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FACTORS AFFECTING PHYSICAL DISTRIBUTION OF PHARAMACEUTICAL PRODUCTS: THE CASE OF ETHIOPIAN PHARAMACETICUAL SUPPLY AGENCY

BY

WENGELAWIT SEYOUM

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APPROVAL

This research paper entitled as "Factors Affecting Physical Distribution of pharmaceutical products : The Case of Ethiopian Pharamaceticual Supply Agency" has been submitted to St. Mary"s University, School of Graduate Studies, Institute of Business, with my guidance and approval as a university advisor.

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Declaration

I, the undersigned, declare that this thesis is my original work, prepared under the guidance of advisor Ass. Professor Zemenu Ayinadis. All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher learning institution for the purpose of earning any degree. It is offered for the partial fulfillment of the degree of MA in Business Administration (MBA).

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Table of Content

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Acronyms / Abbreviations

EPSA	Ethiopian Pharmaceutical Supply Agency
RDF	Revolving Drug Fund
WHO	World Health Organization
FEFO	First Expiry First Out
CMS	Central Medical Store
SPSS	Statistical Package for Social Science
ANOVA	Analysis Variance

List of Tables

List of figure

Abstract

The purpose of this research was to find out factors affecting physical distribution pharmaceutical products: The case of EPSA. The study was considered four independent variables. The researcher used descriptive and explanatory (casual) research design. To this objective quantitative approach was used. The data's were collected from 125 employees who were selected using convenience sampling technique. The sample technique was chosen the respondents were selected particularly which meets a certain criteria. The sources of data were primary and secondary data. The method of data collection was questionnaire. Validity and reliability test were directed to check the consistency between the variables all included variables confirmed to reliable scoring with alpha value greater than 0.7. The method of data analysis was using correlation, multiple regression, frequency, table and percentages. The major findings showed that, there is significant positive relationship between independent and dependent variables. The other was linear combinations of all factors of physical distribution considered under the present study were significantly contributed to the positive variation for effectiveness of physical distribution management. The researcher concluded that in the case of selected branches of EPSA, the different factors which have significant positive impact on effectiveness of physical distribution management. Finally, the researcher recommended EPSA to reexamine the warehouse practice assessment in order to make more space and buy more shelves that are necessary for pharmaceutical products in more effective physical distribution management, agency needs to the reconsider on availability of vehicles in order to increase the physical distribution management effectiveness. The agency needs to update to latest technology for controlling vehicles rather than the manual way of controlling the vehicles and needs to give more emphasis in improving effective supply of medicine since it is a major mandatory in distributing medicine in the country.

Keywords: product, physical distribution, warehouse practice, transportation, storage, product timeline and overall physical distribution of pharmaceutical products

CHAPTER ONE
INTRODUCTION

This chapter deals with background of the study, profile of the company, terms of definition, and statement of the problem, basic research questions, and objective, significance, scope and limitations of the study with highlights the organization of the paper.

1.1. Background of the Study

Every health logistics aim is to make sure that the product delivered based on the customers' needs at the right place. The commodity security exists when every person is able to obtain the use of quality essential health supplies whenever he or she needs them (USAID DELIVER PROJECT, 2011).

Grujic, Moraca & Fajsi, (2020) mentioned there is the uncertainty of drug and medical service when distribution channels are familiarized by the lively and complex market.

According to the definition of Economic times, (2020) distribution means to feast the product through the marketplace such that a large number of people can purchase it. It also includes the following things such as a good tracking system to allow the desired goods reach at the right time. An efficient transport system takes the goods into different geographical areas with good packaging, avoiding the wear and tear in transport, tracking the places where the product can be placed such that there is a maximum opportunity to buy it and it also involves a system to take back goods from the trade. In the same way the distribution concept is about the allocation of income and asset in one society. On the business side distribution is related to allocation of goods to the beneficiaries Wirtschaftsleyikon24.net, (2011).

Distribution involves in a process that all doings related to the circulation of economic goods between producers and customers Domschke and Shield, (2010). Distribution attributes include channel coverage, varieties, site, stocks, and transportation Ibidunni, (2011). The Product distribution strategy is the main activity in the marketing management of products that are formed for the needs of consumers. The distribution or implementation of product placements has the purpose of bringing the product closer to potential customers or its target market, Trihatmoki & Mulyani,(2018).

Distribution of goods and services is divided in two. And these are acquisition distribution system and logistic (physical distribution system). The author also explained acquisition distribution system management includes the management of distribution routes which we called distribution channels. Logistic distribution system is focused on bridging the space and time by transportation and storage, as well as ordering the processing and shipment and supply logistics which is called the movement of materials, Specht, (2018). According to the findings of key distributors and wholesalers have logistics challenges that affect storage and transportation of the company's product (Ajegetina, 2015).

The dimensions used for the external survey, the most important points are a communication system, availability of finished products, response to customer order and conducting customer satisfaction survey have shown poor performance EPSA, (Adane,2017). EPSA is advisable to use computerized system for warehousing and storage practice in order to improve the distribution system, Admasu, (2017).

In on one hand physical distribution involves in manufacturing and commerce to explain the broad range of activities concerned with efficient movement of finished products from the end of production line to the consumer. It is also about the movement of raw material from the source of supply to the beginning of the production. It includes all aspects like freight transportation, warehousing, material handling protective packaging, inventory control, plant, warehouse selection, order processing, marketing, forecasting and customer service (Kahanna,2007)

In the other hand the concept physical distribution concept includes management (planning action and control). It is about the flow of raw material and finished goods from the point of use consumption to encounter the customer require at a profit. It include all activities in the flow of goods between producer and consumer (James, 2009)

Logistics is the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and associated information from point of origin to point of consumption for the purpose of imitating to customer requirements (USAID | DELIVER PROJECT, 2011).

Pharmaceuticals distribution is one of the logistics activities as; it remains the process by which medicines are moved from a central warehouse to storage depots and health facilities. Pharmaceuticals supply system which is for this purpose ensures that procurement, warehousing

and transportation are flawlessly linked to form a network that can deliver the requested health commodities in appropriate time, at the required quantities and at the lowest possible cost (Yadav , 2011).

In Ethiopia, a country wide assessment of the pharmaceuticals supply management system was undertaken to document the challenges faced in the procurement, storage and distribution of pharmaceuticals. The assessment revealed that long procurement lead times, inadequate storage infrastructure, and unsystematic distribution practices were major constraints to pharmaceuticals supply management system in the country. From the above assessment the following point were drawn. The main causes of these problems are poor procurement planning due to the lack of a logistics management information system (LMIS), inadequate staff capacity in the Federal Ministry of Health (FMOH) Pharmaceutical Administration and Supply Service and non-optimal administrative procedures at federal and regional government levels (FMOH, 2005).

1.2. Background of the organization

The Ethiopian Pharmaceuticals Supply Agency (EPSA) was established as a semi-autonomous public institution in 2007 to supply quality-assured and affordable pharmaceuticals to all public health facilities in Ethiopia. EPSA has contributed to the achievements made in the health sector regarding the reduction of morbidity and mortality associated with both communicable and non-communicable diseases. Since its establishment EPSA has sought to build its capacity in terms of human resource and supply chain systems at all levels. As a result, EPSA's capacity in procuring, storing and distributing pharmaceuticals through the Revolving Drug Fund (RDF) and other programmers has noticeably increased. In 2015, EPSA developed and commenced five-year Pharmaceutical Sector Transformation Plan, covering all aspects of the end-to-end supply chain. The plan was revised in 2018 and by the end of 2019 EPSA had achieved many of its strategic objectives and made significant progress**.**

1.3. Statement of the Problem

Distribution is an important activity in the combined supply chain management of pharmaceutical products. The stated people and entities are generally responsible for the handling, storage and distribution of such products. In some cases, however, a person or entity is only involved in and responsible for certain elements of the distribution process WHO, (2010).

The distribution of pharmaceutical product is frequently handicapped by scanty infrastructure storage, transportation and lack of effective management information systems. The information systems for tracking stock and associated certification may be poorly managed, leading to gaps in the control of orders at all levels. Mismanagement of distribution is therefore common, leading to both the oversupply of unnecessary products and the under supply or stock-outs of essential items, including life-saving and other essential medicines, Adzimah, (2014)

According to the report of EPSA,(2016) in on hand stated it is essential to increase the number of trucks mainly more importance shall be given for shipment from center to centers and after hubs to health facilities. On the other hand, outsourcing transportation will also improve efficient and effective logistical system. However, local transport associations are not receptive and mainly from centers to health facilities it is very problematic to become commercial trucks.

Ethiopia`s Federal Ministry of Health (FMOH) has been working to guarantee an efficient and high-performing healthcare supply chain that ensures equitable access to affordable medicines for all Ethiopians. However, there are various challenges remain, including an inadequate supply of quality and affordable essential pharmaceuticals, poor storage conditions, and weak stock management, which has resulted in high levels of waste and stock outs (Shewarega ,2015).

According to the transformation plan report of EPSA, (2018) as the number of warehouses has increased the control and management of the ware houses and the stock they hold becomes increasingly difficult. In addition, the original distribution routes are 'cannibalised' as some delivery points are transferred to the new hubs. The consequence being a degrading of the efficiency of the original hubs as the number of delivery points is reduced at each centre.

Gullat ,(2018) suggested in EPSA pharmaceutical hubs and warehouses should be constructed and strategically located to improve proximity and effectiveness in distribution. The researcher also recommended methods like outsourcing intend to be used to ensure cost effectiveness in the transportation of pharmaceuticals to service delivery points. The other point is logistics management information system (LMIS) shall be improved and integrated with the health management information system (HMIS) and stock management of health facilities to improve forecasting and quantification of pharmaceuticals.

The handling, storage and transportation of pharmaceutical products also require special attention to avoid degradation, deterioration and fraud before reach to user. Therefore, Good distribution practices (GDP) is a vital concept of pharmaceutical SCM to ensure systematic distribution of pharmaceutical products from manufacturing site to retailers at their original quality. The main problems arising during pharmaceutical distribution are deterioration, counterfeit, pilferage, damage and theft during storage and transportation (Kumaar & Jha, 2015).

For proper and rationally use of drugs there should suitable storage condition with maintained room temperature, humidity level, appropriate lighting, adequate security system and clean & pest free environment for all drugs. It is expected that drugs are placed in their pharmacological or arranged order in the store so that they are easily identified and picked and may minimize accidental mistakes when issuing. In general manufacturer's recommendation for the storage of a particular drug/s/ specified on the tags must be followed, Getachew, (2009).

As we can understand from the above statement, there is gap on product (physical distribution) in terms of product storage practice, warehouse management, transportation facility and other physical distribution components. As a result the researcher examined factors affecting physical distribution of EPSA.

1.4. Research Questions

i. To what degree warehouse component affected the physical distribution of pharmaceutical products in EPSA?

ii. To what level transportation has effect on the actual physical distribution of pharmaceutical products in EPSA?

iii. How storage facilities do affected physical distribution of pharmaceutical products in EPSA?

iv. How the product timeline does affected physical distribution of pharmaceutical products of EPSA?

1.5. Objective of the study

1.5.1. General Objective

The main objective of this research to study the factors affecting physical distribution of pharmaceutical products of EPSA

1.5.2. Specific objective

Specifically, the study achieved the under mentioned problems:

I. To analyse the effect of warehouse on physical distribution of pharmaceutical products in EPSA.

II. To analyze the level of transportation on physical distribution of pharmaceutical products in EPSA.

III. To analyse storage facilities on physical distribution of pharmaceutical products in EPSA.

IV. To examine affect product timeline on physical distribution of pharmaceutical products in EPSA.

1.6. Significance of the study

This study expected to provide relevant information's to the current product distribution of pharmaceutical products practices specifically in EPSA. For the researcher it helps to identify and gave broad understanding on the physical distribution. Moreover and it gave awareness about the way of conducting research to arrive at something useful for the people around.

The study had contribution to surge the general knowledge of the subject and better understanding of product distribution management.

1.7. Scope and Limitation the Study

Even if there are many factors that affect physical distribution, the researcher focused in four factors (warehouse, transportation, and product timeline and product storage) that were expressed in 29 items. Due to geographical time, financial and limited location, the researcher included only the three branches that are located in only in Addis Ababa city.

From 150 respondents, 125 filled the questionnaire. Most of these questionnaires were filled and returned back. The other limitation was, the respondents weren't returned on time they kept for some days without giving a response. Moreover the managers were busy at that time and it was difficult to meet them to fill the questionnaires.

1.8. Organization of the paper

The research report has five chapters. The first chapter consisted of background of the study which will describe a brief overview of the subject understudy, definition of terms, statement of the problem where the problem was precisely described, research questions, objectives of the study, significance of the study, the scope of the study and limitation of the study. The second chapter is allocated to reviewing related literatures which included theoretical, empirical and conceptual frame work of the study. The third chapter concerned with research design, population and sampling techniques, and sources of data, instrument and procedures of data collection, methods of data analysis, pilot testing and ethical considerations. The fourth chapter focused on data presentation and interpretation where the collected data presented in different ways. The fifth chapter will consist of summary of the major findings, conclusions and recommendations of the study.

1.9. Definition of key terms

Product: A product is anything that can be offered to a market for attention, acquisition, use or consumption. It includes physical objects, services, personalities, place, organizations and ideas, Kotler, (2010)

Distribution is the process of making a product or service available for use or consumption by a consumer or business user, using direct means, or using indirect means with intermediaries. The movement of goods and services from the source through a distribution channel, right up to the final customer, consumer or user, and the movement of payment in the opposite direction, right up to the original producer or supplier. An order or pattern formed by the tendency of a sufficiently large number of observations to group themselves around a central value, Wren, (2007).

Warehouse: is large building where pharmaceuticals are stored prior to the distribution.

CHAPTER TWO

RELATED LITERATURE REVIEW

This chapter contains theoretical review; empirical literature review; conceptual framework and identified literature gap. Theoretical literature deals with concepts and definition of pharmaceutical distribution by different scholar's, practical aspects of pharmaceutical distribution management in Ethiopia, key pharmaceutical distribution operations like storage and transportation would be presented in detail.

2.1. Theoretical Literature Review

2.1.1. General views of Pharmaceutical Distribution Management

According to Weiss and Gershon, 2002, cited in Yeboah *et al*., 2013 noted that, distribution describes all the logistics involved in delivering a company's products or services to the right place, at the right time, for the lowest cost.

Distribution plays a key role within the marketing mix, and the key to success is its successful integration within the mix, ensuring that customers get their products at the right place and at the right time. If the product cannot reach its chosen destination at the appropriate time, then it can erode competitive advantage and customer retention (Yeboah *et al*., 2013).

Physical distribution management is the term used to describe the management of every part of the distribution process (Little and Marandi, 2003, cited in Yeboah *et al*., 2013). Physical distribution management includes the following functions: customer services; order processing; materials handling; warehousing; stock/inventory management & transportation. The key success factors of physical distribution management include all elements of the marketing mix: that is Product characteristics; packaging; pricing; promotional campaigns and timing is a critical element of pharmaceutical distribution management (Yeboah *et al*., 2013).

Distribution channel consists of a group of individuals or organizations that assist in getting the product to the right place at the right time. Distribution plays a vital role, primarily because it ultimately affects the sales turnover and profit margins of the organization (Yeboah *et al*., 2013).

Physical distribution has recently expanded into the broader concept of supply chain management. Supply chain management starts earlier than physical distribution attempts to procure the high input craw material, components and capital equipment's convert them efficiently into finished products and dispatch them the final destination(Kotler,2002)

In the pharmaceuticals distribution system there are two main approaches that is pull or push system are used to distribute stock from the higher level store to a lower level store or health facility. In a push system, the central medical store (CMS) or the regional or district store determines what quantities of medicines are to be issued to each lower level store or the health facility, based on centrally estimated allocation quantities. In a pull system, each health facility determines the medicines requirements to be requisitioned or bought from the higher level warehouse. Pull system use local information about demand, which often does not reach the CMS and depends on good decision making ability and accountability at the decentralized level. A push system is robust to weak order and stock management capabilities at the lowest level of the distribution system (Yadav *et al*., 2011).

The push system is generally used for the distribution of medicines from vertical programmes and in countries where the funding of medicines is ensured by the government and managed at the central level. For countries where there is a cost recovery system in place (most of the Francophone countries in Africa), the pull system is used (Yadav *et al*., 2011).

The choice of a push or a pull system depends largely on in-country capacity to conduct stock planning and forecasting at each level of the supply chain as well as the level of maturity of the supply chain. Often a combination of push and pull systems is used in which the regional or district stores pull stock from the CMS but then in turn use push- based allocation to distribute stock to the health facilities. Such an arrangement is currently used in multiple countries as it acknowledges the lack of stock planning capacity at the health facility level while achieving the benefits of the pull system for the primary leg of distribution i.e. from CMS to district or regional stores (Yadav *et al*., 2011).

Another important variable in the design of the distribution system is the resupply interval. In distribution models such as the ones currently in use in Kenya or Gambia, each health facility receives a delivery of stock every three months. This ensures the transport cost of the distribution system is reduced. A more frequent resupply interval is used in three-tiered distribution models, such as in the United Republic of Tanzania or Zambia, where delivery from the central medical store to the health facilities through district-level stores is once a month. Although more frequent resupply intervals lead to higher transport costs, they also result in a shorter forecast horizon for the health facilities, thereby allowing for better stock management and a lower chance of stock-outs (Yadav *et al*., 2011).

The quantity of stock held at each tier is based on a system of minimum-maximum rules for each level. Under such a system, orders are placed by the health facilities or lower level stores at regular intervals, but a product is ordered only if it has reached its minimum stock level; products reaching the minimum stock level are ordered/ resupplied to the maximum stock level. Although most countries surveyed have some form of minimum-maximum rule, strict adherence to the ordering rules remains poor (Yadav et al., 2011).)

2.1.2. Physical Distribution

In on hand physical distribution is described as an art and science of determining requirement, acquiring them, distributing them and maintaining them in an operationally ready condition for their entire life (Khanna, 2002)

On the other hand physical distribution as a marketing activities relating to the flow of raw materials from the suppliers to the factory and movement of finished goods from the end production line to the final consumer or ultimate user. Marketing agencies such as dealers, merchants and mercantile agents manage the flow of goods and perform the function of physical supply- right up to consumer's homes and stores (Shelkers, 2003).

2.2. Pharmaceuticals Distribution Cycle

According to Management Science for health (2012) the distribution cycle begin when pharmaceuticals are dispatched by the manufacturers or suppliers, it ends when medicine consumption information is reported to the procurement unit. The major activities of pharmaceutical distribution cycle include the following steps: 1.Port clearing (for importing products); 2.Receipt and inspection; 3.Inventory control; 4.Allocation of supplies; 5.Delivering;

6.Dispensing to patient's 7.Consumption reports.

Port clearing: It is the process of clearing cargos from a land, sea or airport. Port delays can have costly consequence such as: Reduced shelf life or for vaccines and other very temperature sensitive items, possibly a complete loss of potency; deterioration of product; damage to product carton and other package or damage to outer identification; increased chance of theft; storage fee (demurrage) & stock out, resulting in emergency purchase made at higher unit cost and with the potential for unsure quality (MSH, 2012).

Receipt and inspection: Central store staff must carry out a complete inspection of every shipment as soon as it is received from the port or local supplier. The shipment must be kept separate from other stock until this inspection has been completed. Inspectors should check for damage and missing items and for compliance with the contract condition concerning drug type, quantity, and presentation, packaging, labeling and special requirements (MSH, 2012).

Inventory control: Establishing and maintaining effective inventory records and procedures are the basis for coordinating the flow of pharmaceuticals through the distribution system and primary protection against theft and corruption. The inventory control system is used for requisitioning and issuing medicines, for financial accounting, and for preparing the consumption and stock balance reports necessary for procurement. Record keeping must be sufficiently detailed to provide an audit trail that accurately traces the flow of medicines and funds through the system (MSH, 2012).

2.2.2. Effective pharmaceutical distribution management

For any organization to be effective in the pharmaceutical sector there should be effective distribution management process to convey finished products from the manufacturer to the final consumers. This is because without distribution the best product will not be delivered and the marketing mix will break down and fail (Yeboah *et al.*, 2013)

A well-established drug supply management system facilitates the best use of financial & human resources, develops the essence of essential drugs, assures the continuous supply of affordable drugs, promotes the rational use of drugs and in general improves the quality of the health care system and access to essential medicines (Getachew, 2009).

In order to manage medicine distribution in an appropriate manner, there is a necessity of deep understanding of its management. The challenges of the pharmaceutical products supply chain are its specified shelf life and specified storage conditions. Managing quality of pharmaceuticals during distribution is a critical operation. There are various dosage forms of medicines example tablets, syrups, injectables etc. Each of them is to be stored at different environmental conditions defined on the basis of stability of drug products. The desired features have high requirements for supply chain management and planning to achieve the goal of ensuring availability in health facility without increasing the quantity of wasted products (Kumar and Jha, 2015).

According to Management Science for Health, (2012) effective pharmaceutical distribution has the following features: Maintain a constant supply of medicines, Keep medicines in good condition throughout the distribution process, Minimize medicine losses caused by spoilage and expiry, Maintain accurate inventory records, Maintain medicines within their recommended storage points, Reduce theft and fraud and Provide information for forecasting of medicine needs.

2.2.3. Pharmaceutical distribution management

2.2.3.1. Pharmaceuticals storage management

Pharmaceuticals require secure storage in controlled climatic conditions and a reliable method of stock rotation. The FEFO rule (first expiry, first out) helps ensure that first expiry stocks are used up first. Security is another major consideration, access to the storehouse must be carefully controlled so that theft and embezzlement are minimized, and the persons who control access must themselves be trustworthy (Adzimah *et al*, 2014).

Proper storage conditions, including minimizing exposure to heat, light, and humidity, are important for drugs. For example tetracycline products, which become toxic when exposed to heat and oxytocin and ergometrine, which lose their potency when exposed to light and heat; all should thus be stored in the refrigerator. The same applies to insulin and, of course, most vaccines .Correct FEFO stock rotation will ensure that exposure to harsh conditions is minimized and that potency is preserved as much as possible. Ensuring good air circulation and preventing direct water contact are most important (Adzimah *et al,* 2014).

Principles of good storage:

Follow the manufacturer or shipper's directions when stacking, and follow labels for storage conditions; Place liquid products on the lower shelves or on the bottom of stacks. Store products that require cold storage in appropriate temperature-controlled zones; Store high-security and high-value products in appropriate security zones; Separate damaged or expired products from usable stock without delay, and dispose of them using established disposal procedures; Store all commodities in a manner that facilitates FEFO policy for stock management; Arrange cartons so arrows point up and identification labels, expiry dates, and manufacturing dates are visible. If this is not possible, write the product name and expiry date clearly on the visible side (MSH, 2012).

2.2.3.2. Pharmaceutical products transportation management

Transportation refers to the movement of products from one location to another such as moving products from the beginning of a supply chain to the customer's hands. It plays a key role in every supply chain as products are rarely produced and consumed in the same location. The ability to transport goods quickly, economically and reliably is vital to a nation's prosperity and capacity to compete in global market (Fekadu, 2013).

The pharmaceutical manufacturer's original outer packing should withstand normal handling and transportation. At the intermediate store, this outer packing often must be removed to allow the assembly of small consignments; these must be repacked for transport in strong cartons. Empty space in partially filled cartons should be filled with newspaper, straw, wood shavings, or other loose material to stop the content from rattling about and prevent cartons from being crushed. Pallets and cartons should be carefully and systematically loaded into vehicles on a first-in /last-out basis. They must then be held secure by straps, nets, or other means .The vibration caused by travel over rough road can damage tablets and other breakable products; long journeys over rough roads should be avoided whenever possible (MSH,2012).

The people responsible for the transportation of pharmaceutical products should be informed about all relevant conditions for storage and transportation. These requirements should be adhered to throughout transportation and at any intermediate storage stages. Pharmaceutical products should be stored and transported in accordance with procedures such that: The identity of the product is not lost; the product does not contaminate and is not contaminated by other products; adequate precautions are taken against spillage, breakage, misappropriation and theft; appropriate environmental conditions are maintained, e.g. using cold chain for heat sensitive products (WHO, 2010).

Transportation and storage of pharmaceutical products containing hazardous substances, such as toxic, radioactive material, and other dangerous pharmaceutical products presenting special risks of abuse, fire or explosion (e.g. combustible or flammable liquids, solids and pressurized gases) should be stored in safe, dedicated and secure areas, and transported in safe, suitably designed, secured containers and vehicles. In addition, the requirements of applicable international agreements and national legislation should be met. Products containing narcotics and other dependence-producing substances should be transported in safe and secure containers and vehicles and be stored in safe and secure areas (WHO, 2010).

The interiors of vehicles and containers should remain clean and dry while pharmaceutical products are in transit. Packaging materials and shipment containers should be of suitable design to prevent damage of pharmaceutical products during transport. Seal control programmers' should be in place and managed properly. Drivers of vehicles should identify themselves and present appropriate documentation to demonstrate that they are authorized to transport the load. Damage to containers and any other event or problem that occurs during transit must be recorded and reported to the relevant department, entity or authority, and investigated. Pharmaceutical products in transit must be accompanied by the appropriate documentation (WHO, 2010).

2.3. Empirical Literature Review

In Ethiopia, IPLS is the primary mechanism by which all public health facilities obtain essential and vital health products. The system explains not only physical flow of products but also the flow of information for decision making (EPSA, 2016).

IPLS **(**Standard Operating Procedures Manual for the Integrated Pharmaceuticals Logistics System in Health Facilities of Ethiopia, 2015). EPSA is health program pharmaceuticals in

parallel. Program pharmaceuticals are ordered every two months by hospitals and health centers and delivered by EPSA to these facilities directly or indirectly. Direct delivery sites are facilities that receive program pharmaceuticals directly from hubs whereas non- direct delivery sites are health centers that receive products from hubs through Woreda Health Offices (Standard Operating Procedures Manual for the Integrated Pharmaceuticals Logistics System in Health Facilities of Ethiopia, 2015).

Health posts report to health centers monthly and collect pharmaceuticals from those health centers; the health centers use the data in the health Post report to calculate consumption and re-supply quantities. For revolving drug fund (RDF) pharmaceuticals, health centers and hospitals will complete RRF as per the facilities review period which can be every two month, every quarter or every six months and collect products from affiliated EPSA branch (EPSA, 2015).

Global Fund (2017) audit report showed that, the inventory management system in EPSA has duplicate records for medicines and automated controls have not been fully activated, which does not allow adequate monitoring of changes to stock balances. Audit report in the audit sample, around 20% and 54% of anti-malarial and TB medicines respectively could not be traced due to the multiplicity of systems at the central level. For instance, stock balances are often adjusted in the system without adequate approval. There are delays in the procurement processes. Expired medicines had also accumulated in various EPSA warehouses last four years, with increasing storage costs for unusable medicines (Global Fund, 2017).

The utilization rate of the EPSAcentral warehouse at the time of the audit was 65%. Nine out of the 10 regional warehouses visited had severely damaged floor space, which limits their ability to use the available racks in those warehouses. Also, most of the stores in health facilities visited had up to one third of storage space filled with expired medicines. Expired medicines at EPSA's owned and rented warehouses and all health facilities visited have accumulated over five years (Global Fund, 2017).

In the assessment of the pharmaceutical supply system conducted in Tanzania indicated that stock availability of twenty tracer medicines was at an average of 79% at the dates of evaluation in the zonal Stores. The stock out situation measured by the number of days the item has been out of stock in a year ranged between 1-183 days. Stock management techniques also were found to be weak except for traceability of batches and the definition of minimum stock levels. This could have contributed highly on the number of expired medicines and supplies which was found to be 3.7% of sales for the year for 2006 at the central store.

The assessment also found that, most facilities studied had a functioning pharmacy system (88.9%) and kept essential medicines (92.9%). However, in most of the pharmacies, a general inadequacy of storage space, storage equipment and facilities for controlling temperatures were found. For example only 33% of pharmacies reported to have adequate storage capacity, only 52% had facilities for cold storage and only 22% had adequate storage equipment. Important parameters in stock management such as maximum and minimum levels of stock were not determined in almost all facilities. The assessment showed the level of stock management in almost all of the pharmacies needed to be improved. Although availability of tracer medicines was high at health facilities, the same facilities also presented a considerable number of stock-out days. Some medicines were out of stock for 4 months (MOH Tanzania, 2009).

For most products assessed, the percentage of facilities resupplied with the quantity ordered was about 60 percent, both at the hospital and health center level. At the health center, ORS, hormonal implants, and nevirapine were resupplied in more than 70 percent of facilities .At hospitals, eight products out the 15 analyzed were resupplied in about 70 percent of the facilities. At both the hospitals and health centers, the resupply with the requested quantities was near or below 50 percent for amoxicillin (33 percent at hospitals and 40 percent at health centers) and dextrose (50 percent at hospitals and 42 percent at health centers) (Shewarega, *et al.,* 2014).

The survey tried to assess the perceptions of facility staff on the timeliness and the resupply of products, as per their request. Regardless of the type of product, more than 80 percent of both hospitals and health centers say they usually receive products requested within one month or less. Only 4 percent of the facilities reported waiting for more than two months to receive

products after placing orders (Shewarega, *et al.,* and 2014).

According to Dessalegn (2015) study result the data visibility at EPSA is poor coordination, lack of accountability and lack of data management and dissemination skills. As a result stock on hand, procurement and pipeline information, and stock out notifications were not organized and shared to both FMOH and stakeholders on regularly bases. The data visibility concerns at health facility were mostly lack of accountability, poor adherence to schedule, and lack of completeness and quality of reports.

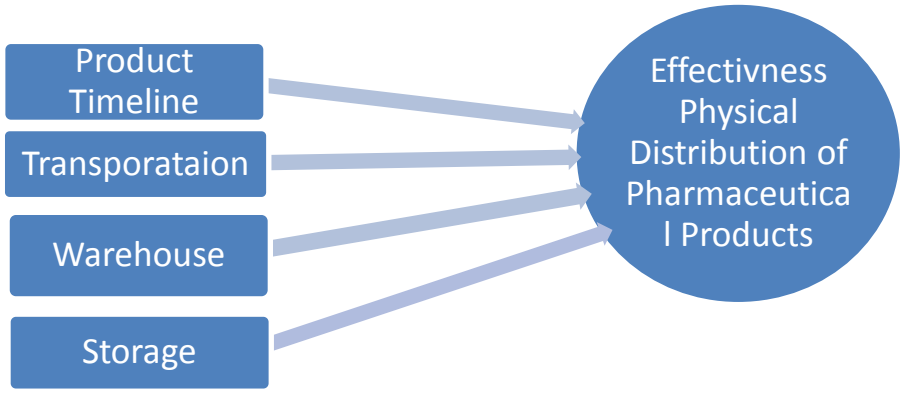
The National assessment of the pharmaceutical sector in Ethiopia, 2010 also showed that the storage conditions of the stores and dispensaries of both PHCF's and PDRO's were inadequate. In PHCF's, among the criteria considered for proper storage, only 68.3% for the stores and 78.1% for the dispensaries were fulfilled. The situation also observed for the PDRO's was 70% for the stores and 80% for the dispensaries. PWH's were observed to have ideal storage conditions (median of 100%). No expired drug was observed for the public warehouses, public health facilities and PDRO's surveyed (WHO and MOH, 2010).

The study conducted on quality perspective of 'good distribution practices in Indian pharmaceutical industry showed that most of the quality of pharmaceutical products is affected at the time of distribution. According to the survey result most of the time products are exposed to direct sun light during transportation and these are the cause of substantial generation of impurities as result of product degradation (Kumaar & Jha, 2015).

The other study conducted on factors affecting for distribution performance of pharmaceuticals in Kenya public sectors in 2012, showed that financial capacity directly and positively related to distributional performance. The findings indicate that relations with government, donors and transport outsourcing followed by information technology and financial capacity have the greatest influence on distribution performance respectively (Achuora*etal.*,20)

2.4. Conceptual Framework

Different factors contribute to increase of physical distribution of pharmaceutical products. Transportation, warehouse, product timeline and storage are among the contributing factors that could positively or negatively affect the dependent variable. These four factors is supposed to have priority in the organization because of the impact on physical distribution of pharmaceutical products. The effect may vary from organization to organization depending on its nature and resources. When the organization gives attention to the basic factors, the organization physical distribution efficiency will be improved. The following factors were studied as it impact on physical distribution of pharmaceutical products. These are product timeline, transportation, warehouse and storage.



Source: Own Survey, (2021)

Figure 2.1. Conceptual framework of the study

2.5. Research Hypothesis

From the theoretical discussion to answer the research problem different hypothetical statements have been developed.

H1: There is a significant positive relationship between warehouse and physical distribution of pharmaceutical products.

H2: There is a significant positive relationship between transportation and physical distribution of pharmaceutical products.

H3: There is a significant positive relationship between product timeline and physical distribution of pharmaceutical products.

H4: There is a significant positive relationship between storage and physical distribution of pharmaceutical products.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

This chapter dealt with research design and methods that are used for achieving the thesis objective. The chapter consisted population of the study, sample size and sampling techniques, sources of data, data collection tools, data collection procedures, data analysis method and ethical considerations.

3.1. Research Design

The basic research category that used was descriptive and causal (explanatory) research design. Descriptive research purpose is to exactly and methodically define a population, situation or phenomenon. It can also riposte what, when, where, when and how questions, but not why questions, McCombes, (2019).

Casual (explanatory) research design is used to discover the evidence of cause and effect relationship between two or more than two variables, which is one/some variable/s would be the dependent and another/rest of the variable would be independent ones, (Singh, 2019).The author also clarified as an experiment is designed when one or more independent variables are deployed and their effects are restrained on one or more dependent variables.

3.2. Research approach

The research approach for this study was quantitative research approach. Quantitative research focuses on measuring and analysis in order to get results. It is also about the application and analysis of numerical data using specific statistical techniques to answer questions like who, how much, what, where, when and the like questions, Leedy & Ormrod (2001) quoted in Williams (2014). Quantitative research methods offer an explaination of an issue or phenomenon through gathering data in mathematical form and analyzing in particular statistics, Aliaga and Gunderson (2002).

3.3. Population and Sampling Technique

3.3.1. Population

The population of the study was EPSA's staffs who are working on three branches of Addis Ababa. The total population considered as the population of the study was 240. The employees were taken from the three branches of operation department of the agency. That means the population consisted Central branch operation department, Lebu (Hana Mariam) operation department and Jackros operation department.

3.3.2. Sampling Size and Sampling Technique

Yamane's (1997) Statistical Formula adopted by Mitiku (2017) is used to calculate sample size for this study as illustrated below.

$$n = N/N\,(e)^{2}+1$$

Where n = sample size
N = population of the study
e = % level of significance or margin of tolerable error. The researcher was considered 5% level of significance or margin of tolerable error and the confidential level is 95%.

$$n=240/240(0.05)^{2}{}_{+1}$$
$$n=150$$

The sample of the total population was stratified on the basis of each department of the branches. Hence, the sample size representing the number of each team who received questionnaires were divided into strata and were calculated using this simple formula X=n(p)/N (Mitiku,2017).

Where X = sample size in each department

n = total sample size of the study who receives questionnaires

P = population size of the department in each stratum excluding the department leaders

N = total population of the study.

Table 3.1. Sample Distribution of the population

No.	Name of branches	P	N	N	X=n(p)/N	X
1	Central operation Department	80	150	240	150*80/ 240	50
2	Lebu(Hana Mariam) Operation Department	80	150	240	150*80/240	50
3	Jackros Operation Department	80	150	240	150*80/240	50

Source: Own survey,2021

3.3.2.1. Sampling Technique

The population in the above strata was relatively homogenous. After the strata were done for respondents of the questionnaire, then the study participants were selected through convenience sample technique. By using random number tables, drew a sample from the sampling frame until the researcher have finished drawing "n" size of the population.

Convenience sampling (also known as Haphazard Sampling or Accidental Sampling) is a type of non-probability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included in the purpose of the study. (American Journal of Theoretical and Applied Statistics, 2016,)

3.4. Source of Data

The data source was primary and secondary data sources. The primary data was collected and structured (close ended questionnaire) for the product distribution of EPSA. The secondary data were the annual reports of EPSA which include different journals, articles, books, and websites.

3.5. Data Collection Tools

3.5.1. Questionnaire

The questionnaires included two parts: section one of the questionnaires contains instructions and the respondents' personal information; section two of the questionnaire includes variables which are measured using Likert scale with five response categories: strongly disagree, disagree, neutral, agree, and strongly agree. The questionnaires are distributed after the expected

participants are selected and informed about the purpose of the research. The pre-testing (pilot testing) will be done with the aim of cleansing the questionnaire to ensure that it was valid and reliable.

3.5.1.2 Reliability validity of the data

3.5.1.2.1. Reliability

(Drost, 2011) quoted in (Kubai,2019) claimed reliability is "the extent to which measurements are repeatable when different people perform the measurement on different occasion, under different condition, supposedly with alternative instruments which measure the construct or skill". It can also be defined as the degree to which the measure of a construct is consistent or dependable. It is a measure of consistency between different items of the same construct. It measures the consistency within the instrument and questions on how well a set of items measures a particular characteristic of the test. Single items within a test are correlated to estimate the coefficient of reliability. Cronbach`s alpha coefficient is used to determine internal consistency between items (Cronbach, 1951).

Table 3.2. Coefficient of cronbach alpha and reliability

Coefficient of Cronbach's Alpha	Reliability level
More than 0.90	Excellent
0.80 – 0.89	Good
0.70 – 0.79	Acceptable
0.60 – 0.69	Questionable
0.5-0.59	Poor
Less than 0.59	Unacceptable

Source: George and Mallery, 2003

From the total respondents that were participated in the study, the researcher disseminated 10 percent of the respondent in order to make pilot test. The survey was distributed to 3 three branches and a total of 15 questionnaires.

Table 3.3. Consistency of the variables

No.	Variables	N of items	Cronbach's alpha	Internal consistency
1	Warehouse	7	.866	Good
2	Transport practices	7	.866	Good
3	Product /physical distribution timeline	5	.851	Good
4	Product storage	5	.554	Poor
5	Overall distribution practice	23	.937	Excellent

The above table 3.4. Showed that there is "Good' 'internal consistency. And the study has the sum of the independent variables average Cronbach's alpha value of (α = 0.937) and the reliability test of the study was located on "Excellent" range.

3.4. Data Collection Procedure

Questionnaire was distributed to eligible staff through the heads of the various departments. A cover letter attached to the questionnaires to introduce the respondents to the research topic to avoid any mistrust respondents might have about the study. The cover letter expected to help motivate respondents to participate in the study and answer the questions and to assure them of anonymity and confidentiality, and to show them how to fill the questionnaire. The questionnaire was distributed among the employees through their departments. The advantage of selecting this method is that, it ensured privacy and keep track on those who may not return the questionnaire on time and need to be reminded. After collecting data from the representative sample through the Questionnaire, data edited, verify for completeness, consistency and reliability of data. The

next step involved coding the responses in the coding sheets by transcribes the data from questionnaire by assigning characters symbols (numerical symbols). This followed by screening and cleaning of data to make sure minimizing the errors. After the whole process the data was transferred to SPSS for analysis.

3.5. Data Analysis

Schindlier (2001) data analysis as the process of editing and reducing collective data to a convenient size, developing summaries, looking for patterns and using statistical methods. In addition to this, ensuring completeness and logical consistency of responses, data editing was carried out by the researcher. Identified mistakes and data gaps were corrected. Once editing the quantitative data was completed, the data were analyzed using quantitative techniques (frequency, mean, percentage, multiple regression and correlation). The data which were collected by the researcher was analyzed with the help of the descriptive and then the researcher produced the result. The researcher used descriptive statistics.

3.6. Pilot Testing

It is vital to pilot test the tool to make certain that the questions were understood by the respondents and there are no problems with the wording or measurement.

3.7. Ethical Consideration

Furthermore, all information concerning the identity and personality of respondents treated with extreme confidentiality and was used for the single purpose of this research study. In addition to the researcher prepared its own thesis without copying other researcher thesis.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

The general objective of the study was to determine the factors affecting effectiveness of physical distribution case of EPSA. The target population of this studies the employees of EPSA which were from three branches. The researcher selected branches which are found in EPSA. This chapter presented the analysis of the data. The survey included two major sections: General information and employee opinion concerning factors affecting effectiveness of physical distribution.

4.1. Response Rate

The general objective of the study was to determine assessment of the effectiveness of product distribution of pharmaceutical products: case of EPSA. The target population of this study was three branches of EPSA. The total distributed questionnaire was 150. Form the total of it, 125 was filled and returned which took percentile of 83.33%.

4.2. Demographic characteristics of the respondents

Table 4.1. Gender, age of the respondents

Characteristics		No	Percentage
Gender	Male	86	68.8
	Female	39	31.2
Age	20-25	9	7.2
	26-30	39	31.2
	31-35	39	31.2
	36-40	23	18.4
	Above 40	15	12.0

4.2.1.1. Gender of the Respondents

Out of 125 respondents 86(68.8%) of the employees of EPSA were male. The remaining 39 employees of EPSA (31.2%) were female. This indicated that most of the respondents included in this data were male.

4.2.1.2. Age of the Respondents

As the result shows there were five categories of age distribution. And this was 20-25, 26-30, 31-35, 36-40-and above 40. Out of the total respondents 9 respondents were belong 20-25 and represent 7.2%. 39 respondents are under the category of 26-30 which took 31.2%. The third category which is the age category 31-35 takes 39 from the total number of the respondents and it was 31.2%. The age category 36-40 took 23 from the total respondents and 18.4%. The last age category which is above 40 took 15 and 12.0%. As the above table showed as the greater number takes the young age which were 26-30 age and 31-35 age category.

Table 4.2. Educational background, working experience, department and job position of the respondents

Characteristics		No	Percentage
Educational Background	Diploma	17	13.6
	BA Degree	81	64.8
	MA	18	14.4
	other	9	7.2
Experience	0-5 Years	37	29.6
	6-10 Years	56	44.8
	11-15 Years	19	15.2
	Above 16 year	13	10.4
Department	Store manager	39	31.2
	Dispatch officer	20	16
	Storage and Distribution	66	52.08
Job Position	Director	26	20.8
	officer	10	8.0
	Warehouse manager	56	44.8
	Driver	33	26.4

Source: Own survey, 2021

4.3.1.4. Educational Background/level

The Educational Background/level held by respondents from Paulos branch, Jacros branch and Hana Mariam branch of EPSA. 18(14.4%) were MA (MSC) holders while the other 81(64.8%) were BSC (BA). The other 17(13.6%) were diploma holders and the other 9(7.2%) were under other which not specified by the respondents. From the above data of educational background, most of the respondents were BSC(BA) holders.

4.3.1.5. Working Experience of the respondents

37 of the total respondents were with experience of 0-5 years and takes 29.6%. The respondents with experience 6-10 years were 56(44.8%).The other category which was 11-15 years was 19 respondents out of the total population and took 15.2%. The last data shows out of the total respondents 13 were with experience above 16 years and takes 10.4%. From the above table we can say most of the respondents were with the working experience 6-10 years and took a percentile of 44.8%.

4.3.1.6. Department of the respondents

Out of the total respondents 39 were from store manager and they represented 31.2%. The Dispatch officer was taken by 20 and represented 16%. 66 were from Store and distribution and represented 52.8%. As of the information of the above table, most of the respondents were for the storage and distribution department which is 52.8 %(66 employees).

4.3.1.7. Job position of the respondents

Out of the total respondents 26 had a position of director and it represented 20%. The officer position was taken by 10 and represented 8%. 56 were warehouse manager and represented 44.8%. The drivers were 33(26.4%). From the data showed in the above table, most of the respondents were in position of warehouse manager and took a percentile of 44.8%.

4.3. Data Analysis of the Study

4.3.1. Descriptive Analysis

Under this discussion the researcher tried to analyze the respondents answer concerning factors affecting effectiveness of product distribution of pharmaceutical products. For this purpose the researcher used average mean tools. The mean of a distribution of data is like a pivot on a seesaw; it indicates the centermost point of your data Salkind, (2008). It shows data points that are much higher or much lower in value.

4.3.1.1. Warehouse practice of EPSA

Table 4.4. Respondents perception about warehouse practice of EPSA

Statements	Note 1=strongly disagree, 2=Disagree, 3=Partially agree, 4=Agree, 5=Strongly agree										
	Strongly Disagree		Disagree		Partially Agree		Agree		Strongly agree		Mean
	No	%	No	%	No	%	No	%	No	%	
The ware house has adequate space for keeping the product	11	8.8	24	28.8	45	36	24	19.2	9	7.2	3.24
The warehouse is quite accessible for loading and unloading the product to vehicles	5	4	16	12.8	66	52.8	28	22.4	10	8	3.17
The shelves or pallets that are located in the ware house are adequate	18	14.4	10	8	34	27.2	48	38.4	15	12	2.90
EPSAware house is designed based on WHO standardization procedure	13	10.4	25	20	31	24.8	43	34.4	13	10.4	2.95
EPSA warehouse is clean for placing pharmaceutical products	10	8	26	20.8	29	23.2	45	36	15	12	2.81
Thereare enough warehouse for storing the product	6	4.8	56	44.8	26	20.8	27	21.6	10	8	2.90
The gap among the shelves is quite enough in order to move the products	61	48.8	10	8	22	17.6	17	13.6	15	12	2.98
											2.998

Source : Own survey,2021

The above table presented the respondents disagreed (dissatisfied) that the warehouse hasn't have adequate space for keeping the products and took 45(36%). On the subject of accessibility for loading and unloading the products from vehicle, most of the respondent's partially agreed (partially dissatisfied) 66(52.8%) which we took as an average response. Concerning adequacy the location of shelves (pallets) in the warehouse, most of the respondents agreed (satisfied) about it and it took a number of 48(38.4%). In the topic under warehouse, most of the respondents were agreed that EPSA has designed the warehouse based on WHO standardization procedure and it took a number of 43 (34.4%) respondent's. With respect to the warehouse cleanness for placing the products, the respondents were agreed (satisfied) about it and took 36%(45). With concern to having enough warehouse for storing purpose of the products, most of the respondents were disagreed there isn't enough warehouse and needed more for storing the products. The last topic under the warehouse component is the gap among the shelves in order to move the products. Most of the respondents were disagreed (dissatisfied) about it. The number of respondents was 66(48.8%).

The average mean value for product distribution was 2.998 which indicate in disagree rate. The respondent's disagreed the warehouse hasn't adequate space for the products. This type of situation decreases the effectiveness of physical distribution. On bright side the respondents agreed the location of shelves in warehouse is adequate which increases the effectiveness of physical distribution. On one hand the respondents agreed on cleanliness of the warehouse, EPSA warehouse designed by WHO standardization. On the other hand the respondents agree there has to be enough warehouses needed which is increases effectiveness in physical distribution.

4.3.1.2. Transport practice of EPSA

Table 4.5. Respondent's insight about transport practice of EPSA

Statements	Note 1=strongly Disagree, 2=disagree, 3=Partially Agree, 4=Agree, 5=Strongly Agree										
	Strongly Disagree		Disagree		Partially Agree		Agree		Strongly agree		Mean
	No	%	No	%	No	%	No	%	No	%	
The pharmaceutical are away from direct sunlight ,humidity and contaminants at transportation process	8	6.4	15	12	26	20.8	57	45.6	19	15.2	3.12
There are vehicles that arefilteredwithrefrigeratorforheattemperatureproducts like vaccine	4	3.2	16	12.8	23	18.4	55	44	27	21.6	3.68
The drivers are aware of all relevant condition regards the pharmaceutical products in moving from one place to another place	15	12	7	5.6	54	43.2	28	22.4	21	16.8	2.98
Vehicles are assigned for emergency order	5	4.0	10	8	61	48.8	25	20	24	19.2	3.014
Vechicles will be ready as soon as it request in distribution	36	28.8	23	18.4	53	42.4	9	7.2	4	3.2	3.11
There is information system to control vehicles	45	36	17	13.6	31	24.8	13	10.4	19	15.2	2.711
There are enough vehicles for requested product distribution in order to meet the demand	22	17.6	40	32	34	27.2	5	4	24	19.2	2.81 **3.11**

Source: Own survey, 2021

As of transportation practice of EPSA, the respondents agreed that the pharmaceutical products are away from direct sunlight, humidity and contaminates at transportation process. It took 45.6% (57). The respondents 55 (44.4%) also agreed about the vehicles are filtered with refrigerator for heat temperature (products like vaccine) took 44%. Responses regarding awareness of conditions moving from one place to another place were neutral 54(43.2%). The other component was assigning the vehicles for emergency order and the respondents were partially agreed (partially satisfied) and they were 61(48.8%).Most of the respondents partially agreed (partially dissatisfied) about the readiness as soon as it request in distribution and it took a percentile of 53(42.4%). With regard to availability of vehicles when requested and the information system to control, most of respondents disagreed with 45(36%) and 40(32) respectively.

The average mean value of physical distribution practice is 3.11 which showed partially satisfied about the component transportation.

4.3.1.3. Product service timeline

Table 4.6. Respondents view on product service timeline

Source: own survey, 2021

Statements	Note 1=strongly Disagree, 2=disagree, 3=Partially Agree, 4=Agree, 5=Strongly Agree										
	Strongly Disagree		Disagree		Partially Agree		Agree		Strongly agree		
	No	%	No	%	No	%	No	%	No	%	Mean
The time of EPSA to supply from receipt of order is right	3	2.4	13	10.4	26	20.8	69	55.2	14	11.2	3.62
The percentage unit delivered in specified time is consistent	6	4.8	10	8	28	22.4	61	48.8	20	16	3.63
The pharmaceutical product are delivered promised specified time as perused in specification	5	4.0	12	9.6	58	46.4	26	20.8	24	19.2	3.67
EPSA is supplying medicine with its original quality throughout the distribution process	5	4.0	9	7.2	17	13.6	60	48.0	33	26.4	3.8
The average delivery time relaible	2	1.6	17	13.6	20	16	51	40.8	35	28	3.8
											3.71

As the above table showed most of the respondents agreed (satisfied) EPSA supply from receipt of order is right and it took 55.2% or 69 respondents. With regard to consistency of the percentage unit delivery in EPSA, most of the respondents satisfied about it and it took 46.4% or 58 respondents. In the question that the pharmaceutical product are delivered promised specified time as perused in specification above 58(46.4%) of the respondents agreed. Only the rest 24% (19.52) disagreed (dissatisfied).Concerning the quality of the medicine supplied with its original quality. Almost 48% (60 respondents) of the employee agreed and only the rest 12% disagreed. Concerning the reliability of the average delivery time, most of the respondents agreed (satisfied) and it took 40.8%. Therefore we say that the consistency in delivery of the product, reliability concerning the delivery time and the quality of the products are good which increases effectiveness of physical distribution.

The average means value to physical distribution effectiveness 3.71 which were promising for increasing physical distribution effectiveness.

4.3.1.4. Product

Table 4.7. Respondent's opinion on product itself

Statements	Note 1=strongly Disagree, 2=disagree, 3=Partially Agree, 4=Agree, 5=Strongly Agree										
	Strongly Disagree		Disagree		Partially Agree		Agree		Strongly agree		
	No	%	No	%	No	%	No	%	No	%	Mean
The product stored with appropriate identification label expiry date and manufacturing date	4	3.2	12	9.6	13	10.4	74	59.2	22	17.6	3.78
Product stored based on the temperature specification including cold temperature a storage that are required for certain products	4	3.2	8	6.4	20	16.0	63	50.4	30	24.0	3.85
Products are distributed to health facilities and branches timely upon requested	3	2.4	10	8	31	24.8	60	48	21	16.8	3.68
Products which have near expiry are reported and distributed timely to health facilities	4	3.2	18	14.4	22	17.6	54	43.2	27	21.6	3.65 **3.74**

Source: Own survey, 2021

The above table showed the respondents agreed (satisfied) that their product stored with appropriate identification label expiry date and manufacturing date which took 59.2% which shows almost most of the respondents satisfied. Regarding the question that the product stored based on the temperature specification including cold temperature a storage that are required for certain products, the response of the respondents was agreed (satisfied) which took 50.4%. With regard to timely distribution to branches, most of the respondents (48%) were agreed. The final component which is concerned product expiration report on time to health facilities; respondents were disagreed (dissatisfied) about it. And it took 43.2%.

The average mean for this component was 3.74. This mean determined most of the respondent satisfied about it which increases the effectiveness in physical distribution.

4.3.1.5. Overall distribution practice

Table 4.8. Respondent's perception on overall distribution practice

Statement	Note 1=strongly Disagree, 2=disagree, 3=Partially Agree, 4=Agree, 5=Strongly Agree										
	Strongly Disagree		Disagree		Partially Agree		Agree		Strongly agree		
	No	%	No	%	No	%	No	%	No	%	Mean
EPSA is effective in providing continues supply of medicine	4	3.2	57	45.6	35	28.0	14	11.2	15	12.0	3.2
EPSA is effective in lessen wastage of medicine	11	8.8	20	16.0	46	36.8	24	19.2	24	19.2	3.24
EPSA is uses reliable information regarding the distribution of pharmaceutical product	2	1.6	16	12.8	32	25.6	55	44	20	16.0	3.30
EPSA is distributing medicine as its original quality in the process of the distribution	8	6.4	8	6.4	27	21.6	50	40	32	25.6	3.0
There is clear line of communication between distribution department	9	7.2	15	12	43	34.4	28	22.4	30	24	3.2
											3.18

Source: own survey, 2021

The above table showed that most of the respondents disagreed there isn't effective in providing continued supply of medicine and took 45.6%. With concern to in lessening wastage of medicine, the respondents were partially agreed (partially satisfied) which was 46 (36.8%) of respondents.

Regarding the reliability information in distribution of pharmaceutical products; the respondents were satisfied about it which took 44%. About 40% were satisfied (agreed) about distributing medicine as original quality in the process of the distribution. 43(34.4%) of the respondents were agreed (satisfied) that there is a clear line of communication between different department.

The average mean for job itself is 3.18 which nearly to agree which encourages the effectiveness of physical distribution.

4.3.2. Correlation Analysis

Pearson correlation test was conducted using SPSS version 20 software to check the magnitude of to show how the factors have effect on product distribution. The dependent variable (warehouse, transportation, service timeline, and product storage) and the independent variable (distribution practice).The researcher used the correlation analysis to prove or disprove the hypothesis. To test the magnitude of the correlation magnitude, the researcher used the following measure of association which is developed by MacEachron (1982) was used as a reference.

Measure of Association	Descriptive Adjective
> 0.00 to 0.20 ; < -0.00 to –0.20	Very weak or very low
> 0.20 to 0.40; < -0.20 to –0.40	Weak or low
> 0.40 to 0.60; < -0.40 to –0.60	Moderate
> 0.60 to 0.80; < -0.60 to –0.80	Strong or high
> 0.80 to 1.0; < -0.80 to –1.0	Very high or very strong

Table 4.9.Measure of association between variables

		warehouse	Transport	Product Timeline	Product Storage	Distribution practice
warehouse	Pearson Correlation	1	.667**	.573**	.530**	.461**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	125	125	125	125	125
Transport	Pearson Correlation	.667**	1	.695**	.606**	.651**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	125	125	125	125	125
Product Timeline	Pearson Correlation	.573**	.695**	1	.746**	398**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	125	125	125	125	125
Product storage	Pearson Correlation	.530**	.606**	.746**	1	.614**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	125	125	125	125	125
Distribution Practice	Pearson Correlation	.461**	.651**	.698**	.728**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	125	125	125	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source : Own Survey,2021

4.3.2.1. Relationship between warehouse and physical distribution practice

The outcome of the Pearson correlation test between dependent variable (distribution practice) and independent variable (warehouse) indicated that there is positive relationship between the two variables at significance level of (. 461**), P<0.01. According to MacEachron(1982) measure of association the variable is moderate.

H1: There is a significant positive relationship between warehouse and physical distribution

Based on the result acquired from Pearson correlation, there is positive relationship between the dependent variable (distribution practice) and independent variable (warehouse). Henceforth, we accept the first hypotheses(H1).

4.3.2.2. Relationship between transport and physical distribution

The Pearson correlation also conducted to identify the degree of association between independent variable (transport) and dependent variable (distribution practice). And the result showed that both variables were positively correlated to one another. The significant level is (.615**), P<0.01. According to MacEachron(1982) the relationship between the variables is strong.

H2: There is a significant positive relationship between transportation and physical distribution practice.

Based on the above outcome the dependent variable (distribution practice) and independent variable (transportation) have positive association. As a result, that we accept the second hypotheses, H2.

4.3.2.3. Relationship between product timeline and physical distribution

From the Pearson correlation of the above table, the product timeline (independent variable) and distribution practice (dependent variable) both variables are related at level of **(. 398**)**and p<0.01. And the relationship magnitude is said to weak or low.

H3: There is a significant positive relationship between product timeline and physical distribution.

The researcher, earlier, stated that there is a significant positive relationship between product timeline and distribution practice. But the result showed the opposite and we reject the third hypotheses, H3.

4.3.2.4. Relationship between product storage and physical distribution

The Pearson correlation test between product storage (independent variable) and distribution practice (dependent variable) have weak or low (MacEachern, 1982) relationship at significant level of **(.614**)** and p<0.01. The relationship magnitude is said to be strong.

H4: There is a significant positive relationship between product storage and physical distribution

According to the above association between product storage and physical distribution practice, the result exposed there is positive relationship between them so we accept the fifth hypothesis, H4.

4.3.3. Multiple Regression Analysis

To explore factors affecting physical distribution, linear regression is used. Linear regression is a statistical procedure for calculating the value of a dependent variable from an independent variable. It is a modeling technique where a dependent variable is predicted based on one or more independent variables. It is the most widely used of all statistical techniques (Kumari& Yadav, 2018).

On the way of process of developing multiple linear regressions, the researcher included the four assumptions that need to be gratified. And these are the assumption of normality, linear relationship, independent of errors and multicollinarty was discussed using SPSS. In addition to this model summary of regression result, ANOVA were presented.

4.3.3.1. Assumption of normality

According to (Matt, Carols &Deson, 2013), one way of measuring the normality of physical distribution is checking skewness and kurtosis. The range for normality of distribution is between 1 up to -1.

Table 4.10. Normality of data

Variables	N	Skewness		Kurtosis	
	Statistic	Statistics	Std. error	Statistics	Std. error
Distribution practice	125	-.786	.136	.048	.164
Warehouse	125	-.0.16	.136	-.736	.164
Transportation	125	.182	.136	. -655	.164
Product timeline	125	.038	.136	-1.044	.164
Product storage	125	-.026	.136	.-633	.164
Valid N (list wise)	125				

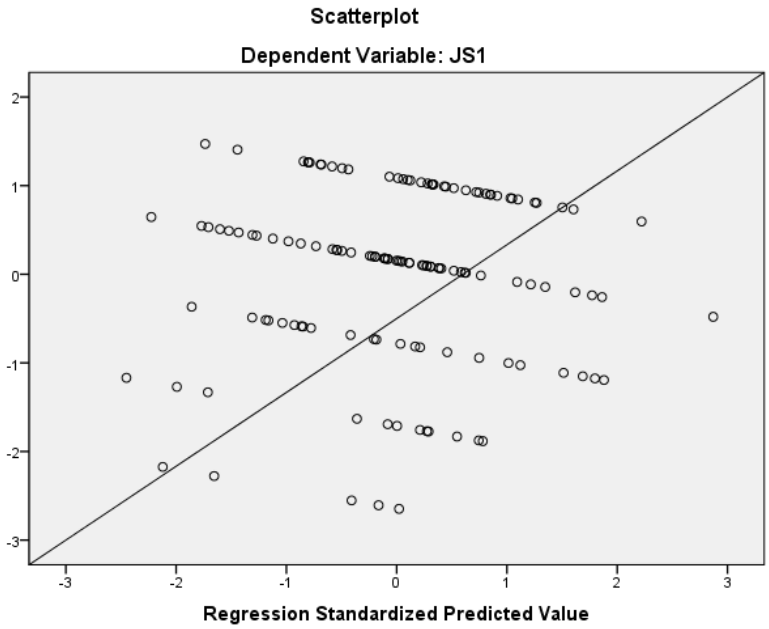
Source: Own Survey, 2021

As the table showed as the result of skewness regarding the measurement of physical distribution practice against factors of the independent variables was in acceptable range **(-1 to 1).** However, the Kurtosis result under product timeline (-1.044) was slightly out of range and this violates the assumption of normality. However according to central limit theorem, sampling distribution, and the use of the statistical test with this variable is appropriate. Hence the normality assumptions are fulfilled (Field, 2013).

4.2.3.2. Assumption 2- Linear Relationship

Linearity of the relationships between dependent and the independent variables is the second pre condition. As showed in the below graph there are few variables out of the line but most of the variables are shows that there is linear relationship between physical distribution practice and the independent variable.

Figure 4.2.. Linear relationship between distribution practice and independent variable



Source: own survey, 2021

4.2.3.3. Independent Errors/Residual

Residual is defined as the difference between actual score and estimated by regression equation. As a result the size of the residual for the given case must have no impact on size of the residuals for the next case. In other words the errors are assumed to independent (Chatterjee &Hadi, 2012)

Table 4.11.Durbin-Watson Table Result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.741[a]	0.550	0.542	1.655

a.Predictors: (Constant), Product storage , warehouse, Transportation , Product timeline

b. Dependent Variable: distribution practice

4.2.3.4. Multicollinearity

Multicollinearity is the existence high correlation among the dependent and independent variables. In other words, multicollinearity exists when there is strong correlation between two or more predictors and it is a problem with multiple linear regression (Field,2006). The multicollinearity exists when variables should not be exceeded above 0.8(Hair,2006).

As it shown table 4.12 both pairwise correlation one of the results and hence none of the study were not exceeded above 0.8. From the above discussion multicollinearity was not a problem for particular study.

Table 4.12. Multicollinearity

		warehouse	Transport	Product Timeline	Product Storage	Distribution practice
warehouse	Pearson Correlation	1	.667**	.573**	.530**	**.461****
	Sig. (2-tailed)		.000	.000	.000	.000
	N	125	125	125	125	125
Transport	Pearson Correlation	.667**	1	.695**	.606**	**.651****
	Sig. (2-tailed)	.000		.000	.000	.000
	N	125	125	125	125	125
Product Timeline	Pearson Correlation	.573**	.695**	1	.746**	**398****
	Sig. (2-tailed)	.000	.000		.000	.000
	N	125	125	125	125	125
Product storage	Pearson Correlation	.530**	.606**	.746**	1	**.614****
	Sig. (2-tailed)	.000	.000	.000		.000
	N	125	125	125	125	125
Distribution Practice	Pearson Correlation	.461**	.651**	.698**	.728**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	125	125	125	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

4.2.3.5. Regression analysis result

In the meantime all multiple regression assumption is satisfied. As a result, the regression analysis continued mainly dedicated on two outputs. These are model summary and ANOVA analysis tool.

Table 4.13. Model summary of regression result

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.741[a]	0.560	0.542	0.44720	1.655

a.Predictors: (Constant), Product storage , warehouse, Transportation , Product timeline

b. Dependent Variable: distribution practice

source: own survey,2021

The regression model considered distribution practice as dependent variable and factors affecting distribution as independent variable. A multiple regression analysis conducted to evaluate how well four factors envisage distribution practice. As table 4.9 represented under linear combination of four factors is significantly related physical distribution practice shows **(R^2 =0.560**). This means 56% of positive variance of physical distribution practice in the sample accounted by combination of four factors that affect physical distribution.

Table 4.14.ANOVA for relationship of factor and physical distribution

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2098.957	4	524.739	49.052	.000[b]
	Residual	1283.715	120	10.698		
	Total	3382.672	124			

a. Dependent Variable: dist

b. Predictors: (Constant), Product, warehouse, Transport, Distribution

Source: own survey,2021

The relationship of four factors and physical distribution is well below 0.05(P<0.001). Therefore, we conclude **R** and **R^2** between dependent variable physical distribution and independent variable of four factors based on the response from EPSA three branches. The ANOVA table

provided proved the result of the test of significant for Rand $\mathbf{R^2}$is using F Statistic since the result of test is significant the p value is less than 0.05 $\mathbf{R^2}$ is significantly different from zero, the relationship between independent variables(factors) and dependent variable (physical distribution practice) in the population (Field ,2006).

Table 4.15 .Beta coefficient

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.473	.101		24.413	.000
	Warehouse	.129	.011	.281	11.532	.000
	Transport Practice	.153	.013	.312	12.007	.000
	Product Distribution	.234	.019	.342	12.414	.000
	Product	.248	.025	.262	10.025	.000

a. Dependent Variable: Overall distribution practice.

Source: own survey, 2021

A. Standardized Coefficients

According to (Field, 2013) standardized beta coefficient (relative importance) aids us to compare Z-scores. The measurement standard is by standard deviation not on unit of measurement. As a result for this type of research it is used relative importance in order to examine the relative contribution of each predictor variable to dependent variable. Based on the above obtained from the multiple regression, the researcher observed EPSA involvement of Warehouse (13.2%), transportation (30.2%), product storage (10.3%) and product timeline (19.2%). The best contributor was transportation (30.2%).

The second important factor was product timeline was (19.2%) followed by warehouse. From the survey made by the researcher on effects of physical distribution in EPSA, the least contributor factor for physical distribution is product storage (10.3%). That means as product storage to physical distribution increases by one standard deviation, the physical distribution increases by 0.103 standard deviation.

B. Unstandardized Coefficients

The linear multiple regression for dependent variable (physical distribution) and four independent variable (warehouse, transportation, and product storage and product timeline) in the form of:

$$Y = a + b1X1 + b2X2 + b3X3 + b4X4 + e$$

Where, Y= the dependent variable physical distribution a = y axis intercept (the constant beta value) b1, b2, b3, b4=beta weight for each independent variable X1, X2, X3, X4 representing(X1=warehouse X2= Transportation, X3=product storage, X4=product timeline) respectively e = the error term (0.05 in our case)

Based on the table 4.16.Taking the unstandardized beta value into thought, the regression equation of this specific study to the nearest two decimal places was expressed as:

$$Y = 1.022 + 0.1X1 + 0.8X2 + 0.3X3 + 0.142X4$$

Interpretation of the equation

- For every unit increase in the worth of warehouse of EPSA scenery all other independent variable to be constant, the value of response variable physical distribution will increase by 0.10 units or 10%.
- For every unit increase in the worth of transportation of EPSA scenery all other independent variable to constant, the value of response variable physical distribution will increase 0.8 units or 8%.
- for every unit increase in the worth of product storage of EPSA scenery all other independent variable to constant, the value of response variable physical distribution will increase 0.3 units or 30%.
- for every unit increase in the worth of product timeline of EPSA scenery all other independent variable to constant, the value of response variable physical distribution will increase 0.142 or 14. 2%.

CHAPTER FIVE

FINDINGS, COCULSIONS AND RECOMMENDATION

The aim of this research paper was to assess factors affecting effectiveness physical distribution in case of EPSA. For this purpose, a descriptive method of data analysis was used. Respondents were selected using convenience sample technique. The findings were analyzed using frequency count and percentage. Thus, based on the analysis and findings presented in the previous chapter, the following summary, conclusion and recommendation has been drawn.

5.1. SUMMARY OF FINDINGS

The major findings of this study are the following:

Studying factors affecting physical distribution is important for employees of EPSA and its management

- Form the descriptive analysis, the respondents were disagreed the warehouse hasn't adequate space for keeping the product. Although the respondents agreed about the location of shelves (pallet) are adequate. The respondents also agreed EPSA designed the warehouse based on WHO standardization procedure and cleanness for placing products. The respondents disagree there isn't much gap among shelves in order to move the products.
- With regard to transportation practice, half of them were agreed at the same time disagreed about awareness of conditions moving from one place to other place, assigning the vehicles for emergency. About moving pharmaceutical products are away from direct sunlight, humidity and contaminates at transportation process, vehicles are filtered with refrigerator for heat temperature, the respondents agreed about it. On opposite side the respondents disagreed there isn't much availability of vehicles when request and information system to control. About accessibility of loading and unloading the products vehicle the respondents give average response.
- Concerning product service timeline the respondents agreed EPSA supply from receipt of orders is right ,consistency of the percentage unit, pharmaceutical products delivered at promised specified time as perused in specification, the quality of medicine supplies with its original quality and the average delivery time reliable.

- From descriptive analysis the respondents disagreed there isn't effective in providing continued supply of medicine. The respondents agreed about the reliability information in distribution of pharmaceutical products, clear line of communication between different departments. Most of respondents partially agreed in lessening waste of medicine.
- Based on the result obtained from Pearson correlation, there is positive relationship between dependent variable (physical distribution) and independent variable (warehouse, transportation, product timeline, product storage). Hence, we accept H1, H2, and H4 except we reject H3.
- The normality test was conducted on this study revealed the skewness value of entire relationship between dependent and independent variable were within acceptable range -1 and +1. While the kurtosis for one predictor (product timeline) out of normal range. Meanwhile the sample size was more than 30 by central limit.
- Most of the variables show that there is linear relationship between physical distribution practice and the independent variable.
- The multicollinearity result showed the pair wise correlation between all independent variable was well below range of 0.8. This indicates the predicting variable (factors) is more related with dependent variable.
- The Durbin Watson result of 1.655 specified the existence of independent residuals or uncorrelated error assumption test result.
- The model summary result presented a linear combination of all independent variable considered under study predict $\mathbf{R^2 = 0.560}$, the variance in the dependent variable physical distribution. As a result, indicated 56% of the variation in physical distribution described by four independent variables.
- The ANOVA result exposed the value of **R**and $\mathbf{R^2}$ obtain under the model summary part was statistically significant at F=49.052 and $p<0.01$.

5.2. CONCLUSIONS

- In overall responses concerning the warehouse practice of EPSA, most of the respondents were rated average 3.0 at "partially agree'' level. We can conclude half of them with were agreed about design the warehouse based on who standardization and location of shelves (pallet are adequate) which increases the effectiveness of physical distribution. However,

others were disagreed that the warehouse hasn't adequate space for keeping the product and there isn't much gap among shelves in order move the products. Which decreases the effectiveness in physical distribution practice.

- With regard to transportation practice, most of the respondents were rated at 3.06 "partially agree" level. We can conclude half of the respondents agreed about moving pharmaceutical products are away from direct sunlight, humidity and contaminates at transportation process, vehicles are filtered with refrigerator for heat temperature which increases the level of effectiveness of physical distribution. Most of the respondents disagree about availability of vehicles when requested and information system to control the vehicles which may bring decrease in effectiveness in physical distribution. Most of the respondents agree at the same time disagree about accessibility of loading and unloading the product vehicle which make physical distribution neutral.
- The product timeline mean average was 3.71"agree'' level. We can conclude there is a good proportion between the product timeline and physical distribution in EPSA.
- The product itself mean was 3.74"agree'' level. We can conclude there is a good proportion between the product itself and physical distribution in EPSA.
- The overall distribution practice mean was 3.18 "agree'' level. This mean was more near to partially agree. Most of the respondents disagreed there isn't effective in providing continued supply of medicine which may decreases the effectiveness in physical distribution. The respondents agreed about the reliability information in distribution of pharmaceutical products, clear line of communication between different departments. Most of respondents partially agreed in lessening waste of medicine.
- Meanwhile most of the independent variables have positive association with physical distribution. The researcher concluded almost all hypotheses were well accepted except for the hypotheses **H3**.
- All assumptions (pre-stated requirements) of the multiple regressions which are normality, linearity, independence of residuals and multicollinarity were demonstrated to effective under the current study.
- Based on the model summary of the multiple regressions we concluded that the stated four factors (independent variable) have significant impact in explaining the variance in the dependent physical distribution in three branches of EPSA.

- From the ANOVA test result, we concluded that, the **R** and $\mathbf{R^2}$of the linear combinations of factor that affect physical distribution was statistically significant in selected three branches of EPSA.
- The standardized beta coefficient for each independent variable (warehouse= 0.132, transportation =0.302, product storage =0.103 and product timeline=0.192). It showed that physical distribution changes by indicated amount as result of one standard deviation changes of each independent variable.
- The unstandardized beta coefficient for each independent variable (warehouse =0.1, transportation =0.72, product storage=0.252 and product timeline=0.142). This result revealed as every one-unit increase indicated predictor there is increase for outcome variable by specified amount

5.3. RECOMMENDATIONS

- The respondents disagreed (dissatisfied) with warehouse hasn't adequate space for keeping the product and there isn't much gap among shelves in order to move the products. Therefore, it is advisable for EPSA to reexamine the warehouse practice assessment in order to make more space and buy more shelves that are necessary for pharmaceutical products in more effective physical distribution.
- Most of the staffs disagreed about availability in need of emergency and information system to control information systems to control vehicles. Due to this fact it is recommendable; the agency needs to reconsider on availability of vehicles in order to ease the physical distribution effectiveness. The agency needs to update for latest technology for controlling vehicles rather than the manual way of controlling the vehicles.
- From the above descriptive analysis, most of the respondents disagreed there isn't effectiveness in providing continued supply of medicine. Therefore, EPSA needs to give more emphasis in improving effective supply of medicine since it is has major mandatory in distributing medicine in the country.
- The respondents give a neutral response about accessibility of loading and unloading the product vehicles. Therefore the agency needs to increase the accessibility of more vehicles in process of loading and unloading.

- On the other hand, most of the respondents positively responded about the product timeline. Thus, ESPA needs to keep it in order to increase the effectiveness of physical distribution.
- The respondents also affirm about the product handling is satisfied (quite good). As a result, it is better for EPSA to retain in protection of material handling.
- Regarding overall practice of distribution, the respondents agreed about reliability information in distribution and clear line of communication between departments. Hence, the agency needs to preserve these activities in order to make distribution more accessible.

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APPENDICES

Appendix 1- Questionnaire

ST MARY'S UNIVERSTITY

SCHOOL OF GRADUATES

PROGRAM OF MASTERS OF BUSINESS ADMINISTRATION (MBA)

Questionnaire Survey

Dear respondents,

This study is entitled "Factors affecting effectiveness of physical distribution the case Ethiopian parametrical supply agency. The data collected will be used only for academic purpose; hence, you are kindly requested to provide genuine information with respect to the questions regarding product distribution in Ethiopian parametrical supply agency. Your honest information is highly important to the success of this study. Therefore, the researcher pledges the information you will provide is confidential and only serves for academic purpose.

I would like to thank you well in advance for your willingness to participate in this study by sparing your precious time.

Thank you

Part I. Demographic Variables of the Respondents

Tick the right (√) by making the symbol copy and paste it on the each questions

1. Gender

- ☐ Male
- ☐ Female

2. Age

- ☐ 20-25
- ☐ 26-30
- ☐ 31-35
- ☐ 36-40
- ☐ Above 40

3. Department you're currently working

- ☐ Store manager
- ☐ Dispatch officer
- ☐ Storage and Distribution

4. Years of Experience in the Agency

- ☐ years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ above 16 years

5. Job position /title

- ☐ Director officer
- ☐ Warehouse manager
- ☐ Driver

☐ Other, specify (If any) ----------

PART TWO: Opinion about product distribution in the case of EPSA

Please indicate your response to each of the following statements regarding, promotion, reward, (√) to the appropriate answer according to the following code of definition.

1. Ware house

1= Strongly Disagree (SD) 2=Disagree (D) 3=Partially Agree (PA) 4=Agree (A) 5=Strongly Agree (SA)

	Statements	1=(SD)	2=(D)	3=(PA)	4=(A)	5=(SA)
1	The ware house has adequate space for keeping the product					
2	The warehouse is quite accessible for loading and unloading the product to vehicles					
3	The shelves or pallets that are located in the ware house are adequate					
4	EPSA ware house is designed based on WHO standardization procedure					
5	EP**S**A ware house is clean and sanitized for placing pharmaceutical products					
6	There are enough ware house centers for storing the product pharmaceutical product					
7	The gap among the shelves is quite enough in order to move the products					

2. Transporation practice

	Statement	1=(SD)	2=(D)	3=(PA)	4=(A)	5=(SA)
1	The pharmaceutical are away from direct sunlight ,humidity and contaminants at transportation process					
2	There are vehicles that are filtered with refrigerators for heat temperature products like vaccine					
3	The drivers are aware of all relevant condition regards the pharmaceutical products in moving from one place to another place					

4	Vehicles are assigned for emergency order					
5	Vehicles will be ready as soon as it request in distribution					

6	There is information system to control vehicles					
7	There are enough vehicles for the requested product distribution in order to meet the demand					

5. Physical distribution service timeliness

Statement		1=(SD)	2=(D)	3=(PA)	4=(A)	5=(SA)
1	The time of EPSA to supply from receipt of order is right					
2	the percentage unit delivered in specified time consistent					
3	The pharmaceutical product are delivered promised specified time as perused in specification					
4	EPSA is supplying medicine with its original quality throughout the distribution process					
5	the average delivery time reliable					

Product

Statement		1=(SD)	2=(D)	3=(PA)	4=(A)	5=(SA)
1	The product stored with appropriate identification label expiry date and manufacturing date					
2	Product stored based on the temperature specification including cold temperature a storage that are required for certain products					
3	Products are distributed to health facilities and branches timely upon requested					
4	Products are distributed to health facilities and branches timely upon Requested					
5	Products which have near expiry are reported and distributed timely to health facilities					

Overall distribution practices

	Statement	1=(SD)	2=(D)	3=(PA)	4=(A)	5=(SA)
1	EPSA is effective in providing continues supply of medicine					
2	EPSA is effective in lessen wastage of medicine					
3	EPSA is uses reliable information regarding the distribution of Pharmatical products					
4	EPSA is distributing medicine as its original quality in the process of the distribution					
5	There is a clear line of communication between distribution department					

Thank you so much for your time!