	B.pharm
MOH	3	Pharmaceutical and medical equipment directorate	9	Msc
		Pharmaceutical service case team	6	Msc
		Pharmaceutical supply case team	9	Msc
RHBs	1	Treatment and care case team successor	7	Msc
	3	Pharmacy case team	10,12, 25	2Msc,1B.pharm
	2	Pharmaceutical logistics expert	11, 26	2 B.pharm,

4.5 Data collection

4.5.1 Data collection instruments

Key informant interview was employed. The interview was conducted using the federal working language (Amharic). Tape recording (after obtaining consent) which was supplemented by note taking was used to collect participants' opinion. In addition semi-structured interview was also conducted to explore the choice of participants on degree of centralization over specific logistic function. Given this, the data collection instrument comprises five parts. Information regarding description of participants was collected before proceeding to the main content of the instrument. Secondly, participants' perception on the current Ethiopian pharmaceutical supply performance was explored. Then the instrument was designed to explore perception of participants on devolution of Ethiopian pharmaceutical supply system. In the fourth section of the instrument various factors that could influence devolution vs. centralization of logistic functions was explored. Finally, all participants were asked to choose the degree of centralization over specific logistic activity. Questions of key informant interview were constructed through intensive discussion with individuals who have high expertise in logistic system, from distinctive literatures and based on the research objective.

4.5.2 Data Collection procedures

The principal investigator primarily participated in data collection particularly during key informant interview. The investigator initially approached responsible individuals from each purposively selected study areas. Then he introduces him-self, the purpose of the study, how the institution was selected and provided an official support letter written from Addis Ababa University. Following this, brief explanation was given including how the data collection would proceed (i.e. individuals would be selected based on their work experience and their knowledge adequacy about Ethiopian pharmaceutical supply system). Once the permission was obtained from the person in charge of the organization, participants were also asked for written consent including about audio recording of the interview. Then face to face audio recorded interview which was supplemented by note taking was conducted for 30-60 minutes with in the study area premises privately.

4.6 Data quality assurance

The data collection tool was pretested in 4 workers of EPSA Addis Ababa branch office to include new emerging issue during pretest time and checked for its consistency and quality since there was no standard tool for validating the interview guide. Most importantly to resolve the issue of trustworthiness and quality of qualitative research distinctive approach have been used for instance: data triangulation was mainly used during data collection by involving different people that have different positions and work in distinctive unit. Accordingly, Managers, directorates, case team leaders and officers from different unit like forecasting, distribution, procurement, inventory control and warehousing who satisfy the inclusion criteria was involved. Beside this to enrich the data acquired from participants the data collection tool were developed prudently to elicit more information by probing or asking follow up question. Providing this conformability the second most sensitive issue in qualitative research was ensured using audit trail, where every step of the study including reflexivity was thoroughly described.

4.7 Data analysis

Prior to initiation of data analysis the data collected by audio recording and field note taking was instantly organized, cleaned and transcribed into text. Then the data collected in Amharic language was first translated into English language and back translated into Amharic with the help of two translators in order to cross check for any inconsistency. Data analysis was started by reading the transcription and listening audio records several times to adequately immerse and understand participants' perspective. Then repetitive or recurrent ideas and key issues that could be unusual or contradictory were listed and highlighted. Those highlighted broad ideas were reduced (coded) to that which is more manageable and abstract units based on the participants' perspective. Meanwhile, those codes were revised several times to see for any trend while, similar codes were categorized into one cluster and labeled since it was helpful to identify or generate themes. Accordingly, most of repetitive and similar codes that have relation to the research objective were developed into theme.

4.8 Ethical consideration

Ethical approval was obtained from the ethics review committee of the School of Pharmacy, Addis Ababa University (AAU). Official support letter from the department was provided to EPSA Head office, MOH, RHBs and EPSA cluster offices. Written consent was obtained from study participant to confirm their willingness of participation in the interview conducted by audio recorder. Meanwhile, respondents were informed that they have the right to refuse or terminate at any part of the interview. Participants' confidentiality has been given large emphasize throughout the study and any personal identifier that could potentially expose a particular study participant such as respondent's name in the data collection tool was avoided. In addition the data collected was not accessed by third party except those who have direct relation with the study. The collected information was presented in an aggregate form in a way that was not possible to identify a particular participant. Respondents' information was kept secure in computer locked by strong password.

4.9 Operational definition

Decision space- refers to the range of decision making power that branch offices need to have over specific logistic function and/or the degree of decision making authority/responsibility that central office need to transfer to branch offices.

Logistic function– term refers to various supply chain activities like financing, budgeting, selection, quantification, procurement, inventory control, LMIS, warehousing etc.

Logistician – professionals who work in EPSA/MOH/RHB which have distinctive role in pharmaceutical supply chain activities.

EPSA branch office – an office that receives pharmaceuticals from central warehouse of EPSA and merely deliver to health facilities

EPSA cluster office – direct subordinate office of EPSA head office which coordinate and mentor some branch offices and directly supply health facilities.

4.10 Dissemination of the result

The final result of the study will be reported to AAU, school of pharmacy scientific community and Library of AAU, EPSA head office, MOH, Oromia and Tigray RHBs. Additionally partners who are engaged in the pharmaceutical supply chain system of Ethiopia will be beneficiary of this study. An attempt will be tried to publish the findings in scientific journal to contribute evidence to international scientific community.

5 RESULT

5.1 Organizational structure of EPSA

Nowadays, EPSA head office was restructured to include a total 7 members for board of directors from different sector that have direct influence on the pharmaceutical supply system of the country. These board members were selected from different sectors such as National Bank Governor (chairman), Deputy Director General of Ethiopian Airlines, State Minister of Health, General Director of Public Procurement and Property Administration Agency, Commissioner of Customs, Director General of Maritime Logistics and Transport and Director General of EPSA with the mandate of leading the agency, approving and evaluating various strategic procedures, monitoring and evaluating annual program budget (EPSA, 2019). Overall the agency has four deputy director generals and twenty directorates as presented in Figure 1 below.

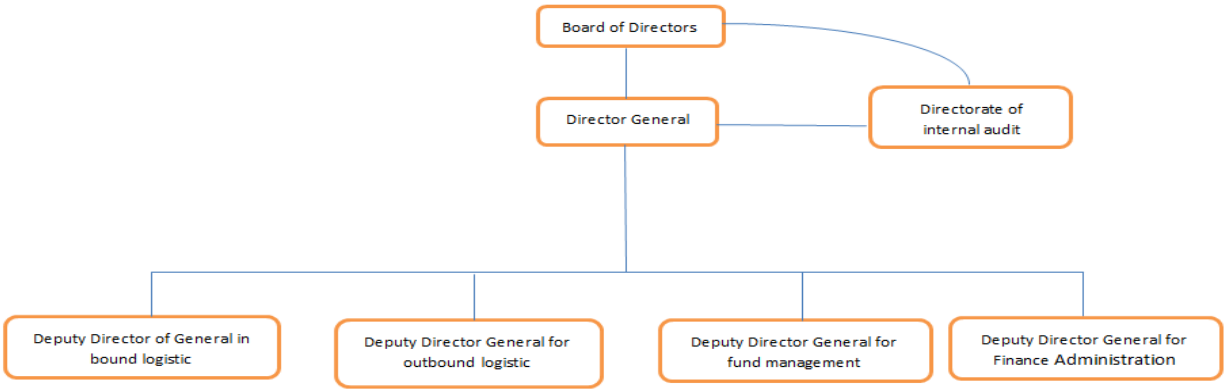


Figure 1: Organogram of EPSA head office

The seven newly emerged cluster of EPSA has similar organizational structure which comprises around six coordinator units as depicted in figure 2 including Forecasting and capacity building coordinator, Inventory management coordinator, Distribution coordinator, Fund administration management, General Service and HRM.

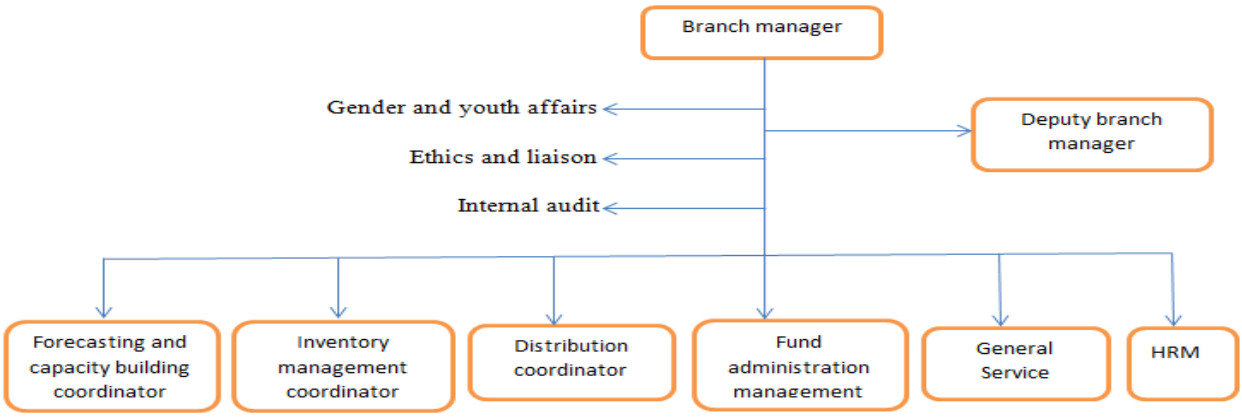


Figure 2: Organogram of EPSA Branch offices

5.2 Perception towards the current Ethiopian pharmaceutical supply agency

Ethiopia is the second most populous country in Africa which has decentralized health care system although, it was not defined what type of decentralization has been implemented (Ageze, 2012). On the other hand, the country practices more of centralized approach of pharmaceutical supply system because RHB/cluster offices involvement on major pharmaceutical logistics activities was insignificant. As this study shows EPSA head office has high control over various logistic functions. For instance, cluster/branch offices does not have a full authority over their inventory including decisions on selling of near expire products to private health facilities because cluster offices were expected to get permission from EPSA head office. In addition, whenever clusters have interests for additional amount of locally manufactured pharmaceuticals other than the quota allocated by head office they don't have an authority to acquire pharmaceuticals by their own unless they get permission from head office. Furthermore, current practice of EPSA central office hinders cluster offices/RHB preference of handling their local pharmaceutical demand. Therefore, these all excessively complicated administrative procedure results on losing of technical efficiency of cluster offices.

> *"We can't sale near expiry medicine for private facilities without obtaining permission from the central office while this all bureaucracy results in efficiency lose"*(CO,02).

Apparently, EPSA has a well-organized and geographically distributed warehouse, trained man power, many small and large vehicles to satisfy pharmaceutical demand of the country but it was not efficient. However, there are different contributing factors such as health facilities failure to

take commitment for their forecasted quantity, shortage of hard currency, inefficiency of other stakeholders likes maritime and custom authority that work jointly with EPSA. Its inefficiency was also raised from circumscribed role of cluster offices over various logistic activities because their role was not beyond receiving of pharmaceuticals from head office and distribution of these products to health facilities like a "pipeline". Thereby, sometimes cluster/branch offices hesitate to take full responsibility for any essential medicine shortage occurred in their warehouse. For instance whenever branches run out of stock either they provide evidence of product stock out to allow health facilities purchase from private wholesales or try to avail by requesting from EPSA head office or sister branch offices unless they have no ways to rapidly respond to local demands. For these reasons, EPSA was perceived as an organization that attenuates the autonomy and logistic activities of cluster/branch offices.

> *"It is challenging to address through one line approach even though they are designing their own strategy. Ethiopia has over hundred millions of populations and it needs innovative approach to be efficient. RDF product needs more attention and it is difficult to manage in the current strategy"* (MOH, 01).

> *"EPSA entirely control the country logistic system by monopoly which pushes any other supplier to concentrate only on fast moving items this all causes to disappear and melt off competitive suppliers through time"* (RHB, 01).

Additionally, EPSA pharmaceutical supply efficiency was mainly classified into two categories such as program and RDF products. Program products (Malaria, ART, TB...) were primarily funded by international donors like global funds. These products were mainly procured by MOH while EPSA participates in warehousing and distribution of these items and claims service charge. Overall, program drugs supply efficiency was perceived as satisfactory which reaches up to 80%.

> *"By the way when we say pharmaceutical supply it was better to see them separately into program products and RDF products. There is no complaining in the supply of program products but there is capacity limitation in RDF products"* (CO, 001).

On the other hand, RDF drug supply was unsatisfactory which raises massive complain from many regions. However, different initiatives have been taken to improve RDF drug availability at health facility level including "*quick win initiative"* in which selectively identified high volume health facilities which serves large population directly report to EPSA branch office every two weeks and thus products available in branches were delivered accordingly unless the central office would directly respond to health facilities request.

> *"In terms of products availability health facilities with sophisticated services has no satisfaction with its services"* (MOH, 02).

> *"Following 'quick win initiative' implementation in Tigray region particularly in 8 piloted hospitals EPSA's average pharmaceutical supply reaches from 65% to 85%"* (RHB, 001).

> *"Availability of drugs in 28 health facilities located under the catchment of EPSA Adama branch reaches 94.3% following the implementation of 'quick win initiative"*(CO, 01).

In addition, the agency develops a procurement list as one action for enhancing its efficiency of availing both program and RDF products. Development of the list helps the agency to be focused on procurement and distribution of these drugs and to measure its supply performance by considering the list as a domain. In view of that, the agency reveals not to take responsibility for products out of the procurement list. Although, some accepted the list as the means of increasing the efficiency of EPSA, concerns were raised on getting pharmaceuticals out of the list and exact accommodation of the list on the major pharmaceutical demand of health facilities.

> *"Currently there is improvement according to feedback received from our health facilities particularly after EPSA developed a procurement list, average refill reaches up to 80% since procurement list was used for measurement"* (RHB, 02).

5.3 Perception towards the devolution of Ethiopian pharmaceutical supply agency

Provision of continuous and sustainable pharmaceutical supply requires establishing of flexible and responsive system alongside with highly capacitated and empowered lower level pharmaceutical management offices. As a result increasing decision making power and widening the role of EPSA cluster/branch offices with the intention of addressing unique local demands

were supposed as means of improving total pharmaceutical supply performance of the country. In spite of that, the existing system of EPSA was perceived as restrictive system which hinders cluster office from using their capacity and resources. Therefore, some suggest reducing cluster offices dependency on head offices by authorizing them at least to partly involve in procurement of high volume and fast moving pharmaceuticals as a necessary measure. In other words, centralization of procurement was perceived advantageous for products required in small quantity because it's too expensive to acquire independently.

> *"Branch should have to take share in procurement at least from local manufacturer/importer. The share may vary for instance allowing the branch office to procure 20-30% of pharmaceuticals and leaving the rest to central EPSA (70%)"* (RHB, 001).

Moreover, the current pharmaceutical supply system of Ethiopia is assumed as a highly centralized system in which most of resources and authorities were concentrated at EPSA head office. Although, there have been some logistic activities, authorities and resources decentralized to cluster/branch offices further decentralization of the system was demanded, despite the fact holding procurement centrally was still regarded as an acceptable measure to obtain an economy of scale. Notwithstanding, full decentralization was also seen as one constitutional right of regions since the country follow federal system of administration in which regional states were expected to have full autonomy.

> *"It should be fully decentralized because it's constitutional right. So regional states have the right to practice and use their autonomy unless it's just a way of giving responsibility without authority (authority in sense resource)"* (RHB, 01).

On the other hand, professionals argue that branch offices already have more than enough roles. For example EPSA branch offices responsibility over several activities like rational drug use, supporting health facilities on DTC, quantification and disposal of expired medicine which is out of the scope/core competency of EPSA and perceived as unnecessary mandate. Therefore, limiting the roles of EPSA branch offices only to inventory management, warehousing and distribution of pharmaceuticals was necessary, although some raise issues on the sufficiency of decision making power within their scope. Beside this, allowing branch/cluster offices to

procure pharmaceuticals by their own was also perceived as illegal practice which open doors for financial misuse and corruption.

> *"Branch offices have sufficient role because their main role is receiving goods and distributing to the health facilities. Besides this letting them to purchase medicine is illegal and creates an opportunity for many inappropriate practice"* (EPSA, 01).

> *"There were activities which have been done by EPSA which some of them were out of the scopes of the organization"* (MOH, 02).

Similarly, some advocates for further centralization of the system by limiting the role of cluster/branches to only distribution of pharmaceuticals to ensure equitably utilization of the scarce resource of the country. For instance the agency was promoting to initiate central ordering system which means every health facility sends their request to head office and stock transfer to cluster office accordingly.

> *"It should be centralized, everything should be linked to central office and we are in the way"* (EPSA, 02)

Generally, with regard to devolution of Ethiopian pharmaceutical supply system different perception was reflected from different perspective. Program products were mainly managed by MOH, so devolving of program drug management was assumed as tough. On the other hand, two different views has been reflected on devolution of RDF drug supply system that is either devolution of various logistic functions from EPSA head office to cluster offices which enables cluster offices to rigorously involve in logistic decision making and different logistic functions including procurement. Otherwise, full devolution of EPSA head office to autonomous regional offices which is primarily accountable for regional states.

> *"The structure should be changed because in current organogram branches are accountable to central EPSA and there is no space for regions to intervene therefore branches should be accountable to regional health bureaus*" (RHB, 001).

Alternatively, the concepts of full devolution to regional states were totally rejected because it is not cost effective as it could badly affect the public. Rather step by step partial devolution of the

system by capacitating and empowering clusters/branches to exercise within central guidance of head office was also considered.

> *"We have not reached to this level. As we know in the healthcare system only pharmaceutical logistic system was left centralized. So, taking resources issue in to consideration for me it is difficult rather it's better to empower and progressively partially decentralize the system to cluster offices"*(MOH, 01).

Hypothetically, most professionals reveal that devolution of various logistic functions as a mechanism of ensuring accountability at subordinate managerial offices. While, some argued that devolving of all logistic activities including procurement result in inefficiency instead specifying logistic activities that requires devolution as better option. Furthermore, devolution allows resource decentralization which helps regions/clusters to improve their capacity and effectively utilize their budgets.

> *"If regions take responsibility for their pharmaceutical forecast and sent budget attachment it's very good to ensure accountability and properly utilize resource but it is not feasible for all operations"* (EPSA, 01).

The existing system was failed to meet public pharmaceutical demand sustainably so, finding ways which could improve pharmaceutical availability at service delivery points were demanded. Hence, current political system (federalism) of the country and availability of well-organized cluster/branch offices in terms of human power and infrastructure was all anticipated as an opportunity for devolution. On the other hand, the issue of devolution was feared because it may raise conflict of interest and resistance from head office beside its instant disruptive consequence on the logistic system. Moreover regions/clusters may face challenges to carry out all complex process related with custom, maritime and hard currency this might result in unhealthy competition. Devolution may also cause poor redistribution of products from region to region, corruption, drug price inflation and wastage as a risk.

> *"As a risk if the communication between regions/branches for redistribution of products were poor there would be overstock and expire in one region while other regions/branches were suffered from stock out or shortage"*(RHB, 001).

5.4 Determinant factors of devolution versus centralization of logistic functions

Financial insufficiency of regions/clusters was expected to significantly influence the idea of devolution, while availability of skilled man power has slight impact which could be corrected by provision of series trainings. With regard to governmental policy some argue as long as the regions/clusters didn't execute international bid it has minimal influence on devolution.

> *"As far as the governing rule is constitution; governmental policy could not affect devolution. Financial matter associated with import is not our concern however we need to administer our independent warehouse, human resource and budget. Procurement by central agency has an advantage and we support that"* (RHB, 01).

Hence, it was perceived that procurement as important determinant factor of availability, cost and quality of drugs. Economy of scale seriously affects centralization/decentralization of logistic functions for example scattered procurement may result in price inflation of drugs, reduction of supplier interest in small amount there by, buyers mostly prefer to execute procurement centrally. Moreover, integrity, attitude and awareness of higher officials also play a significant role on decentralization of logistic functions. Furthermore, availability of foreign hard currency of the country also affects the organization of pharmaceutical supply strategy since more than 50% of pharmaceuticals were imported.

For instance, an Oromia regional state has been trying to establish an independent agency called "Biftu adugna" which mainly works on supplying of medical equipment, chemical reagent and pharmaceuticals not provided by EPSA. However, biftu adugna supplying performance was substantially declined because of financial scarcity and lack of hard currency. As a result the prices of pharmaceuticals were considerably increased.

> *"For sure it's difficult, previously some regions have been trying to establish independent supplier for instance Oromia try to establish an independent agency which procure and distribute pharmaceuticals. However I need to warn boldly that it will affect the public negatively"* (EPSA, 01)

5.5 Degree of Centralization required over specific logistic Functions

Among the various logistic functions procurement was highly preferred logistic function to be executed at head offices for the reason of economy of scale. Whereas, participants from EPSA head office prefer high centralized pharmaceutical logistic system over several logistic functions because it allows ensuring uniformity of work and homogeneity of efficiency among branch offices. In addition, EPSA head office has interests for further retaining of previously decentralized activities. For instance, as long as EPSA head office has adequate data and potential to decide on the number of drugs required for every branch. Therefore, recentralization of quantification to head office which has been performed by cluster/branch offices was perceived as important measure to enhance forecasting accuracy. Likewise, logistic functions like quality control especially for internationally procured pharmaceuticals were also chosen to be executed centrally.

> *"EPSA has clear and sufficient data to make decisions on how much line item to procure. So, decentralizing has no benefit other than increasing tiers and confusing individuals"*(EPSA, 03).

Alternatively, some also suggest that clusters partial involvement on procurement of locally manufactured pharmaceuticals and reserving international procurement for head offices. However, participants from RHB and cluster office prefer low degree of centralization in managing and making decisions over a number of logistic functions like budgeting, inventory control system, direct receiving and warehousing of internationally procured pharmaceuticals. While total outsourcing of logistic activities including fleet management and other non-logistic tasks like security and sanitary issues were also suggested to enhance the efficiency of current supply system.

> *"Centralizing the procurement is good to promote bulk procurement. Its more preferable when central office procures from international supplier while allowing branches/regions to procure from local supplier by tender"*(CO, 02).

6 DISCUSSION

This study generally tries to find ways on how the efficiency of Ethiopian pharmaceutical supply system could be affected by centralization/decentralization of the system. Thus, it starts from examining the current organizational structure of the agency. Recently, the agency has been reforming its structure starting from board of directors to emerge 7 new members from different sectors since its efficiency significantly depend on the efficiency of those sectors. In addition, EPSA restructures the organization of 19 branch offices which was directly linked to the head office previously to form seven new cluster offices. Moreover, the agency develops new initiatives like "Quick Win Initiative", implement Business Plan Reform (BPR) and develop procurement list. These all reforms result in slight improvement of pharmaceutical availability in some health facilities mainly due to communication enhancement among facilities, branches and head offices.

Obviously, information communication system has a pivotal role in supply chain system in order to timely ensure drug availability at health facility level. Quick win initiative was primarily implemented approach to improve availability of pharmaceuticals particularly RDF products by enhancing communication among different stake holders. Health facilities which implement this initiative have improved their essential drug availability to 94.3% in 28 health facilities piloted for quick win initiative under the catchment of EPSA Adama branch and to 85% in 8 piloted health facilities of Tigray. Comparably, a study conducted in selectively identified 11 public hospitals of Addis Ababa reveals similar result following the implementation of quick win initiative where average stock out was reduced from 24% to 6% and around 50000 USD wastage reduction due to expire was also achieved (FMoH, 2018). Such results indicate that strengthening and simplifying information exchange among pharmaceutical stakeholders greatly boost drug availability at service delivery point. However, this initiative still don't resolve dependency of cluster/branch offices on head offices because health facilities request were served as long as cluster/branch offices were supplied by head office.

In spite of progresses achieved in those health facilities selected for Quick win initiative in Tigray and Oromia regions pharmaceutical availability of RDF products still remained not more than 65% at EPSA head office. This indicates that most of health facilities continued to run out of stock chronically. Similarly, experience from Tanzania reveals the same result where the

traditional central medical stores were changed to autonomous medical store in effort to improve essential medicines supply. However, following years the reform was still faced by serious stock unavailability for example in 2007 only 33% of public health facilities were exclusively procured from MSD. Therefore, this all inefficiency could be resulted from the strategy where both countries Tanzania and Ethiopia implements i.e. autonomous supply system which was a highly centralized system so, searching for better alternative pharmaceutical supply strategy is an important option to look (Tanzania, 2007).

Additionally, in this study it was found that supply performance of cluster offices were significantly dependent on the efficiency of head office which was similar with the practice of Ghana logistic system. Unlike Ethiopia, Ghana use "carry and cash" system in which any administrative level was required to fund and purchase pharmaceuticals from its higher level of the supply chain. However, when products were not available in lower level medical stores/cluster offices both countries have no options other than providing certificate of stock out to facilities because the system were very restrictive and highly centralized (Bossert et al., 2007).

In this study, it was found that selective devolution of logistic activities as means of improving accountability at subordinate offices and boosting the efficiency of pharmaceutical supply system for example allowing regions or regional clusters to send their forecasted quantity along with budget attachment and/or limiting the role of EPSA head office only to availing pharmaceuticals at central office and letting regions administer their own independent warehouse, human resource and budget. This is consistent with the study conducted in Kenya where county governments take responsibility to budget and procure pharmaceuticals primarily from central KEMSA otherwise from any other supplier. For these reasons, devolution of essential medicines and medical supplies in Kenya provide high bargaining power to county government while it places competitive pressure on KEMSA (Tsofa et al., 2017). Unfortunately, in case of Ethiopia regions/clusters don't have actual money to see for alternatives as long as EPSA head office fails to supply. In addition, most of woreda/zonal/regional health offices in Ethiopia didn't fully engage in the annual quantification of RDF meanwhile, they didn't even know how much budgets they have because number of pharmacy workforce was limited which is mainly engaged in various activities other than logistics.

In the same way, previously decentralization was also experimented on reproductive health commodity of Ethiopia. However, it was failed to succeed because both central office and regional offices had poor commitment. In addition, regional offices have a weakness in clearly establishing their annual pharmaceutical budget since reproductive health commodities are program drugs which most of the time financed by donors so, it was difficult to send budget attachment along with pharmaceutical forecast. Nonetheless, this could work out for essential medicines by devolving budgets to subordinate institutions. Equally important, central offices need to closely monitor and continuously support cluster/regional offices to bear out their gaps (USAID, 2012).

In contrast, this study shows high interest of centralization over procurement which was similar with the study conducted in Ghana because it was perceived as best practice to obtain economy of scale from bulk procurement. However, some participants from cluster office and RHBs have requested low degree of centralization over budgeting, inventory control system, direct receiving and warehousing of internationally procured pharmaceuticals up to partial involvement on procurement which is consistent with the study conducted in Guatemala. While in Guatemala the Health Area Offices (HAO) determines the type & quantity to procure using their own budgets and suppliers ship directly to HAO for subsequent redistribution. This allows health facilities to achieve high order fill rate (between –5% and 5%) for medicines. However, the study conducted in Philippines and Uganda give emphasis to decentralization of their healthcare system rather than logistics. Therefore, better information, fiscal and administrative capacity at subordinate level was necessary for decentralization along with good political commitment of the government. Since, devolving decision making power to local officials and letting them locally control their budgets and financial matters was suggested for accountable and efficient resource utilization. Although, some officials of EPSA head office show high interest on further centralization of the whole system because they perceive the current system was suffered from financial scarcity (Bossert et al., 2007).

Likewise, interest of centralization over procurement and devolved budget utilization reflected by some professionals from regional health bureaus and cluster offices on this study particularly for small and expensive items (class C items) was comparable with the practice of Eastern Caribbean countries where member countries get commitment to purchase certain quantity of

pharmaceuticals and deposit their budget on the common account of pharmaceutical purchase service an agency responsible for group purchase. However, unlike Ethiopia, eastern Caribbean countries were independent and sovereign countries with a total of around 43 million populations which were regionally integrated to obtain economy of scale during pooled pharmaceutical procurement. Therefore, Ethiopia as a country with over 100 million populations that comprises 9 autonomous regional states and two administrative cities could take a lesson from these countries by allowing each region to manage their own budgets and held clusters/regions honorable for their forecasted quantity by managing procurement centrally (Embrey, 2012).

Herein this study, different possible dangers of devolution of Ethiopian pharmaceutical supply system was also explored such as wastage of resources due to expire/overstock because redistribution may not occur between devolved units, increment of drug price, unavailability of drugs if clusters/regions fail to operate effectively. On the contrary in the study conducted in Kenya following devolution mean on-time delivery of pharmaceuticals to health facilities were significantly decreased, although distribution cost to hospitals were increased. Despite of this, devolution in Kenya was also confronted by some inconsistency and lack of coordination during transition period. Overall this indicates that poorly designed and carelessly implemented devolution could negatively affect the advantage of centralization in other words, pharmaceutical cost might be inflated (Kimathi, 2017, Onyancha, 2015).

Furthermore, cluster offices have clearly stated scope to exercise but their authorities and decisions making powers were limited. For example, cluster/branch offices have the right to locally manage their logistic activities including managing of program drug distribution, monitoring of their stock and requesting of pharmaceuticals from central offices based on their consumptions etc. However, some participants from cluster office and RHBs perceive that the current pharmaceutical management system requires further decentralization to allow cluster offices respond local demands flexibly.

Therefore, Ethiopia as a country that comprises diversified peoples with a distinctive local circumstance and interests, its pharmaceutical supply system needs improved performances. So, decentralization of Ethiopian pharmaceutical supply system might be considered as an option although some remains concerned about loss of economy of scale and purchasing power, lack of technical and managerial skills at subordinate levels. However, it needs tradeoff between cost

effectiveness of the current pharmaceutical supply system versus cost effectiveness of using decentralized/devolved pharmaceutical supply system.

7 LIMITATIONS AND STRENGTHS OF THE STUDY

7.1 Limitations of the study

- Although pharmaceutical logistic system of Ethiopia involves different sectors (National bank, airlines, custom and maritime and professionals) and various professionals like accountants, IT workers, biomedical and laboratory technologists, this study exclusively conducted in pharmacy professional who actively work in EPSA,MOH and RHBs.
- Key informant interview was not complemented with FGD due to lack of time
- This study gives more emphasize on exploring perception of participants on devolving of RDF drugs because it was the main area that causes dissatisfaction in several health facilities.
- This study doesn't explicitly explore what type of devolution (fiscal, managerial, ,) that EPSA requires.

7.2 Strengths of the study

- ✓ Although many studies have been conducted in decentralization of health care system this study entirely focus on decentralization of pharmaceutical logistic system.
- ✓ The issue of trustworthiness and quality of this study was ensured by triangulation in which professionals who have different work experience from different unit at different time was included, while audit trail and reflexivity was also used to show researcher neutrality from introducing bias.
- ✓ In addition, this study was conducted comprehensively in two regional health bureau which have different population size and geographical location along with two cluster offices, EPSA head office and MOH.

8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusions

Decentralization of health care system was executed in Ethiopia, in which regions were independently managing their budgets, organizational structures including their human power. However, pharmaceutical supply chain was held highly centralized for various reasons such as economy of scale. For these reasons, many logistic functions and major logistic decisions were managed in head office while cluster/branch offices remained as a pipeline. Thus, centralization hinders local level management responsiveness to seasonal and/or local demand variations. While, political context of the country favor for devolution of the pharmaceutical management system because some RHBs realize centralization of pharmaceutical management system as violation of their autonomy.

Therefore, devolving of various logistic functions was seen as the main mechanism of ensuring accountability and efficient resource utilization at local level. Moreover, devolution was expected to reduce physical and managerial complication at head offices since it was believed that serving more than hundred million populations through one line approach was difficult. However, devolution needs high political reform and commitments since it require high financial and human resources. In spite of all, conducting centralized procurement particularly for expensive and small quantity items was still believed as cost effective measure. Furthermore, devolution of Ethiopian pharmaceutical supply system was not perceived as simple process because there are a number of factors such as hard currency, custom, drug price that could greatly affects efficiency of pharmaceutical availability therefore, this topic needs further serious studies.

8.2 Recommendations

- Capacitating and empowering of cluster offices to reduce physical and managerial congestion in head office
- Considering devolution of some logistic functions like budget, vehicle maintenance, inventory management, direct receiving and warehousing up to allowing of regional states establish and manage their own regional agency
- Giving due emphasize only to pharmaceutical management by outsourcing of some activities like fleet management, warehouse cleaning, security and disposal of expired products
- Conducting serious studies on alternative public pharmaceutical supply strategies like Direct delivery system

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10 ANNEX: English Version

Annex I. Participant information sheet and consent form

Dear respondent my name is **Micheale Gebrehans**, I am second year Masters student of Pharmacoepidemiology and Social Pharmacy at Addis Ababa University, School of Pharmacy. Currently, I am working my research entitled **"Devolution versus centralization of various logistic functions of Ethiopian pharmaceutical supply Agency; exploratory study"** as part of requirement for my MSc degree. The purpose of this study is to explore perception on devolution of various logistic function of Ethiopian pharmaceutical supply agency. The result obtained from this survey will be used as preliminary input for decision makers to see for opportunities and challenges of devolving health logistics functions in Ethiopia. To achieve the study objective, your honest and genuine participation by responding to the question prepared is very important and highly appreciated.

The interview may take 30-60 minutes and it will be tape recorded. Your participation in this study is completely voluntary. You have the right to be in the study or to withdraw in any time; there is no influence that insists you to participate, unless you voluntarily confirmed to participate.

We would like to assure you that privacy will strictly be maintained throughout. Your personal information will be maintained through the use of unique identifiers, and through restricting access to the data set to the principal investigator. The data collected from each participant will be entered into a computer where it will be maintained in password control. Hard copies of completed instruments will be kept in a locked file and will be available only for research study staff.

If you have any questions or would like to receive further information about the study; please contact using the following address.

Persons to contact:

Micheale Gebrehans
Mob: +251-975-276880
E-mail: ghansmicheale@gmail.com
or My advisor: Dr. Matiwos Ensermu

E-mail: ensermujalata@gmail.com

For data collector: If agreed to participate and receive written consent and confirm with his/her signature and precede the interview

Name of the interviewee: _____Sign. _____ Date of interview_____

Thank you for your time.

Annex II: Key informant interview for EPSA central/hub/MOH/RHB

Part 1: Participant description

Q.N	Question	Response
1.	Gender	1. Male 2. Female
2.	Age	_____Year
3.	Profession	1. Pharmacy 2. Laboratory 3. Accounting 4. Management 5. Other(specify_____)
4.	Which department are you working in now?	1. Procurement 2. Forecasting 3. Warehouse management 4. Distribution 5. Freight Management 6. Finance 7. Human Resource 8. Other(Specify_____)
5.	Experience in pharmaceutical supply system	_____Year
6.	Educational status	1. Diploma 2. Degree 3. Masters and above

Part 2: Perception of participants on devolution versus centralization of various logistic functions of Ethiopian pharmaceutical supply agency

1. How do you describe Ethiopian pharmaceutical supply agency?

Probe: its efficiency with regard to drug availability, customer satisfaction, transparency and accountability?

Probe: the relationship between central EPSA, hubs, MOH and RHB?

Probe: the potential of EPSA central office and cluster offices in terms of ensuring responsiveness and flexibility to local demand?

2. How do you describe the accountability of EPSA cluster offices to health facilities around their catchment area?

Probe: How do you perceive the responsiveness and flexibility of EPSA cluster offices toward local demand?

Probe: What do you suggest to make EPSA cluster office more responsive and flexible for local demands?

3. Do you think branch office would have role and decision making power beyond what they have now? If yes how? If no why?
4. What type of approach do you suggest that EPSA should use to satisfy pharmaceutical demand of the country? Centralized, partially decentralized or fully decentralized approach? Please justify your answer?

Now let me give you one example of decentralized pharmaceutical supply system i.e. Devolution refers to transferring of significant decision-making power, responsibility, budget and authority from national institution to local/branch offices. However the overall national policy direction was determined by the national level.

5. What do you think on devolution of Ethiopian pharmaceutical supply agency?

6. How could devolution of various logistic functions/decision making powers ensure accountable and efficient resources utilization?
7. What are the opportunities for devolving of various logistic functions/decision making powers on current Ethiopian pharmaceutical supply system?
   a. What are the possible benefits obtained from devolving of various logistic functions?
8. What are the possible challenges for devolving various logistic functions of current pharmaceutical supply system?
   a. What do you think the risk of devolving various logistic functions of current pharmaceutical supply system?

Part 3: Exploring factors that influence Devolution versus centralization

9. What factors influence the devolution or centralization of supply chain decision making?

Probe: How could the government policy, capacity constraints (financial, skilled human power), costumers' requirement, foreign or local suppliers and cost of pharmaceuticals affect devolution or centralization of decision making/ logistic function?

Part 4: Exploring degree of centralization over specific logistic function

10. How much degree of centralization do you suggest over specific logistic function? Please justify your answer? Refer Table 1
11. Finally is there anything more you would like to add?

Table1. **Semi-structured Questions for key participant**

S.N	Logistics function	Degree of centralization (low, high)? Please Justify?
1	Financing	
2	Budgeting/planning	
3	Product selection	
4	Procurement	
5	Inventory control system	
6	Warehousing	
7	Fleet management	
8	Logistics information Systems	
9	Human resource management	
10	Organizational support	
11	Quality control	
12	Others	

Thank you once again for your cooperation!!

11 ANNEX: Amharic Version

አባሪ ፡ የቁልፍ መረጃ ሰጪ ቃለ-መጠይቅ

ክፍል አንድ፡ የጥናቱ ተሳታፊዎች መግለጫ

ተ.ቁ	ጥያቄ	መልስ
7.	ጾታ	1. ወንድ 2. ሴት
8.	ዕድሜ	_____ዓመት
9.	ሞያ	1. ፋርማሲ 2. ላባራቶሪ 3. አካውንቲግ 4. ማናጅመንት 5. ሌላ(ይገለጽ_____)
10.	የትኛው መምሪያ ላይ ነው አሁን እየሰሩ ያሉት ?	1. ግጂ 2. ትንበያ 3. የመጋዘን አስተዳደር 4. ስርጭት 5. ፋይናንስ 6. የሰው ሃበት አስተዳደር 7. ሌላ(ይገለጽ_____)
11.	በመድኃኒት አቅርቦት ስርዓት ያለዎት የስራ ልምድ	_____ዓመት
12.	የትምህርት ደረጃ	1. ዲፕሎማ 2. ዲግሪ 3. ማስተርስ እና ከዛ ብላይ

ክፍል 2፡ የተሳታፊዎች ግንዛቤ በዲቮሉሽን እና በማዕከላዊ የኢትዮጵያ መድሃኒት አቅራቦት ድርጅት የተለያዩ የሎጂስቲክ ተግባራት

1. አሁን ያለውን የኢትዮጵያ መድሃኒት አቅርቦት ድርጅት እንዴት ትገልጸዋለህ?
    a. ከመድሃኒት አቅራቦት ፣ ከደንበኛ እርካታ፣ ከአሰራር ግልጸኝነት ና ተጠያቂነት አንጻር?
    b. በኢመአኤ ና በጤና ጥበቃ ሚኒስተር እንዲሁም በኢመአኤ ቅርንጫፍ ጽ/ቤት ና በ ክልል ጤና ቤሮዎች ከመድሃኒት አቅርቦት አንጻር ያለው ግንኙነት ምን ይመስላል?
    c. የኢመአኤ ዋና መ/ቤት ና ቅርንጫፍ ጽ/ቤት የጤና ተቀማትን የመድሃኒት ፍላጎት በቅልጥፍና ና በፍጥነት ለመመለስ ያላቸው አቅም እንዴት ትገልጸዋለህ?
2. የኢመአኤ ቅርንጫፍ ጽ/ቤቶች በአከባብያቸው ለሚገኙ ጤና ተቃማት ያላቸው ተጠያቂነት እንዴት ትገልጸዋለህ/ምን ይመስላል?
    a. የኢመአኤ ቅርንጫፍ ጽ/ቤቶች በአከባብያቸው የሚገኙቱን የጤና ተቃማት መድሃኒት ፍላጎት ለማርካት ያላቸው ቅልጥፍና ና መለስ ሰጪነት እንዴት ትገነዘበዋለህ/ትገልጸዋለህ?
    b. የኢመአኤ ቅርንጫፍ ጽ/ቤቶች በአከባብያቸው የሚገኙቱን የጤና ተቃማት መድሃኒት ፍላጎት በፍጥነት ለመመለስ መን መደረግ አለበት ብለህ ታስባለህ?
3. የኢመአኤ ቅርንጫፍ ጽ/ቤት አሁን ካላቸው የስራ ድርሻ በላይ ሚና ሊኖራቸው ይገባለ ብለህ ታስባለህ? መልስህ አዎ ከሆነ እነዴት? አይገባም ከሆነ ለምን?
4. የኢመአኤ ምን ዓይነት የአስተዳደር ስርዓት ቢከተል የህብረተሰቡን የመደሃኒት ፍላጎት ሊያማላ የችላል ብለህ ታስባለህ የተማከለ፤ በከፊል ያልተማከለ ወይስ መሉ ለሙሉ ያልተማከለ አሰራር? እባክዎን ያብራሩ?

አሁን አንድ አብነት ስለ ያልተማከለ የመድሃኒት አስተዳደር ስርዓት ልስጥህ ዲቮልሺን ይባላል

Devolution ማለት ወሳኝ የሆኑ የውሳኔ ሰጪነት ስልጣን, ኃላፊነት እና በጀት ከብሄራዊ ተቋም ወይም ከ ማዕከላዊ ቢሮ ወደ አካባቢ / ቅርንጫፍ ቢሮዎች ማዛወር ማለት ሲሆን አጠቃላይ የብሔራዊ ፖሊሲው አቅጣጫ በማዕከላዊ ቢሮ የሚወሰን ይሆናል፡፡

5. ስለ የኢመአኤ ዲቮልሺን (የውሳኔ ሰጪነት ስልጣን, ኃላፊነት እና በጀት ከዋናው መስራያ ቤት ወደ ቅርንጫፍ/ክልል ቢሮዎች ማውረድ) ምን ታስባለህ ?
6. የተለያዩ የሎጂስቲክ ተግባራትን ዲቮልቭ ማድረግ (የውሳኔ ሰጪነት ስልጣን, ኃላፊነት እና በጀት ከዋናው መስራያ ቤት ወደ ቅርንጫፍ/ክልል ቢሮዎች ማውረድ) እንዴት ተጠያቂነትን እና ዉጤታማ የህብት አጠቃቀምን ለያሰፍን ይችላል?
7. በአሁኑ የኢትዮጵያ መድሃኒት አቅራቦት ስርዓት የተለያዩ የሎጅስቲክ ተግባራትን/የውሳኔ ሰጪነት ስልጣን ወደ ቅርንጫፍ/ክልል ጽ/ ቤት ለማስተላለፍ ያሉት መልካም ኣጋጣሚዎች ምንድን ናቸው?

a. የሎጅስቲክ ተግባራትን/የውሳኔ ሰጭነት ስልጣን ወደ ቅርንጫፍ/ክልል ጽ / ቤት በማስተላለፍ ሊገኙ የሚችሉ ጥቀሞች ምንድናቸው?

8. በአሁኑ የኢትዮጵያ መድሃኒት አቅራቦት ስርዓት የተለያዩ የሎጅስቲክ ተግባራትን/የውሳኔ ሰጪነት ስልጣን ወደ ቅርንጫፍ/ክልል ጽ/ ቤት ለማስተላለፍ ያሉት ተግዳሮቶች ምንድናቸው ?
    a. የሎጅስቲክ ተግባራትን/የውሳኔ ሰጭነት ስልጣን ወደ ቅርንጫፍ/ክልል ጽ / ቤት በማስተላለፍ ሊያጋጥሙ የሚችሉ ጉዳቶች ምንድናቸው?

ክፍል 3፡ በዲቮሉሽን ላይ ተጽዕኖ የሚያሳደሩ ነገሮች

9. አንድን የሎጅስቲክ ተግባር/ የውሳኔ ሰጪነት ስልጣን ከዋናው መስራያ ቤት ወደ ቅርንጫፍ/ክልል ቢሮዎች ለማውረድ ና ላለማውረድ ተጽዕኖ የሚያሳድሩ ነገሮች መንድን ናቸው?

የመንግስት ፖሊሲ ፤ የመድሃኒት ዋጋ፤ የአቅም ዉስንነት(የፋይናንስ ፤ የክእሎት አጥረት)፤የደንበኞች ፍላጎት(የመአኤ ቅርንጫፍ፤ ጤና ተቃም) እና የሀገር ዉስጥ ና የአለም አቀፍ አቅራቢዎች በዲቮልሽን ላይ እንዴት ተጽዕኖ ይኖራችዋል?

ክፍል 4 በተለያዩ የሎጂስቲክ ተግባራት ሊኖር የሚገባው የዉሳኔ ማዕከላዊነት ደረጃዎች

10. በእያንዳንዱ የሎጂስቲክ ተግባራት ውስጥ ምን ያክል የዉሳኔ ደረጃ ማዕከላዊነት ሊኖር ይገባል ብለው ሰንጠረዥ 1 ይመልከቱ እባክዎ ለመልሶ ማብራርያ ይስጡ
11. በመጨረሻ ለመጨመር የሚፈልጉት ተጨማሪ ሃሳብ ካለዎት ቢገልጹሉኝ?

ሠንጠረዥ 1. የቁልፍ መረጃ ሰጪዎች አጭር ጥያቄዎች

ተ.ቁ	ሎጂስቲክ ተግባራት	የማዕከላዊነት ደረጃዎች (ዝቅተኛ, ከፍተኛ)? እባክዎን ያብራሩ?
1	ፈይናንስ	
2	የበጀት / እቅድ	
3	የመድሃኒት ምርጫ	
4	ግዥ	
5	የመድሃኒት ቁጥጥር	
6	የመጋዘን አገልግሎት	
7	መጓጓዣ	
8	የሎጂስቲክስ መረጃ ስርዓቶች	
9	የሰው ሀብት አስተዳደር	
10	ድርጅታዊ ድጋፍ	
11	የጥራት ቁጥጥር	
12	ሌላ	

ለትብብርዎ በድጋሜ በጣም አመሰግናለው!!!