

HARAMAYA UNIVERSITY

POST GRADUATE PROGRAM DIRECTORATE

**Assessment on Healthcare Inventory Management Practices and Client
Satisfaction among Public and Private Hospitals of Harari Region**

MBA Research Thesis

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STATEMENT OF AUTHOR

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Acronyms and Abbreviations

ABC	Activity Based Costing
DC	Data collectors
EM	Essential Medicines
EOQ	Economic Order Quantity
FMOH	Federal Ministry of Health
HAI	Health Action Africa International
HIV	Human Immuno deficiency virus
JIT	Just in time
MSF	Medicine San Frontiers
NGOs	Non-Governmental Organizations
PI	Principal Investigator
RBV	Resource Based View
ROL	Re-order level
SPSS	Statistical Package for Social Science
TQM	Total Quality Management
USAID	United States Agency for International Development
VEN	Vital, Essential and Non-Essential Drugs
VMIS	Vendor Managed Inventory System
WHO	World Health Organization
CA	Competitive Advantage

Summary

Background: Reliable and affordable supplies of commodities and effective management of inventory are critical for the success of the health sector organizations. The scarcities and mismanagement of these medical commodities negatively affect the quality of health services and hospital's overall organizational performance in turn.

Objectives: To investigate inventory management practices and its effect on hospital performance among public and private hospitals of Harari regional state, Ethiopia.

Methods: hospital cross sectional study was conducted in three public and two private hospitals in Harar Town. Data was collected using structured and pretested questionnaire from total of 398 customers/patients from the five hospitals with stratified allocation to measure client satisfaction aspects of hospital performance. Additionally data was also collected from 32 hospital managers and officers (Procurement officers, store keepers, hospital administrators etc.) from five hospitals to assess the hospital inventory management practice, two aspects of overall hospital performance (Competitive advantage and Market& Financial performance of hospitals. Informed consent was obtained from the respective respondents. The information will be kept confidential. Data was entered in to SPSS version 20 for analysis. The data was presented in tables, frequencies, percentages, mean, median and standard deviations. Multiple linear regression analysis model was used with B coefficients and standard errors.

Results: In this study a total of 398 clients (94%) and 32 inventory related officers and officials from 5 hospitals were involved. Less than half of the clients (42.2%) were satisfied with Hospitals care and medical supply. Higher satisfaction (60.4%) was observed among private hospitals than public hospitals (29.5%). The overall mean score of Hospitals competitive advantage was found to be 3.6 out of expected 5 score. Hospitals market and financial performance mean score is 3.57 out of 6. Over all hospital performance is found to positively related with EOQ, ROL, ABC/VEN and hospital ownership but negatively related with VMI. The MLR model shows 63.4% of variation in the overall hospital performance can be shown by variations in the independent variables.

Conclusions and recommendations: Establishing a good inventory management practice (EOQ, ROL and ABC/VEN) of hospitals are key to improve patient satisfaction, market and financial performance, competitive position and hence overall hospital performance.

1. INTRODUCTION

1.1 Background of the Study

Every organization must have raw materials and other inputs of some kinds in order to serve its customers. Organizations exist for the purpose of creating value for various stakeholders by serving its customers. In fact, no organization can exist without inputs which refers to anything that is put in, taken in or operated upon, and is transformed into something different and desirable by customers. Inventories are commodities, supplies, equipment, and other materials that are available in stock in an organization (Ministry of Health Kenya, 2012). Inventory management entails procedures that govern how supplies and materials are ordered, received, stored, handled, and issued (Arlington, 2008).

Inventory management is defined as the system that organizations put in place to control their investments in inventory. It involves the recording and monitoring of stock level, fostering future demand and deciding on when and how to order. It reduces cost associated with inventory while ensuring optimum organizational performance (Eucnice, 2011).

Inventory is defined as a stock or store of goods (Stock and Lambert, 2001). These goods are maintained on hand at or near a business's location so that the holding organization may meet demand and fulfill its reason for existence. Davis (2003) also defines inventory as “the stock of any item or resource used in an organization”. It includes inputs such as financial, energy, human, equipment, and physical items such as raw material, inputs such as parts, components, and finished goods, and interim stages of the process. They are the physical resources that an organization holds in stock with the intent of selling it or transforming it into a more valuable state (Dilworth, 2009).

In the era of globalization and intense competitiveness, the one of the major requirements for each organization either private or public is the need for effective and efficient organization of resources to avoid wastes (Fariza A, 2015).

In today's competitive corporate world where the customer is treated as a king and every product or service has alternative substitute from competing sources, organizations face a lot of challenges including retaining its customers. In the process of finding solutions to

these challenges of getting competitive advantage over competitors, all organizations lay emphasis on areas such as strategic management, marketing, accounting, auditing, customer care and public relation and effective inventory management. It is impossible to offer any meaningful health service to the satisfaction of patients and clients without the availability of inventory. Quality health care essentially is dependent on the availability of quality medical inventory at the right time. In the absence of inventory, health service delivery is severely affected.

Reliable and affordable supplies of commodities and effective management of inventory are critical for the success of the health sector organizations. The scarcities of these commodities negatively affect the quality of the services and their availability and cost which will affect the performance of the healthcare provider or hospital. An effective inventory management system must be in place to ensure their accessibility and effective use, both at the basic service delivery and referral services in hospitals (WHO, 2009). Inventory management in the health sector should follow well-established principles but must be flexible and responsive to the varied settings and services offered to ensure effective health service delivery.

It is, therefore, prudent that some minimum stock of medical supplies be kept in hospital. In addition, controlling logistics and ensuring a system of maintaining some minimum stock level through appropriate inventory management practice in the health sector will improve patient safety (Pan & Pokharel, 2007; Kumar et al., 2008; Mustaffa & Potter, 2009). This in turn will affect the customer satisfaction, safety and care provided to clients/patients.

1.2 Statement of the Problem

Healthcare is one of the industries with high potential to contribute significantly towards a national economy. Therefore, it is important to look into the determinants that will improve healthcare organizational performance. Of the various determinants, inventory management practices have been viewed as the vital one to improve healthcare organizational performance in terms of service delivery related to client/patient satisfaction and competitive advantage due to operation cost efficiency. The hospital inventory management practices are viewed to be related to capacity and capability to

meet health service demands through robust system of medical inventory order, acquisition, storage and distribution which increase competitive advantage and then lead to higher organizational performance (Sukati, Hamid, Baharun&Huam, 2011).

Effective inventory management practices will reduce costs, increase client/patient satisfaction, and hence improve service delivery of hospitals (Baltacioglu, Ada, Kaplan, Yurt & Kaplan, 2007). Thus, the control of inventories needs the attention of not only inventory practitioner's staff but also top management to provide the right structures for inventory operation. This has become more prevailing in today's strategic management decisions, which is geared towards client satisfaction, profitability and adding value.

A survey done in Nepal found that the availability of 32 selected essential reproductive health care commodities in public health outlets was less than 25 percent, while in Nicaragua only 20 percent of essential medicines (EM) were available to the public clients (Rao &Thapa, 2005). In Bangladesh, there are documented challenges on the inventory management of health commodities as well as monitoring consumption which is the primary source of information for forecasting and quantification despite years of support from United States Agency for International Development (USAID) (MSH, 2009). A study by Annor (2012), in Ho Municipality of Ghana, found that 50 percent of the prescriptions were not serviced at the health facility where the patient had been seen. In South Africa, according to a survey done by Medicine San Frontiers (MSF) in collaboration with Treatment Action Campaign (TAC), it was established that across most provinces, frequent stock-out reports were received for a wide range of essential medicines and medication inventory items (MSF, 2013).

Most organizations invest so much money in materials and it is important for them to put in place a good material management system in order to manage the stock properly (Wangari, 2015).

A study by Health Action Africa International (HAI) revealed that essential medicines are available in only 50% of the health facilities and 65% of hospitals in Kenya (HAI, 2010). Another estimate in low and middle income countries showed the availability of essential drugs which was at 20% in public sector and 56% in private sector (WHO, 2010).

Additionally poor handling healthcare commodities contributed to increased patient's dissatisfaction, prolonged illness, and increased needless death and have resulted in a

decline in out-patient attendance and hence hugely affecting the health care service delivery and patient satisfaction performance of hospitals (WHO, 2010).

Another Ethiopian report on inventory management practice showed, 67% and 83% of laboratories in the hospital didn't set minimum and maximum stock levels respectively. Similarly in 2016 report, only 26 percent of healthcare facilities in Ethiopia have essential medicines (FMOH, 2016).

Robust inventory management practice is essential to facilitate quantification, to avoid stock-outs, to prevent medical inventories from expiring on shelves, and to control possible theft and misuse. In addition assessing inventory management practice and client satisfaction has paramount importance to improve performance of hospitals for better customer focused cares.

There are little studies that focus on assessments of healthcare inventory management practice as well as client satisfaction of hospitals in Ethiopia. As far as the researcher's knowledge is concerned, there is no empirical information about inventory management practices and client satisfaction of hospitals in Harari region in general and regarding public and private hospitals specifically. Therefore this study aims to assess healthcare inventory management practices as well as client/patient satisfaction among public and private hospitals of Harari region.

1.3 Scope of the Study

Inventory management in hospitals is viewed to be one of the most important areas to improve the performance of the healthcare delivery system. This study will focus on assessment of the most common hospital inventory management practices and assessment of client satisfaction level of all public and private hospitals in harari region. Thus healthcare inventory management practices and client/patient satisfaction status of three public hospitals and two private hospitals will be separately assessed and presented in this study.

1.4 Significance of the Study

This study is designed to assess healthcare inventory management practices and client/patient satisfaction of public and private hospitals in Harari region. The study is expected to come up with facts about healthcare inventory management practices and

client/patient satisfaction level of both public and private hospitals in harari region. So it will help those hospitals in providing facts and suggestions regarding their own and rivals inventory management practices and client satisfaction and thus help any healthcare service delivery performance improvement efforts in the region. Additionally it will be valuable input to Harari regional health bureau as baseline information about the healthcare inventory management practices and client/patient satisfaction status among hospitals in the region and can be useful for the bureau's healthcare planning, monitoring and evaluation tasks.

1.5 Objectives of the Study

1.5.1 General Objectives

- To assess healthcare inventory management practices and client/patient satisfaction among public and private hospitals in the Harari Regional state, Ethiopia.

1.5.6 Specific Objectives

- 1) To assess inventory management practices of both public and private hospitals in the harari regional state.
- 2) To assess client/patient satisfaction level of public and private hospitals of harari region.
- 3) To compare public and private hospitals of harari region in terms of healthcare inventory management practices and client/patient satisfaction.

2. REVIEW OF RELATED LITERATURES

2.1 Inventory management practices of Hospitals

Inventory management practice relates to the tracking and management of inventories which includes the monitoring of commodities moved into and out of stockroom locations and the reconciling of the inventory balances. Inventory management practices are extremely important for business operations because Effectiveness in inventory management necessitate improved organizational performance and competitiveness by allowing for smooth functioning of operations/service provision (Lambert, 2008). Some of the techniques used in managing inventories were discussed below:

2.1.1 Re-Order Level

As organizations strive to achieve efficiency, they should be able to understand their Re-Order Levels (ROL) which enables them know when to order and when not to order for inventory. This can be achieved through the use of quantitative methods which necessitate proper inventory management (Apte, 2010). Re-Order level is critical for Healthcare organizations like Hospitals to achieve optimal efficiency and be effective leading to high hospital performance and client/patient satisfaction, then they need to have two reorder levels one that is normal whereas the other is an emergency one in case of disaster (Beamon and Kotleba, 2006).

2.1.2 Economic Order Quantity (EOQ)

Economic Order Quantity (EOQ) which developed by F.W Harris in 1915 has been the most commonly used in practice. He mentioned that EOQ derives the optimal lot size for purchasing by minimizing the total operating cost. EOQ formula helps inventory manager to determine how many optimum products to buy. However, the classical EOQ model assumes such as: constant demand, constant lead time, fixed order cost per order, instantaneous replenishment, no stocks out allowed, no demand uncertainty and quantity discount aren't available. In order the above assumptions do not reflect in all situations, EOQ model must be modified in a real inventory system analysis (Rachmania, 2012). Replenishment process is also one of common practices in inventory control. Replenishment is divided in two types, which is continuous review and periodic review. Continuous review placed the order when the inventory declines to the re-order-point (ROP). While periodic review placed the order at regular periodic intervals. ROP also used

in inventory control to seek suitable level for replenishment. Another model in controlling inventory is safety stock. Safety stock must be considered where there is an uncertainty in demand; also safety stock is needed during the replenishment lead time when there is a mismatch between actual demand and expected demand (Rachmania, 2012).

2.1.3 ABC/VEN Analysis

The ABC Inventory management practice is applied by those firms that have to maintain several types of inventories. Ideally, it is not desirable to keep the same degree of control over all the inventory types, since each vary in terms of its value of annual consumption (<http://businessjargons.com>,2017).

ABC/VEN-analysis used for the investigation represents the simple and effective method of analysis of medicine expenditures, identifying priority groups of medicines, the use of which, when improved, may provide the greatest clinical and economic impact that has huge potential to improve performance of hospitals. ABC analysis provides an accurate and objective picture of budget expenditures on medicines. VEN-analysis helps to prioritize between various medicines in their selection for procurement and use within a drug supply system.

"When assigning VEN categories of medicines we used expert method", comments Lilia Ziganshina, Head of the Department of Basic and Clinical Pharmacology at Kazan Federal University", "the assignment of categories was carried out by clinical pharmacologists after reviewing all available evidence on effectiveness, safety and cost-effectiveness compared to other drugs in this group".

Sometimes there are insufficient funds to buy all the desired medicines. VEN analysis is a well-known method to help set up priorities for purchasing medicines and keeping stock. Drugs are divided, according to their health impact, into vital, essential and non-essential categories. VEN analysis allows medicines of differing efficacy and usefulness to be compared, unlike ABC and therapeutic category analyses, where only drugs of similar efficacy or action can be compared.

Vital drugs (V): potentially life-saving or crucial to providing basic health services **Essential drugs (E):** effective against less severe but significant forms of disease, but not absolutely vital to providing basic health care.

Non-essential drugs (N): used for minor or self-limited illnesses; these may or may not be formulary items and efficacious, but they are the least important items stocked when managing drug supply et.al (1997).

Based on ABC inventory analysis method, an item of high value are categorized as “A” and generally consists of 15%-25% of inventory items; that accounts for 60%-75% of annual usage value. The firm keeps strict control over these inventory items. The Category “B”, is comprised of those items that are of relatively less value or has moderate importance and consists of 20%-30% of inventory items that accounts for 20%-30% of annual usage value. A reasonable control is kept on the “B” category inventory items. The least important items of the inventory are categorized as “C”. It consists of 40%-60% of inventory items; that accounts for 10%-15% of annual usage value. Due to a low value of these items, a simple or an ordinary control is kept on them. Thus, the ABC Inventory Control System focuses on significant items of the inventory and hence is also called as “Control by Importance and Exception.” Since the categorization of the inventory items is done on the basis of their relative value, this approach is often known as “Proportional Value Analysis.” (<http://businessjargons.com>, 2017).

2.1.4 Just-In-Time

Just-in-time (JIT) is one of the most talked about topics in materials planning primarily due to its tremendous success in the context of Japanese companies. JIT or zero-inventory system is an idealized concept of inventory management wherein we are able to supply whatever material is required, wherever required, and whenever required just in time with 100 % supply assurances without keeping any inventory on hand. Obviously, from the resource management point of view, nothing can be better than this, as there are no inventories, no shortages, and no replenishment orders placed. However, this concept necessitates that the suppliers (vendors) are local and are 100 % dependable; orders splitting with small orders without additional transportation costs is feasible, i.e., frequent deliveries are economically viable, and the requirements are firmly known. This also calls for a single vendor base and having long-term relationship with the vendor who has to be a quality vendor. This also requires that the vendor has sufficient capacity to supply anytime without passing on the costs of overcapacity to the buyer (Springer India, 2014).

2.1.5 Vendor managed inventory management

A vendor managed inventory system (VMIS) helps in minimizing the company's holding of stock and forces the distributor to maintain goods which in turn secures the level of service of the retailer. Vendor inventory management can be described as supplier managed inventory or as continuous replenishment. The system is an initiative of partnering that encourages cooperation and the sharing of information between partners in a business (Zer and Wei, 2006). Bar codes are used in tracking items such as stock in retail, records, people and machines. Some control systems used for inventories apply this technology in order to make stock tracking automatic this improves on efficiency and thus supply chain performance (Njoroge, 2015).

2.1.6 Materials Requirement Planning (MRP)

According to fuller (2003) states that material requirement planning is a scheduling procedure for production process that have several levels of production given information describing the production requirement of several finished goods of the system, the structure of the production system, the current inventory for each operation and the lot sizing procedures for each operation, MRP determines a schedule for the operation and raw material practice.

The main function of Material requirement planning is to guarantee material availability that is it used to procure or produce the requirement quantities on time both for internal purpose and for sale and distribution. This process involves the monitoring of stock and in particular, the automatic creation of procurement proposals for purchasing and production. MRP tries to strike the best balance possible between optimizing the service level and minimizing costs and capital lock up (Eunice, 2011 and Robert, 2002).

2.1.7 Physical Inventory Management

A physical inventory is a "wall-to-wall" count of your warehouse to map it in advance. Create a map indicating the location of every shelf, pallet rack and all other places where material is stored. One of the best ways to increase accuracy is to assign counters by area in the warehouse rather than product lines. It is more difficult to account for misplaced material when counting by product line. One has to make sure that all inventory items are clearly identified and located in their assigned places. If you have multiple locations for the same items, consolidate them into as few locations as possible. By combining smaller quantities into larger aggregated units, you

reduce their counting time. Preparation for physical counting also includes a thorough clean-up by doing lots of sweeping, aggregating and organizing before you count (Smartturn, 2014).

2.1.8 Benefits of Inventory Counting

Inventory counting is one of frustrating, tedious and time consuming activity. The actual process of counting requires to remove employees from their regular jobs for hours, if not, days in every inventory location. This could affect shutdowns in some parts of an organization's business such as manufacturing. While the frustration of counting every item, and hunting for items and material that are nowhere to be found or, once found, unidentifiable, can be acute, the organizational value of stock accuracy is considerable (Smartturn, 2014).

Whether through cycle counting or conducting an annual tally, the accuracy of inventory data enables organizational sales, customer service and financial management systems to operate much more efficiently and effectively. Your annual count confirms what you actually have in stock and then adjusts your database records to reflect reality. Do the on-hand product quantities in your computer reflect what is actually on the shelves in your warehouse? If your buyers or sales personnel make replenishment decisions or customer promises using inaccurate stock balances, mistakes will happen. When your database indicates less stock than there actually is, you'll end up ordering sooner than necessary and more than you require. You commit capital to products you don't currently need. When your database indicates more stock than there actually is, you may not re-order in time and produce a stock-out. To help avoid both of these undesirable results as well as satisfy tax obligations and financial and insurance requirements, you need to account for the cost of your inventory (www.software4manufacturers.com, 2009).

2.2.Inventory Management practice and Health Service Delivery

In the healthcare delivery a critical pretended by stock is expanding the measure of interest that can be fulfilled when clients' needs items they are promptly accessible.

Quality care can be given on time when required material is accessible in sufficient quality. Administration of stock assumes a critical part in giving proficient human services in connection to three essential parts of medicinal supplies utilized as a part of the wellbeing offices; security, accessibility, and moderateness.

2.2.1Timing; the Most Crucial Aspect. In healthcare delivery time factor is the most crucial aspect. Life can be lost by just a delay by a few seconds. Therefore, Inventory manager's huge responsibility is ensuring most diverse healthcare commodities available on time. The expected patients number is unpredictable suppliers are unreliable and costs are rising. Hence making the challenge even greater,

2.2.2 Patient safety; the first priority in healthcare delivery the patient wellbeing is the principal need, and critical part is played by directors of stock in ensuring their goal. Stock chief greatest obligation is to guarantee that great quality items are obtained for clinical utilize. In spite of vital basis in surveying items being cost, clinical viability and wellbeing concerns are organized. Administrators of stock ought to likewise guarantee that the supplied things are well inside the expiry time frame.

2.2.3 Cost (Affordability);an important variable. Enormous weight is on stock directors to start cost cutting measures. Colossal number of patients is requesting high caliber at sensibly estimated social insurance administrations though the medicinal supply cost has been spiraling up.

Inventory managers should continuously ensure that they can obtain better deals since supplies cost constitute significant portion of healthcare expense. For vast majority an economical price helps in ensuring affordable healthcare. Because of increased number of patients the healthcare reaps the benefit of increased revenue. Innovative services and products flood the medical supply industry. Managers of inventory need to persistently scout for alternative competitive item or methods that outcome in better result. Nature of the item should be the essential worry

with a specific end goal to guarantee that patient care is not traded off despite the fact that cost is an imperative rule.

3. MATERIALS AND METHODS

3.1 Study Area

This study was conducted in Harari Regional state, at both private and public hospitals, in the capital city of the region. Harar is located 526 km from Addis Ababa, the capital city of Ethiopia. In Harar town, there are two private hospitals, namely: image and Harar General Hospitals. Similarly, there are three public hospitals, namely: HiwotFana Specialized University Hospital, Harar Police Hospital and Jugol Hospital. In the hospitals catchment areas, there is an estimated/projected population size of 250, 906 in 2017/18 in Harari region only.

3.2 Study Period

The study duration was from December 2017 to March 2019 starting from proposal writing to final thesis report writing.

3.3 Study design

Institution based descriptive cross sectional study was employed.

3.4 Population

3.4.1 Source population

All eligible professionals, decision makers and officers who are involved in inventory management were the source population of the study. Patients/customers were also considered as source population for the study.

3.5 Variables of the study

Dependent variables

Knowledge, attitude and practices of hospital staff dealing with aspects of health care inventory management toward the appropriate inventory management practices of health commodities.

Inventory management practices such as availability of healthcare commodities, timely delivery, reduced lead time, reduction of waste, greater accuracy of information, improve accuracy of data and efficiency.

Health care service patient/client satisfaction.

Independent variable

Type of hospitals(public versus private),presence of guideline, order allocation, storage condition, stock procedure, EOQ, ROL, ABC/VEN analysis, JIT, VMI, expiry condition, stock out, employees theft, constraint of fund, insufficient storage.

Type of hospitals(public versus private), care and waiting time, competency of staff, price of healthcare services, availability of drugs,accessibility of healthcare services, protection of patient right(trust and confidentiality), consistency in care and facility status

3.7 Sample Size

Purposive and convenience sampling was used to contact department heads and inventory related staff at two private hospitals and three public hospitals. So all staffs working in store and procurement of inventories as well as department staffs are target population of the study and hence 32 staffs working in those five hospitals were identified for gathering data through structured questionnaire and interview adopted from previous study. On the other hand observation checklist was developed and used for the assessment of hospital pharmacy and other healthcare inventory store conditions. Both quantitative and qualitative data collection techniques were used. Thus all responsible staff of the selected five hospitals dealing with healthcare inventory management were involved in this study.

Patient/client satisfaction assessment was made using sample size calculated bysingle population proportion formula with 95% confidence, 5% margin of error, corresponding to p-value of 50% as follows.

$$n = \frac{(Z_{\alpha/2})^2 p (1-p)}{d^2}$$

Where Z is the standard critical value of normal distribution at 95% confidence level

P is Magnitude of good hospital performance

d=is margin of error/ measure of precision/for estimating outcome taken as 5%

Addition of 10% non-response rate was made to the calculated sample size and the final sample size was determined to be422 clients. Then the calculated sample size was allocated to the five hospitals equally. Accordingly questionnaire were administered on 84/85 patients from each of the five selected hospitals.

3.8. Sampling Procedure

The adopted patient/client satisfaction questionnaires were administered to collect data from patients based on the following sampling procedure.

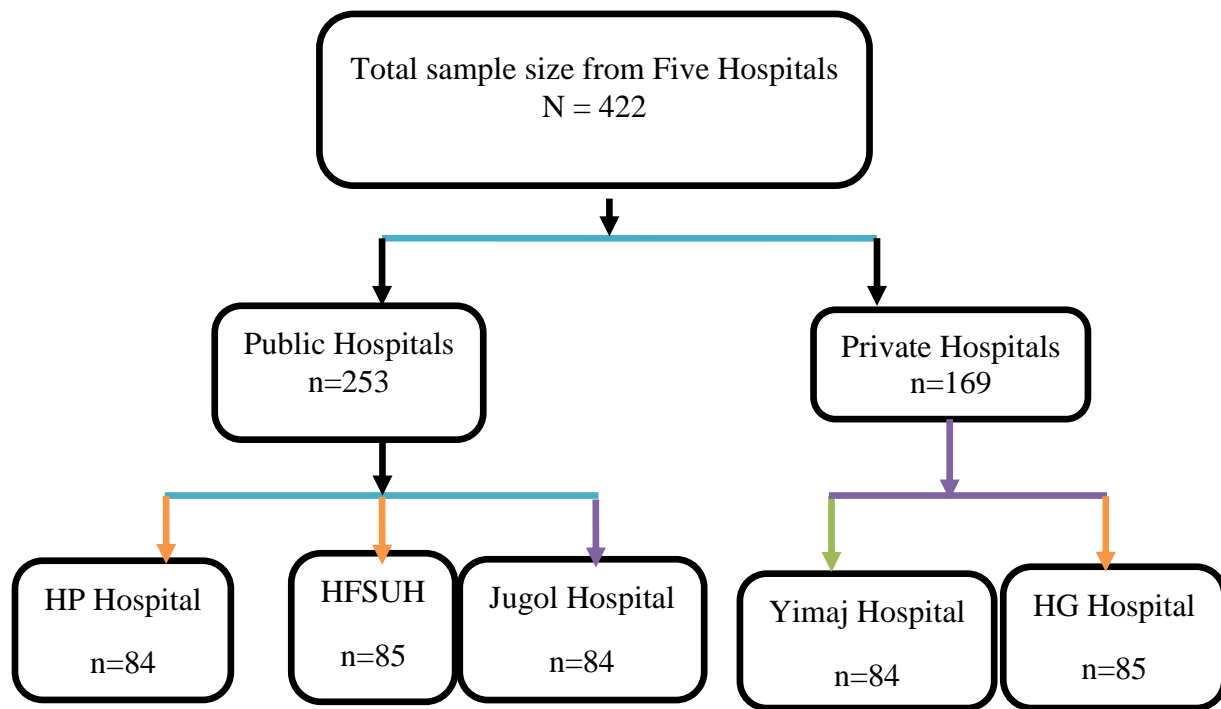


Figure 1 Sample Distribution across hospitals

3.9. Data Quality Control

Throughout the data collection process, close daily supervision was done. The daily collected data were checked for consistency, mismatches and necessary amendments were done for the next day. The tools used to collect data was adopted and pretested before the actual data collection at Haramaya Hospital and amendments of the tools were made accordingly. The data

entry was made by two data entry clerks and was checked for consistency. For an error that was observed, it was cross checked with the hard copy form. The purpose of the study was made clear to the study participants especially for respondents from private hospitals to avoid social desirability bias.

3.10 Data Processing and Analysis

The quantitative data were entered and analyzed in to SPSS version 20. The data were presented in tables, frequency, percentage, scatter plots and graphs. Mean for each components of the inventory management practices and patient satisfaction measures and the overall scores were calculated. To compare the inventory management practices across different hospitals and other predictors, one way analysis of variance (ANOVA) was used with F statistics and P value for both healthcare inventory management practices and client satisfaction assessments. The value below 0.05 was declared to show statistically significant associations.

In addition qualitative data from observation and interview are summarized and presented as explanations.

3.11 Operational definitions

Inventory is the term used to describe medical supplies and tools, pharmaceuticals and drugs that hospitals use to offer healthcare services for customers.

Satisfied client: when the sum score for all satisfaction questions was above the mean the client/patient are considered as satisfied.

3.12 Ethical considerations

Ethical approval was obtained from Haramaya University, College of Business and Economics Ethical Review committee. Then support letter was obtained from Harari Regional Health Bureau of Ethical committee to the corresponding selected hospitals. After clear explanation of the study procedure, verbal consent was obtained from each study participants. The information collected from each hospital was kept confidential and will not be used for other purpose without the full permission of the hospitals.

3.13 Dissemination plan

The final results of the study will be presented in Haramaya University, Post graduate program directorate during open defense. The findings will also be presented to Harari Regional Health Bureau, to respective hospitals both in document and open presentation forms if necessary. Finally, this paper will be published in relevant reputable journals.

4. RESULTS AND DISCUSSIONS

Results of the collected data according to the plan outlined on the previous chapter was organized and presented in this part as follows.

4.1. Socio demographic characteristics of staff respondents (IMP Assessment)

A total of 32 procurement and inventory related officers were contacted from five hospitals to collect data about inventory management practice and about two aspects of hospital performance (competitive advantage and market and financial performance of hospitals). Out of the total staff respondents 10 (31.3%) and 9 (28.1%) were from Harar General Hospital and Harar Police Hospital respectively. Majority of staff respondents (20 (62.5%)) were from public hospitals (Table 1).

Table 1. Number of hospital staff respondents.

Hospitals	No of respondents	Percent
Harar General Hospital	7	21.875%
HFSUH	8	25%
Yemaje Hospital	5	15.625%
Harar Police Hospital	6	18.75%
Jugol Hospital	6	18.75%
Total	32	100.0%
Types of Hospitals		
Private	12	37.5
Public	20	62.5

Source: own survey data, 2019.

4.2. Inventory Management Practices of Hospitals

Analysis of the data collected about the inventory management practice of the five selected hospitals of Harari region (two private and three public hospitals) from 32 hospital staff respondents are organized and presented as follows.

4.2.1. Inventory Management practice (EOQ and ROL) of Hospitals in Harar Town

Based on staff responses for EOQ practice related questions (Table 2) majority of staff respondents (68.8%) strongly agreed that their hospitals inventory management practice are organized in a logical way and they know when and how much to order. In addition around 71.9% of the respondents said that their hospital plan to make inventory replenishment on timely basis. In addition 56.3% of respondents strongly agreed to the statement that their hospital minimize storage costs through the use of EOQ. However only 43.3% and 3.3% of staff respondents strongly agreed and agreed with the statement regarding the use of clear forecasting technique through EOQ practice by hospitals in harar. Out of the expected EOQ score of 28, the overall EOQ practice mean performance score of hospitals in harar was found to be 23.

Regarding optimal level of ROL practice by hospitals in harar, 40.6% of respondents strongly agreed that their hospital knows when to and not to order. About 28% of respondents disagreed that their hospital reduces costs of inventory management through the use of ROL practice. Almost one third, 34% of the respondents disagreed with the statement that there is reduction in cost and wastage by use of ROL. With respect to ROL practice, a total mean score of 14.4 out of the expected ROL score of 20 is observed with standard deviation of 3.6. (Table 2)

Table 2. Inventory Management practice (EOQ and ROL) of Hospitals in Harar Town.

EOQ and ROL Dimensions					
Variables (n=32)	Strongly disagree %	Disagree %	Agree %	Strongly agree %	Mean ± SD
The hospital inventory management is organized in a logical way and it is known when to and how much to order.	2(6.3)	2(6.3)	6(18.6)	22(68.8)	3.55(0.88)
The hospital plans its inventory replenishment on a timely basis	2(6.3)	0	7(21.9)	23(71.9)	3.59(0.80)
The hospital minimizes storage costs through the use of EOQ	2(6.2)	5(15.6)	7(21.9)	18(56.3)	3.28(0.96)
The hospital reduces the cost of inventory management through the use of EOQ	1(3.1)	5(15.6)	13(40.6)	13(40.6)	3.19(0.82))
The hospital reduces wastages of inventory by use of EOQ	1(3.1)	7(21.9)	10(31.3)	14(43.8)	3.16(0.88)
The hospital ensures that inventory supply does not hit stock outs	4(12.5)	4(12.5)	6(18.8)	18(56.3)	3.19(1.1)
The hospital clearly forecasts hence making inventory available by use of EOQ	3(9.4)	5(15.6)	10(3.3)	14(43.8)	3.09(1.0)
Over all EOQ score			23 (5.3)/28		
The hospital knows when to order and when not to order	3(9.4)	3(9.4)	13(40.6)	13(40.6)	3.13(0.94)
The hospital reduces lead time by use of re-order level	3(9.4)	5(15.6)	17(53.1)	7(21.9)	2.88(0.87)
The hospital reduces cost of inventory management by use of reorder level	2 (6.3)	7(21.9)	16(50%)	7(21.9)	2.88(0.83)
The hospital reduces wastages by use of re-order level	5(15.6)	6(18.8)	11(34.4)	10(31.3)	2.81(1.1)
The hospital achieves optimal efficiency by use of re-order level	6(18.6)	8(18.6)	10(31.3)	10(31.3)	2.75(1.1)
Over all ROL score			14.4(3.6)		

Source:-Own Survey, 2019

4.2.2. Inventory Management practice (JIT) of Hospitals in Harar Town

As shown in table 3 below, 77% of the staff respondents agreed that their hospital reduces inventory levels by use of JIT inventory management system. In addition 68.8% of respondents agreed that inventory items reach hospitals just in time. Half of the respondents disagree that the hospitals do not have tolerance for early and late delivery of inventory items. 78% of the respondents agreed that the hospital avail the right amount of inventory items at right place that can allow for effective health care service delivery. Majority of respondents(80%) agree that hospitals in harar match demand and supply of medical inventory items through the use of JIT. The overall score for JIT was 24.1 out of 32 with standard deviation of 5.9 (Table 3).

Table 3. Inventory Management practice (JIT) of Hospitals in Harar Town.

JIT Dimensions					
Variables (n=32)	Strongly disagreed %	Disagree %	Agree %	Strongly agree %	Mean ± SD
The hospital reduces inventory levels through the use of JIT	3(9.4%)	4(12.5%)	13(40.6%)	12(37.5%)	3.06(0.94)
The inventory items desired by hospitals arrives just in time for use	3(9.4%)	7(21.9%)	10(31.3%)	12(37.5%)	2.97(1.0)
The hospital does not have tolerance for late or early deliveries	7(21.9%)	9(28.1%)	10(31.3%)	6(18.8%)	2.47(1.1)
The hospital maintains enough items in just the right time at the right place to safely serve and capably serve its customers	3(9.4%)	4(12.5%)	14(43.8%)	11(34.4%)	3.03(0.93)
The hospital coordinates movement of Inventory through the use of JIT	1(3.1%)	4(12.5%)	15(46.9%)	12(37.5%)	3.19(0.78)
The hospital matches demand and supply through the use of JIT	6(18.8%)	0	14(43.8)	12(37.5%)	3.0(1.1)
The hospital saves cost of inventory management through the use of JIT	3(9.4)	0	17(53.1%)	12(37.5%)	3.19(0.86)
The hospital reduce warehousing space through the use of JIT	1(3.1%)	4(12.5%)	14(43.8)	13(40.6%)	3.22(0.79)
Over all mean JIT score (SD)			24.1(5.9)/32		

Source: Own survey data, 2019

4.2.3. Inventory Management practice (VMI & ABC/VEN) of Hospitals in Harar Town

More than half of the respondents said that their hospital avoids stock out through the use of VMI and their hospital inventories are delivered on time. About 28% and 47% of respondents from hospitals agreed and strongly agreed to the statement that their hospital saves finance and time through the use of VMI. The overall score for VMI was 16 out of 20 (SD of 4.7). About 72% of the respondents strongly agreed that the hospital allocates its time and money in inventory through the use of ABC/VEN. While 22% and 69% agreed and strongly agreed that the Hospital determines the importance of items by use of ABC/VEN. Thus majority of staff respondents of hospitals in Harar indicated that their hospitals employ VEN inventory management practice which is specially tailored type of ABC system for healthcare organizations with overall VEN score found to be 10.8 out of the highest expected sum scores of 12 in this assessment. (Table 4).

Table 4. Inventory Management practice (VMI & ABC/VEN) of Hospitals in Harar Town

VMI Dimensions					
Variables (n=32)	Strongly disagreed %	Disagree %	Agree %	Strongly agree %	Mean ± SD
The hospital avoids stock outs through the use of VMI	4(12.5)	0	6(18.)	22(68.8)	3.44(1.)
The hospital inventory delivered on time through the use of VMI	5(15.6)	2(6.3)	6(18.8)	19(59.4)	3.22(1.1)
The hospital saves finance and time through the use of VMI	5(15.6)	3(9.4)	9(28.1)	15(46.9)	3.17(1.1)
The hospital coordinates movement of inventory through the use of VMI	3(9.4)	5(15.6)	9(28.1)	15(46.9)	3.13(1.0)
The hospital achieves high inventory utilization through the use of VMI	4(12.5)	6(18.8)	2(6.3)	20(62.5)	3.19(1.1)
Over all mean VMI score(SD)	16(4.7)/20				
ABC/VEN dimensions					
The hospital allocates time and money in inventory through the use of ABC/VEN	3(9.4)	4(12.5)	2(6.3)	23(71.9)	3.66(1.1)
The hospital determines the importance of items through the use of ABC/VEN	1(3.1)	2(6.3)	7(21.9)	22(68.8)	3.56(0.76)
The hospital determines the control level placed on the items through the use of ABC costing/VEN	3(9.4)	3(9.4)	2(6.3)	23(71.9)	3.56(1.1)
Overall VEN score	10.8(2.7)/12				

Source: Own survey data, 2018

4.3:- Overall IMP Descriptive Scores

Generally better performance was observed on VEN inventory management practice with 90% of its aspects out of the highest expected value(10.8 out of 12) is being implemented by hospitals in harar and least performance was observed on ROL with 72%(14.4 out of 20) overall implementation status in all hospitals of harar. Surprisingly Jegol hospital is found to have better inventory management practice scores than other hospitals in harar but private hospitals have better collective performance than public hospitals in their inventory management practice. (Table:-5)

Table5:- Overall Healthcare IMP descriptive statistics across hospitals in harar

	EOQ		ROL		JIT		VMI		VEN/ABC	
	M	S.d	M	S.d	M	S.d	M	S.d	M	S.d
Harar General Hospital	24.5714	3.45722	15.2857	1.60357	26.4286	1.6183	19.1429	1.2199	12.00	0.00
HFSUH	24.1250	1,80772	14.2500	1.48805	22.75	1.58114	14.3750	1.30247	11.75	0.4629
Yimaje Hospital	25.8000	2.28035	17.000	2.000	28.4000	2.9664	19.2000	0.83668	11.2	1.3038
Jugol Hospital	27.6667	0.57735	19.000	1.000	30.000	1.000	19.000	1.7325	12.33	0.57735
Harar Police hospital	17.6667	6.63325	11.000	4.35890	19.2222	8.15135	12.6667	6.74537	8.2222	4.055
Total	23.00	5.2548	14.4375	3.6272	24.1250	5.86	16.1250	4.6193	10.78	2.69

Source:- Own survey,2019

4.4 Inventory Management Practice and Type of Hospitals in Harar town

As shown in **table 6**, the relation between types of hospital (Private versus public) and inventory management practices showed that private hospitals have better level of inventory management practice than public hospitals with mean difference of 17.15 (p value = 0.006). In addition the one way ANOVA table(**table 7**) below shows inventory management practice of public and private hospitals of harar is different and the difference is statistically significant with respect to JIT specifically and all other IMP(excluding JIT) generally (**sign.=0.017 and sign.=0.026**)

Table 6:- chi square test for type of Hospital versus inventory management practice.

	X2 value	P value
Pearson chi-square	7.5	0.006

Source:- Own survey(2019)

Table7 :- One way ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
Jitscore	Between Groups	187.500	1	187.500	6.407	.017
	Within Groups	878.000	30	29.267		
	Total	1065.500	31			
overall inventory score (excluding JIT)	Between Groups	1101.102	1	1101.102	5.494	.026
	Within Groups	6012.117	30	200.404		
	Total	7113.219	31			

Source:- Own survey,2019

The above One way ANOVA table shows that there is statistically significant difference among public and private hospital regarding their performance on inventory management practices with better performance observed at private hospitals as a group.

4.5. Results of Qualitatively Gathered Data

The study also uses observation and interview to gather data about inventory management practice of five hospitals in Harar based on the checklists developed for the purpose. Thus all five hospitals main stores and facility was observed based the checklists and inventory related officers and staffs were interviewed based on the checklist at convenience as well. Thus results of the observation and interview at those five hospitals are presented as follows in an explanation form.

Observation of the main medical inventory stores in the concerned five hospitals shows good arrangement of items in the store, products are stored & organized in FEFO (first expire first out) secured storage practices, separate expired/damaged products, knowledge of responsible person, store room maintain in good condition. But store space size and keeping full knowledge of all inventory in the storage needs to be improved in all hospitals especially at Jugal hospital.

Majority of interviewees of public hospitals in Harar described that their hospitals use inventory consumption data fill form which is IFRR/Internal Facility Resupply requisition form for internal distribution & for external procurement agree the long term supply from PFSA/pharmaceutical fund & Supply Agency for direct procurement by submitting requisition form/RF/. Public hospital uses private medical inventory wholesalers for some kind of emergency inventory demand. Private hospitals use direct issuance from store for internal distribution through direct payment and/or responsibility for the internal staff. External supply for private hospitals are mostly private wholesalers with some supply from PFSA. The study found that total inventories held by majority of the concerned five hospitals constitute mostly medical consumables. Stock is replenished manually with special focus on item of high government & global focus healthcare services such as ART, TB & FP services. In this study it is observed that some hospitals struggle with moisture, leaking ceilings, taps, inappropriate/small cold storage and nonexistent designated areas for reception, delivery and quarantined products. Stock management is done manually with stock holding cards and follows the first-expired-first-out (FE-FO) strategy.

It was also observed in the study that all hospital stores applied use of bin cards for tracking inventory and simple automated stock tracking via use of computer. But timely filling of

inventory utilization is found to be common problems in all hospitals which shows some stock records were not adequately maintained and physical inventory counts did not correspond with either stock records or computerized records.

In addition a probe to identify major inventory management practice challenges at hospitals in harar shows inability to fully automate the system and availability of appropriate written guideline for managing inventory management practices are their major challenges in medical inventory management. Besides this missing medical inventory items due to theft is also considered medical inventory management challenge especially at public hospitals with the minimum known such act of two times per year during 2010E.C. In addition interview with those hospitals inventory related officers and staff based on the interview guideline shows the major reasons for stock outs at hospitals of harar are weak selection, quantification, procurement and in adequate stock control and management, delaying of purchasing procedure, weak/unknown consumption data, limited capacity of PFSA to avail needed medical inventories, shortage of budget, work load, unpredicted service demand or increased patient flow, transportation challenges, inability to put timely order, and inadequate supply.

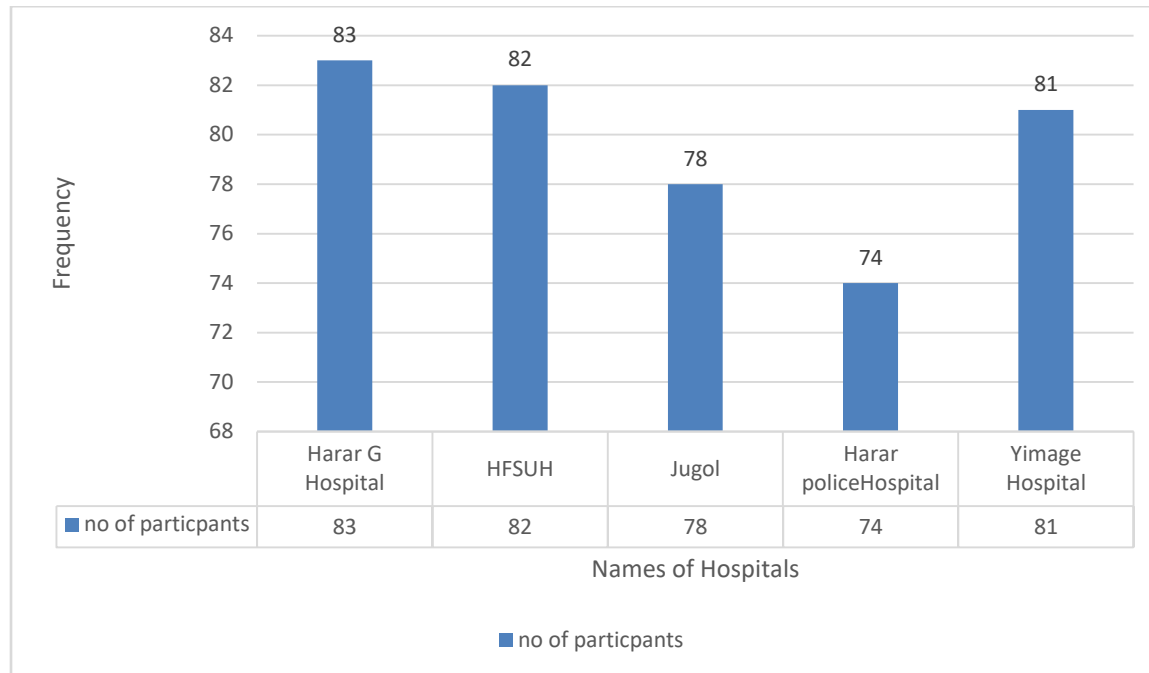
Review of the 2011E.C report of public hospitals on medical inventory supply and service shows fulfillment of inventory storage requirement is 75%, 78% and 70% at Hiwotfana, Harar police and Jugal hospitals respectively. The same report shows 80% is proportion of availability of essential medicines for all considered three public hospitals.

4.6. Results of Client/Patient Satisfaction Assessment

Client/patient satisfaction assessment was also made in this study as outlined on methodology and the result of the assessment is presented as follows.

4.6.1. Client/Patient Satisfaction Level among Hospitals of Harar Town

In order to assess the client/patient satisfaction level with respect to hospitals healthcare service and medical inventory issues questionnaires developed for the purpose was administered to 398 clients with response rate of 94.3%. As shown in figure 3, 83 (20.9%) patient respondents and 82(20.6%) respondents were from Harar General and HFSU Hospital respectively implying the highest response rate was observed at the two hospitals.



Source:-Own survey(2019)

Figure 2. Distribution of clients/patient respondents from each hospital.

According to the data from patients(60%) of hospital client/patients disagreed with the statement that they are satisfied with the care and waiting time provided by hospitals in harar town. Similarly 59% of respondents disagreed and 14% strongly disagreed (dissatisfied) that there is good interpersonal relationship with hospital staff members. Thus 73% of hospital client/patients

are dissatisfied with interpersonal relationship related aspects of hospital staff. In addition 58% of the clients/patients at harar hospitals are dissatisfied with the competency of hospital staffs. Almost half of the respondents said that the hospital costs are fair. With regard price for the service of hospitals the clients are more dissatisfied at private hospitals than public hospital hospitals. Less than half of the clients/patients are found to be satisfied with the facilities of hospitals of harar town. With this regard it is better among private hospitals than public hospitals. Regarding the availability of essential medicines and the suitability of drug shop with in the hospital almost 60% of the clients/patients are dissatisfied. (Table 6)

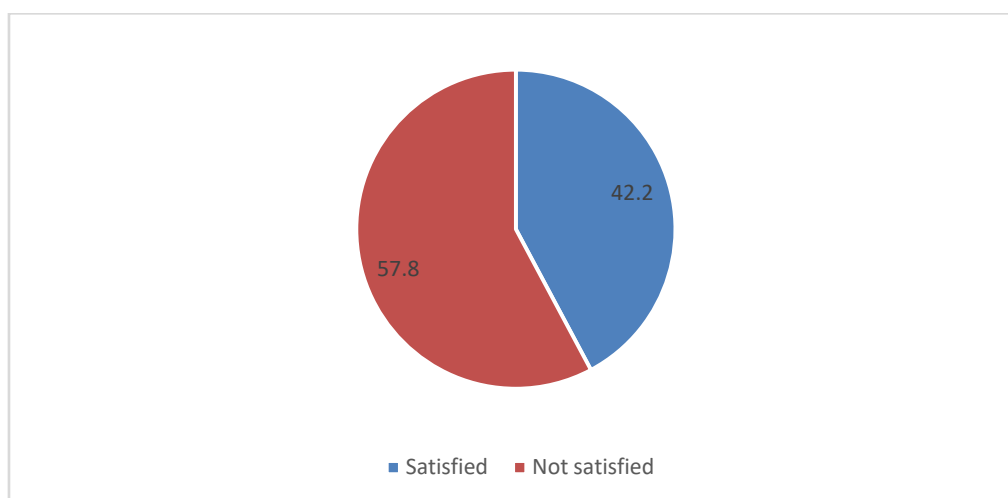
Only 45% of the patient/client respondents agreed that the hospital medicines are available at affordable cost. Availability of medicines at an affordable cost is better at private hospitals than at public hospitals. Almost 65% of the clients/patients at hospitals of harar town are dissatisfied with the statement that the hospital provides organized and convenient pharmaceutical service for clients. 60.6% of patients/clients of hospitals in harar town are not ready to recommend hospitals they visit for relatives or other persons which can indicate the minimum level of their overall satisfaction with the health care service of those hospitals. (Table 8)

Table 8. Drug and healthcare service related satisfaction level of clients.

Variables (n= 398)	Strongly disagreed %	Disagree %	Neutr al %	Agree %	Strongl y agree %
Satisfied with care provided and waiting time	17.6	60.1	11.6	6	4.8
Interpersonal relationship with the patient is good	14.1	59.0	20.6	4.0	2.3
The hospital Staff members are technically competent	10.1	58.0	21.4	6.3	4.3
Costs for the service provided is fair	11.6	22.9	23.9	22.4	19.3
Facilities are up to the patients expectation	7.3	32.9	41.5	13.6	4.8
There is unrestricted access to the hospital's services	6.5	42.2	38.4	11.1	1.8
The hospital maintains a good level of trust and confidentiality with patients and risk of injury and infections are minimal	6.3	27.4	46.5	14.3	5.5
The hospital provides consistent and constant care to the patient	5.5	33.7	43.0	11.3	6.5

The hospital offers good facility, comfort and clean environment	10.3	45.2	28.9	10.1	5.5
The hospital offers appropriate choice of treatment.	3.0	35.2	44.0	11.3	6.5
essential medicines and drugs are available	9.0	35.9	23.9	16.1	15.1
Location of drug shop and pharmacy is suitable	22.9	52.5	15.6	4.5	4.5
the costs of the medicines is affordable	18.3	12.8	22.9	24.1	21.9
The hospital provides organized and convenient pharmaceutical service	9.8	55.5	25.4	3.5	5.8
Getting appointments easy.	7.5	22.4	47.0	15.6	7.5
The time to contact with my health care professional/doctor was short	13.1	21.4	39.9	16.8	8.8
The cleanliness and appearance of the hospital is good.	15.6	66.1	10.1	3.8	4.5
Are you ready to recommend this hospital for family or friends	15.6	45.0	26.9	8.8	3.8

Source: Own survey data, 2019



Source:-Own survey(2019)

Figure 3. Overall satisfaction level of clients/patients at hospitals of Harar town

As shown by figure 4 above, only less than half of the clients (42.2%) were satisfied with Hospitals healthcare service and medical inventory supply. Highest level of client satisfaction was found among clients served at private hospitals namely, **Yimaj Hospital (79%)** followed by **Harar General Hospital (42.2%)**. Comparison between public and private hospital shows

higher client/patient satisfaction, almost two fold (60.4%), was observed among private hospital attendants than public hospital (29.5%) (Table 7).

Table 9. Client/patient satisfaction level across hospitals of harar town,2019.

<i>Hospitals</i>	<i>Satisfied (%)</i>	<i>Not satisfied (%)</i>
Harar General Hospital	35 (42.2%)	48 (57.8%)
HFSUH	27 (32.9%)	55 (67.1%)
Jugol Hospital	23 (29.5%)	55 (70.5%)
HararpoliceHospital	19 (25.7%)	55 (74.3%)
Yimage Hospital	64 (79.0%)	17 (21.0%)
<i>Types of Hospital</i>		
Private Hospitals	99 (60.4%)*	65 (39.6%)
Governmental Hospitals	69 (29.5%)	165 (70.5%)

Source:- Own survey,2019

4.3.2 Client/patient satisfaction across private and public hospitals

Table 10: Satisfaction level of clients across public & private hospitals

Hospittype	Mean	N	Std. Deviation
Private	1.3963	164	.49064
Government	1.7051	234	.45696
Total	1.5779	398	.49452

Source:- Own survey(2019)

Percentage of satisfaction was calculated by computing the mean which is 1.5779 and those numbers above the mean is classified as Satisfied and below the mean is considered dissatisfied in each category of hospital type.

Table 11:- One Way ANOVA Satisfaction level of clients

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.194	1	9.194	41.423	.000
Within Groups	87.892	396	.222		
Total	97.085	397			

Source:- Own survey(2019)

The above satisfaction level and one way Anova table shows patient/client satisfaction is better at private hospitals than at public hospitals and the difference in this regard between public and private hospital is statistically significant(**Sig.=0.000**)

5. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter gives a summary of the findings of the study, the conclusions and the recommendations for medical inventory management practices and patient/client satisfaction assessments at public and private hospitals of Harari region.

5.2. Summary of Findings

In this assessment it is mainly found that Hospitals in harari region whether they are private or public are implementing various medical inventory management practice even if the status of their implementation and managerial focus is different. Study indicators shows that inventory management practices such as EOQ, ROL, JIT, VEN/ABC and VMI are being implemented both at Private hospitals and Public hospitals of Harari region with better inventory management focus and performance was observed in private hospitals as a group. In addition VEN/ABC is found to be the most practiced inventory management practice among all hospitals of harar and the finding goes healthcare tailored purpose of VEN inventory management practice. In addition this assessment shows a very low level of client/patient satisfaction level among hospitals of Harar. Generally private hospitals registered better client/patient satisfaction level than public hospitals in this assessment. Competency of staff, availability of drugs and interpersonal relationship are some of the major cause for patient/client dissatisfaction especially at public hospitals. On the other hand healthcare service price is the major cause of patient dissatisfaction at private hospitals.

5.3. Conclusions

- Generally inventory management practice are found to be better at private hospitals than at public hospitals of harari regional state, Ethiopia.
- ABC/VEN is the most practiced inventory management practice both at public and private hospitals of harari regional state, Ethiopia which goes with hospital tailored purpose of VEN practice which is healthcare version of ABC practice.
- Majority of staff respondents indicate that cost reduction benefit is not secured by their inventory management practice since their inventory budget increases from year to year. This

may be due to organization and cost sensitivity in inventory management practice implementation.

- Generally most hospital clients/patients (**57.8%**) at hospitals of harar are dissatisfied with the service they are getting from hospitals. Satisfaction level of **60.4%** are registered at private hospitals where as only **25.4%** of clients/patients are satisfied by the healthcare service of public hospitals in harar.
- Majority of clients/patients of hospitals in harari regional state are dissatisfied with the healthcare service they get from both public and private hospitals. Client dissatisfaction are greater at public hospitals than private hospitals. *Hospital staff's incompetency, weak interpersonal relationship and poor availability of medical inventories* are found to be the three major causes for patient/client dissatisfaction.

5.4. Recommendations

Based on the findings of this study the following recommendations are forwarded.

The hospital managers and relevant stakeholders:

- Should strengthen and focus inventory management as strategic area for improved hospital overall performance but consider further empirical evidence about using any aspects of various types of inventory management practice.
- There should be dedicated professionals working on Inventory management with well-established system in a way that improve client/patient satisfaction.
- Hospitals should practice activity based targeted budget for medical equipment in economical and timely way.
- Hospitals should identify main priority areas of patients' dissatisfaction like service charge, availability of medicines, essential drugs, and competency of staff, facilities and address areas of major problem to improve client/patient satisfaction at their hospitals.
- Hospitals in harari regional state should consider effective and efficient ways to improve their patient/client satisfaction level as the level is found to be very low which will its own implication on the overall hospital performance level.
- Hospitals in harari regional state(both public and private) should adopt and implement inventory demand forecasting approaches in their inventory management practice that

combine all important variables of demand, supply, inventory characteristics and competitive environment.

- Supplier management should also be implemented proactively for making their inventory management practice more effective and that avoids risk of medical inventory stock out.
- Analysis of relationship between hospital's inventory management practice and client/patient satisfaction should also be made for better understanding of the link so that it is managed effectively.
- Major areas for patient satisfaction such as competency of staff, unfair price and etc should be addressed effectively by each hospital for better performance specially as the healthcare sector is becoming more competitive
- The total healthcare service delivery system of public hospitals of harar need to be investigated and appropriate managerial improvements be implemented as the study showed a very low client satisfaction level at public hospitals. Low quality healthcare services indicated by very low client/patient satisfaction may have negative effect of harmful healthcare service contrary to the desired curative and preventive healthcare services. Thus Harari regional health bureau and management of the three public hospitals in harar should seriously work to improve client/patient satisfaction level of public healthcare delivery system.
- Finally future research in this field should be made with respect to the importance and effect of medical inventory management practice for/on client/patient satisfaction, comparative study between public and private hospitals on factors for client/patient satisfaction as well as overall hospital performances.

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7. APPENDICES

Data collection Instrument

General Information

Hospital Name _____

Types of Hospital _____

Year Hospital established _____

Total number of Health Professionals: _____

Total number of Inventory/procurement staffs _____

Number of Doctors _____

Number of Nurses _____

Part I-Inventory management practice

	Inventory management Practice questions (please tick your answers)	1	2	3	4	5
	1 strongly disagree, 2 disagree 3 Neutral 4 Agree 5 strongly agree					
	Economic Order Quantity					
201	The Hospital inventory management is organized in a logical way they know when to order and how much to order					
202	The Hospital plans their inventory replenishment on a timely basis					
203	The Hospital minimizes storage costs by use of EOQ					
204	The Hospital reduces the cost of inventory management by use of					
	EOQ					
205	The Hospital reduces wastages of inventory by use of EOQ					
	The Hospital ensures that inventory supply does not hit stock outs					
206	The Hospital clearly forecasts hence making inventory available by use of EOQ					

	4 Re-order level					
207	The Hospital understands their re-order levels					
208	The Hospital knows when to order and when not to order					
209	The Hospital reduces lead time by use of re-order level					
210	The Hospital reduces cost of inventory management by use of reorder level					
211	The Hospital reduces wastages by use of re-order level					
212	The Hospital knows when to order and when not by use of re-order level					
213	The Hospital achieves optimal efficiency by use of re-order level					
	5 Just In Time					
214	The Hospital reduces inventory levels					
215	The Hospitals items desired arrives just in time for use					
216	The Hospital does not have tolerance for late or early deliveries					
217	The Hospital maintains first enough material in just the right time just the right place at to make just the right amount of product					
218	The Hospital coordinates movement of Inventory by use of JIT					
219	The Hospital matches demand and supply by use of JIT					
220	The Hospital saves cost of inventory management by use of JIT					
221	The Hospital reduce warehousing space by use of JIT					
	6 Vendor Managed Inventory					
222	The Hospital avoids stock outs by use of VMI					
223	The Hospital inventory delivered on time by use of VMI					
224	The Hospital saves on finance and time by use of VMI					
225	The Hospitals coordinates movement of inventory by use of VMI					
226	The Hospitals achieves high inventory utilization by use of VMI					
	5. Activity based Costing/VEN					
227	The Hospital allocates time and money in inventory by use of ABC/VEN					
228	The Hospital determines the importance of items by use of ABC/VEN					

229	The Hospital determines the control level placed on the items by use of ABC/VEN					
230	The Hospital allocates time and money in inventory by use of ABC/VEN					

Part II:-observation check lists

#.	Descriptions	Yes	No
1.	Products that are ready for distribution are arranged so that identification of labels and expiry dates and/or manufacturing dates are visible.		
2.	Products are stored and organized in a manner accessible for first-to-expire, first-out (FEFO) counting and general management.		
3.4.	The facility makes it a practice to separate damaged and/or expired products from usable products and removes them from inventory.		
5.	Storage area is secured with a lock and key, but is accessible during normal working hours; access is limited to authorized personnel.		
6.	Knowledge of responsible personnel about the method how to store medical commodities.		
7.	Store room is maintained in good condition (clean, all trash removed, sturdy shelves, organized boxes.		
8.	The current space and organization is sufficient for existing items and reasonable expansion		
9.	Bin cards are Availability?		
10.	Are bin cards updated		
11.	Are there overstocks		
12.	Are there stock outs		
13.	Are there expired items		
14.	Are stock cards available		
15.	Is the stock card match with the bin card?		
16.	Are there written guideline for storing medical supplies or commodities according to their specification.		
17.	The hospital uses automatic stock tracking		

Part III. Interview questions

1. Does this facility applied any methods for periodic replenishment of stock?
2. Are there long – term agreements between the hospital and its suppliers? If yes who is the supplier
3. Who is responsible for procurement & is that proper person? Why?
4. Are there stocks out of health commodities at ZMH? If yes what are the reasons of stock out & which type of commodities are stock out?
5. Are there physical inventory count at regular basis?

Challenges of inventory management related questions

1. Delays in delivery of drugs leading to insufficient inventories
2. Use of manual inventory management system/Lack of technology
3. Bureaucratic process in procurement
4. Losses of health commodities occurs through theft
5. The hospital have weak management system
6. Insufficient funds for procurement
7. Experience for overstocks of health commodities
8. Experience for expire of health commodities
9. Experience for stock out of health commodities
10. Lack of proper training of inventory management
11. The Stock outs of essential medicine is a regular situation
12. Long time it take your unit to receive commodities once a request has been placed

S. No	Part IV Patient satisfaction	1 strongly disagree, 2 disagree 3 Neutral 4 Agree 5 strongly agree				
		1	2	3	4	5
301	The Hospital services are effective and efficient					
302	The Hospital Staff and Patients have good interpersonal relations					
303	The hospital Staff members are technically competent in performing their task and the facilities provided by the Hospital are able to meet up with patients' expectation					
304	There is unrestricted access to the Hospital's services					
305	The hospital maintains a good level of trust and confidentiality with patient and risk of injury, infections and other harmful side effects are minimal					
306	The Hospital provides consistent and constant care to the patient which enables them maintain continuous visit for treatment					
307	The hospital offers to the patients' good facility, comfort and clean environment					
308	The hospital offers their patients appropriate choice treatment					

8. APPROVAL SHEET
HARAMAYA UNIVERSITY

POST GRADUATE PROGRAM DIRECTORATE

Submitted By:-

<hr/>	<hr/>	<hr/>
Name of student	Signature	Date

Approved By:-

1.

Major Advisor	Signature	Date
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2.

Co-Advisor	Signature	Date
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3.

Research Thematic area leader	Signature	Date
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4.

Chairman DGC/SGS	Signature	Date
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5.

PGPD Signature	Date	
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