

ADDIS ABABA UNIVERSITY
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DEPARTMENT OF LOGISTICS & SUPPLY CHAIN MANAGEMENT

**ASSESSMENT OF INFORMATION QUALITY IN LOGISTIC MANAGEMENT
INFORMATION SYSTEM AND ASSOCIATED SYSTEM LEVEL FACTORS IN
PUBLIC HEALTH FACILITIES IN JIMMA ZONE.**



By

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Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other university. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by Addis Ababa university of school of commerce a thesis entitled “assessment of information quality in logistic management information system and associated system level factors in public health facilities in Jimma zone” in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Logistics & supply chain Management of by Addis Ababa university of school of commerce.

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Abstract

Background: The primary goal for information quality is to deliver information which is accurate, timely and completeness information to manager. information quality is viewed as an essential element in measuring logistic management information system. **The objectives of the study:** To assessing information quality and the factors that affect information quality in logistic management information system at services delivery point in Jimma Zone public health facility. Specific emphasis was put on the effect of system quality and information quality dimension information quality in logistic management information systemat services delivery point in Jimma Zone public health facility. **Methods:**The study used an explanatory approach to understand the factor that determines information quality. A total of 84 respondents were selected for the study. The researcher used both stratified and simple random sampling techniques in selecting the samples... **Results:** The results showed that over 63.6% ,64.6% and 63 of the information reported were inaccurate, incomplete and untimely respectively and influenced by data management system. The overall mean score of information quality was 1.8 indicating that poor information quality. Information quality dimension with ($\beta_1 = 0.356$) and system component quality with $\beta_2 = 0.241$) imply that they positively impact on information quality. The study findings confirmed that information quality dimensions and system quality factors positively affect information quality in in logistic management information system at services delivery point in Jimma Zone public health facility. **Conclusions:** Findings indicate that information quality in Jimma Zone logistic management information system was low quality, which is affected by information quality dimensions and system quality. **Recommendations:** The study recommended that public health facilities should purposely invest in data departments that can oversee the monitoring and evaluation function, conducting of formal trainings for all staff in data management and joint supervision in quality assurance and improvement to promote sustainability in public health facilities.

Key words:logistics, management,information ,systems, Quality ,Dimension.

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List of acronyms and Abbreviations

ART - Anti Retroviral Treatment

LMIS - Logistic Management Information System

NGOs - Non-Government Organizations

PFSA - Pharmaceutical Fund and Supply Agency

RRF- Requesting and reporting Form

SDPs - Service Delivery Points

TB - Tuberculosis

WHO - World Health Organization

WoH- Woreda health office

ZHD- Zonal health department

CHAPTER ONE: INTRODUCTION

This chapter introduces the topic of this study and provides general view of what are presented in the thesis. It contains brief introduction on the background, Statement of the problem, research question and objectives, significance of the study, scope of the study, definitions of terms and organization of the thesis.

1.1 Background of the Study

Health is an important indicator of the status of development of a society and country. While in Ethiopia citizens have access to both public and private health care services, typically the common citizens in the country are largely dependent on the public services. Managing these scarce resources effectively becomes a crucial task, and a significant aspect in this regard is the Logistics Management Information System. Supply chain management is known to be the backbone of healthcare systems and this arises from the fact that health care is so dependent on the logistics availability of drugs and other medical supplies got at the right time and in the right quantities for the management of patients. New business models based on new ways of designing logistics flows and supply chains have emerged during the past couple of decades. The health care industry is undergoing major revolutions as far as supply chain management is concerned (USAID | Deliver project, 2010)

Logistics and management information systems is a management information system that collects, records, and reports logistics data. The logistic management information system can be manual (paper based), partly computerized, or entirely computerized. A well-functioning logistic management information system provides decision makers throughout a supply chain with accurate, timely, and appropriate data. The logistic management information system ensures or fulfills the rights of a supply system by delivering the right products the right quantities, in right time, in the right condition, for the right cost and to the right place. The system serves a variety of functions such as managing data on the quantity of medicines or supplies needed at specific service delivery point (SDP), reporting on current stock levels of supplies at service delivery points and storing, tracking data regarding usage of medical commodities over time at all levels of the health (USAID | Deliver Project, 2012)

Generally, manual systems are very slow, inconsistent, and error prone, with frequent information delays. A manual system seriously restricts a company's ability to reduce total costs while simultaneously maintaining or improving customer service. Some common problems include the inability to detect pricing errors, and lack of access to timely credit information, or difficulties in determining inventory availability. Timely and accurate information has value. Computerized systems can potentially help managers to integrate various aspects of the logistics systems and allows the reduction of costs through improved inventory and freight management. The communication network is clearly a key factor in achieving effective logistics systems (Stock & Lambert, 2001).

Logistic management information system in supply chain provides decision makers and customers with accurate, timely and appropriate data such as stock on hand, loss and adjustments, consumptions, demand, issues, shipment status and information about the cost of commodities managed in the system. The system allows organizations to track the flow of both information up and down, helping the organization know how well the supply chain is functioning. Training personnel within the health system to manage the information systems has frequently been overlooked by donors and governments until the system breaks down (Gunasekaran & Ngai, 2004).

Information is the engine that drives the entire logistics cycle; without information, the logistics system would not run smoothly. In the beginning of the logistics cycle, managers gather information about each activity in the system and analyze that information to make decisions and coordinate future actions. For example, information about product consumption and inventory levels must be gathered to ensure that a manager knows how much of a product to procure. Information collects to make decisions; the better information, the better decisions can make.(Sunil & Peter, 2013).

Information quality is major determinant of the success of the logistic information system.Poorinformation quality can cause a variety of risk in pharmaceutical logistic management system. The efficiently manage the resource to improve theinformation quality of; you must understand where, how and how much informationquality affects the organization's ability to successfully deliver its services(George, Antonio, & Claudio, 2016).

Information quality is dependent on the underlying systems level factors. Good information quality to be produced by and flow through a system level factor (WHO, 2009). Poor information quality can result in improper allocation of funds and undermines the concept of performance-based funding. Hence, the information quality reported by countries is a critical component of performance-based funding (WHO, 2010).

Globally, reliable and accurate logistic information is essential for monitoring supply chain and for evaluating and improving the delivery of health-care services and programmes. High-quality logistic information is crucial in addressing supply chain challenges and building strong supply chain systems (Abouzahr, 2005). As countries report their progress towards achieving the United Nations Millennium Development Goals, the need for high-information quality has been neglected. Furthermore, funding and support for logistic activities remain contingent on demonstrating coverage using routine statistics. However, assuring the quality of logistic information systems remains a challenge (Doyle, 2009).

In Africa, studies of logistic management information systems frequently document problems with information quality, such as incomplete records and untimely reporting. There are so many problems that exist in the drug logistics management in the developing countries which result in the shortages (or stock outs) and uneven distribution of drugs, among others. This affects the clients at the health facilities (Makombe, 2008).

The Ethiopia Government intends to provide program drugs free of charge at all public health facilities for drugs reach patients in need of them. “However, there is evidence that drug shortage is a major barrier to access essential drugs in the sub-Saharan Africa”. One of causes of this problem is the poor drug logistics management system (Lufesi, Andrew, & Aursnes, 2007).

In Ethiopia, pharmaceuticals fund and supply agency (PFSA) has been designed and implemented logistics management information system throughout the public-sector health facilities whereby health facilities receive their drugs on a bi-monthly cycle based on their need (Shewarega, Paul, Welelaw, & Sami, 2015).

1.2 Statement of the Problem

Jack and Dan (1999) observed that technical issues like slow response time, lack of reliable data, and system quality and user satisfaction also play significant role in the making of an effective MIS system (Jack & Dan, 1999). During the last decade, the Health Sector has changed rapidly. Due to increased competition, the growing influence of patient associations and a necessity to deliver health services in a more efficient and effective way, many health care organizations have started projects in patient logistics, clinical pathways, data interchange and vertical integration. Moreover, the redesign of health facilities and the implementation of information systems to integrate care programs have been frequently addressed as being critical strategies to decrease resource utilization and improve health care quality (Aptel & Pourjalali, 2001).

In Ethiopia, the health system programs face many challenges that makes it difficult for supply chain to operate efficiently. Logistics plays a major role in ensuring that drugs and equipment are sourced and delivered within a reasonable time to serve its purpose. In the Public Health Sector; PFSA is the only public institution that has the mandate of procuring and delivering drugs and equipment to various public health facilities in Ethiopia. There have been recent numerous county cases of health facilities having challenges of drug shortages, stock outs and delay of deliveries (USAID | Deliver Project, 2012).

Scholars researching on logistic management information system in developing countries has found that sometimes the vertical logistic management information system collects similar information in similar formats between programmers, present in several countries (Chindove & Mdege, 2012). This has implications for standardization efforts, as this would make it less complicated to align stakeholders. This relates to another challenge in logistic management information system' in developing countries, namely lack of standardization in reporting formats (Chindove & Mdege, 2012). Overall, the lack of standardization is influenced by different health initiatives maintaining their own ordering tools and methods, thereby resulting in differences in methods.

Another issue prominent in logistic management information system in developing countries is that they are predominantly paper-based (Chindove & Mdege, 2012). This leads to a more

demanding information handling process than in digitalized management systems and may cause delays in the overall information creation process (SIAPS, 2014).

Accurate record keeping is critical to the well-functioning of an effective logistic management information system, the information must be reported to higher levels so effective logistics decision making can take place. In addition, the information sent on those reports should be complete and accurate. However, study in Nigeria indicated that only 45.3 percent send their RRF to a higher-level and 32.7 percent of SDPs had the RRF completed accurately. Approximately one-fifth of SDPs had the forms completed, but they were filled out inaccurately. In addition, almost one-fifth of SDPs did not have these forms in stock (FMOH, Nigeria, 2009)

Facility based study in Ghana indicated that, timeliness of reporting was found to be extremely low only 58% of reports were sent to a higher level within the last month. Accuracy of the stock status on logistic management information system reports at health facilities was found to be poor and 72% of health facilities having accurate or near accurate stock balances on logistic management information system reports. (McLaughlin, Erika, & Erin, 2006). Similar study in Cameroon also shows that on average, a timely report was received only 29 % of the time and only half were complete (Gabriel & Kwesi, 2011).

In Ethiopia, majority of the common leading causes of morbidity can be substantially reduced if carefully selected, low-cost pharmaceuticals are available and appropriately used (FMHACA, 2013). Availability of health commodity is the construct of the components of the pharmaceutical logistics system and a failure in one part of the system leads to the failure of the whole pharmaceutical management process (MSH, 2011). Lack of effective pharmaceutical logistics system not only affects the availability of health commodities, but also significantly affects efficiency. Deficiencies in selection, quantification, storage, as well as high prices, poor quality, theft, expiration of drugs, irrational prescribing, and incorrect use of medicines by patients cause losses totaling 70% of the original expenditure (MSH, 2011).

1.3 Research Question

This study was conducted to answer the following basic questions based on the statement of the problem.

1. What is the quality of information in pharmaceutical logistic management information system practices at public health institution in Jimma Zone?
2. What are the factors determining withinformationquality in pharmaceutical logistic management information system?

1.4 Research Objectives

1.4.1 General objective

- To assess information quality in pharmaceutical logistic management information system and identify factors determining with information quality at public health institution in Jimma zone.

1.4.2 Specific objectives

- To assess information quality in pharmaceutical logistic management information system. at public health institution in Jimma zone.
- To identify factors that determining information quality in pharmaceutical logistic management information system. at public health institution in Jimma zone.

1.5 Significance of the Study

The development of Logistics management information systems has for many years been regarded as the domain of the technical expert. In what appears to be a growing number of instances on the information quality and appear to be having numerous factors within the public health sector.

The findings of this study will therefore be of significant to various people. The concept from the study will form a basis for further research to the academicians. The logistics and Information Systems are important field concepts that are beneficial to the management of logistic management information system. For decision makers at PFSA, the findings from this will provide pertinent information on the extent of the information quality at services delivery point.

The study will also contribute toward making of a sounder decision to the government of Ethiopia on the factor influencing information quality to the policy maker. This will enable them to make better reporting decision to health facilities and public. The study will also enable partners/ stakeholders to have a better understanding on how well to help the health facilities during facilitation of program commodity funds using logistic management information system. On the other hand, the public health facilities in Ethiopia on a day to day basis are faced with numerous problems. This study will help the health facilities to mainly understand the factors influencing information quality and how to improve on the same.

1.6 Scope of the Study

This research focused on pharmaceutical logistic management information system which currently has information from public health facilities supply by PFSA and the status of information quality. The research sought to study factors that affect information quality in logistic management information system at services delivery point. The research focused on program commodities managed by public health facilities, which makes its generalization to the overall public-sector quality of information in pharmaceuticals logistic management information system. The study was performed at Jimma zone only; therefore, the finding of this study cannot be generalized to Ethiopia.

1.7 Limitation of the Study

This research was undertaken in the period of three months. It is important to note that for an in-depth analysis of the factors that affect the quality of information in logistic management information system more time may be required. It is also important to note that there was insufficient literature in general on information system in developing countries.

This research focused only on the public health facility and thus did not address the private and NGO sector because of lack of resource and capacity. Responses to questions of information quality relied solely on subjective memory, which lead to recall bias. Also, the cross-sectional design of the study hinders the identification of the causal relationships between independent variable and information quality.

1.8 Definition of Terms

Accurate information is actual patient information that is written as it was observed.

Complete information is when all information is present, for example, all columns are filled in.

Data is individual facts, statistics, and raw numbers

Information is knowledge acquired in any manner; facts and information that have been turned into useful material.

Information Quality has been defined as the desirable characteristics of the system output (Petter, DeLone, & McLean, 2008)

Information Quality Assessment is the process to determine if the information is suitable for a specific use.

Logistic management information system is the system of that collects, facilitates and organizes the follow of logistic information between the various part of the supply chain, from the central warehouse to services delivery point.

Timely information is information that is recorded as it is collected, or done on time, processed on time, sent on time.

1.9 Organization of the Study

This thesis was divided into five chapters. Chapter 1 introduces the topic of this study and provides general view of what were presented in the thesis as described above. This chapter was followed by Chapter 2 which consists of the literature and the conceptual framework used in this study. The literature was about information quality with emphasis on the factors that influence information quality in logistics management information system and data quality dimension. The conceptual framework consists of the data management system as characteristics of data quality and base concept of the Information Quality. While the research approach and methods are described in Chapter 3 which includes description of the study area, research design, population and Sample, data Sources and types, data Collection Procedures, Ethical Consideration and data Analysis. After that, it is the research methodology chapter, Chapter 4 provides presents the results, discussion and interpretation the results. Lastly chapter 5 presents summary of major finding conclusion and recommendation.

CHAPTER TWO: RELATED LITERATURE REVIEW

This chapter will delve in to detail on what the logistic management information system is about and why generating quality information for this system is important. It will also consider the definition of information quality and various dimensions and characteristic of information quality. Thischapter will also try and compare the various models available for measuring information quality as well as identify factors affecting information quality.

The literaturecontains theoretical review, empirical review and literature gap about information quality on logistics management information system (LMIS). The conceptual framework consists of system quality aswell as informationquality dimension.

2.1 Theoretical Literature review

Theories of information systems are considered to comprise various models and approaches:

2.1.1 Technology Acceptance Model

The Technology Acceptance Model (TAM) was developed by Davis (1989) to explain the Theory of Reasoned Action (TRA). According to Fishbein and Ajzen the theory needed to explain why some information system are more readily accepted by users than others (Fishbein & Ajzen, 1975).

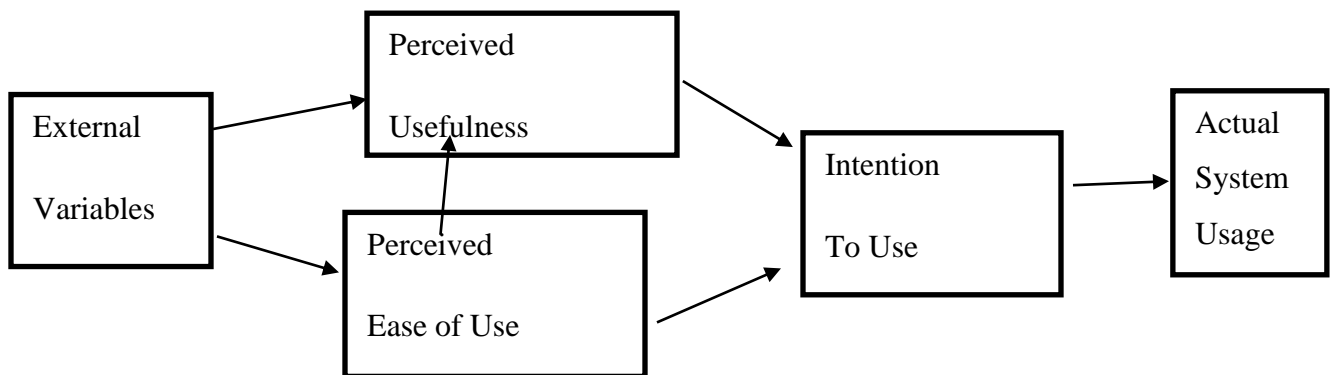


Figure 1: Refined Technology Acceptance Model

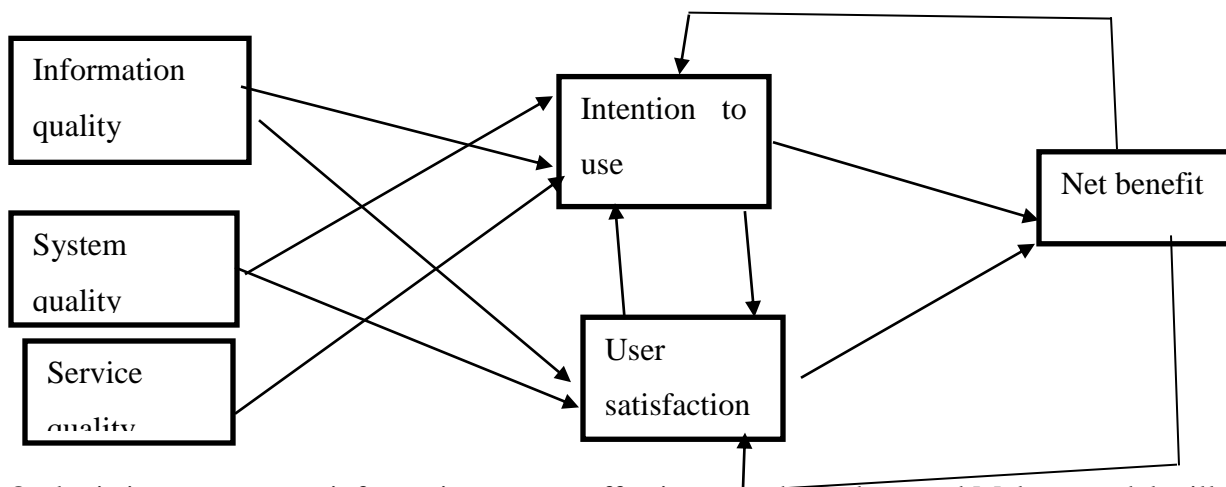
The TAM will predict information system acceptance and diagnose design problems in Logistics Management Information Systems (LMIS) before users have experience with a system. User

acceptance of logistic management information system through TAM model will be determined their perceived usefulness and perceived ease of use. Within the model, perceived usefulness is defined by the degree to which they believe that using the system will enhance performance. Perceived ease of use is defined as the degree to which the user believes that using the logistic management information system will be free from effort. This will impact on user's attitude toward using the Logistic management information system is shown by their feelings of being favorable or unfavorable to the system (Fishbein & Ajzen, 1975).

2.1.2 The DeLone and McLean Models

According to Mason the information system produces information that is, afterwards, communicated to the recipient who is subsequently influenced by the information (Mason, 1978). On level of information transfer Petter, DeLone and McLean concluded that there are six distinct categories or aspects of information systems: (a) system quality, (b) information quality, (c) Service quality, (d) Usage, (e) user satisfaction, and (f) Net benefit(Petter, DeLone, & McLean, 2008).

Figure 2: The De Lone and Mclean Model 2008 (Petter, DeLone, & McLean, 2008)



On logistic management information system effectiveness, the DeLeon and Mclean model will be able to assess the gap based on the information collected from the system

2.1.3 Logistics Management

Logistics is that part of Supply Chain Management (SCM) that plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related

information between the point of origin and the point of consumption to meet customers' requirements (Murphy & Wood, 2008).

Logistics management deals with the planning and control of material flows and related information in organizations, both in the public and private sectors. Its mission is to get the right materials to the right place at the right time, while optimizing a given performance measure and satisfying a given set of constraints (Jonsson, 2008).

2.1.4 Logistics Management Information Systems

Information is the motor that drives the logistics cycle. Without information, the logistics system would not be able to run smoothly. Managers gather information about each activity in the system and analyze that information to coordinate future actions. For example, information about inventory levels and consumption must be gathered to ensure that a manager knows how much more of a product to procure. Logisticians added the word logistics to Management Information System (MIS) to create logistics management information system. They wanted to make it clear that the collection of data for logistics is a separate activity from the collection of data for other information systems (Frazelle, 2002).

Logistic management information system is a system of records and reports whether paper based or electronic used to aggregate, analyze, validate, and display data (from all levels of the logistics system) that can be used to make logistics decisions and manage supply chain (USAID | Deliver project, JSI, 2000). The logistic management information system may be fully automated or manual, and most of them are somewhere in between. Depending on the sophistication of the system, the quality and speed of information flow will vary (Lambert, 2004).

The information system collects, processes, and reports supply chain data. A well-functioning logistic management information system provides decision makers throughout a supply chain with accurate, timely, and appropriate data. It can be manual (paper based), or partly or wholly computerized. For any supply chain system, there are five essential logistic management information system data items quantity of stock on hand, quantity of stock consumed (dispensed to users), losses and adjustments, dates of orders/ receipts and amounts on order (USAID | Deliver project, 2010).

2.1.5 Information quality

Data is raw unprocessed facts and figures that have no context or purposeful meaning and information is processed data that has meaning and is presented in a context (Patterson, 2005). According to Shim Data are usually the input of a management information system. After data are processed by the MIS, information will be generated. Users can then use information for decision making. Data are normally organized into files' tables, and files are organized into database. Users can retrieve data as input of application software and produce information as output (Shim, 2000).

Information is a collection of facts organized or processed in such a way that they have additional value for further use. Information is valuable and useful because it can help decision makers. According to Ramachandra and Srinivas information is the data that is processed in a form which helps the management to take decisions i.e. it is the data that have been put into a meaningful and useful context and communicated to a recipient who uses it to make decisions (Ramachandra & Srinivas , 2012).

The relation of data to information is that of raw material to finished product. The word information is a processed data, useful or relevant data, data with surprise value, data which is useful in the decision-making process. how to transform Data into Information (Yaser Hasan, Alina , & Nor , 2014)

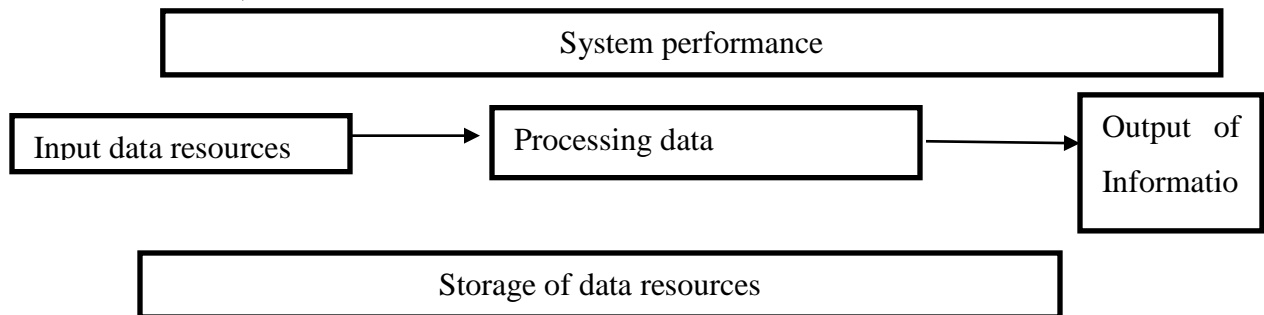


Figure 2:transforming data in to information (Yaser Hasan, Alina , & Nor , 2014)

Information quality is the desirable characteristics of the system outputs. For example, accuracy, completeness and timeliness. The output of the information systems should to be relevant to the purpose for which it is required, easy to understand, accurate or less error, complete or contains all the required information, currency, quick availability and timely to support information needs, and usability. According to (Yaser Hasan, Alina , & Nor , 2014). Many researchers

consider information quality as important factor to logistic management information system success in organization.

2.1.6 Factors influencing information quality

Information system effectiveness is the extent to which a specific information system contributes to achieving organizational goals, that is, its effect on organizational performance. The influence information quality is factored under information quality dimensions factors and system quality factors.

2.1.6.1 Information quality dimensions factors

Information quality is to measure outputs of an information system. Wixom and Todd defined information quality as the completeness, accuracy, format, and timeliness as four information quality antecedents (Wixom & Todd, 2005).

Accuracy

Accuracy means how accurate is the information or how much error does it contain? (Belle, Eccles , & Nash , 2001). Information needs to be accurate enough for the use to which it is going to be put (Patterson, 2005). Logistic management information system information should be accurate and avoid any inclusions of estimates or probable costs.

Completeness

Information should contain all the details required by the user (Patterson, 2005) . Completeness means Does it contain all the important facts? (Belle, Eccles , & Nash , 2001). According to (Lee, Strong, Kahn, & Wang, 2002) measures of completeness is this information includes all necessary values. This information is complete. This information is sufficiently complete for our needs. This information covers the needs of our tasks. This information has sufficient breadth and depth for our task. According to (Kahn, Strong, & Wang, 2002)completeness is the extent to which information is not missing and is of sufficient breadth and depth for the task at hand.

Timeliness

Information must be on time for the purpose for which it is required. Information received too late will be irrelevant (Patterson, 2005). Data must be available for the intended use within a

reasonable time. According to (Lee, Strong, Kahn, & Wang, 2002) measures of timeliness are this information is sufficiently timely. this information is sufficiently current for our work, this information sufficiently up-to-date for our work. According to (Kahn, Strong, & Wang, 2002) . Timeliness is the extent to which the information is sufficiently up-to-date for the task at hand.

Logistic management information system should facilitate informed decisions in the supply chain, striving for accurate, timely, and appropriate data (USAID, 2006) Overall, logistic management information system can be understood as a management information system used to support the flow of information and commodities between warehouses and patients. In the context of Ethiopia, this includes information handling at the facility, woreda and national level. Through such a system, collection, processing and reporting on commodity data are used to get an informative overview of where logistics resources are needed in the supply chain. The goal of a successful logistic management information system is to better facilitate well-informed decision making.

2.1.7 System quality

System quality is user friendliness and ease of use are the two instruments to measure System quality. System quality is the desirable characteristics of an information system. For example, ease of use, system flexibility, system reliability, ease of learning, intuitiveness, sophistication, response time (Petter, DeLone, & McLean, 2008). Ease of use is the degree to which the users perceived that by using information system they need less effort to use the system. In addition, a quality of information system needs to be flexible enough for the user to use the system. Flexible information system means the ability to customize the system based on the conditions and the internal and external changes. Moreover, reliability is important indicators of system quality.

2.2 Empirical Literature Review

Jacqueline argued that systems fails due to top management support training and effective project management plays a major role in success of the system (Jacqueline, 2013). Availability of drug supplies is essential element in the delivery of quality, integrated health services (Sowedi.M, David.V, & Olupot.G, 2006). The improved availability of affordable drugs depends on effective logistics systems to move essential commodities down the supply chain to the service delivery point, ultimately, to the end user (Bossert, Bowser, & Amenyah, 2007).

Studies in Mozambique (Macueve, 2003); (JSI/Deliver, 2007) indicate that there are problems of staff have very little working experience in supply chain management of medicines; staff turnover; and lack of quality and timely logistics information at the central level. In Nepal (FPLM, 2000), there are inaccuracies and errors in reporting system that result the reports not being used for decision making; weak supervision of district storekeepers; no much update of stock book; lack of staff training; fewer mid-level managers; and excessive storekeepers but not enough training. Even Tanzania (Deliver, 2007), and Zambia (Deliver, 2007), (Bates, J. & Rao, S, 2000) face problems of lack of quality logistics information at the service delivery point for proper decision making and monitoring system performance at the lower levels.

Study in Malawi indicate that there are unexpected shortage of drugs in health facilities due to the insufficient deliveries from the regional medical stores; poor recording of logistics information at the health facilities; uneven distribution of drugs among health centers; delays in delivering of drugs to the health facilities; lack of staff training and supervision; no integration of the logistics information and the health information; and shortage of human resources at all levels because professionals leave the civil service for “greener pasture” (JSI/Deliver, 2007).

A study conducted in Addis Ababa show that stock cards and RRFs were available 96.2% of the health facilities. Among these facilities, 61.5% health facilities update stock cards regularly and 92.6% of the facilities were completing and sending RRF to supply PFSA every two months. Review of the completeness of the report formats involving two review periods show that 87.5% of facilities had completed data items on RRF. Accuracy of information reported on the report formats (RRF) was discrepancy in the ending balance record between RRF data and stock card records was 60% of the health facilities (Bekesho, Bineyam, Dereje, & Motuma, 2016)

A study done by Kidist Teklegiorgis (2014) in Eastern Ethiopia showed that, health facilities have skilled human resource were 3.26 times more likely to achieve information quality than without skilled human resource health facilities which had well-designed reporting formats were 2.38 times more likely to achieve information quality than without reporting format. Similarly, health facilities which had trained staffs able to fill formats were 3.52 times more likely to achieve information quality. Health facilities which had a friendly format for reporting were 2.25 times more likely to achieve information quality than health facilities without a friendly format. After adjusting with other variables, only trained staffs to fill out formats were found to be

statistically significant. Hence, health facilities who had trained staffs to fill formats were 2.253 times more likely to achieve information quality than those health facilities without. Health facilities which base their decisions on supervisor directives were 3.26 times more likely to achieve information quality than those health facilities which did not base their decisions on supervisor directives. Health managers who report on information accuracy regularly were 88% more likely to achieve information quality than those health facilities in which their managers did not report information accuracy. Similarly, health managers who seek feedback from supervisors were 3.49 times more likely to achieve information quality than those managers who did not seek feedback.

However; after adjusting these variables with other variables, only decisions based on supervisor directives and managers seeking feedback were found to be determinant factors for information quality. Hence health facilities whose decisions were based on supervisor directives were 2.15 times more likely to achieve information quality than those health facilities which did not base their decision on supervisor directives. Similarly, health managers who sought feedback from senior supervisors were 2.54 times more likely to achieve information quality than those managers who did not seek feedback (Kidist, T, Kidane.T, Gebremeskel, M; Wondwossen, T., 2013)

The studies done by (Adino, Bineyam, Getachew, & Alemayehu, 2013)in Addis Ababa showed that, majority of stock/bin cards were not updated with accurate information matching with the physical count done at the time of visit. The overall accuracy (matching with physical count) of stock/bin cards in all facilities was 38.9%. Similar study in Zimbabwe showed that 80% of facilities using stock/bin cards 60% were updated with accurate information. This may be due to the presence of programmed supervision and trained staffs that improved stock/bin card accuracy in Zimbabwe (Jabulani, David.Alt, & Ali, 2005). Training of professionals in LOGISTIC MANAGMENT INFORMATION SYSTEMfrom involved in laboratory commodity management 62.3% were trained in logistics management information system (integrated pharmaceutical logistics system or Ethiopian laboratory logistics system) of these 58.8% were pharmacy professions

Study done by Daniel in Diredawa branch pharmaceutical fund and supply agency showedthat Management support for LOGISTIC MANAGMENT INFORMATION SYSTEM

implementation was significantly associated with improved information quality. Availabilities of LIMS recording and reporting formats (bin cards, and RRF) were reported in 92.6% of facilities reported the three-basic logistics information with an average of 85.7% of arithmetic accuracy and close to 93% completeness (Daniel., 2015).

2.3 Conceptual framework

The conceptual framework illustrates how the two independent variables, information quality dimension factor and system component quality factor interrelate to influence information quality the dependent variable (Petter, DeLone, & McLean, 2008).

Independent variables

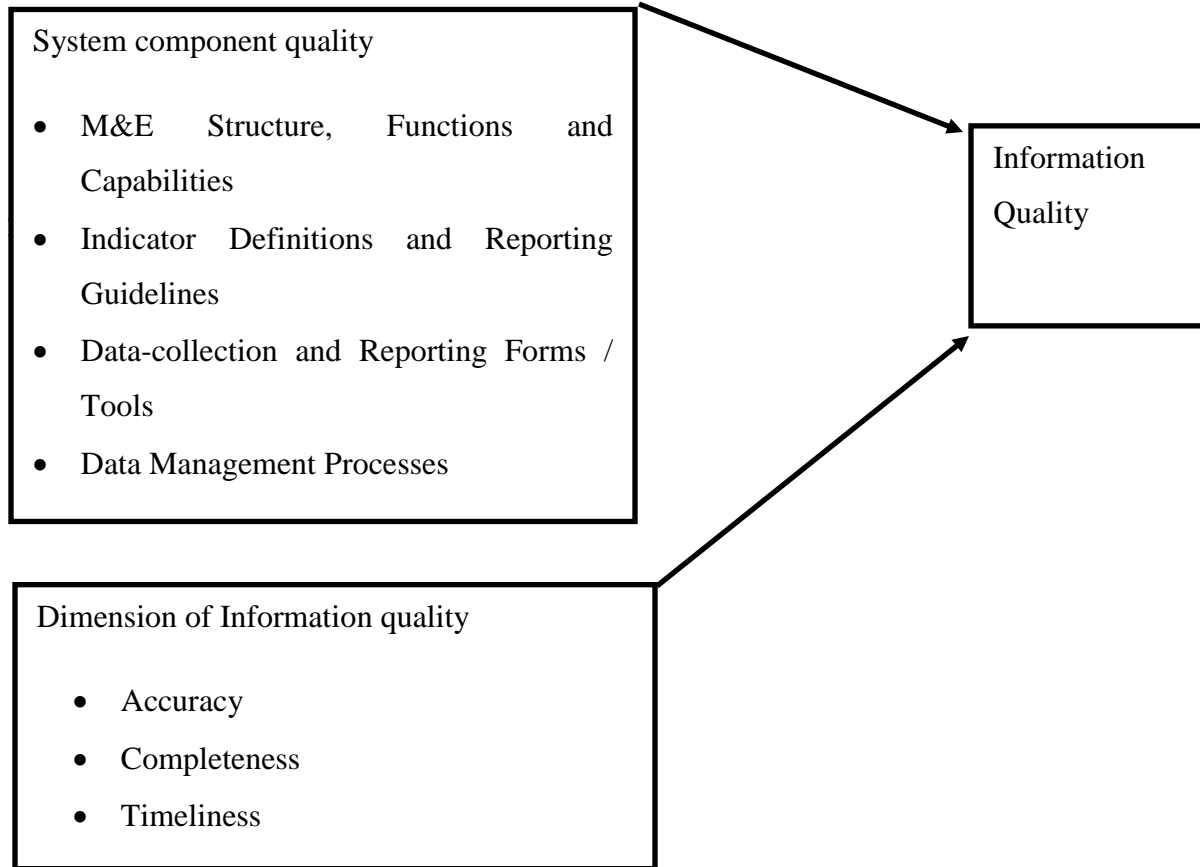


Figure 3: Conceptual Framework of information quality (Petter, DeLone, & McLean, 2008)

CHAPTER THREE: METHODOLOGY OF THE STUDY

3.1 Description of the Study Area

The study was conducted in selected health care facilities of Jimma zone from February.1, 2018 to April.30, 2018. Jimma zone is one of the 17 zones of Oromia Regional state that is in the south-western part of Ethiopia, 346 km away from the Addis Ababa, capital of Ethiopia. The zone is divided into 22 woreda and one city administration. It has a total land area of 15,568.58sq kilometer. There are 611 health facility, one specialized referral hospital, one military hospital, four primary hospital, 65 health centers, 75 clinics, 469 health posts, according to Jimma zonal health officer report ((Jimma zone health, 2017)

3.2 Research Approach

The study used an explanatory approach to understand the factor that influence information quality. Quantitative was collected to know factors associated to information quality in logistics management information system and information quality status in terms of timeliness, completeness and accuracy of information. Data was collected from service provider's staff to gather data on information Management Systems of the current logistic management information system.

3.3 Research Design

A quantitative data which was conducted from February 1, 2018 to April 30, 2018 on information quality in logistic management information system practice. The study health facility was selected at a time point to assess the status of information quality and associated factors and study participants was interviewed about information management systems.

3.4 Study variables

3.4.1 Independent variable

Information quality dimension's

Completeness as the degree to which logistic information system covers all essential information and is filled out in full on reporting forms was assessed at SDP: Accuracy is concerned with data errors, which can occur when data points are initially recorded, or when data is transferred from

one record or data collection tool to another, such as between a bin card and the Report and Requisition Form (RRF) (Deliver Project task order, 2008). Timeliness is required information points are gathered and submitted within the established timeframe. (MeasureEvaluation, 2010).

System component quality

System component are M&E structure, functions and capabilities, indicator definitions and reporting guidelines, data-collection and reporting forms, data management processes and links with national reporting system. The Likert scale was used to collect opinion data and this was used to measure the respondents' beliefs on how the factors under investigation affect information quality in LIMS Supported Public health facility in Jimma zone using the five scales, that is, 5=strongly agree; 4=agree; 3=undecided; 2=disagree; 1= strongly disagree

3.4.2 Dependent variable

Information Quality

Table 1:Grading criteria for information quality

Scoring criteria	Criteria
2.5	Information quality is good.
≤ 2.5	Information quality is poor.

3.5 Population and Sample

This research focused on information quality in logistic management information system. Public health facilities providing health services to the people of Jimma zone was the source population. Thus, the target health facilities for this study was draw from the total number of these health facilities providing program product to the people of Jimma zone had been implemented logistic management information system; this added up to 29 health facilities. Considering that target health facilities is not homogeneous, the research used stratified sampling to identify health facilities of the research. Health facility was stratifiedbased of health facility and then proportion of sample size determined based of the number of sample. The population included only the

staff and management of the respective Health facilities supplybyPFSA. These categories of population were chosen because they were presumed to be the type of people who have participated in logistic data management and processing within their health facilities and therefore are in position to give accurate and reliable information about the study.

The research used Raosoft software to calculate sample size or the Yamane’s Formula (Yamane, 1997) on a 95% confidence level and Margin of error 10% to calculate the sample size. Thus, the sample size for this research is 28.

Simple random sampling used to select services delivery points within stratification

$$n = \frac{N}{1 + Ne^2}$$

N=sample size; N=population; e=error

Equation1: Yamane’s Formula

Table 2: sampling frame

No	Health Facilities	Number of Health facilities	% of Population	Proportion of sample Size
1	Hospital	8	28	8
2	Health center	21	72	20
Total Number		29	100	229

3.6 Data Sources and Types

The research was undertaken to gather primary data on information quality and factors associated in logistic management information system. primary data was collected from store manager, head of pharmacy and heads of health facilities to measure system quality of logistic management information system through qualitative data collection. The independent variable for this research M&E Structure, Functions and Capabilities; Indicator Definitions and Reporting Guidelines; Data-collection and Reporting Forms / Tools; Data Management Processes; and

Links with National Reporting System. Secondary data was collected from systematic documentation review, Cross-checks and trace and verification about dimension of information quality and information use through quantitative data collection in stock card, Model19 and logistics management information system recording and reporting forms.

3.7 Data Collection Procedures

Two pharmacy professionals were trained about data collection. A Questionnaire was designed as a tool to gather information the respondent opinions regarding the variables mentioned above from services delivery points. We were adapted a set of information quality review tools developed by WHO, in conjunction with the Global Fund to Fight AIDS, Tuberculosis and Malaria; Gavi; and USAID/MEASURE Evaluation.

The questionnaire was designed with three sections to collect data. Section A collects demographics of the respondent key among them being the level of education and role in Logistic management information system. Section B had included and information quality dimension questions for logistic management information system recording and reporting format. Section C of the assessment tool was a systems quality assessment. This assessment consists of an interview with the facility in-charge or most store managers available at health centers and hospitals, and head of Pharmacy.

A pre-testing questionnaire was sent out to a portion of the health facilities. Pre-testing is an important step in the administration of the survey as it facilitates the development of better questions and survey instruments (collins, 2003)

3.8 Ethical Consideration

The study was first approved by Addis Ababa University (AAU) Institutional Review Board of school of commerce and research and ethical committee of Addis Ababa University before the study commenced, then a letter informing the facility administrators was written from the school of school of commerce. There was a high degree of confidentiality during information collection and no name of any health facility and participating subjects was put in the result instead the aggregate result of the facilities.

3.9 Data Analysis

Data from the questionnaires was arranged, coded, edited for consistency and easiness and later entered using Statistical Package for Social Scientists. The information quality confidence of research was calculated by adding the rating for information completeness, information accuracy, and information timeliness. The mean score of the information quality dimension ranged from 0 to 4. The overall score of information quality dimension with scores >2.5 indicate high quality, while scores <2.0 reflect low.

The entered data was later analyzed and the relationship between the factors that affect information quality in logistic management information system using Pearson's correlation coefficients was established. The correlation coefficient always takes a value between -1 and 1, with 1 or -1 indicating perfect correlation. A positive correlation indicates a positive association between the variables (increasing values in one variable correspond to increasing values in the other variable), while a negative correlation indicates a negative association between the variables (increasing values in one variable correspond to decreasing values in the other variable). A relationship value close to 0 indicates no association between the variables. Furthermore, regression analysis using SPSS was also used to analyze how (the extent to which) these factors under investigation affect information quality. Data from questionnaires was later presented in form of frequency tables, pie charts and bar graphs for ease of interpretation.

3.10 Validity and Reliability of Questionnaire

Quality research is important in producing quality evidence and new knowledge in a subject matter. Research quality is measured by validity and reliability. Reliability is the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects or the consistency of a measurement.

The research used the Cronbach's alpha to measure the internal consistency of the questions in the survey conducted. Cronbach's alpha is an index of reliability associated with the variation accounted for by the true score of the underlying construct (Santos, 1999). The questionnaire feedback was subject to the Cronbach's alpha. The Cronbach's alpha indicated a high level of internal consistency at 0.937

CHAPTER FOUR: RESULTS AND DISCUSSION AND INTERPRETATION

This study sought to establish information quality and the factors affecting information quality in public health facilities in Jimma Zone, with reference to LIMS-supported Facilities. This chapter presents data analysis and interpretation of study findings on information quality as well as the factors that affect information quality in LIMS-supported Public health facilities in Jimma Zone. The chapter is arranged according to the study findings.

4.1 Demographic characteristics

The demographic information of the employees in terms of sex and level of education was obtained. Findings in the table above show that most of the respondents were males (64%) and 36% were females. The findings mean that both males and females in LIMS participated in the study. The results are summarized in the tables below.

Table 3: Gender of respondents for LIMS at services delivery point in Jimma Zone, May, 2018

Gender	Frequency	Percentage
Male	54	64%
Female	30	36%
Total	84	100%

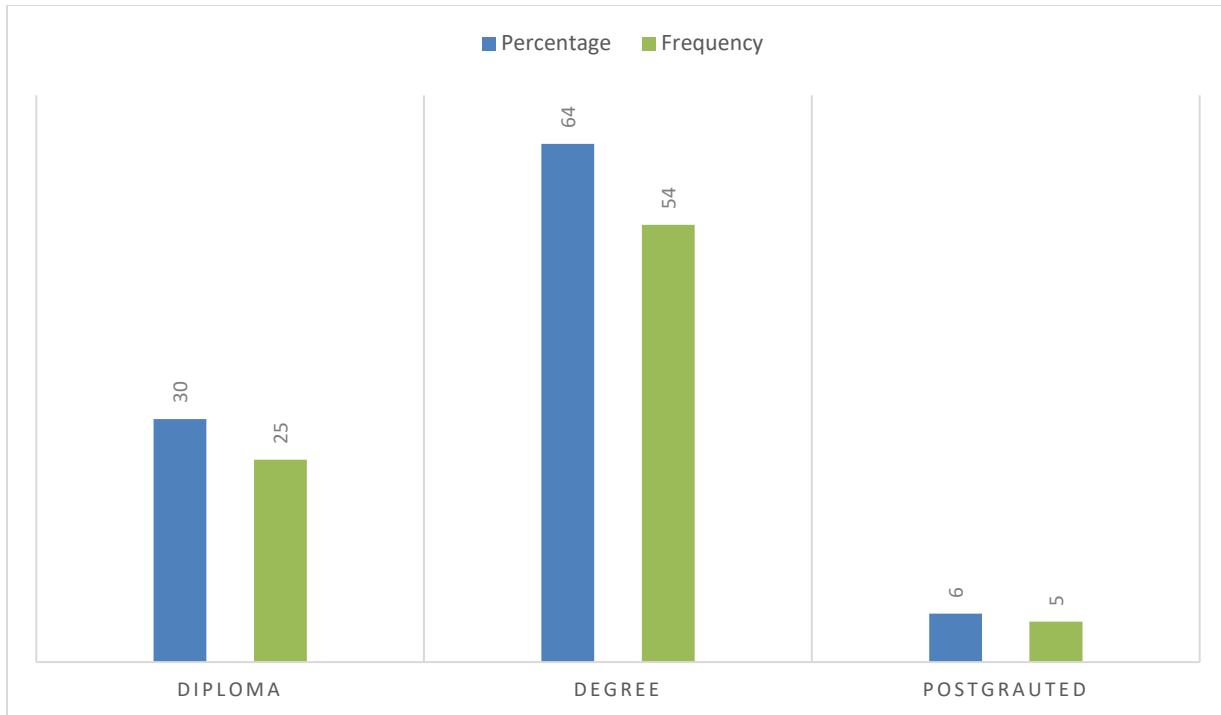


Figure 4: Level of Education in LIMS at services delivery point in Jimma Zone, May, 2018

Level of education

On the level of education of the respondents, majority (64%) noted that they had attained degrees, followed by 30 % who revealed they had diplomas while 6 % had attained master's degrees. The findings mean that the respondents had the minimum education level which was vital in the interpretation of the data collection tools, especially the questionnaire. The study asked respondents to reveal their respective levels of education and figure 5 shows the details.

4.2 Information quality dimensions

Table 4: Information quality dimensions in in LIMS at services delivery point in Jimma Zone, May,2018

Items	Response					Mean	SD
	Strongly agree	Agree	Disagree	Strongly disagree	Neutral		
Information is accurate	10(11.7%)	14(16.2%)	38(45.6%)	15(18%)	7(8.1%)	1	.11
Information is complete	5(5.4%)	19(22.5%)	27(32.4%)	27(32.4%)	6(7.2%)	2	.23
Information is timeliness	5(6.3%)	22(26.1%)	38(45%)	15(18%)	4(4.5%)	2.4	.27
Mean of Mean for information Quality	7(7.8%)	18(21.6%)	34(41%)			1.8	.20

The results for descriptive statistical analysis of all the dimensions are shown in table 4. Respondents perceived information timeliness ($M = 2.40$, $SD = .27$) to be the most influence dimension in information Quality. Information is accurate ($M = 1$, $SD = .11$) was identified as the lowest mean score. Table 4 below shows the completeness of information in services delivery points. Overall completeness of information of logistic management information system was rated as poor mean score (2). Around two-thirds (67 percent) of required data elements were available in the reports (RRF) submitted to the higher level.

Findings revealed that Overall information completeness for the supply chain was rated as low. Mean score of 2 required information elements were available in the reports (RRFs) submitted to a higher level. That means it was difficult to determine stock availability for one in every three transactions, hence weakening the ability to refill services delivery points or to accurately forecast future demand and plan orders. Information completeness indicates that facilities were reluctant to properly report information. The findings are in line with Weir (2003) who noted that data availability from patients.

This was the most affected information quality dimension. Nearly mean score of 1 required information elements were accurate in the reports (RRF) submitted to the higher level. Accuracy was poor for the required information elements of products. The research revealed mean of 2.4 services delivery points were sending three consecutive logistic information to the higher level on time. Information is the lifeblood of decision-making and the raw material for accountability. Without high-quality information providing the right information on the right things at the right time, designing, monitoring, and evaluating effective policies becomes almost impossible. Information quality is a composite indicator of the timeliness, completeness, and accuracy of information quality. The research showed that out of a total information quality score mean of 4, the overall score means was 1.8, indicating low information quality. That means decision-makers did not confidence in the information.

Respondents were also asked to respond to the information quality dimensions on accuracy, completeness and timeliness. Most of the respondents (63.6%) noted that their logistic information was not accurate, with 27.9% saying that their logistic information was accurate, while 8.1% were neutral about the idea. More so, 64.8% revealed that their logistic information was incomplete, whereas 27.9% said that their logistic information was complete, and only 7.2% were not certain about the completeness of their logistic information. Regarding timeliness of logistic information, majority of the respondents (63%) noted that their logistic information was not timely, whereas 32.4% agreed that their logistic information was timeliness, and 4.5% were neutral about the idea.

4.3 Presenting the results from correlation between independent and dependent variables

The relationship between information quality dimensions, system quality and information quality were investigated using Pearson product-moment correlation coefficient. Before performing a correlation analysis, a scatterplot generates. To check for violation of the assumptions of linearity and homoscedasticity. there were no violation of the assumptions of normality, linearity and homoscedasticity.

Table 5: Correlation between information quality dimension and information quality in in LIMS at services delivery point in Jimma Zone, May,2018

		Information quality in Public health facilities
Information quality dimension Factors	Pearson Correlation	.282*
	Sig.(2tailed)	.003
	N	84
system quality in public health facilities	Pearson Correlation	.131*
	Sig. (2-tailed)	.001
	N	84

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

The analysis of data revealed that information quality dimension in services delivery points significantly and positively affect information quality in logistic management information system in services delivery points in Jimma zone. The findings are like the one done by Burger (2007) who argued that timeliness affects data quality and accuracy which reduce information quality on an everyday basis. The analysis of data revealed that information quality dimension factors in public health facilities significantly ($P=0.01$) and Positively ($r= 0.282$) affect information quality in logistic management information system of public health facilities in Jimma Zone. Hence this implies that information quality in logistic management information system of public health facilities in Jimma Zone is positively affected by information quality dimensions like low levels of accuracy, completeness and timeliness.

There was a positively ($r = 0.131$) and very significant ($P=0.01$) relationship between system component quality and information quality in LIMS of public health facilities in Jimma zone. This implied that information quality in LIMS of Public health facilities in Jimma Zone was positively affected ($r = 0.131$) by system component quality factors like unfriendly information collection and report form and incomplete and inaccurate information provided by services delivery point during data collection and entry.

The study confirmed a positive relationship between system Quality and information quality in logistic management information system at services delivery point in Jimma Zone which therefore implies that system quality like unfriendly data collection and reporting format and incomplete information provided at collection and entry. The findings agree with Berendsohn (2000) who argued that there are many information quality principles that apply when dealing with species data and especially with the spatial aspects of those data and if these principles are not involved at all stages of the data management process, it positively affects information quality.

4.4 system quality factors affecting information quality

Majority of the respondents (60%) noted that Logistic management information system links with national reporting system to ensuring the information quality, whereas 23% saying that Logistic management information system links with national reporting system, with 27 % no about the linkage. More so, 26 % completely have indicator definitions and reporting guidelines available, whereas 74 % did not have indicator definitions and reporting guidelines in the health facilities.

Table 6 :system component quality factors affecting information quality in LIMS at services delivery point in Jimma Zone, May,2018

System component quality	Responses		
	Completely	partly	No
Items			
M&E structure, functions, and capabilities	45%	29%	27%
Indicator definitions and reporting guidelines	26%	0%	74%
Data collection and reporting forms and	47%	0%	53%
Data management processes	27%	11%	62%
Links with national reporting system	60%	13%	27%
Use of data for decision making	18%	29%	82%

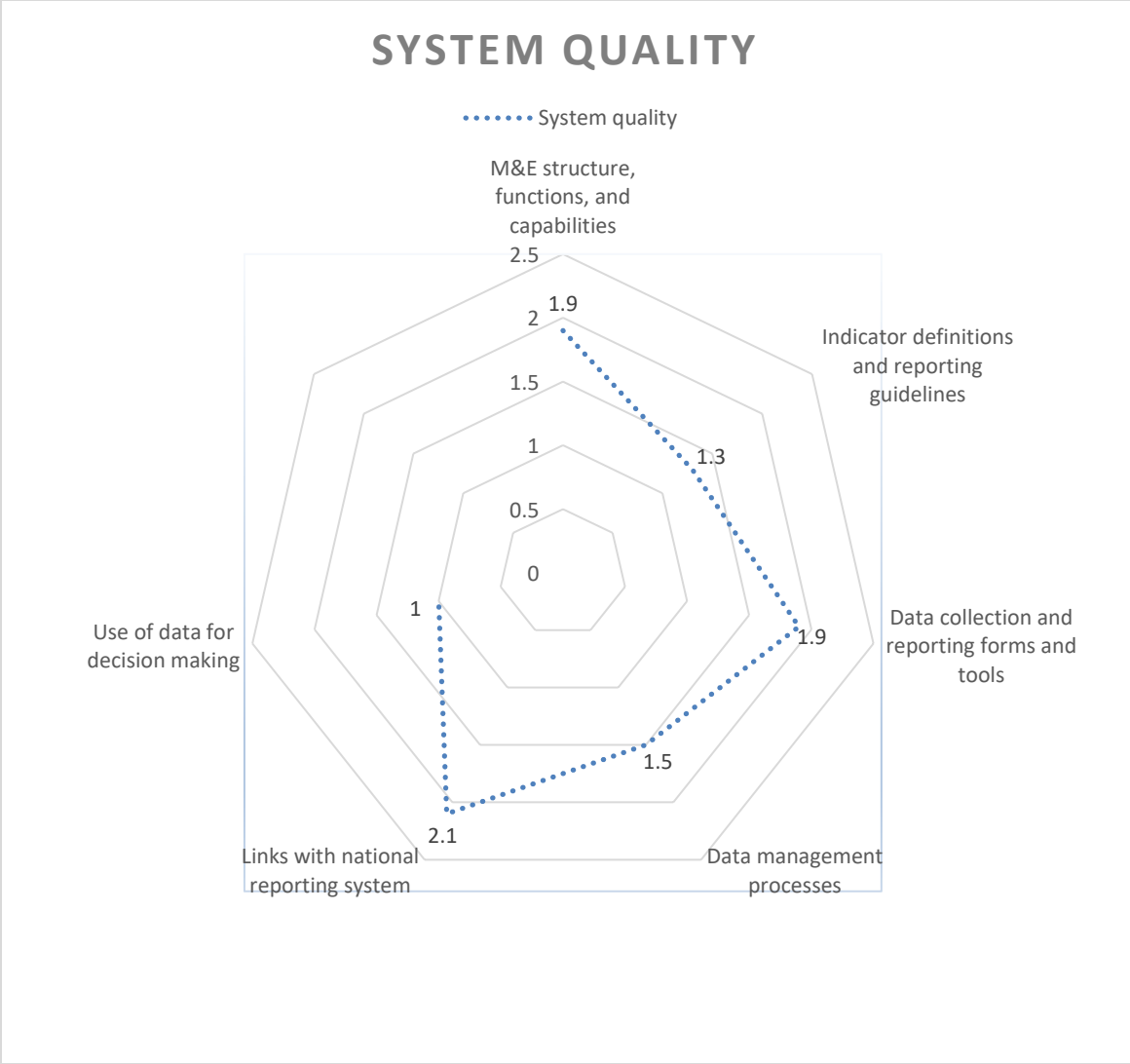


Figure 5: System quality results in LIMS at services delivery point in Jimma Zone, May,2018

Figure above shows the score of system quality at services delivery points. The reporting system was linked along the supply chain with the highest score of 2.1. On the contrary, use of data for decision-making, indicator definition and reporting guidelines and data management process were the lowest. In general, the system quality was the lowest for services delivery points in most components. This might indicate that improving the system quality at services delivery points is critical to improving the overall supply chain information quality.

The average score of at services delivery points was 1.5 out of 3, as shown in figure 6. The two components of information use for decision making and data management processes they scored the least. The reporting system was linked along the supply chain with the highest score of 2.1.

On the contrary, use of information for decision-making is the lowest. In general, the system quality was the lowest for services delivery points in most components. This might indicate that improving the use of information for decision-making system at services delivery points is critical to improving the overall information quality.

4.5 Multiple Regression analysis and Model development

Both independent variables (information quality dimension and system quality) correlate substantially with information quality (.28 and .13 respectively), which is less than .7; therefore, all variables will be retained. I have quoted commonly used cut-off points for determining the presence of multicollinearity (tolerance value of less than .10, or a VIF value of above 10). In this research the tolerance value for each independent variable is .87, which is not less than .10; therefore, we have not violated the multi-collinearity assumption. This is also supported by the VIF value, which is 1.149, which is well below the cut-off of 10. Preliminary analyses were indicated there is no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity.

Table 7: Model Summary in LIMS at services delivery point in Jimma Zone, May,2018

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.363a	.132	.116	.72809

a. Predictors: (Constant), System component quality factors in LIMS SDP, Information quality in LIMS in SDP

We also observe that about 11.6% of the variation (adjusted R² =0.116) in information quality in Jimma Zone, is explained by a combination of information quality dimension and system quality. Hence, the other factors that this study may not have examined could be taken to explain the remaining 88.4% of the variation in information quality.

Table 8: Regression analysis between Factors and information quality in in logistic management information system at services delivery point in Jimma Zone, May,2018

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.113	.306		13.445	.000
Information quality in LIMS at SDP	.206	.054	.356	3.780	.000
System component quality in LIMS at SDP	.175	.069	.241	2.560	.012

a. Dependent Variable: Data quality in jimma Zone

Correlations alone could not help the researcher find a conclusive position as to what extent the independent variable affects the dependent variable. So, to ascertain the extent of the relationship between the independent variables (factors) and the dependent variable (information quality), multiple regression analysis was carried out to establish the extent to which each independent variable determines information quality. The results are shown in the table above. From the regression analysis and model above, information quality dimension and system component quality in logistic management information system at services delivery points were found to have positively and significant impact on information quality in logistic management information system at services delivery point in jimma Zone. For instance, information quality dimension with ($\beta_1 = 0.356$) and system component quality with ($\beta_2 = 0.241$) imply that they positively impact on information quality.

From the regression analysis table above, information quality was treated as the dependent variable influenced by information quality dimensions system quality. The hypothetical regression model that guided this study was in the multiple regression equation form of:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

Where: Y is the dependent variable (information quality), “ α ” is a regression constant; β_1 , β_2 , β_3 and β_n are the beta coefficients; and X1, X2, X3, and Xn are the independent (predicator) variables. Therefore, standardized beta coefficients were substituted in the hypothesized regression equation. This revealed that information quality can be predicated as:

$$Y = 4.113 + .356 X_1 + .241 X_2$$

Where: Y is information quality; X1, is information quality dimension in logistic management information system at services delivery point X2, is and system quality in logistic management information system at services delivery point.

CHAPTER FIVE: SUMMARY OF MAJOR FINDING, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of major findings

This study extends the use of McLean and DeLeon model within the context of information quality of logistic management information system with inclusion of system quality and information quality dimensions factors. Descriptive statistics and multiple regression analysis were the analysis technique used.

The relationship between system quality, information quality dimensions and information quality was investigated using Pearson product-moment correlation coefficient. There was a strong, positive correlation between system quality, Information quality dimensions and information quality, $r = .13$, $n = 84$, $p < .001$ and $r = .28$, $n = 84$, $p < .003$, with high levels of information quality dimension associated with lower levels of system quality. Multiple regression was used to assess the ability of two independent variables (system quality and information quality dimensions) to predict information quality. Two independent variables (system quality and information quality dimensions) explained the total variance by the model was 11.6%.

The information quality assessment offered insights into the level of information quality and the underlying data management system in the logistic management information system. In general, information quality is poor. Information accuracy was the most challenging dimension of information quality, followed by information completeness. The system quality was running partially. Implementation of the already existing logistic management information system as well as in of internationally accepted simple interventions to improve the information system, particularly information use and the data management process, will likely improve information quality.

The findings revealed that information quality dimension in logistic management information system practices at public health institution in Jimma zone significantly and positively affect information quality in at public health institution in Jimma zone.

5.2 Conclusions

The information quality studied is not supplying the drugs logistic system with information needed for providing the medicines in the right quantities, where and when they are needed. The existing information system is not well managed to guarantee the efficiency and effectiveness of the logistic management information system. One example is that large quantities of medicines are getting expired in the main storage places because of poor management. This management is closely related to the non-use of information for decision making. The collected information should be used to decide to allocate medicines in what quantities and where. The non-use of information is also related to the lack of culture in the use of information.

The study confirmed that information quality dimension has a positive relationship with data information quality implying that if these information quality dimensions are not improved or rectified, information quality in services delivery point will continuously be poor and vice versa. The study confirmed that system quality has a positive relationship with information quality implying that if these system qualities are not improved or rectified, information quality in services delivery point will continuously be poor and vice versa.

A culture of information use is lacking, including developing charts, reviewing logistics performance in management meetings, and developing action plans and disseminating them to stakeholders. These steps are further hindered by data limitations. Guidance and technical assistance to facilities is lacking. Facilities are not assigning focal persons to regularly carry out information use activities and promote a culture of information use. Considering logistics as a critical part of the overall health system management and including logistics indicators in a regular performance review session were suggested to improve the information use culture.

5.3 Recommendations

Based on the findings from this study, we recommended that the Ministry of Health and PFSA focus on training staff at all levels of the health system in logistic management information system, improving logistic management information system-focused supportive supervision, ensuring internal information quality reviews, and encouraging information use to decision making. In addition, the National Evaluation Platform's agenda for building country leadership for use focuses on improving the enabling environment for information improvement and use.

The improvement of communication technologies is providing help in collecting and processing data quickly and easily, or allowing for easy communication between the stakeholders of the logistics management information system, fast delivery and production of information for the decision-makers priority tasks to improve information quality. the collecting information system is manual and the existing human resources are few and overworked, the number of forms should be electrically. Ministry of health should invest in electronic systems in those public health if they are to collect accurate and timely information. The use of papers and registers is very laborious and prone to many errors. Data cleaning and extraction using manual systems is an uphill task that produces inaccurate results. Purchasing computers and installing software for data capture and retrieval would be of great help.

- Standardize the feedback mechanism to the health facilities and enforce mandatory feedback provision by PFSA and RHB/ZHD/WoHO.
- Roll out the electronic logistic management information system in to more health facilities to reduce work burden and improve information quality.
- • Re-examine the supportive supervision strategy that is already in place to provide better support to the health facilities and increase its acceptance rate.

5.4 Future Research forward

The study suggests that future researchers should do the same using other factors not only the information quality dimensions and system quality factors but from other corresponding factors that determine information quality in logistic management information system practices at public heath institution in Jimma zone. Other corresponding factors, that is, store manager competency and commitment, management ownership, a recommends a further detailed analysis using other research methods.

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Appendixes

Introduce Interviewer

Explain the objectives of this study:

Good day. My name is _____. I am conducting a study regarding information quality in pharmaceutical logistics management information system. I am looking at accuracy, completeness and timeliness of selected commodities and information about data management and reporting system. We are visiting selected health facilities throughout the Jimma zone; this facility was selected to be in the study. The objectives of the study are to collect current information on logistics system and information quality of selected commodities. This is not a supervisory visit and the performance of individual staff members is not being evaluated. The results of this study will provide information to make decisions and to promote improvements.

I would like to ask store managers and logistic officers a series of questions about the information quality and data management and reporting system at this facility. In addition, we would like to count selected products you have in stock today.

Do you have any questions?

Appendix 1: Data Collection Form

This questionnaire seeks to measure the information quality of logistic management information system at service delivery point		
Section A: Demography and Health facility information		
Name of services deliver point		
Facility type		1=Hospital, 2=Health center
Woreda		
Date of assessment		February, 2018
interviewer name		
Q1	Name and title and mobile phone number of person interviewed for this study	Name: _____ Title: _____ Mobile number: _____
Q2	Gender	Male _____ Female _____
Q3	Level of education	Diploma _____ Degree _____ Post Graduated _____ -
Q4	Number of years and months you have worked at this facility?	Years: _____ Months: _____

Q5	Who is the principal person responsible for managing medical supplies at this facility?	Pharmacy Technician 1 Nurse 2 Pharmacist 3 Other (Specify) 4
Q6	Is supplies/stock management the primary role of this person at this facility?	Yes 1 No 0
Section B: information Quality Dimensions		
This section intends to measure the quality of information on logistic management information system using 3 key characteristics. All statements are measure on a scale of 0 to 4 where 0 is strongly disagree and 4 is strongly agree		
1. Completeness		
Q1.1	The information on the RRF include all necessary value	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
Q1.2	The information on the RRF is incomplete(R)	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree

		<ul style="list-style-type: none"> ○ Strongly agree
Q1.3	The information on the RRF is complete	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Q1.4	The information on the RRF covers the need of your tasks	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Q1.5	The information on the RRF has sufficient breadth and depth for your task	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Q1.6	The information is sufficiently complete for Your needs	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree

		<ul style="list-style-type: none"> ○ Neutral ○ Agree ○ Strongly agree
2. Accuracy		
Q2.1	The information on the RRF is correct	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Q2.2	The information on the RRF is accurate	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree
Q2.3	The information on the RRF is reliable	<ul style="list-style-type: none"> ○ Strongly disagree ○ Disagree ○ Neutral ○ Agree ○ Strongly agree

Q2.4	The information on the RRF is incorrect(R)	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
3. Timeliness		
Q3.1	The information on the RRF is sufficiently current for your work	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
Q3.2	The information on the RRF is not sufficiently timely(R)	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
Q3.3	The information on the RRF is not sufficiently current for your work(R)	<input type="radio"/> Strongly disagree

		<ul style="list-style-type: none"> <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
Q3.4	The information on the RRF is sufficiently up-date for your work	<ul style="list-style-type: none"> <input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
Q3.5	The information is sufficiently timely	<ul style="list-style-type: none"> <input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree
<p>Section C: Section B: system component quality</p> <p>This section intends to measure the system Component quality in logistic management information system using 6 key characteristics. All statements are measure on a scale of 1 to 5 where 1 is Very good and 5 is very Poor</p>		
<p>I. M&E structures, functions and capabilities</p>		
Q1.1	All relevant staff has received appropriate training on the data management processes	<ul style="list-style-type: none"> <input type="radio"/> Completely

	and M&E.	<input type="radio"/> Pratley <input type="radio"/> No
Q1.2	Staffs are identified with clearly assigned responsibilities about M&E and data-management	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
II. Indicator definitions and reporting guidelines		
Q2.1	Indicator definitions are meeting relevant standards that are systematically followed by all service points	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Q2.2	There is clearly documented (in writing) what is reported to who, and how and when reporting is required?	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
III. Data collection and reporting forms and tools		
Q3.1	There are standard data-collection and reporting forms that are systematically used	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Q3.2	Data are recorded with sufficient precision/detail to measure relevant indicators	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Q3.3	Data are maintained in accordance with international or national confidentiality guidelines	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No

Q3.4	Source documents are kept and made available in accordance with a written policy	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
IV. Data Management Processes		
Q4.1	Clear documentation of collection, aggregation and Manipulation is steps exist	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Q4.1	Are data quality challenges are identified and are mechanisms in place for addressing them	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
V. Links with national reporting system		
Q5.1	data collection and reporting system of is link to the National Reporting System	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Vi -. Use of data for decision making		
Q6.1	The analyzed data/ results are presented/ disseminated to other information system stakeholders in a timely manner so that the information can be used to inform decisions.	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No
Q6.2	When data are disseminated they include indications of any limitations that may exist in the data.	<input type="radio"/> Completely <input type="radio"/> Pratley <input type="radio"/> No