**MEDICAL SUPPLY CHAIN PRACTICES AND HEALTH SERVICE DELIVERY IN PUBLIC HOSPITALS OF SOUTH SUDAN**

 **A CASE STUDY OF TONJ STATE HOSPITAL IN WARRAP STATE**

**BY:**

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**FEBRUARY, 2022**

# DECLARATION

I Sekwat Solomon, declare that this research dissertation is my original and independent investigation. It has never been submitted to any institution of learning for an award.

**SEKWAT SOLOMON**

Signature ………………………………… Date ………………………………..

# APPROVAL

This research dissertation has been done under my supervision and it is now ready for submission.

**Dr. LUTAYA SADAT**

**(University Supervisor)**

Signature…………….………………… Date……………………………………

# DEDICATION

This work is dedicated to my family members, my wife, sons and daughters without whose caring support it would not have been possible, and have been my constant source of inspiration and passed on a love of reading and respect for Education.

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# LIST OF ABBREVIATIONS/ ACRONYMS

ANC: Antenatal Care

CVI: Content Validity Index

ICT: Information and Computer Technology

KEMSA: Kenya Medical Supplies Agency

RBT: Resource Based Theory

SCM: Supply Chain Management

SCM: Supply Chain Performance

SPSS: Statistical Package for Social Sciences

TCT: Transaction Cost Theory

UNICEF: United Nations International Children’s Fund

UNHCR: United Nations High Commission for Refugees

USAID: United States Agency for International Development

WHO: World Health Organisation

# ABSTRACT

The study examined the contribution of medical supply chain practices on healthcare service delivery in Tonj State Hospital in Warrap State, South Sudan. The specific objectives of the study were to; examine the effect of warehousing management practices on health service delivery in Tonj State Hospital; ascertain the impact of inventory management practices on health service delivery in public hospitals in Tonj State Hospital and to investigate the effect of information flow management practices on health service delivery in public hospitals in Tonj State Hospital. The study employed descriptive and case study research design which involved an intensive analysis of the research variables.

A sample size of 109 respondents was used from a population of 125 people including, management staff, support staff and community leadership in Warrap State. Purposive and simple random sampling techniques were used to select the respondents. The respondents were issued with self-administered questionnaires which had closed ended questions and face to face interviews were conducted among management staff and community leadership.

The study found out that one of the effects of Inventory management practices that led to the health care service delivery was that Inventory management practices was given adequate attention as a prerequisite of improved health care service in Tonj State Hospital. The study then concludes that medical supply chain practices highly determined health care service in Tonj State Hospital in assessing its effectiveness and efficiency, ensuring that each and every item of stock is identified with its principal function, keeping track of price changes of all items of stock by keeping records of purchase prices.

The researcher concluded that there is a positive significant relationship between warehousing practices and health care service delivery in Tonj State Hospital with a significant positive correlation value of 0.63.4, inventory management practices with a significant correlation value of 0.782 and information flow management practices with a significant correlation value of 0.601 on health care service delivery in public hospitals in Tonj State Hospital.

The researcher recommended that; from the study findings. Health facilities should request for training on inventory control from the ministry of health. Regular supervision of health facilities should be made by the inspectors of ministry of health to ensure that stores and health facilities respect and adhere to set guidelines and that public hospitals should also base their decisions in respect to experience with the rate of turnover of an item that will help indicate the level of inventory at which the unit should be re-ordered to make sure that the new stock arrives before the old stock is totally exhausted.

Therefore, suggests that more studies should be conducted the role of medical supply chain practices on the performance of service delivery of Private Hospitals in South Sudan and more research should be conducted on the contribution of automated inventory management systems on service delivery to understand whether automation of inventory management systems can reduce on inventory related costs in Private Hospitals in South Sudan.

# CHAPTER ONE

#  INTRODUCTION AND BACKGROUND TO THE STUDY

**1.0. Introduction**

This study intended to examine the contribution of medical supply chain practices on healthcare service delivery in Tonj State Hospital in Warrap State, South Sudan. In this chapter, attempt is made to position and introduce the subject matter of the study. The background to the study provides an overview of what the study variables. Statement of the problem highlights the main variables under consideration. From the objectives of the study the research questions are derived, which questions, the study will attempt to answer and suggest possible solutions to the problem. Scope of the study specifies the boundaries of the study in terms of geographical location, and population type and size. Significance of the study are also outlined and the chapter is concluded the conceptual framework used to explain the relationship between the study variables.

* 1. **Background to the Study**

The background of the study is sub-divided into historical, theoretical, conceptual and contextual perspectives as indicated below;

* + 1. **Historical Background**

Historically, since the beginning of the 70s of the 20th century, we have been witnessing, in a relatively short period of time, the creation of a variety of concepts and methods of management (Lichtarski, 1998). This resulted from exogenous and endogenous impulses and the related imperative of efficiency and flexibility of the company (Lichtarski, 2010).

During the last ten years, a considerable amount of studies has emphasized the importance of supply chain management for companies (Croom et al., 2000). Both in theory and in practice it is widely recognized nowadays that by integrating information and materials flows throughout the entire supply chain, both the internal and external performance of supply chain partners can be improved significantly. Many authors have remarked however that the supply chain management philosophy not only receives considerable attention from the field of logistics and operations management but also from other areas (Burgress et al., 2006). Clearly, the origin of supply chain management is of a multidisciplinary nature and stems from different areas such as strategic management, marketing, and organizational behavior (Croom et al., 2000). It is not surprising therefore, that the phenomenon of supply chain management is studied from several different perspectives and, by doing so, several aspects have emerged as being of importance when trying to establish integrated supply chains (Harland, 1996; Lee, 2002; Boone and Ganesham, 2007). Despite the variety of perspectives, the elimination of waste and an emphasis on improving performance by coordinating supply chains are generally considered the core issues of supply chain management relationships.

This focus is reflected in the many studies on the exchange of information, materials and products (Jarett, 1998; Chen and Paulraj, 2004; Cooper and Tracey, 2005).

* + 1. **Conceptual Background**

A supply chain may be defined as an integrated process wherein a number of various business entities work together in an effort to: (1) acquire raw materials, (2) convert these raw materials into specified final products, and (3) deliver these final products to retailers (Clark and Scarf, 2019).

According to the USAID Deliver Project, Task Order 1. (2011), medical supply chain practices are supply chain management functions that medical organizations carry out to help them plan, manage and implement processes to move and store drugs used to meet customer demands. These practices involve activities done through the planning, control and implementation of the effective movement and storage of related information, goods and services from origin to destination.

Medical supply chain practices are also defined as component functions of the medical supply chain that organizations carry out that involve planning, controlling and implementing of activities that effectively move goods beginning with raw material accumulation to the final stage of delivering goods to the destination by adhering to customer needs and industry standards (CSMP, 2011).

Whipple et al. (2019) argued that a particular service delivery system type may be very efficient in reducing transaction costs in an exchange but may not be effective to provide services that satisfy customers. The issues of service delivery in procurement have become increasingly critical to many organizations, especially with regard to supply chains (Carter 2000). By embracing the intention and spirit of these requirements in all aspects of business companies service delivery organizations will become more effective and better run, fostering greater supplier confidence and leading to a positive impact on the supply chains. In a supply chain that is trying to rid itself of an image of corruption, kickbacks and the lack of ethics in service delivery within health centres and hospitals.

* + 1. **Theoretical Background**

This study was guided by two theories of; The Resource Based View (RBV) theory and the Transaction cost theory.

Resource Based Theory (RBT) is posited by Wernerfelt (2004) & Barney, (2003). It that states that when an organization puts more emphasis on inner competencies and weakness in institutional resources, showing how procedures are controlled and the way resources are apportioned and arrayed this results in execution of various strategies (Wernerfelt, 2004 & Barney, 2003). The effectiveness of firm best practices depends on the utilization and exploitation of existing resources to the extent that firms have pools of under used resources, these create unique, firm-specific opportunities for exploitation (Montgomery, 2004).

According to the theory, instead of looking at the competitive business environment to get a niche in the market or an edge over competition and threats, the organization should instead look within at the resources and potential it already has available. It’s these internal resources (Barney, J. B. (1986a) that create competitive advantage for the organization (Wernerfelt, 1984, Barney J.B, 1986a, Berny J.B, 1991). Barney (1991), asserts that these resources are into three categories that is physical capital resources, human capital resources and organizational capital resources.

The physical capital resources include plant and equipment (Rothaermel, F. T. (2012), human capital resources (Barney, 1991) are training relationships and experience and organizational capital resources are reporting structure, formal/informal planning and controlling. From the above, since hospitals already have established infrastructures and systems in place, staffed with personnel, there should be focus on building staff capacity and streamlining of systems in order for hospitals to better address the needs of their stakeholders.

The Transaction Cost Theory (TCT) is also another theory that will underpin this study developed by Oliver Williamson who was an economist. This model answers queries about why manufacturing entities exist (i.e., to minimize logistics costs), how entities describe their borders, and how they should to administer processes. Based on Lozano and Valles (2013), TCT was initially established to aid regulate the proficiency in manufacturing goods and at lower charge to guarantee low prices to clients (Sirmon, Hitt & Ireland, 2007).

* + 1. **Contextual Background**

In South Sudan, Public hospitals are Government operated hospitals. Hospitals are open systems strongly influenced by the environment in which they operate (McKee and Healy 2016). They interact with the surrounding environment to secure the resources needed for survival, adaptation and growth. Their policies and activities are constantly influenced by external factors related to the population they serve, patterns of prevailing diseases, public expectations, changes in the hospital system and healthcare system, and the broader socio-economic and political environment. Hospitals represent the largest cost component of national healthcare expenditures, and both medical and non-medical supplies account for one of the largest costs to hospitals (OECD 2011). Hospitals continue to adopt expensive technology and customized drugs, their costs will likely continue to escalate. Hospital supply chains must be resilient and flexible to accommodate both global and regional market constraints, as well as government regulations; because they are critical to delivering healthcare services and achieving desired patient outcomes.

In South Sudan, medical logistics agencies have employed various logistics management practices with the aim of ensuring that public sector health commodity logistics systems continue to provide drugs security improve program impact, quality of care, and cost efficiency (Jones, Howard & Legido-Quigley, 2015). The use of efficient logistics management practices has resulted in increased overall program effectiveness ensuring that public health programs deliver high-quality, comprehensive services; ensure drug security, and a robust logistics system for managing health commodities is in place. In logistical incorporation, diverse associates of equivalent supply chain work together to harmonize particular logistics events to increase ultimate buyer fulfillment through delivery of the right drugs to the right place within agreed period of time (Cooper, Lambert & Pagh, 1997). Melnyk et al. (2009) indicated that by adopting logistics management practices, medical logistics agencies are able to significantly reduce on logistical cost as well as offering right drugs to clients at lower prices thus logistics is seen as a strategic or value-creation tool.

## **Statement of the Problem**

South Sudan is the World’s youngest nation with bad infrastructure in form of roads, bridges, education facilities, health facilities and the lowest number of qualified personnel in proportion to the population compared to any other country in the world (Mugo et al., 2018). South Sudan has some of the world’s lowest health indicators with gaps in qualified personnel, inefficiencies health supply chain (Montrose, 2018) coupled with constant conflicts which makes movement of goods and services as well as human resource risky, a combination of which affect health service delivery (Health Pooled Fund, 2018; Mugo et al., 2018). The health services of South Sudan fall short of the required basic minimum with some of the basic indicators showing dismal performance. Among the notable ones is Antenatal Care (ANC) attendance where 40% of the mothers who deliver attend ANC and these hardly meet the required four times recommended by World Health Organization (WHO).

This situation is escalated by the rampant fuel shortages arising from nearby countries’ failure to export goods like fuel, pharmaceuticals and other consumables, caused by the insecurity in this country (Green, 2012; World Factbook, 2019). This volatile political situation in South Sudan has complicated work of donor agencies that are capable of providing goods and services to the people in the hard to reach areas and has affected the overall service delivery(Grant and Thompson, 2013).

Several factors explain this situation, these include; limited availability of the required pharmaceutical products, few or no trained personnel at the health facilities leading to inefficient health service delivery of any country (Green, 2012; Mugo, Dibley and Agho, 2015). Besides, the government’s willingness to pledge towards the management of supply chain of pharmaceutical products has no sign yet (Jones, Howard and Legido-Quigley, 2015) considering there is no mechanism to monitor health service delivery in this dispute affected country which makes planning and implementation of activities for such a health system unattainable (Kevany et al., 2012).

An empirical study by Macharia et al., (2017) established that in South Sudan, by 2016, there were 1747 public health facilities, of which 294 were non-functional. This largely attributed war in this country. The study further alluded that, admittance to a qualified health practitioner was lowly rated at 25.7%. More still, the population living within 5kms to a facility was 28.6%.Among the key issues to note here is the 28.6% health facility access of within 5kms against the anticipated 70%. Yet, those that are able to access are not guaranteed of health services; like access to medical personnel and the required drugs. This has caused health indicators like maternal mortality, infant mortality to escalate (Macharia et al., 2017).

However, the bad situation in South Sudan however has not completely brought everything to a standstill, several international organizations, the South Sudan government and private companies are still conducting business including sustaining the supply chain of health products to the best of their abilities by facilitate the health services with as much health products amidst the risks involved. This gave the researcher motivation to conduct this research. This research therefore aims at exploring the contribution of SCM practices (Warehousing, Inventory Management and Information Flow) on service delivery in Tonj State Hospital in Warrap State, South Sudan.

## **1.3. Purpose of the Study**

The purpose of this study is to examine the contribution of medical supply chain practices on healthcare service delivery in Tonj State Hospital in Warrap State, South Sudan.

## **Objectives of the Study**

The study was guided by the following objectives;

1. To examine the effect of warehousing management practices on health service delivery in Tonj State Hospital, Warrap State.
2. To ascertain the impact of inventory management practices on health service delivery in public hospitals in Tonj State Hospital, Warrap State.
3. To investigate the effect of information flow management practices on health service delivery in public hospitals in Tonj State Hospital, Warrap State.
	1. **Research Questions**

From the above study objectives, the following questions were formulated;

1. What is the effect of warehousing management practices on health service delivery in Tonj State Hospital, Warrap State?
2. What is the relevancy of inventory management practices on health service delivery in public hospitals in Tonj State Hospital, Warrap State?
3. What is the effect of information flow management practices on health service delivery in public hospitals in Tonj State Hospital, Warrap State?

## **1.6 Hypothesis of the Study**

H1: There is a statistically significant relationship between warehousing management practices and health service delivery in public hospitals in Tonj State Hospital, Warrap State?

H2: There is a statistically significant relationship between inventory management practices and health service delivery in public hospitals in Tonj State Hospital, Warrap State.?

**H3:** There is a statistically significant relationship between information flow management practices and health service delivery in public hospitals in Tonj State Hospital, Warrap State?

## **1.7 Scope of the Study**

The scope of the study captured the subject scope, geographical scope and time frame within which the study was conducted.

## **1.7.1. Content Scope**

The study generally investigated the contribution of medical supply chain practices to health care service delivery in Tonj State Hospital in Warrap State, South Sudan. Medical supply chain practices was perceived as the independent variable and health care service delivery in public hospitals as the dependent variable. Inventory management and control in this study focused on factors like, warehousing practices, inventory management practices and information flow practices while health care service delivery in public hospitals was based on, customer satisfaction, availability of drugs, quality of patient care, responsiveness, reliability and assurance. The intervening variables used in the study are, government policies and political climate. The study assumed that these paradigms are more linked as forecasters between independent and the dependent variables.

## **1.7.2. Geographical Scope**

The study was carried out in Tonj State Hospital in Warrap State of South Sudan. The hospital is located in Tonj South County, Warrap State, in northwest South Sudan. Its location lies approximately 525 kilometers (326 mi), by road, northwest of Juba, the capital and largest city in the country. It lies on the northwest bank of the Tonj River (or Ibba River). Tonj lies between Rumbek, approximately 153 kilometers (95 mi) by road to the southeast, and Wau, approximately 108 kilometers (67 mi) by road to the northwest. The coordinates of Tonj are: 7° 16' 48.00"N, 28° 40' 48.00"E (Latitude: 7.2800; Longitude: 28.6800). The average elevation of the town is approximately 427 meters (1,401 ft) above sea level.

## **1.7.3. Time Scope**

The time scope which was used to collect data is the period ranging from 2013 up-to-2021. This period is of interest because; this is the period when service delivery at Tonj State Hospital, Warrap State has been preferably very low with worrying and questionable efficacy. Furthermore, the time was enough to provide more information for the study upon which conclusions and recommendations were based.

## **1.8. Significance of the Study**

The research findings and recommendations may be of importance to the following stakeholders:

**Academicians:** The study may give the researcher and other academics a more practical analytical insight relating theory to practice. In this regard, the study may broaden the researcher’s knowledge on procurement studies and policy analysis. Additionally, the study might act as a reference point for researchers who may pursue further research in on service delivery in the region and the country at large. The study may add value to the body of existing knowledge and perhaps lead to ventures in further research thus it may contribute to the existing literature on procurement performance. Through the resultant interaction between the researcher and the respondents, the researcher’s knowledge, skills and understanding of research may improve.

**Management of Public Hospitals:** Findings and recommendations of the studymight help management of several public hospitals to understand the extent to which their decisions affect Health Service delivery in the refugee hospitals.

**The government through** **Ministry of Health:** The findings and recommendations of this study might help the Ministry of health to better its policies with regard to procurement of medical supplies. This might be in terms of quality, delivery times, prices as well as supply capacity of suppliers.

**Development Partners:** Being funders of many health programs in South Sudan, the donors such as UNHCR, UNICEF, WHO, DRC among others may get to understand how their support in form of donations is being distributed to health units in South Sudan.

**Policy Makers**: The findings and recommendations might bring more insight to policy makers to come up with proper mechanisms that may help foster quality procurement performance for medical logistics. It may also inform the ongoing policy debates on the effectiveness of procurement departments in the private and public entities.

**CHAPTER TWO**

**LITERATURE REVIEW**

**2.0. Introduction**

This chapter reviews work of several researchers relevant to study. It reviews opinions, observations attributes and conclusions from various researchers which offer useful material in support of the study. The study advanced understanding of medical supply chain practices and health service delivery in public hospitals of south Sudan. The chapter consists of the literature survey, theoretical review, the literature review and the conceptual framework.

## **2.1. Literature Survey**

## **2.1.1. Medical Supply Chain Practices in Public Hospitals in Warrap State**

The South Sudan Supply chain management system is faced with a number of issues. These issues include; incompetent staff, inadequate storage facilities, and poor road infrastructure among others. This situation has led to the closure of a number of health facilities, since the delivery of basic pharmaceutical products cannot be done. This implies that sustainability of basic treatment required for these facilities to remain running is impossible (Katy Magiro, 2016; USAID, 2017). However, the issues surrounding the situation in this country have had a number of international agencies, private companies and the government of South Sudan engaged in ensuring that there is adequate provision of health care. This has involved reestablishment the supply of these health requirements, food supplies among other products, to get to the people of this country (World Food Programme, 2015). Although, having a proper supply chain structure especially for health products goes a long way in having assurance of a proper functioning health care system; something which the South Sudan system needs to benchmark, for any improvement to be made ( Montrose, 2018).

It should further be noted that deficiencies in supply chain practices of consumable goods are analogous with what happens in the supply chain of healthcare products, this is worse in rural and risky places of South Sudan. A situation like this is evidenced in a study by Desmond Kuupiel et al. (2019), in Ghana exhibiting comprehensive stock-out of key medicinal products like blood glucose test, haemoglobin and hepatitis B virus test; consequently arising from poor record administration and/or inadequate monitoring. Inevitably, it becomes impossible to impose a proper system in a situation that cannot efficiently allow the latest technologies which facilitate supply chain management of goods to ensure suppliers like non-government organisations, private and government do timely deliveries. This problem eventually trickles down to the users and final consumers of these pharmaceutical goods involved at the end of the value chain. Yet, in South Sudan, block chain technologies that would facilitate systematic processes in supply chain management and supply chain performances are not yet handy (Hald, 2019).

Indeed, the risky nature of the situation in South Sudan escalates caution to the manufacturers and suppliers, given the high risks involved that directly affect the SCP of the healthcare products. The push for cost minimization is done under such circumstances in the war tone place which in essence affects the quality of the products. These products eventually reach the consumers with inevitable delays, leading to shortages of the required pharmaceutical goods (Joseph, 2019). So, sustainability in the supply chain management of pharmaceuticals as a result, becomes unattainable given the complexities involved in the prevailing circumstances in South Sudan at the moment (Morali and Searcy, 2013).

The works by Hosseini *et al.*, (2019) and Pettit, Croxton & Fiksel, (2019) promoting the concept of supply chain resilience do not prevail in the current setting South Sudan finds itself in, with disruptions whose risk assessment cannot be predicted given the nature of assumptions that are required to do so. The study employed cross-sectional study design and indicated that managers should always understand the importance the two types of plans, that is, the strategic plans and the operational plans so that the whole planning process in the organisation fits in the organisational activities. However, he states that there are two types of operational plans, which include the single use and standing plans. The single use plans are designed and developed usually to achieve a specific objective and are dissolved on completion or achievement of that objective. Whereas, for this report, it shall focus on Tonj State Hospital and determine how planning is linked to the effect of medical supply chain practices on the health care service delivery in the public sector of South Sudan.

## **2.1.2. Health care service delivery in South Sudan**

South Sudan’s health system is one of the worst in health systems the world at the moment. The health indicators are worryingly pointing at high maternal mortality rates, high infant mortality rates, and high malaria prevalence. This is made worse with poorly coordinated health system (Health Pooled Fund, 2018; Mugo *et al.*, 2018). The nature of the supply chain of the health products has meant that the health system does not receive enough deliverables required to run it even at sub-optimum. There is unreliability which stems from the way events unfold in the current war status quo. It has thus far taken the government of South Sudan and the international agencies to put structures in place. However, the political unrest has made everything next to impossible. If the supply chain of the pharmaceutical products can be sorted, then the health service delivery will most likely be improved (Gones, 2016).

Furthermore, disruptions of any form in any country affect the health service delivery. This by all standards causes poor health indicators like the situation is in South Sudan at the moment. During wars, armies and paramilitaries openly rob the drugs, overrun health facilities and cause displacement of people causing inability to access basic health services. A number of studies allude to these facts (Nickerson, 2015; David et al., 2017; Yousefi et al., 2019), where distribution of health related goods and services is difficult. Then the created situation would apparently require to solicit for clearances by international bodies like Red Cross from the warring parties. Indeed, the dire environment created by the prevailing circumstances stretches all sectors of the country causing famine, limited and/or no drugs, leading to stretching the health services.

Not only is this current health situation in South Sudan going to have short-term impact, but, it is going to have long term impact as well. A number of issues can be envisaged; for example, child development is already encountering challenges, hence, casting doubt to the productivity of the majority of the population during the next generation. This can highly be associated to limited admittance to health amenities (WHO, 2010c). The long-term effects of this further mean that, inadequacies in the training of prospective health personnel having a bearing on the quality of those passed on. Moreover, quality and quantity in terms of the numbers required to meet the demand of population are also still a major problem. Indeed, there is a very high correlation between the number of health practitioners passed out periodically and the future performance of any health system (Kepros and Opreanu, 2009).

## **2.2. Theoretical Review**

There is a growing and significant interest over logistics management practices and SC performance by the supply chain management academia and researchers in recent years. Various theories have been developed which describe the consequence of Medical supply chain practices on health service delivery in pharmaceutical industry of South Sudan.

## **2.2.1. Resource Based View Theory**

The study is informed by the Resource Based Theory (RBT) posited by Wernerfelt, 2004 & Barney, (2003) that states that when an organization puts more emphasis on inner competencies and weakness in institutional resources, showing how procedures are controlled and the way resources are apportioned and arrayed this results in execution of various strategies (Wernerfelt, 2004 & Barney, 2003). According to Montgomery (2004) the resource-based standpoint therefore meaning existence of convinced focus on resources owned by firms or by its companions and the various properties that can enlighten company supply chain performance, long term development or weakening. The resource-based viewpoint intents to give a blueprint of company resources before and throughout decision-making processes and business strategies in the company (Montgomery, 2004).

According to Barney (2003), in order to successfully implement logistics management practices resources, have to be strategic. The resource-based viewpoint in a contemporary outlook includes a company’s elements such as structure, communication within a supply chain player trying to coordinate info disseminated among them and assurance of the key actors in a firm management in order to fully ensure proper logistics management practices implementation (Barney, 2003). The effectiveness of firm best practices depends on the utilization and exploitation of existing resources to the extent that firms have pools of under used resources, these create unique, firm-specific opportunities for exploitation (Montgomery, 2004). This philosophy is applicable to this study as it looks at management of resources that manufacturing firms has in order to improve product delivery or the movement of fresh inputs and finished outputs from the firm to customers point of collection.

## **2.2.2. Transaction Cost Theory**

The Resource-based Transaction cost economics theory developed by Oliver Williamson (1951) answers queries about why manufacturing entities exist (i.e., to minimize logistics costs), how entities describe their borders, and how they should to administer processes. Based on Lozano and Valles (2013), TCT was initially established to aid regulate the proficiency in manufacturing goods and at lower charge to guarantee low prices to clients (Sirmon, Hitt & Ireland, 2007). Medical logistics agencies have to offer correct quality of goods and reward to the bidder posing the lowest price.

In logistic management, transaction cost economics theory applies in manufacturing logistics total cost ownership concept which includes the purchase cost, maintenance cost, warehousing cost, transportation cost, service cost and processing cost. Warrap State Public Hospitals will incur this cost by shipment of materials from upstream level to the final customer and therefore logistics manager must carefully evaluate the tradeoff between these costs because all these will either increase or reduce logistics cost. Also there is need to coordinate all the activities involved in getting the product to the firm so as to ensure that the integrated effort of logistics is achieved.

This theory is very crucial in managing Warrap State Public Hospitals especially the cost associated with logistics operations because it affects the level of customer satisfaction and may even change customer perceptions and loyalty to the firm (Walker and Brammer, 2009).

**2.3. Literature Review**

**2.3.1. Inventory Management Practices and Health Service Delivery**

In logistic management, Transaction cost economics theory applies in manufacturing logistics total cost ownership concept which includes the purchase cost, maintenance cost, warehousing

Inventory Management is defined in Stevenson (2010) as a framework used by firms to monitor their inventory objectives. It requires the registration and tracking of stock rates, prediction of potential demands and arrangement of when and how. Deveshwar and Dhawal (2016) on the other hand proposed that inventory management as a method used by companies to organize, store and substitute inventory so as to minimize the cost of ensuring that goods are properly supplied simultaneously.

Inventory management practices provide visibility in the supply chain system and the upstream and downstream inventory. The purpose of the inventory is to provide the appropriate levels of service for internal and external customers, determine current and potential requirements for all forms of inventory, reduce costs and pay for the inventory (Lysons & Farrington, 2016). All stock policies in the business must be profitable by operating expenditures and working capital needs

over the driving period. According to Lysons and Farrington (2016), the calculation of inventory's effective and productive efficiency depends on the degree to which the firm has the correct inventory quantity in the right place and at the right time. The measuring indicators for this inventory include lead time, service time (Security inventory), stock turnover rate, inventory results over a certain period and inventory cover. On the contrary in this study, focusing on Tonj State Hospital as one of the public hospitals in South Sudan, it shall seek ascertain how inventory recording is linked to the health care service delivery. Whereas this study shall be looking at Tonj State Hospital recording and reporting and its impact on the health care service delivery in South Sudan.

In a related study, Naliaka and Namusonge (2018) conducted a study in Kenya that inventory management affects production companies ' competitive advantages. The same study shows further that the company can compete on a long-term basis on the basis of the quality and delivery. Competitive value includes capabilities which make it possible and a crucial management decision to distinguish an organisation (Li, Ragu-Nathan, Ragu-Nathan, & Subba Rao, 2016; Subba Rao, 2016). One of the key success factors of any institution, including humanitarian organizations, is efficient and efficient inventory management flow across the value chain. The problem in inventory management is to balance the interaction between inventory supplies and demand. To order to meet the expectations of those without loss due to product inventory losses, preferably a company needs to have enough stock. On the other hand, due to the expense of carrying inventories, the company doesn't want to have too much inventory available. Inventory decisions are high risk and have an significant effect on the management of the supply chain of an enterprise. Inventory management practices, according to Dimitrios (2018), are recognized as a critical area of concern that requires the highest priority.

The literature survey above indicates that the effectiveness of inventory management on the health care service delivery of public hosptials as highlighted by several researchers from studies done in other organization settings is still lacking. The degree of the effect on the inventory management varies from industry to industry, organization to organization, small business entity to different entity but mainly how efficiently and effective private organizations implement inventory management practices. The literature indicates that having an efficient inventory valuation, inventory taking and recording system directly have an effect on the health service delivery. However, the studies reviewed the focuses on resource rich settings and non in the poor setting. The effectiveness of inventory and stores management practices may behave differently or may have negative results when applied to a company in a resource poor setting. There is therefore need to carry out this research to evaluate the effectiveness of inventory management and health service delivery in the public sector setting.

**2.3.2. Warehousing Practices and Health Service Delivery**

In a study conducted by Coyle and Largely (2020), distribution management was defined as overseeing of events engaged in distributing any products from vendors to the firm, warehouses or customer’s point of collection. Murphy (2008) pointed out that transportation management for a huge part of firm cost of production hence if firms want to have competitive edge over others, then they must ensure that their cost of logistics or moving materials and products to customers point of collection is minimized of any firm supply chain. This is usually done by use of various modes of transport depending on factors such as transportation loads, delivery points and distribution centers (Laird, 2016).

Warehousing includes space determination, stock layout, configuration, and stock placement (Ballou, 2016). In logistics, it depends on warehousing picking and delivery accurately to deliver the right amount of product. Warehousing ensures that supplies are delivered in the right place and on time to the right customer. The production of a commodity at the right price and in good order and quality guarantees cost-effective operation too. Pienaar and Voght (2016) have suggested the effective service of customers depends on the operations of the warehouse. Warehouse has three business functions: the function receiving and passing on customer orders; the IT function ensuring that technology for the efficiency of storage is used and the storage function which temporarily or constantly stores the product.

According to Chopra and Meindl (2017), a transporter creates speculation choices concerning the conveyance equipment’s and in certain circumstances arrangements need to be done to make functioning decision capitalize on the yield from assets. Distribution management occupies majority of the amount in the logistical costs henceforth transportation management influence the performance of manufacturing firms and their respective logistics system immensely because movement of products is necessary in the whole manufacturing processes, since industrializing to distribution to the ultimate customers and returns (Bowersox, et al., 2010). Therefore a perfect management and coordination between firms supply chain components leads or bring the maximum benefits with worthy transportation management being able to provide improved logistics efficiency, reduced operation cost as well as promoting service quality on firms (Sople, 2010). However, none of the above studies looked at warehousing practices and health care service delivery of public health facilities in South Sudan. All the these researchers focused on other sectors not necessarily the health sector and were also carried out in another geographical locations outside South Sudan, but this particular study is being carried out in Tonj South County, Warrap State, South Sudan and particularly in the health sector.

In a supply chain, the warehouse function of the material flows between the supplier and the customer is very critic because it serves as a node. Companies are increasingly pushed to develop their warehouse operations in today's dynamic business climate. Several businesses have also adjusted their value proposal to increase their customer service rates, leading to improvements in warehouse position (Grant, 2016).

In order to coordinate operations in the stores correctly, a well implemented storage management system. It is important to ensure that our company performs efficiently and profits from economies of scale and an enhanced customer experience. Well-developed storage systems are designed to assist in the definition, operation and control of inventory procedures (Forger 2017). In the past, warehouses were often labeled cost centers and never added value. A radical change in warehouse operations was observed by the migration of production to the Far East, growth in e-commerce and the market requirements (Richards, 2017). Frazelle, (2016) states that warehouses are important for a supply chain because they provide storage for raw materials, components, work-in-process, and finished goods; operate as distribution and order fulfillment centers; and perform localized and value-added warehousing.

The adoption of information technology in logistics management such RFID, GPRS, wireless networks and sensors have enabled manufacturing firms have accurate information through real-time tracking of trucks on transit hence firms have been able to reduce cost associated with such transit or late deliveries resulting to unmonitored movements and inventories (Bardaki, & Pramatari, 2011). In the automation, computerization has a vibrant responsibility in firm manufacturing process maximization with technology considered for playing a main part in enhancing the effectiveness of a firm through use of various technologies such as Global positioning network and vehicle trucking devices or prized software’s which can be implemented throughout logistical process (Zhang,Goh, & Meng , 2011).

Distribution also incorporates the process of environment conservation through better disposal of products earlier sold to the customers for objective of repossessing value or proper disposal. It forms logistical movement which corresponds to green advertising including sales returns, source reductions, recycling’s, material substitutions, reuse of resources, surplus disposals, and revamping and restoration (Barney, 2001). Conversely, due to more emphasis awarded to environmental conservation on recent past for purposes on reducing on pollution and conserving environment, more countries have enacted bills to promoted or ensure manufacturing firms incorporate reverse logistics in their production processes to ensure care is taken to products consumed by their (Allan et. al., 2006).

Conventionally, in firm supply chain there exist smoothness flow of products from manufacturers to the end users with all attention being majorly focused on inbound and outbound logistics actions and as soon as the same products are vended and transported to customers point of collection, the manufacturers develops impression that their responsibility comes to an end due to believe that their accountability is restricted to the extent of replacement of substandard merchandises enclosed by warrant or those spoiled throughout transportation (Timnah, 2017). Due to the need to fully satisfy customers and ensure clean environment, manufacturers have embraced reverse logistics to address used supplies, wrapping surplus, throwaway wastes produced by end products delivered to customer’s point of collection (Sople, 2010).

Crişan, (2009) states that Companies could gain cost advantage using their logistics area of the business because warehouse management is a possible source of cost improvements from logistics that companies could use during this economic crisis. Best practices for warehouse performance measurement that lead to improved performance and their solution lead to the optimal use of storage space, activity for customer relations, quality level, use of assets and costs. Performance assessment makes the biggest contribution to figuring out the causes of poor production. Solutions to improve performance and improve performance, to prevent discomfort before it is too late, to monitor customer relationships, to monitor processes and costs and to maintain quality have to be found after that step (Ackerman, 2017).

**2.3.3. Information Flow Practices and Health service delivery**

With the development of ICT, the flow of information offers a special benefit to connect one activity to the others and make available in the company as well as with external providers, channels and customers in real time data created by business. For the efficient and successful flow of information, the logistics processes of the organization need to be strengthened through planning, tracking, collaboration and tracking logistics processes. The successful operation of the logistics information technology system involves the use of hardware and technology transfer, according to Nowakowska and Grunt (2017), and the information system should be configured to best support a logistics system to improve the contact line (Wisner et al. 2017).

Long and Wood (2015) indicated that knowledge management during a crisis is the single biggest success factor. IT helps integrate activities and provide proof of information to improve the functioning of the supply chain. The monitoring and management of relief operations includes complex decision support structures, communications and information structures. These programs enable the planning, response and management of crisis, disasters and emergency situations. Thomas and Kopczak (2015) argued that humanitarian supply chain practitioners need to find ways in which donors and the public can connect about how the effectiveness of the supply chain improves.

In a related study, Maspero & Ittmann, (2018), asserted that it was an opportunity for the humanitarian supply chain to increase its contribution to and for disaster relief by introducing information management, technology, measuring and positioning initiatives. While delivery of disaster relief items is an important role in the supply chain for humanitarian aid, it should be strategic to provide timely information and analyze information for improved information on how operations can be improved. However, in South Sudan it was conducted in the health sector and particularly, the warehouses across of Tonj State Hospital that keep the hospital supplies so as to establish the inventory service levels.

In another study, Monczka (2018) explained that information sharing among the supply chain partner is related to the degree of critical and proprietary information shared among each other’s. Mentzer (2010) mentioned that sharing information may be varied in nature especially customer information through the flow of information about logistic activities. Basically, information sharing involved information related to logistics, customer orders, forecasts, schedules, market and so on. Besides, information sharing is included the access of private data between trading partners so that they are able to follow up on the products status and the progress of the order through the supply chain system (Simatupang & Sridharan, 2012 and Zhao & Benton, 2017). Lalonde (2018) explained that information sharing has been recognized as one of the importance SCM practices that use to characterize on a solid supply chain relationship.

According to Stein and Sweat (2018), supply chain partners who exchange information frequently are able to respond to market change quicker as they understand the needs of the end customer and they are able to work as a single entity. Through information sharing, demand and product availability information flow in a correct and systematic manner will smoother the operation process. Moreover, information sharing and knowledgeable will helps to reduce uncertainties in the market when supply chain members have information and knowledge about each other (Yu, 2001; Frazier, 2018) and organizations should share and exchange information with their supplier so that they are synergies with each other. Hence, information sharing enable the right information available for the right time, right place and right trading partner which will contribute to greater organizational performance.

Various scholars have analysed the effect of medical supply chain practices and health service delivery. According to these studies, utility of inventory control in supply chain management appears to be felt across a diversity of sectors in the world (Subba Rao, 2016; Deveshwar and Dhawal, 2016; Dimitrios, 2018; Naliaka and Namusonge, 2018; Maspero & Ittmann, 2018). No literature however exists showing how medical supply chain for instance directly impacts on health service delivery in the public sector of South Sudan and in Tonj State Hospital in particular. In the absence of such evidence, the current study comes in to bridge the gap by investigating the relationship between medical supply chain practices and health service delivery of Tonj State Hospital in South Sudan.

## **2.4. Conceptual Framework**

Conceptual framework is a model of how one makes a logical link between the several elements that have been identified as important to the problem (Sekaran, 2003). The conceptual framework adopted for this study is developed to examine the contribution of medical supply chain practices on healthcare service delivery of Pharmaceutical products as shown in the figure 2.1

## **Figure 2.1: Conceptual Framework**

 **INDEPENDENT VARIABLE DEPENDENT VARIABLE**

**Medical Supply Chain Practices**

* Warehousing practices
* Inventory management practices
* Information flow practices

**Health Service Delivery**

* Customer satisfaction
* Availability of drugs
* Quality of patient care
* Responsiveness
* Reliability
* Assurance

 **Intervening Variables**

* Government policies
* Political climate

**Source**: *Adapted with modification from* Ejite (2015) *and PPDA Act, (2014).*

The conceptual framework indicates the relationship between medical supply chain practices and health service delivery as the independent and dependent variable respectively. Figure 2.1 illustrates that the independent variable of this study is medical supply chain practices measured using attributes like, inventory management practices, warehousing management practices and distribution management practices. Literature tells as that supply chain practices through inventory management practices, warehousing management practices as well as distribution management practices can result to better healthcare service delivery. Healthcare service delivery can be measured through the heal service delivery variable is the dependent variable measured using the health service delivery model by WHO, (2010) with, comprehensiveness, accessibility, coverage, quality, person-centeredness and efficiency. However, the outcome might also be influenced by the intervening variables such as government regulations and policies, organizational resources, external resource controls and internal controls.

# CHAPTER THREE

# RESEARCH METHODOLOGY

# 3.0. Introduction

This chapter presents the research methodology, which include; research design, study area, study population, sample size, sampling techniques, sources of data, data collection instruments, quality assurance, measurement of variables, data analysis and presentation, ethical issues, and study limitations.

## **3.1. Research Design**

A research design is the structure, or the blueprint, of research that guides the process of research from the formulation of the research questions and hypotheses to reporting the research findings (Cooper and Schindler, 2010; Creswell. 2017). This study used a descriptive and case study research design. Descriptive research design is a design that is used when the researcher wants to describe specific behaviour as it occurs in the environment (Creswell, 2017). Mugenda and Mugenda (2003) contends that a survey that is a descriptive study essentially concerned with describing, recording, analyzing and interpretation of conditions that exist or that once existed or as they were or as they may be (Bryman & Bell, 2015). Surveys do not manipulate variables nor arrange for events to happen, but focuses only on conditions or relations that exist, opinions held, processes that are going on, effects that are evident or trends that are developing (Katamba and Nsubuga, 2014). The researcher used descriptive because it was one of the suitable methods to obtain information concerning current situations. A case study design is selected to get the required data since a case study is a complete study in itself can provide focused and valuable insights to phenomena that may otherwise be vaguely known or understood (Cooper and Schindler, 2010).

## **3.1.1. Research Approach**

The study also adopted mix approach using quantitative and qualitative approaches based on correlations and regressions and narratives transcribed from the interview guide. The researcher employed both research approaches because they complement one another. Using both helped cover more areas, while using only one approach was defective (Ferreira and Otley, 2010). Quantitative research approach is necessary for the growth of any organization. Insights drawn from hard numerical data and analysis prove to be highly effective when making decisions related to the future of the business (Saunders et al., 2009). [Qualitative research](https://www.questionpro.com/blog/qualitative-research-methods/) determines relationships between collected data and observations based on mathematical calculations. Theories related to a naturally existing phenomenon can be proved or disproved using statistical methods (Gall & Borg, 2009). This enables the analysis and description of the relationships between medical supply chain practices and health care service delivery in the study.

## **3.1.2. Research Strategy**

A cross sectional strategy was used; the researcher plans to carry out the research in two months in Tonj State Hospital in Tonj South County of Warrap State. Distribution of questionnaires and conducting interviews were all done within this period and focuses on the research topic, research objectives research questions.

# 3.1.3. Research Duration

This study was cross-sectional and a representation of events over a given period of time. This helped to gather data required from the administrators and the staff at large as indicated under the research schedule and covered a period of 6 months from June to November 2021.

## **3.2. Study Population**

The population of this research study consisted of management and staffs of Tonj State Hospital in Tonj South County, Warrap State of Sudan. In this case, the study targets a population of 125 respondents of whom 80 were support staffs in these hospitals and the 20 were from management staffs and 25 from the community leadership.

**Table 3.1: Population of the Study**

|  |  |  |
| --- | --- | --- |
| **Institution** | **Category** | **Population Size** |
| **Tonj State Hospital** | Management staff | 20 |
| Support Staff | 80 |
| Community Leadership | 25 |
| **Grand Total** |  | **125** |

***Source; Public Hospitals’ employee database.***

## **3.3. Sample Size and Selection**

A sample is defined by Oppenheim (1996) as a collection of some of subset elements of the population. Dealing with the whole population would be costly, time consuming, faces limited cooperation, less accurate, among other limitations and therefore, dealing with a smaller group of population elements yields better research convenience and reliability upon generalizations that apply to the whole population would apply. A sample of 109 from a population of 125 was used for the study in accordance with Krejcie and Morgan (1970) as appended in appendix I. And this yielded a sampling frame as indicated in table 3.2.

**Table 3.2: Sampling Frame**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Institution** | **Category** | **Population Size** | **Sample Size** | **Sampling Technique** |
| **Public Hospitals** | Management staff | 20 | 19 | Purposive sampling |
| Support Staff | 80 | 66 | Simple random sampling |
| Community Leadership | 25 | 24 | Purposive sampling |
| **Grand Total** |  | **125** | **109** |  |

***Source; Public Hospitals’ employee database &*** ***Krejcie and Morgan (1970)***

## **3.4 Sampling Design**

According to Kothari (2006), sampling is the selection of some parts of the aggregate of the totality based on judgment where the aggregate is done. A sample was used to generate sufficient data for the study. Methods used were a combination of random and purposive sampling techniques. Thus the sample size was determined by the pre-calculated table of Krejce & Morgan, (1970).

## **3.4.1. Simple Random Sampling**

This involved selecting respondents from the identified population by chance. According to Amin (2005) a good sample is one that is representative of the population from which it is drawn. This means that as much as possible most characteristics of the population should be presented in the sample selected.

The advantage with simple random sampling is that it allows the use of inferential statistics. It therefore enabled the researcher to determine how the characteristics of samples (statistics) are accurately represented the population parameters. It also allowed generalization of findings to a larger population with a margin of error that can be statistically determined.

## **3.4.2.** **Purposive Sampling**

This involved selecting a certain number of participants (Administrators of Tonj State Hospital) based on the nature of their work at the study area in this case. Mugenda and Mugenda (1999) noted that samples selected by purposive sampling methods comprise of Key informed respondents. This method was appropriate because the informed persons provided relevant data that is comprehensive enough to gain a better understanding of the problem at the study case.

## **3.5. Data Sources**

## **3.5.1. Primary Data**

Primary data refers to information in its original form as obtained from the actual authors or that which has not been altered in any way (Kankiriho, 2014). Mugenda and Mugenda (2012) cited that primary data refers to information that is gathered from the field. Primary data enhances reliability since it’s conducted by the investigator conducting the research. Concerning the field data method, the study used a questionnaire and interview guide. Questionnaires and interviews were useful in collecting primary data. This primary data was collected with the aid of a semi-structured questionnaire and this was analyzed using both descriptive and inferential statistics like Pearson’s correlation to establish the significance of the correlation between the medical supply chain practices and health care service delivery in Tonj State Hospital.

## **3.5.2. Secondary Data**

Secondary data as a source of data that can be evaluated to study past trends based on reports, public records, and other publications (Cooper and Schindler, 2010). According to Creswell, (2014), secondary data sources are those which have already been collected elsewhere for some other purpose but were used or adapted for the current study purpose, that is, document review. Secondary information/data was collected from different sources like; text books, internet, newspaper, magazines, and journals. This information was reviewed by visiting places like libraries and internet cafes and this type of information was used supplement the collected data from different categories of the respondents. Information obtained from these sources helped to complement the information obtained from primary sources (Amin, 2005).

# 3.6. Data Collection Methods

Data collection is defined as the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer queries, stated research questions, test hypotheses, and evaluate outcomes (Nemanja. J. 2009). The researcher used the following methods for collection of data for this study.

## **3.6.1. Survey.**

This study focused on collecting primary data was obtained directly from the respondents by use of questionnaires. The researcher prepared a set of questions pertaining to the field of enquiry. The questionnaire was in the form of Likert scale where respondents shall be required to indicate their views on a scale of 1 to 5 representing; [1]- Strongly Disagree, [2] - Disagree, [3] – Not Sure,[4]- Agree and [5]-Strongly Agree.

The Questionnaires was used because it is cheap to administer to the respondents that are expected to be scattered over several branches of the organization within a short period of time. Questionnaires also allowed respondents to feel free to give information and respondents answer the questions at their own time sometimes without the influence of the researcher (Amin, 2005).

Questionnaires are a popular means of data collection because they are inexpensive and can provide a broad perspective. They can be conducted face-to-face, by mail, telephone, or Internet, in which case, they can include respondents from anywhere in the world.

## **3.6.2. Face to Face Interviews.**

This method used to collect primary data from top officials from both administrators of Tonj State hospital, Community health leaders of Warrap State of South Sudan. Interview method basically relies on face-to-face interviews with the respondents in a bid to generate detailed and first-hand information. This involved the researcher personally interacting with the selected respondents with a set of pre-determined questions that they were required to respond to on a one-by-one basis. This chose to use a semi-structured interview guide (Sekaran, 2004). Interviews allowed the researcher to probe and prompt the answers as they arose from the key informants for deeper study findings.

## **3.6.3. Documentary Review.**

The document review was chosen to review a number of records and documents sources that exist on pharmaceutical industries and health service deliveries for secondary data collection. These documents were reviewed with an aim of collecting data and information that would verify what had been reported through questionnaires and interviews. Furthermore, public records were used in ascertaining the problems related to supply of medial resources.

## **3.7. Data Collection Instruments**

## **3.7.1. Self-Administered Questionnaire**

This tool allowed the collection of quantified data from a large number of respondents. The researcher prepared a set of questions pertaining to the field of enquiry. The designed questionnaire included mostly closed ended, although there were some open-ended questions.

The questionnaire was used because it is cheap to administer to the respondents that are scattered over a large area of the hospitals, within a short period of time. A questionnaire also allowed respondents to feel free to give information and respondents answer the questions at their own time sometimes without the influence of the researcher (Amin, 2005). The questionnaire were designed using the Likert scale format of Strong Agree to Strong Disagree.

## **3.7.2 Interview Guide**

In-depth interviews were conducted using the interview guide. The interview guide was unstructured and semi-structured. For either technique, the method enabled the researcher to collect accurate information from the officials who were selected to participate as key informants because; they were believed to have a wealth of experience and knowledge in medical supplies in public hospitals in South Sudan.

The instrument was used to ensure that reliable information is gathered because; it facilitated a deeper investigation into the topic under study. This technique helped the researcher to explain or clarify questions and find out the likeness. The interviews applied to administrators of Tonj State hospital, Community health leaders of Warrap State in South Sudan.

## **3.7.3. Document Review Guide.**

The researcher used the document review guide to review a number of sources that exist for secondary data collection. In here, review was done on existing working documents of the public hospitals. These were reviewed with an aim of collecting data and information that would verify what had been reported through questionnaires and interviews. Further, other records which were obtained from public documents that were used to ascertaining the problem being studied.

# 3.8. Data Quality Control

## **3.8.1. Validity**

Validity was defined by Vogt (2007) as the truth or accuracy of the research. Saunders et al (2009) adds that it is the extent to which the data collection instrument measures as well as the appropriateness of the measures coming to accurate conclusions. Validity tests were conducted for content, criterion & construct validity test how well the instrument was representative, captured relationships between the variables as well as measures the concepts (Saunders et al, 2009; Vogt, 2007; and Sekaran & Bougie, 2010). The researcher prepared research instruments and subjected them to validity tests before finally subjecting them to the respondents. The draft questionnaire were subjected to expert judgment including the supervisor of the researcher to verify the validity of the questions in line with Lynn (1986) where the researcher used Content Validity Index (CVI).

Bhattacherjie (2012) pointed out that CVI is concerned with assessing how well a set scale of items matches the relevant content domain of the construct that it intends to measure. The researcher distributed an initial draft questionnaire to 3(three) subject matter specialists in procurement as well as hospital management who were requested to validate the contents of the draft tool whose results were subjected to a CVI calculation whose formula is:

CVI = Total Number of items rated by all respondents as valid

 Total Number of items in the Instrument

The researcher sought to ensure that the draft tool content complied with the recommended content validity index of 0.7 and above according to Amin, (2005) which qualified the instrument for the study. Consideration of comments of the subject matter specialists on the contents of the instrument were done and improvements made accordingly.

## **Table 3.3: Determination of Validity of Instruments**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Anchor** | **Content Validity Index** |
| Warehousing practices  | 5-point | 0. 843 |
| Inventory management practices | 5-point | 0. 777 |
| Information flow practices | 5-point | 0. 785 |
| Health service delivery | 5-point | 0. 828 |

***Source: Primary data, (2021)***

According to the results in Table 3.3 above, Warehousing practices had Content Validity Index of 0.843; Inventory management practices had 0.777, Information flow practices had 0.785 and Health service delivery had 0.828. This shows that the values were high, hence valid. These results validated the data collection instrument and are supported by Rodrigues et al. (2017) who state that an I-CVI of 0.70 or higher is considered excellent.

## **3.8.2. Reliability**

Ahuja (2001) and Amin (2005) define reliability to mean the ability of instruments to collect the same data consistently under similar conditions. Reliability is further defined by Vogt (2007) as the consistency of either measurement or design to give the same conclusions if used at different times or by different scholars. The first step in ensuring reliability was by providing clear operational definitions of the variables under study. Thereafter, upon establishing the mentioned CVI, the researcher cleaned the draft questionnaire and pretested it on ten respondents using the “test-retest” technique with a time frame of four weeks between the testing and re-testing.

This facilitated the easy understanding of the tool by the proposed respondents in line with the assertion by Mugenda and Mugenda (1999) and enabled the researcher establish if the tool was able to solicit similar responses at different times (Amin, 2005) thus proving reliability. From this, the researcher was able to make improvements on the tools (Bhattacherjie, 2012) thus improving reliability. Thereafter, internal consistency (how items correlate amongst themselves) was measured through internal consistency reliability (Sekaran & Bougie, 2010) as well as split-half reliability using Cronbach alpha, basing on the fact that the questionnaire had closed ended question, which used a Likert scale as indicated below.

**Table 3.4: Cronbach Alpha Coefficient Model Results Table**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Anchor** | **Cronbach Alpha Coefficient** |
| Warehousing practices  | 5-point | 0. 803 |
| Inventory management practices | 5-point | 0. 831 |
| Information flow practices | 5-point | 0. 782 |
| Health service delivery | 5-point | 0. 822 |

***Source: Primary data, (2021)***

According to the results in Table 3.4 above, Warehousing practices had Cronbach Coefficient of (α = 0.803); Inventory management practices had (α = 0.831), Information flow practices had (α = 0.782) and Health service delivery had (α = 0.822). All alpha coefficients were above 0.7 implying that the data collection instrument was reliable. This is supported by Daud et al. (2018) who state that Alpha Cronbach values ranging 0.6-0.8 are considered moderate but acceptable.

## **3.9. Data Collection Procedure**

Before going for data collection, the researcher followed all the professional guidelines of researchers including acquisition of an introductory letter from School of Business Administration and Information Technology, Nkumba University and permission from the Manager Human Resources of Tonj State Hospital in Warrap State to conduct a research in the health facility. At the same time, the researcher before engaging particular respondents, the researcher requested for an oral or written consent. Then the questionnaire and interview guides were distributed and conducted among the respondents and key informants, respectively. After a specified time scale agreed with participants, the researcher collected the filled instruments. The collected data was at this point set for editing, coding, and analysis.

## **3.10. Data Presentation and Analysis**

The researcher upon gathering data intends to use word processors to enter key words into the text field notes and data was compiled, sorted, edited and coded to have the required quality, accuracy and completeness and others was entered into the computer using the Statistical Package for Social Sciences (SPSS V. 23.0) for analysis and during the analysis of the data, descriptive statistics was used to present the results of the sample characteristics.

Other data also was summarized the in tables which makes the findings easy to understand and led to clear conclusions to stakeholders. In addition, micro soft excel was also used to regress the research variables in order to determine the relationship between the independent variable and the dependent variable. Data was presented according to the research findings after being processed mainly in form of tables, and discussions. The tabulation helped in determining the existence of the effect between the variables to determine the validity of the data.

Corelation analysis which is “used when the researcher is interested in finding out whether there exists a relationship between the variables” (Mugenda & Mugenda, 1999) was used to establish where there existed a relationship between medical supply chain practices and health service delivery. The researcher used both descriptive and inferential statistics to analyze data.

## **3.11. Ethical Issues**

The researcher obtained an introductory letter from the school of business administration and information Technology Nkumba University and presented it to the HRs of Tonj State Hospital in Warrap State of South Sudan seeking permission to carry out the research from the organization. Later the researcher made an appointment with specific employees and hospital administrators that were sampled.

No names of respondents or names of employees and managers were used either on the questionnaires or in the final- results of this study. The researcher kept filled data forms jealously and confidentially. The participants sign informed consent forms after they agree to participate in the study.

## **3.12. Limitations of the Study**

1. The researcher used sampling technique to collect data from the respondents hence, not all employees was contacted and so some significant information may have been missing out which may lead to errors in the findings. This was mitigated by use of multi data collection techniques.
2. The study was limited by time and other logical issues to use the data collection tools adequately to get complete information. However, the researcher used a case study design to alleviate this drawback.
3. The study was conducted in Warrap State, using Tonj State Hospital as a case study. This means that the study had geographical limitations. However, the researcher used quantitative data collections approach to collect enough data from a large number of respondents.
4. The study was a case study which means a short-term study and could lead to making errors in conclusions on the findings to the study. The researcher used the multi data collection techniques to mitigate making wrong conclusions using appropriate data collection tools that is self-administered questionnaire.
5. The study faced some limitations with respect to the time frame within which the data was to be collected from the respondents. The respondents were very busy hence requiring constant reminders so as to attend to the questionnaire. Out of the questionnaires sent to the field, a number of them were not received back. The receipt of this could have led to an improvement in the conclusions drawn in the study.
6. Some respondents could not volunteer divulge all the vital information that the researcher had requested through the research tools for fear of losing their jobs. Some government officials and management of the hospital also feared that the employees could expose some of their weaknesses by responding to the research tools. The researcher however made effort of convincing the respondents that the information exchanged was confidential and only to be used for academic purposes.

# CHAPTER FOUR

# DEMOGRAPHC CHARACTERISTICS OF RESPONDENTS

## **4.0. Introduction**

This part shows the general background information about the respondents of the study. This includes; gender, age bracket, level of education, marital status, level of education, department of the respondents of respondents and their working experience. The analysis is based on the data collected using questionnaires and interview guide which were answered by the target respondents. These findings were analyzed using SPSS version 23, Microsoft excel and Microsoft word and presented in tables and percentages as it gives a clear understanding of the study findings.

## **4.1. Response Rate**

Response rate in [survey](http://en.wikipedia.org/wiki/Statistical_survey) research refers to the number of people who answered the survey divided by the number of people in the [sample](http://en.wikipedia.org/wiki/Sample_%28statistics%29). It is usually expressed in the form of a [percentage.](http://en.wikipedia.org/wiki/Percentage) Therefore, response rate is viewed as an important indicator of survey quality. According to Amin (2005), posits that higher response rates assure more accurate survey results. The researcher had a sample size of 109 respondents and a total of 109 sets of the instruments were distributed. Out of these, a total of 105 were returned making a response rate of 96.3% and therefore this was used in the analysis of findings.

## **4.2. Demographic Characteristics of the Respondents**

The demographic characteristic of the sample that were considered important for this study are; gender, age bracket, level of education, marital status, level of education, department of the respondents of respondents and their working experience as indicated in the tables below.

#

## **4.2.1. Gender of the Respondents**

A descriptive analysis of the respondent’s gender was carried out and the results were as presented in table 4.1 below.

**Table 4.1: Respondents’ Gender**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Male | 64 | 60.9 | 60.9 |
| Female | 41 | 39.1 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 4.1, the highest proportion 64 (60.9%) of the study respondents were males and the rest 41 (39.1%) were females. This result implies observance of gender balance in the study. Both men and women were given approximately equal opportunities to take part in the study. Creswell (2014) contends that data collection that integrates responses from both genders is consistent than data from a single gender.

#

## **4.2.2 Age of the Respondents**

A descriptive analysis of the age of the different study participants was carried out and the results were as presented in table 4.2 below.

**Table 4.2: Age of Respondents**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
|  | Below 26 years | 14 | 13.3 | 13.3 |
| 26-35 | 26 | 24.8 | 38.1 |
| 36-45 | 35 | 33.3 | 71.4 |
| 46-55 | 20 | 19.1 | 90.5 |
| Above 55 years | 10 | 9.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 4.2, 14 (13.3%) of the respondents were below 26 years, 26 (24.8%) of the respondents were between 26-35 years of age; 35 (33.3%) of the respondents were between 36- 45 years of age; 20 (19.1%) of the respondents were between 46-55 years of age where as 10 (9.5%) were above 55 years of age. This result implies that most of the employees in Tonj State Hospital are in the youthful age group (at most 35 years of age) and had acquired enough experience in taking favorable decision on their medical supply chain practices and control.

These findings are supported by Amin (2005), who asserted, if majority age of the respondent is above 18 years, it adds value to the study since the responses given by mature people are well thought through. It is also in agreement with the findings by Price (2006) who maintained that there are two natural age peaks correlated to entrepreneurship, namely the late twenties and mid-forties. The study findings are almost similar to a study done in America by Muijanack, Vroonhof and Zoetmer (2003) who determined that the optimum age for entrepreneurs was 25-35. The age of 25-35 is therefore the age at which entrepreneurial capacity of the respondents was active as shown in above table.

## **4.2.3. Marital Status of the Clients.**

The study also established the marital status of the respondents, the table 4.3 shows the results relating to the marital status.

**Table 4.3: Marital Status**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Married | 53 | 50.5 | 50.5 |
| Single | 31 | 29.5 | 80.0 |
| Separated | 10 | 9.5 | 89.5 |
| Divorced | 03 | 2.9 | 92.4 |
| Widowed | 08 | 7.6 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 4.3, 50 (50.5%) of the respondents were between were married, 31(29.5%) of the respondents were single, 10(9.5%) of the respondents had separated from their partners and 03(2.9%) of the respondents had divorced from their partners while the rest 08(7.6%) of the respondents were widowed. The gender distribution of the respondents implies that most of the people working in Tonj State Hospital are married indicating and they cannot easily leave their areas of operation in the process of providing their services to the health institute.

## **4.2.4. Level of Education of the Respondents**

Quantitative analysis of the level of education of the participants was considered and presented in tale 4.4 below.

**Table 4.4: Education Level of the Respondents**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | PhD | 05 | 4.8 | 4.8 |
| Master’s Degree | 08 | 7.6 | 12.4 |
| Bachelors | 42 | 40.0 | 52.4 |
| Diploma  | 28 | 26.7 | 79.1 |
| Certificate | 22 | 20.9 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 4.4, 05(4.8%) of the respondents had done PhD in various courses, 08(7.6%) of the respondents were Masters Holders, 42(40%) of the respondents had had Bachelor’s Degree and 28(26.7%) had diplomas in various fields while 22(20.9%) had done certificates in various fields. Majority of respondents were degree holders, this therefore implying that the respondents had acquired a reasonable level of knowledge about the subject under study. The results also indicated that the information got during the research can be depended on as majority of the respondents were educated with capability of internalizing issues and making independent decisions.

In this regard, the information provided in this study can be relied upon since a good number of the respondents were learned and could do enough research and make informed decisions especially on the issues regarding the study variables. This is in line with Fujii, (2017) investigations in social science research should have some acceptable level of learning in order for them to interpret the content of the study. Uma (2000) who argued that it is important in social investigation research to involve people that have attained an acceptable level of literacy and numeracy in order to be in position to understand and interpreted the content in questionnaire.

**4.5. Departments of the Respondents**

Quantitative analysis of the departments of the participants was considered and presented in tale 4.5 below.

## **Table 4.5: Departments of the Respondents**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Procurement | 28 | 26.7 | 26.7 |
| Marketing | 32 | 30.5 | 57.2 |
| Accounting & Finance | 15 | 14.3 | 71.5 |
| Stores and Inventory Management  | 11 | 10.5 | 82.0 |
| ICT and Systems Administration | 19 | 18.0 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 4.5 indicates that, 28(26.7%) were from procurement department, 32(30.5%) were from marketing, 15(14.3%) were from accounting & finance and 10(10.5%) were from stores and inventory management while 19(18%) were from ICT and systems administration in Tonj Stae Hospital. This implies that the majority of respondents were capable and had capacity to provide precise and concise information on medical supply chain practices and health care service delivery in Tonj Stae Hospital, South Sudan.

## **4.2.6. Working Experience**

Respondents were asked about their working experience and the study findings are indicated in 4.6 below;

**Table 4.6: Working Experience of the Respondents**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | 0-4 years | 27 | 25.7 | 25.7 |
| 5-9 years | 38 | 36.2 | 61.9 |
| 10-14years | 24 | 22.9 | 84.8 |
| 15 and above years | 16 | 15.2 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 4.6 above indicate that 27(25.7%) of the respondents had worked in Tonj State Hospital for a period between 0-4 years, 38(36.2%) had worked in the hospital for a period between 5-9 years and 24(22.9%) had worked between 10-14 years while 16(15.2%) had worked for over 15 and above years.

This reveals that quite a number of respondents in the population were not that very old in the system, but with a good blend to provide very good ideas and responses. The inclusion of both new and old workers was to provide a balance in responses and ideas. This result is consistent with previous empirical studies on the age of enterprises in South Africa by Rwigema and Karungu (1999), in a study of enterprises in Johannesburg, stipulate that forty seven percent (47%) of enterprises surveyed had operated between one and ten years.

# CHAPTER FIVE

# WAREHOUSING MANAGEMENT PRACTICES ON HEALTH SERVICE DELIVERY IN TONJ STATE HOSPITAL.

## **5.0. Introduction**

The study findings and analysis are presented in this chapter. The purpose of the study was to establish the effects of effect of warehousing management practices on health service delivery in Tonj State Hospital. The discussions of the study findings were done in line with the study objectives.

One of the study objectives was to examine the effect of effect of warehousing management practices on health service delivery in Tonj State Hospital. As indicated in the research methodology, the data was collected using a closed ended questionnaire under different statements and the results of analysis are presented in the table below;

## **5.1. The hospital management does proper selection and location of warehouses**

The researcher saw that there was need to find out whether the hospital management did proper selection and location of her warehouses. Therefore, different statements concerning this effect were posed to the respondents and the responses are presented as below in table 5.1;

**Table 5.1: The hospital management does proper selection and location of warehouses**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 09 | 8.6 | 8.6 |
| Disagree | 15 | 14.3 | 22.9 |
| Not Sure | 11 | 10.5 | 33.4 |
| Agree | 58 | 55.2 | 88.6 |
| Strongly Agree | 12 | 11.4 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.1, 09(8.6%) of the respondents strongly disagreed with the statement; 15(14.3%) of the respondents disagreed with the statement; 11(10.5%) were not sure of the statement response and 58(55.2%) of the respondents agreed with the statement, while 12(11.4%) of the respondents strongly agreed with the statement. The majority of the respondents, 58(55.2%) generally agreed with the statement and this is an implication that the hospital management did proper selection and location of warehouses.

In the interview with one of the hospital administrators, he revealed;

*“The hospital has good store room management in protection of drugs from sun light, good arrangement of products in alphabetical order which is similar to the assessment made using observation.”*

## **5.2. The hospital’s distribution center enables order processing and delivery of goods directly to customers under one roof**

The respondents were asked whether the hospital’s distribution center enabled order processing and delivery of goods directly to customers under one roof and the results attained are presented in table 5.2 below;

**Table 5.2: The hospital’s distribution center enables order processing and delivery of goods directly to customers under one roof**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 18 | 17.1 | 17.1 |
| Disagree | 7 | 6.7 | 23.8 |
| Not Sure | 17 | 16.2 | 40.0 |
| Agree | 52 | 49.5 | 89.5 |
| Strongly Agree | 11 | 10.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.2, 18 (17.1%) of the respondents strongly disagreed with the statement; 7 (6.7%) of the respondents disagreed with the statement; 17 (16.2%) were not sure of the statement response and 52 (49.5%) of the respondents agreed with the statement and none strongly agreed with the statement, while 11 (10.5%) of the respondents strongly agreed with the statement.

The majority, 52 (49.5%) generally agreed with the statement and this is an implication that the hospital’s distribution center enabled order processing and delivery of goods directly to customers under one roof.

In the interview with one of the hospital administrators, he revealed;

*“In the hospital there are excellent storeroom and inventory management practices. However, this slightly differs from the assessment made using observation in which products arrangement in alphabetical order was average.”*

## **5.3. The hospital’s distribution centers generally keep goods for longer periods**

The respondents were asked whether the hospital’s distribution centers generally kept goods for longer periods. The results attained are presented in table 5.3 below;

**Table 5.3: The hospital’s distribution centers generally keep goods for longer periods**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 4 | 3.8 | 3.8 |
| Disagree | 18 | 17.1 | 19.6 |
| Not Sure | 8 | 7.6 | 27.2 |
| Agree | 61 | 58.1 | 85.3 |
| Strongly Agree | 14 | 13.3 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021).***

According to the findings in table 5.3, 4 (3.8%) of the respondents strongly disagreed with the statement; 17 (17.1%) of the respondents disagreed with the statement, 8 (7.6%) were not sure of the statement response; 61 (58.1%) of the respondents agreed with the statement; 14 (13.3%) of the respondents strongly agreed with the statement.

Majority of the respondents, 61 (58.1%) generally agreed with the statement. This means that hospital’s distribution centers generally kept goods for longer periods hence determining health care service delivery of the public hospital.

## **5.4. The hospital has a storage system of holding and preserving goods**

The respondents were asked whether the hospital had a storage system of holding and preserving goods. The results attained are presented in table 5.4 below;

**Table 5.4: The hospital has a storage system of holding and preserving goods**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Disagree | 19 | 18.1 | 18.1 |
| Not Sure | 08 | 7.5 | 25.6 |
| Agree | 68 | 64.8 | 90.4 |
| Strongly Agree | 10 | 9.6 | **100.0** |
| **Total** | **80** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.4, 19 (18.1%) of the respondents strongly disagreed with the statement; 8 (7.5%) of the respondents disagreed with the statement; none of the respondents was not sure of the statement response; 68 (64.8%) of the respondents agreed with the statement; while 10 (9.6%) of the respondents strongly agreed with the statement.

The largest percentage of the respondents, 64.8% generally agreed with the statement. This means that the hospital had a storage system of holding and preserving goods.

In the interview with one of the hospital administrators, she stated;

*“There is also proper fire prevention and extinguishing equipment in place. The stores were found to be locked at all times with adequate locks and keys when not in use. The lighting and ventilation in the store rooms of the hospitals is good.”*

## **5.5. This hospital maintains adequate inventory size and mix**

The respondents were asked whether the hospital maintained adequate inventory size and mix and the results attained are presented in table 5.5 below;

**Table 5.5: This hospital maintains adequate inventory size and mix**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Disagree | 20 | 19.1 | 19.1 |
| Agree | 60 | 57.1 | 76.2 |
| Strongly Agree | 25 | 23.8 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.5, none of the respondents strongly disagreed with the statement; 20 (19.1%) of the respondents disagreed with the statement; none of the respondents was not sure of the statement response; 60 (57.1%) of the respondents agreed with the statement; while 25 (23.8%) of the respondents agreed with the statement. Majority of respondents, 60 (57.1%) generally agreed with the statement, which implied that the hospital maintained adequate inventory size and mix.

In the interview with one of the supervisors in the hospital, she stated;

*“Supplies are arranged in alphabetical order on the shelves, windows are secured with curtains and grills, good store ceiling condition assessed that had no dampness this differed from the results of the observation made were store ceiling condition in the hospital was average for it is right to say that store ceiling in one hospital was good and in another was not good.”*

##

## **5.6. In this hospital, supplies are delivered in the right place and on time to the right customer**

The respondents were asked whether in this hospital, supplies are delivered in the right place and on time to the right customer and the results attained are presented in table 5.6;

**Table 5.6: In this hospital, supplies are delivered in the right place and on time to the right customer**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Disagree | 59 | 56.2 | 56.2 |
| Not Sure | 11 | 10.5 | 66.7 |
| Agree | 25 | 23.8 | 90.5 |
| Strongly Agree | 10 | 9.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.6, 59 (56.2%) of the respondents disagreed with the statement; 11 (10.5%) were not sure, 25 (23.8%) of the respondents agreed with the statement, and 10 (9.5%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 59 (56.2%) generally disagreed with the statement. This means that in this hospital, supplies were not delivered in the right place and on time to the right customer, something that affects the health care service delivery in the community.

However, in the interview with one of the administrators, she stated;

 *“Supplies are stored in the order in which they came in the stores (FIFO). There is traceability of batches and use of stock keeping forms such as stock card, bin card, and stock ledger and the regular physical count of medicines stock at the hospitals are average.”*

## **5.7. In this hospital, effective service of customers depends on the operations of the warehouse**

The respondents were asked whether in this hospital, effective service of customers depends on the operations of the warehouse, the results attained are presented in table 5.7 below;

**Table 5.7: In this hospital, effective service of customers depends on the operations of the warehouse**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Disagree | 12 | 11.4 | 11.4 |
| Agree | 73 | 69.5 | 80.9 |
| Strongly Agree | 20 | 19.1 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.7, 12 (11.4%) of the respondents disagreed with the statement; none of the respondents was not sure of the statement response; 73 (69.5%) of the respondents agreed with the statement and 20 (19.1%) of the respondents strongly agreed with the statement.

The largest percentage of the respondents, 73 (69.5%) generally agreed with the statement. This implied that in the hospital, effective service of customers depended on the operations of the warehouse.

## **5.8. This hospital has got an IT function which ensures that technology for the efficiency of storage is use**

The respondents were asked whether the hospital had got an IT function which ensures that technology for the efficiency of storage is use and the results attained are presented in table 5.8 below;

**Table 5.8: The hospital has got an IT function which ensures that technology for the efficiency of storage is use**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Disagree | 20 | 19.0 | 19.0 |
| Agree | 68 | 64.8 | 83.8 |
| Strongly Agree | 17 | 16.2 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 5.8, none of the respondents strongly disagreed with the statement; 20 (19%) of the respondents disagreed with the statement; none of the respondents was not sure of the statement response; 68 (64.8%) of the respondents agreed with the statement; while 17 (16.2%) of the respondents agreed with the statement. Majority of respondents, 68 (64.8%) generally agreed with the statement. This means that the hospital has got an IT function which ensures that technology for the efficiency of storage is use.

# 5.9. Relationship between warehousing management practices and health service delivery in Tonj State Hospital

The first hypothesis was that there was a positive significant relationship between warehousing management practices on health service delivery in Tonj State Hospital. To determine the degree of the relationship, a Pearson’s correlation coefficient analysis was run as follows;

**Table 5.9: Correlation for warehousing management practices on health service delivery in Tonj State Hospital**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Warehousing management practices | Health service delivery |
| Warehousing management practices | Pearson CorrelationSig. (2-tailed)N  | 1105 | .634\*\*.000105 |
| Health service delivery | Pearson CorrelationSig. (2-tailed)N  | .634\*\*.000105 | 1105 |
| \*\*. **Correlation is significant at the 0.01 level (2-tailed).** |  |

***Source: Primary data (2021)***

Pearson’s Correlation Coefficient for warehousing management practices on health service delivery was r = 0.634, which was positive with probability value (p = 0.000) that is less than α = 0.01 level of significance showing a strong positive relationship between warehousing management practices on health service delivery. The results provide justification that if in Tonj State Hospital improves medical supply chain practices through warehousing management practices, this would enhance optimum level of health care service delivery in the public hospital as illustrated in table 5.9 above.

# CHAPTER SIX:

# INVENTORY MANAGEMENT PRACTICES ON HEALTH SERVICE DELIVERY IN TONJ STATE HOSPITAL

## **6.0. Introduction**

The third objective of the study was to establish the effect of inventory management practices on health service delivery in Tonj State Hospital. The frequency and percentage scores were computed using SPPS as presented below.

## **6**.1. The hospital’s storage system is carefully planned and coordinated to achieve the objectives of storekeeping

Respondents were asked whether the hospital’s storage system was carefully planned and coordinated to achieve the objectives of storekeeping, the results obtained are presented in table 6.1 as below;

**Table 6.1: The** hospital’s storage system is carefully planned and coordinated to achieve the objectives of storekeeping

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 15 | 14.3 | 14.3 |
| Disagree | 5 | 4.8 | 19.1 |
| Not Sure | 10 | 9.5 | 28.6 |
| Agree | 50 | 47.6  | 76.2 |
| Strongly Agree | 25 | 23.8 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 6.1, 15 (14.3%) of the respondents strongly disagreed with the statement; 5 (4.8%) of the respondents disagreed with the statement; 9.5 (28.6%) were not sure of the statement response; 50 (47.6%) of the respondents agreed with the statement; 25 (23.8%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 50 (47.6%) generally agreed with the statement and this implies that the hospital’s storage system was carefully planned and coordinated to achieve the objectives of storekeeping.

In an interview with some of the hospital administrators stated;

*“The store rooms are tidy with shelves dusted, floors swept and walls clean with no signs of infestation of pests as reported by the pharmacists.”*

In another interview with one of the hospital administrators, it was stated;

*“Expiry management practices which include; good record for expired drugs in the hospitals assessed, separate storage of unexpired drugs from expired drugs are done well in the hospitals.”*

## **6.2. The hospital’s storage system aims at smooth functioning of the whole organisation, perfect coordination**

The respondents were asked whether the hospital’s storage system aimed at smooth functioning of the whole organisation, perfect coordination and the results attained are presented in table 4.16;

**Table 6.2: The hospital’s storage system aims at smooth functioning of the whole organisation, perfect coordination**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 20 | 19.0 | 19.0 |
| Disagree | 28 | 26.7 | 45.7 |
| Not Sure | 6 | 5.7 | 51.4 |
| Agree | 40 | 38.1 | 89.0 |
| Strongly Agree | 11 | 10.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 6.2, 20 (19%) of the respondents strongly disagreed with the statement; 28 (26.7%) of the respondents disagreed with the statement; 6 (5.7%) were not sure, 40 (38.1%) agreed with the statement; 10 (10.5%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 40 (38.1%) generally agreed with the statement. This means that the hospital’s storage system aimed at smooth functioning of the whole organisation, perfect coordination.

## **6.3. The hospital’s responsiveness is within the expectations of customers and this response is continuously improved**

The respondents were asked whether goods are inspected on receipt and during issuing out to reduce on discrepancies for correct consignments and the results attained are presented in table 6.3 below.

**Table 6.3: The hospital’s responsiveness is within the expectations of customers and this response is continuously improved**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 4 | 3.8 | 3.8 |
| Disagree | 10 | 9.5 | 13.3 |
| Not Sure | 19 | 18.1 | 31.4 |
| Agree | 59 | 56.2 | 87.6 |
| Strongly Agree | 13 | 12.4 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 6.3, 4 (3.8%) of the respondents strongly disagreed with the statement; 10 (9.5%) disagreed with the statement; 19 (18.1%) were not sure of the statement response; 59 (56.2%) agreed and 13 (12.4%) of the respondents strongly agreed with the statement. This means that the hospital’s responsiveness was within the expectations of customers and this response was continuously improved for quality health care service delivery.

## **6.4. At this public hospital, stock management is essential for the efficient management of organizations**

The respondents were asked whether theat the public hospital, stock management was essential for the efficient management of organizationsand the results attained are presented in table 4.16;

**Table 6.4: At this public hospital, stock management is essential for the efficient management of organizations**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 9 | 8.6 | 8.6 |
| Disagree | 14 | 13.3 | 21.9 |
| Agree | 68 | 64.8 | 86.7 |
| Strongly Agree | 14 | 13.3 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Findings from table 6.4 indicates that, 9 (8.6%) of the respondents strongly disagreed with the statement; 14 (13.3%) of the respondents disagreed with the statement; 68 (64.8%) agreed to the statement and 14 (13.3%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 68 (64.8%) generally agreed with the statement. This means that at Tonj State Hospital, stock management was essential for the efficient management of organizations and improved health care service delivery.

## **6.5. At this public hospital, lead time management encourages us to deliver services in accordance with customers’ needs**

The respondents were asked whether at the public hospital, lead time management encouraged them to deliver services in accordance with customers’ needs, and the results attained are presented in table 6.5 below;

## **Table 6.5: At this public hospital, lead time management encourages us to deliver services in accordance with customers’ needs**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 6 | 5.7 | 5.7 |
| Disagree | 4 | 3.8 | 9.5 |
| Not Sure | 2 | 1.9 | 11.4 |
| Agree | 79 | 75.3 | 86.7 |
| Strongly Agree | 14 | 13.3 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 6.5, 6 (5.7%) of the respondents strongly agreed with the statement; 4 (3.8%) of the respondents agreed with the statement; 2 (1.9%) were not sure, 79 (75.3%) disagreed whereas 14 (13.3%) of the respondents strongly disagreed with the statement. Majority of the respondents, 79 (75.3%) generally agreed with the statement. This means that at Tonj State Hospital, lead time management encouraged the staff to deliver services in accordance with customers’ needs

#

# 6.6. At this public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management

The respondents were asked whether the public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management. Results obtained are indicated as follows in table 6.6.

**Table 6.6: At this public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 8 | 7.6 | 7.6 |
| Disagree | 19 | 18.1 | 25.7 |
| Not Sure | 7 | 6.7 | 32.4 |
| Agree | 59 | 56.2 | 88.6 |
| Strongly Agree | 12 | 11.4 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

As shown in table 6.6, it is observed that the respondents that 8 (7.6%) disagreed 19 (18.1%) disagreed to the statement, 7 (6.7%) were not sure, 59 (56.2%), and 12 (11.4%) strongly agreed. Majority of respondents as indicated, 59 (56.2%) generally agreed implying that in Tonj public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management.

Further this was supported by the one of the store keeper in the hospital in an interviewer;

*“Pharmacists are responsible for stocking and receiving medicines, stock cards existed for each and every product in the store, stock cards are kept on the same shelves as the items, drugs requisitions by the various departments are recorded, logistic management system report forms include quantities used, losses and adjustments, stock on hand forms and the hospitals dispatched stock based on First In First Out.”*

Another hospital administrator was quoted saying’

*“Expired and damaged medicines are quarantined and separated from items in the storage area.”*

## **6.7. The hospital recognizes the role of capacity utilization in the formation and maintenance of competitive advantage**

The respondents were asked whether Tonj State Hospital recognized the role of capacity utilization in the formation and maintenance of competitive advantage and the results are contained in table 6.7 below.

**Table 6.7: The hospital recognizes the role of capacity utilization in the formation and maintenance of competitive advantage**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 10 | 9.5 | 9.5 |
| Disagree | 7 | 6.7 | 16.2 |
| Not Sure | 5 | 4.8 | 21.0 |
| Agree | 60 | 57.1 | 78.1 |
| Strongly Agree | 23 | 21.9 | **100.0** |
| **Total** | **105** | **100.0** |  |

**Source: Primary data (2021)**

According to the findings in table 6.7, 10 (9.5%) of the respondents strongly disagreed with the statement; 7 (6.7%) of the respondents disagreed with the statement; 5 (4.8%) were not sure, 60 (57.1%) agreed and 23 (21.9%) strongly agreed with the statement. The largest percentage of the respondents, 60 (57.1%) generally agreed. This means that Tonj State Hospital recognized the role of capacity utilization in the formation and maintenance of competitive advantage.

## **6.8. The hospital has enough the tools to quickly assess the level of capacity utilization**

The respondents were asked whether there is periodical and continuous stocktaking to avoid unnecessary discrepancies to maintain standard measures and the results attained are presented in table 6.8 below;

**Table 6.8: The hospital has enough the tools to quickly assess the level of capacity utilization**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 27 | 25.7 | 25.7 |
| Disagree | 48 | 45.7 | 71.4 |
| Not Sure | 9 | 8.6 | 80.0 |
| Agree | 13 | 12.4 | 92.4 |
| Strongly Agree | 8 | 7.6 | **100.0** |
| Total | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 6.8, 27 (25.7%) of the respondents strongly disagreed with the statement; 48 (45.7%) of the respondents disagreed with the statement; 9 (8.6%) were not sure of the statement response; 13 (12.4%) of the respondents agreed with the statement; 8 (7.6%) of the respondents strongly agreed with the statement. Results show that majority of respondents 48 (45.7%) generally disagreed with the statement. This implied that Tonj state hospital didn’t have enough the tools to quickly assess the level of capacity utilization.

##

## **6.9. Relationship between inventory management practices on health service delivery in Tonj State Hospital.**

The second hypothesis was that there was a strong significant relationship between stock taking and performance of Save the Children International. Further to determine the degree of the relationship, a Pearson’s correlation coefficient analysis was computed as shown in the table below;

## **Table 6.9: Relationship between inventory management practices on health service delivery in Tonj State Hospital.**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Inventory management practices | Health service delivery |
| Inventory management practices | Pearson CorrelationSig. (2-tailed)N  | 1105 | .782\*\*.000105  |
| Health service delivery | Pearson CorrelationSig. (2-tailed)N  | .782\*\*.000105 | 1105 |
| **\*\*. Correlation is significant at the 0.01 level (2-tailed).** |  |

***Source: Primary data (2021)***

Pearson’s Correlation Coefficient for inventory management practices and health service delivery was r = 0.782, which was positive with probability value (p = 0.000) that is less than α = 0.01 level of significance showing a positive strong relationship between inventory management practices and health service delivery. The results provide justification that if medical supply chain practices were effective through inventory management practices, then there is a high probability of improving health service delivery in the hospital as illustrated in table 4.23 above.

# CHAPTER SEVEN:

# INFORMATION FLOW MANAGEMENT PRACTICES ON HEALTH SERVICE DELIVERY IN TONJ STATE HOSPITAL

## **7.0. Introduction**

Data analysis was based on this study objective and results were presented from the following statements in a questionnaire and interview guide.

##

## **7.1. Information Flow Management Practices**

## **7.1.1. There is smooth information flow to all logistics functions of the hospital**

The respondents were asked whether there was smooth information flow to all logistics functions of the hospital. The results attained are presented in table 7.1 below.

**Table 7.1: Table: There is smooth information flow to all logistics functions of the hospital**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 12 | 11.4 | 11.4 |
| Disagree | 59 | 56.2 | 67.6 |
| Not Sure | 6 | 5.7 | 73.3 |
| Agree | 20 | 19.1 | 92.4 |
| Strongly Agree | 8 | 7.6 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.1, 12 (11.4%) of the respondents strongly disagreed with the statement; 59 (56.2%) of the respondents disagreed with the statement; 6 (5.7%) were not sure 20 (5.7%) agreed and 8 (7.6%) strongly agreed. Results show that majority, 59 (56.2%) generally disagreed with the statement. This implied there are no smooth information flow to all logistics functions of the hospital, a factor that affected the effectiveness of health care delivery in Tonj State Hospital.

The agreement was supported by one of the beneficiaries who stated in an interview survey that;

*“The information on staff roles in the stores as to monitor flow of medicines and to receive medicines and check the stock card is not clear.*”

## **7.1.2. There is practice of internal information sharing**

The respondents were asked whether in the hospital, there was practice of internal information sharing and the results attained are presented in table 7.2.

**Table 7.2: There is practice of internal information sharing**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 9 | 8.6 | 8.6 |
| Disagree | 14 | 13.3 | 21.9 |
| Not Sure | 15 | 14.3 | 36.2 |
| Agree | 49 | 46.7 | 82.9 |
| Strongly Agree | 18 | 17.1 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.2, 9 (8.6%) of the respondents strongly disagreed with the statement; 14 (13.3%) of the respondents disagreed with the statement; 15 (14.3%) were not sure, 49 (46.7%) agreed and 18 (17.1%) of the respondents strongly agreed with the statement. According to the results majority of respondents, 49 (46.7%) generally agreed disagreed with the statement. This means that there was practice of internal information sharing in the public hospital.

One of the hospitals administrators was quoted saying;

*“There is need to strengthen the logistics processes of the hospital through planning, tracking, collaboration and tracking logistics processes”*

## **7.1.3. The hospital management has invested on information communication systems**

The respondents were asked whether receiving, issuing, accounting and storing responsibilities are properly segregated to ensure responsibly performance of each department the results attained are presented in table 7.3;

**Table 7.3: The hospital management has invested on information communication systems**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Frequency | Percent | Cumulative Percent |
| Valid | Strongly Disagree | 17 | 16.2 | 16.2 |
| Disagree | 22 | 20.9 | 37.1 |
| Not Sure | 11 | 10.5 | 47.6 |
| Agree | 41 | 39.1 | 86.7 |
| Strongly Agree | 14 | 13.3 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.3, 17 (16.2%) of the respondents strongly disagreed with the statement; 22 (20.9%) disagreed with the statement; 11 (10.5%) were not sure and 41 (39.1%) agreed while 14 (13.3%) of the respondents strongly agreed with the statement. Majority of the respondents, 41 (39.1%) generally agreed with the statement. This means that the hospital management had on a small extent invested on information communication systems, which influences the quality of health care service delivery in the public hospital.

##

## **7.1.4 The hospital has achieved accurate demand forecasting**

The respondents were asked whether the hospital had achieved accurate demand forecasting and the results attained are presented in table 7.4;

**Table 7.4: The hospital has achieved accurate demand forecasting**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 11 | 10.5 | 10.5 |
| Disagree | 57 | 54.3 | 64.8 |
| Not Sure | 8 | 7.6 | 72.4 |
| Agree | 24 | 22.8 | 95.2 |
| Strongly Agree | 5 | 4.8 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.4, 11 (10.5%) of the respondents strongly disagreed with the statement; 57 (54.3%) disagreed 8 (7.6%) were not sure, 24 (22.8%) of the respondents agreed, 5 (4.8%) of the respondents strongly agreed with the statement. Majority of the respondents, 57(54.3%) generally disagreed with the statement. This means that hospital had not achieved accurate demand forecasting, a factor that affects the quality of health care service delivery in the public hospital.

## **7.1.5. The hospital has achieved timely respond to customer references**

Regarding whether the hospital had achieved timely respond to customer references, the results obtained are contained in table 7.5 below;

**Table 7.5 : The hospital has achieved timely respond to customer references**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 18 | 17.1 | 17.1 |
| Disagree | 43 | 40.9 | 58.0 |
| Not Sure | 04 | 3.8 | 66.6 |
| Agree | 29 | 27.6 | 94.2 |
| Strongly Agree | 11 | 10.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.5, 18 (17.1%) strongly disagreed with the statement; 43 (40.9%) disagreed 4 (3.8%) were not sure, 29 (27.6%) of the respondents agreed, 11 (10.5%) of the respondents strongly agreed with the statement. Majority of the respondents, 43 (40.9%) generally agreed with the statement, implying that hospital had achieved timely respond to customer references.

## **7.1.6. The hospital has achieved optimal inventory**

Respondents were asked whether the hospital had achieved optimal inventory, results obtained are contained in table 7.6.

**Table 7.6: The hospital has achieved optimal inventory**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid  | Strongly Disagree | 18 | 17.1 | 17.1 |
| Disagree | 44 | 41.9 | 41.9 |
| Not Sure | 8 | 7.6 | 66.6 |
| Agree | 26 | 24.8 | 91.4 |
| Strongly Agree | 9 | 8.6 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.6, 18 (17.1%) strongly disagreed with the statement; 44 (41.9%) disagreed 8 (7.6%) were not sure, 26 (24.8%) of the respondents agreed, 9 (8.6%) of the respondents strongly agreed with the statement. Majority of the respondents, 44 (41.9%) generally disagreed with the statement. This implied that the hospital had not achieved optimal inventory, an indication that the medical supply chain practices had not been effective.

One of the supervisors in the hospital in an interview was quoted on this issue;

*“There is no a good procedure for disposal of expired drugs in the hospital.”*

## **7.1.7. The hospital has achieved smooth flow of materials and products**

Respondents were asked whether the hospital had achieved smooth flow of materials and products, and the results are presented in table 7.7 below.

**Table 7.7: The hospital has achieved smooth flow of materials and products**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 15 | 14.3 | 14.3 |
| Disagree | 46 | 43.8 | 43.8 |
| Not Sure | 24 | 22.9 | 81.0 |
| Agree | 13 | 12.4 | 93.4 |
| Strongly Agree | 7 | 6.6 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.7, show that 15 (14.3%) of the respondents strongly disagreed with the statement; 46 (43.8%) of the respondents disagreed, 24 (22.9%) were not sure 13 (12.4%) agreed and 7 (6.6%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 46 (43.8%) generally disagreed with the statement. This meant that hospital had not achieved smooth flow of materials and products.

## **7**.1.8. There is electronic order processing and electronic customer feedback in the hospital

When asked whether there was electronic order processing and electronic customer feedback in the hospital, the following results were obtained;

**Table 7.8: There is electronic order processing and electronic customer feedback in the hospital**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 13 | 12.4 | 7.5 |
| Disagree | 71 | 67.6 | 32.5 |
| Agree | 15 | 14.3 | 78.7 |
| Strongly Agree | 6 | 5.7 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.8, show that 13 (12.4%) of the respondents strongly disagreed with the statement; 71 (67.6%) of the respondents disagreed, none was not sure, 15 (14.3%) agreed and 6 (5.7%) of the respondents strongly agreed with the statement. The majority of the respondents, 71 (67.6%) generally agreed with the statement. This implied that there was electronic order processing and electronic customer feedback in the hospital.

One of the respondents in the interview statement said:

“*Inventory records are essential to organizational performance, however, there is no electronic order processing and electronic customer feedback in the hospital”*

## **7.1.9. Correlational relationship between information flow management practices on health service delivery.**

The third hypothesis was that there was a positive significant relationship between information flow management practices on health service delivery in Tonj State Hospital. To determine the degree of the relationship, a Pearson’s correlation coefficient analysis was run as follows;

**Table 7.9: Correlation between information flow management practices on health service delivery**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Stock taking  | Organizational performance  |
| Stock taking  | Pearson CorrelationSig. (2-tailed)N  | 1105 | .601\*\*.000105  |
| Organizational performance  | Pearson CorrelationSig. (2-tailed)N  | .601\*\*.000105 | 1105 |
| **\*\*. Correlation is significant at the 0.01 level (2-tailed).** |  |

***Source: Primary data (2021)***

Pearson’s Correlation Coefficient for information flow management practices on health service delivery was r = 0.601, which was positive with probability value (p = 0.000) that is less than α = 0.01 level of significance showing a strong positive relationship between information flow management practices on health service delivery. The results also provide justification that when Tonj State Hospital management implemented effective supply chain practices through information flow management practices, they would achieve improved health service delivery as illustrated in table 7.9 above.

## **7.2. Level of health care service delivery in Tonj Hospital.**

## **7.2.1. There is ability of the health practitioners and all staff to perform the required health services dependably**

The respondents were asked whether there was ability of the health practitioners and all staff to perform the required health services dependably. The results attained are presented in table 7.10 below.

**Table 7.90: Table: There is ability of the health practitioners and all staff to perform the required health services dependably**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 17 | 16.2 | 16.2 |
| Disagree | 49 | 46.7 | 62.9 |
| Not Sure | 5 | 4.8 | 67.7 |
| Agree | 24 | 22.9 | 90.6 |
| Strongly Agree | 10 | 9.4 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.10, 17 (16.2%) of the respondents strongly disagreed with the statement; 49 (66.7%) of the respondents disagreed with the statement; 5 (4.8%) were not sure 24 (22.9%) agreed and 8 (9.4%) strongly agreed. Results show that majority, 49 (46.7%) generally disagreed with the statement. This implied there was no ability of the health practitioners and all staff to perform the required health services dependably, hence poor health care delivery in Tonj State Hospital.

There qualitative results were in agreement with the above results one respondent was quoted lamenting that, *“The wars in South Sudan however have not completely destroyed all the systems as several international organizations, the government and other private stakeholders are still trying to deliver the services like provision of drugs, counseling services and other humanitarian services”*

As well, the study respondent also showed that, “*the government has put in little or no efforts to ensure cost minimization especially in the sectors most affected by the war like health, education, and agriculture sectors*”. Many respondents had responses in this direction hence the theme of inadequate government support.

## **7.2.2. There is a standards body that checks all the equipment and drugs supplied to the hospital**

The respondents were asked whether in the hospital, there was a standards body that checks all the equipment and drugs supplied to the hospital and the results attained are presented in table 7.11.

**Table 7.11: There is a standards body that checks all the equipment and drugs supplied to the hospital**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 9 | 8.6 | 8.6 |
| Disagree | 19 | 18.1 | 26.7 |
| Not Sure | 5 | 4.8 | 31.5 |
| Agree | 54 | 51.4 | 82.9 |
| Strongly Agree | 18 | 17.1 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.11, 9 (8.6%) of the respondents strongly disagreed with the statement; 19 (18.1%) of the respondents disagreed with the statement; 5 (4.8%) were not sure, 54 (51.4%) agreed and 18 (17.1%) of the respondents strongly agreed with the statement. According to the results majority of respondents, 54 (51.4%) generally agreed disagreed with the statement. This means that there was a standards body that checks all the equipment and drugs supplied to the hospital.

One of the hospitals administrators was quoted saying;

*“There is little done by the government of South Sudan to support the management of supply chain of the health services as there are no mechanisms to monitor service delivery in the health sector”*

According to the results from the qualitative, the respondent also showed that, *“there is little monitoring on the quality and nature of the health products procured by the government due to lack of strong mechanisms as a result of war”. Here a theme of limited monitoring was qualified given that none of the respondents was admissive of the monitoring and evaluation.*

**7.2.3. The hospital has enough equipment to address most health complications in South Sudan.**

The respondents were asked whether receiving, issuing, accounting and storing responsibilities are properly segregated to ensure responsibly performance of each department the results attained are presented in table 7.12;

**Table 7.12: The hospital has enough equipment to address most health complications in South Sudan.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 19 | 18.1 | 18.1 |
| Disagree | 39 | 37.1 | 55.2 |
| Not Sure | 5 | 4.8 | 60.0 |
| Agree | 26 | 24.8 | 84.8 |
| Strongly Agree | 16 | 15.2 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.12, 19 (18.1%) of the respondents strongly disagreed with the statement; 39 (37.1%) disagreed with the statement; 5 (4.8%) were not sure and 26 (24.8%) agreed while 16 (15.2%) of the respondents strongly agreed with the statement. Majority of the respondents, 39 (37.1%) generally disagreed with the statement. This means that the hospital had no enough equipment to address most health complications in South Sudan, a factor that affected the quality of health care service delivery in the hospital.

Another respondent also argued that, *“the previous wars negatively affected public supply systems more so in the health sector which resulted into uncontrollable prices and substandard health products”.*

And lastly, several study respondents noted that, *“The wars also led to big numbers of unvaccinated children in the country due to poor supply systems in the health sector and lack of skilled personnel to carry out sensitization and immunization activities”.*

## **7.2.4. The bed to patient ratio meets the WHO standards in all health facilities**

The respondents were asked whether the bed to patient ratio meets the WHO standards in all health facilities and the results attained are presented in table 7.13;

**Table 7.13: The bed to patient ratio meets the WHO standards in all health facilities**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 17 | 16.2 | 16.2 |
| Disagree | 61 | 58.1 | 74.3 |
| Not Sure | 3 | 2.9 | 77.2 |
| Agree | 16 | 15.2 | 92.4 |
| Strongly Agree | 8 | 7.6 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

According to the findings in table 7.13, 17 (16.2%) of the respondents strongly disagreed with the statement; 61 (58.1%) disagreed 3 (2.9%) were not sure, 16 (15.2%) of the respondents agreed, 8 (7.6%) of the respondents strongly agreed with the statement. Majority of the respondents, 61 (58.1%) generally disagreed with the statement. This means that the bed to patient ratio didn’t meet the WHO standards in all health facilities, a factor that affects the quality of health care service delivery in the public hospital.

## **7.2.5. There is always assured storage for delicate health products like vaccines and other drugs**

Regarding whether there was always assured storage for delicate health products like vaccines and other drugs, the results obtained are contained in table 7.14 below;

**Table 7.14: There is always assured storage for delicate health products like vaccines and other drugs**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 7 | 6.6 | 6.6 |
| Disagree | 22 | 20.9 | 27.5 |
| Not Sure | 6 | 5.7 | 33.2 |
| Agree | 57 | 54.3 | 87.5 |
| Strongly Agree | 13 | 12.5 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.14, 7 (6.6%) strongly disagreed with the statement; 22 (20.9%) disagreed 6 (5.7%) were not sure, 57 (54.3%) of the respondents agreed, 13 (12.5%) of the respondents strongly agreed with the statement. Majority of the respondents, 57 (54.3%) generally agreed with the statement, implying that hospital had an assured storage for delicate health products like vaccines and other drugs.

## **7.2.6. Emergence services are facilitated with all the requirements like ambulances and personnel**

Respondents were asked whether emergence services were facilitated with all the requirements like ambulances and personnel, results obtained are contained in table 7.15.

**Table 7.15: Emergence services are facilitated with all the requirements like ambulances and personnel**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid  | Strongly Disagree | 8 | 7.6 | 7.6 |
| Disagree | 31 | 29.5 | 37.1 |
| Not Sure | 5 | 4.8 | 41.9 |
| Agree | 46 | 43.8 | 85.7 |
| Strongly Agree | 15 | 14.3 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.15, 8 (7.6%) strongly disagreed with the statement; 31 (29.5%) disagreed 5 (4.8%) were not sure, 46 (43.8%) of the respondents agreed, 15 (14.3%) of the respondents strongly agreed with the statement. Majority of the respondents, 46 (43.8%) generally agreed with the statement. This implied that in the hospital, some emergence services were facilitated with all the requirements like ambulances and personnel.

## **7.2.7. There is willingness by the practitioners in the hospital to respond to the necessary needs at any time**

Respondents were asked whether there was willingness by the practitioners in the hospital to respond to the necessary needs at any time, and the results are presented in table 7.16 below.

**Table 7.16: There is willingness by the practitioners in the hospital to respond to the necessary needs at any time**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 11 | 10.5 | 10.5 |
| Disagree | 26 | 24.8 | 35.3 |
| Not Sure | 6 | 5.7 | 41.0 |
| Agree | 47 | 44.8 | 85.8 |
| Strongly Agree | 15 | 14.2 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.16, show that 11 (10.5%) of the respondents strongly disagreed with the statement; 26 (24.8%) of the respondents disagreed, 6 (5.7%) were not sure 47 (44.8%) agreed and 15 (14.2%) of the respondents strongly agreed with the statement. The largest percentage of the respondents, 47 (44.8%) generally agreed with the statement. This meant that there was willingness by the practitioners in the hospital to respond to the necessary needs at any time.

## **7**.2.8. The health facility administration have hired qualified personnel to handle the products you supply for them to perform their duties

When asked whether the health facility administration had hired qualified personnel to handle the products you supply for them to perform their duties, the following results were obtained;

**Table 7.17: The health facility administration have hired qualified personnel to handle the products you supply for them to perform their duties**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Frequency** | **Percent** | **Cumulative Percent** |
| Valid | Strongly Disagree | 11 | 10.5 | 10.5 |
| Disagree | 16 | 15.2 | 32.5 |
| Agree | 61 | 58.1 | 78.7 |
| Strongly Agree | 17 | 16.2 | **100.0** |
| **Total** | **105** | **100.0** |  |

***Source: Primary data (2021)***

Results from table 7.17, show that 11 (10.5%) of the respondents strongly disagreed with the statement; 16 (15.2%) of the respondents disagreed, none was not sure, 61 (58.1%) agreed and 17 (16.2%) of the respondents strongly agreed with the statement. The majority of the respondents, 61 (58.1%) generally agreed with the statement. This implied that health facility administration had hired qualified personnel to handle the products you supply for them to perform their duties.

One of the respondents in the interview statement said:

“*In addition, the study respondent also quoted that, “there is limited availability of the required health products, few or no trained personnel at the health facilities around the country leading to inefficient health service delivery system.”*

# CHAPTER EIGHT

# DISCUSSION OF STUDY FINDINGS

## **8.0. Introduction**

This chapter presents the discussion of study findings in line with the study findings and correlates with findings of other scholars on how medical supply chain practices influences the health care service delivery in terms of warehousing management practices, inventory management practices and information flow management practices.

## **8.1. Warehousing management practices on health service delivery in Tonj State Hospital**

Under objective one, the study sought to examine effect of warehousing management practices on health care service delivery in Tonj State Hospital. The correlation results indicated a significant positive relationship between warehousing management practices on health service delivery (r = 0.634 with probability value (p = 0.000) which implied that warehousing management practices explained health care service delivery in Tonj State Hospital by 63.4%.

While assessing Warehousing management practices it was further analyzed using different variables and the outcomes of analysis were; majority of the respondents agreed that warehousing management practices enhances health care service delivery in Tonj State Hospital for instance; that 55.2% agreed that hospital management does proper selection and location of warehouses, 49.9% of respondents agreed that the hospital’s distribution center enabled order processing and delivery of goods directly to customers under one roof.

Given that findings established a strong positive relationship between warehousing management practices and health service delivery in Tonj State Hospital, there is probably no assurance that the actual outcome will be similar in other public and private hospital since the valuation process may differ according to factors such as availability of funds, human resource expertise among others. It was indicated in the findings that the hospital’s distribution centers generally kept goods for longer periods

Findings revealed that 64.8% of the respondents agreed that the public hospital had a storage system of holding and preserving goods, 57.1% agreed that hospital maintains adequate inventory size and mix. However, 56.2% disagreed that supplies are delivered in the right place and on time to the right customer, something that affects the health care service delivery in the community.

Results further indicated that in the hospital, effective service of customers depended on the operations of the warehouse with 69.5% of the respondents agreeing to the statement. And 64.8% of the respondents agreed that the hospital has got an IT function which ensures that technology for the efficiency of storage is use.

Various authors concurred with the findings of Coyle and Largely (2020) who defined distribution management as overseeing of events engaged in distributing any products from vendors to the firm, warehouses or customer’s point of collection. Murphy (2008) pointed out that transportation management for a huge part of firm cost of production hence if firms want to have competitive edge over others, then they must ensure that their cost of logistics or moving materials and products to customers point of collection is minimized of any firm supply chain. This is usually done by use of various modes of transport depending on factors such as transportation loads, delivery points and distribution centers (Laird, 2016).

In a related study, Pienaar and Voght (2016) suggested the effective service of customers depends on the operations of the warehouse. Warehouse has three business functions: the function receiving and passing on customer orders; the IT function ensuring that technology for the efficiency of storage is used and the storage function which temporarily or constantly stores the product. According to Chopra and Meindl (2017), a transporter creates speculation choices concerning the conveyance equipment’s and in certain circumstances arrangements need to be done to make functioning decision capitalize on the yield from assets.

## **8.2. Inventory management practices on health service delivery in public hospitals in Tonj State Hospital**

Under objective two, the study sought to establish the relationship between inventory management practices and on health service delivery in public hospitals in Tonj State Hospital. The correlation results indicated a significant positive relationship between inventory management practices on health service delivery (r = 0.782 with probability value (p = 0.000) which implied that inventory management practices explained health service delivery in Tonj State Hospital by 78.2%.

While assessing inventory management practices, the researcher used various qualities of inventory management practices which were analyzed and the results revealed that; majority of the respondents agreed that inventory management practices enhances the health service delivery in Tonj State Hospital; for example 47.6% respectively agreed that the hospital’s storage system is carefully planned and coordinated to achieve the objectives of storekeeping, 38.1% of the respondents agreed that the hospital’s storage system aims at smooth functioning of the whole organisation, perfect coordination, 56.2% of the respondents agreed that the hospital’s responsiveness is within the expectations of customers and this response is continuously improved.

More so, 65.8% of the respondents agreed to the statement that at the public hospital, stock management is essential for the efficient management of organizations, 75.3% agreed that at Tonj public hospital, lead time management encouraged the staff to deliver services in accordance with customers’ needs. 56.2% of the respondents agreed that at this public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management. And 57.1% of the respondents agreed that the hospital recognized the role of capacity utilization in the formation and maintenance of competitive advantage. However, 45.7% of the respondents disagreed that the hospital had enough the tools to quickly assess the level of capacity utilization which affected the quality of health care service delivery in Tonj State Hospital.

Various authors concurred with the findings of the study by Lysons and Farrington (2016) who asserted that the calculation of inventory's effective and productive efficiency depends on the degree to which the firm has the correct inventory quantity in the right place and at the right time. The measuring indicators for this inventory include lead time, service time (security inventory), stock turnover rate, inventory results over a certain period and inventory cover.

In a related study by Naliaka and Namusonge (2018) who conducted a study in Kenya that inventory management affects production companies ' competitive advantages. The same study shows further that the company can compete on a long-term basis on the basis of the quality and delivery. Inventory decisions are high risk and had a significant effect on the management of the supply chain of an enterprise. Inventory management practices, according to Dimitrios (2018), are recognized as a critical area of concern that requires the highest priority.

## **8.3. Information flow management practices on health care service delivery in public hospitals in Tonj State Hospital**

Under objective three the study sought to determine the relationship between information flow management practices and health care service delivery in public hospitals in Tonj State Hospital. The correlation results indicated a significant positive relationship between information flow management practices on health care service delivery (r = 0.601 with probability value (p = 0.000) which implied that information flow management practices explained health care service delivery in Tonj State Hospital by 60.1%.

Information flow management practices was measured using different variables which were later analyzed and the result of analysis revealed that; most of the respondents assented to the view that information flow management practices leads to better p health care service delivery in Tonj State Hospital,for instance that 56.2% agreed and strongly agree there is smooth information flow to all logistics functions of the hospital, 46.7% of respondents agreed there is practice of internal information sharing, that 39.1% and agreed that the hospital management has invested on information communication systems.

IT helps integrate activities and provide proof of information to improve the functioning of the supply chain. However, 54.3% disagreed that the hospital has achieved accurate demand forecasting, 40.9% of the respondents disagreed that hospital had achieved timely respond to customer references. And 40.9% of the respondents disagreed that the hospital had achieved optimal inventory. The results also indicated that 43.8% of the respondents disagreed that the hospital had achieved smooth flow of materials and products. And majority of the respondents, 67.6% disagreed that there was electronic order processing and electronic customer feedback in the hospital, ineffectiveness of such factors affected the quality of health care service delivery in Tonj public hospital.

The above findings concur with Maspero & Ittmann, (2018) who asserted that it was an opportunity for the humanitarian supply chain to increase its contribution to and for disaster relief by introducing information management, technology, measuring and positioning initiatives. While delivery of disaster relief items is an important role in the supply chain for humanitarian aid, it should be strategic to provide timely information and analyze information for improved information on how operations can be improved.

In a related study, Monczka (2018) explained that information sharing among the supply chain partner is related to the degree of critical and proprietary information shared among each other’s. Mentzer (2010) mentioned that sharing information may be varied in nature especially customer information through the flow of information about logistic activities. Basically, information sharing involved information related to logistics, customer orders, forecasts, schedules, market and so on. Besides, information sharing is included the access of private data between trading partners so that they are able to follow up on the products status and the progress of the order through the supply chain system (Simatupang & Sridharan, 2012 and Zhao & Benton, 2017). Lalonde (2018) explained that information sharing has been recognized as one of the importance SCM practices that use to characterize on a solid supply chain relationship.

According to Stein and Sweat (2018), supply chain partners who exchange information frequently are able to respond to market change quicker as they understand the needs of the end customer and they are able to work as a single entity. Through information sharing, demand and product availability information flow in a correct and systematic manner will smoother the operation process. Moreover, information sharing and knowledgeable will helps to reduce uncertainties in the market when supply chain members have information and knowledge about each other (Yu, 2001; Frazier, 2018) and organizations should share and exchange information with their supplier so that they are synergies with each other. Hence, information sharing enable the right information available for the right time, right place and right trading partner which will contribute to greater organizational performance.

# CHAPTER NINE

# SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

## **9.0. Introduction**

This chapter presents the summary on the effects of medical supply chain practices on the health care service delivery basing on the findings from the study. The data were analyzed inform of tables which were used to test the relationship between the independent variable (medical supply chain practices) and the dependent variable (health care service delivery).

## **9.1. Summary of study findings**

## **9.1.1. Warehousing management practices on health service delivery in Tonj State Hospital**

From the findings it can be noted that warehousing management practices enhances health care service delivery in Tonj State Hospital. Warehousing ensures that supplies are delivered in the right place and on time to the right customer. The production of a commodity at the right price and in good order and quality guarantees cost-effective operation too. Therefore a perfect management and coordination between firms supply chain components leads or bring the maximum benefits with worthy transportation management being able to provide improved logistics efficiency, reduced operation cost as well as promoting service quality on firm

##  **9.1.1. Inventory management practices on health service delivery in Tonj State Hospital**

The results indicated effective inventory management practices enhances health care service delivery in Tonj State Hospital Inventory management practices provide visibility in the supply chain system and the upstream and downstream inventory. It also provides the appropriate levels of service for internal and external customers, determine current and potential requirements for all forms of inventory, reduce costs and pay for the inventory. However, the calculation of inventory's effective and productive efficiency depends on the degree to which the firm has the correct inventory quantity in the right place and at the right time.

## **9.1.3. Information flow management practices on health care service delivery in Tonj State Hospital**

Effective information flow management practices in Tonj State Hospital enhanced the health care service delivery. IT helps integrate activities and provide proof of information to improve the functioning of the supply chain. Through information sharing, demand and product availability information flow in a correct and systematic manner will smoother the operation process. Moreover, information sharing and knowledgeable will helps to reduce uncertainties in the market when supply chain members have information and knowledge about each other.

It is an opportunity for the humanitarian supply chain therefore, to increase its contribution to and for disaster relief by introducing information management, technology, measuring and positioning initiatives. While delivery of disaster relief items is an important role in the supply chain for humanitarian aid, it should be strategic to provide timely information and analyze information for improved information on how operations can be improved.

## **9.2. Conclusions**

From the above summary of findings, the following conclusions were made. The study conclusions and recommendations were to examine how medical supply chain practices in form of warehousing practices, inventory management practices and information flow practices influences the health care service delivery in public hospitals like Tonj in Warrap State of South Sudan. These are detailed as follows;

## **9.2.1. Warehousing management practices on health service delivery in Tonj State Hospital**

From the analysis given in the discussion of findings, it is noted that the respondents confirmed that warehousing management practices enhanced the health care service delivery in Tonj public hospital in Warrap State of South Sudan as evidenced by the positive significant correlation value of 0.63.4 and this shows that effective warehousing management practices enhanced health care service delivery Tonj public hospital by 63.4%.

## **9.2.2 Inventory management practices on health service delivery in public hospitals in Tonj State Hospital**

And from the analysis given in the discussion of findings, it is noted that the respondents agreed that inventory management practices enhanced the health care service delivery in Tonj public hospital in Warrap State of South Sudan as evidenced by the positive significant correlation value of 0.78.2 and this shows that effective inventory management practices enhanced health care service delivery Tonj public hospital by 78.2%, which was the highest among the factors.

## **9.2.3 Information flow management practices on health care service delivery in public hospitals in Tonj State Hospital**

In general, the findings showed that information flow management practices led to improved health care service delivery in public hospitals in Tonj State Hospital since most of the respondents had positive views on the importance of information flow management practices as shown by the positive correlation value of 0.601, an indication that effective information flow management practices enhanced health care service delivery Tonj public hospital by 60.1%,

## **9.3 Recommendations**

Basing on the findings of the study, the researcher found it prudent to make a few recommendations which are deemed important to guide the readers and policy makers as they use this research work and in order that Tonj State Hospital may use it to achieve potential health care service delivery through improved medical supply chain practices.

Knowledge of the health workers in the facilities is moderate. Health facilities should request for training on inventory control from the ministry of health.

Regular supervision of health facilities should be made by the inspectors of ministry of health to ensure that stores and health facilities respect and adhere to set guidelines.

From the study findings, it is pertinent that inventory managers should be given adequate attention as a prerequisite of improved health care service delivery since it enables the organization to have records of stock at hand and the forecasted issues expected from the stock at hand.

The organization should also base their decisions in respect to experience with the rate of turnover of an item that will help indicate the level of inventory at which the unit should be re-ordered to make sure that the new stock arrives before the old stock is totally exhausted.

A standard operating procedure should be availed by the ministry of health to all the health facilities in South Sudan and government should ensure that all health workers adhere to it so that proper inventory management practices are followed.

The research recommends that the government of South Sudan and all companies in health products service delivery should ensure that all stakeholders are given chance to take part in the supply chain management at all levels so as to ensure an effective health service delivery.

The research recommends that the government of South Sudan secures routes for transportation of the health products to address the supply chain management issues related to the transportation and procurement department employees so as to ensure its effectiveness.

There is need to train experts to man the supply chain, especially those of health products. Further training is also required for the health workers given that country falls short of health experts at all levels of the health system.

The study recommends that when presenting strategies and plans, senior management should recognize that the future is inherently uncertain and that its endless possibilities are too complex for anyone to predict with great accuracy. Instead of maintaining the illusion that the future can be fully understood or controlled, senior management should show courage and honesty when updating key stakeholders based on the latest forecasts in the health delivery system.

## **9.4 Suggested Areas for further research**

Further research should be undertaken on the role of medical supply chain practices on the performance of service delivery of Private Hospitals in South Sudan.

Inventory management and performance of Non-Governmental Organizations to get a deeper understanding on the role of proper inventory management towards organizational performance.

Further research should also be conducted on the contribution of automated inventory management systems on service delivery to understand whether automation of inventory management systems can reduce on inventory related costs in Private Hospitals in South Sudan.

# REFERENCES

Abu-kharmeh, S. (2012). Evaluating the quality of healthcare services in the Hashemite of kingdom of Jordan. *International Journal of Business and Management,* 7(4), 195-205

Acharyulu, G. V. R. K., & Shekhar, B. R. (2012). Role of value chain strategy in healthcare supply chain management: An empirical study in India. *International Journal of Management, 29(1), 91-97.*

*Akter, S., D‟Ambra,* J., & Ray, P. (2010). *Service quality of Health platforms:* development and validation of a hierarchical model using PLS. Electron Markets.

Al-Saa'da, J.L., Abu Taleb Y.D., Al Abdalla, M.E., Rasmi Abd Alraheem Al-Mahasneh, Nabil Awni Nimer & Ghazi A. Al-Weshah. (2013). Supply Chain Management and Its Effect on Health Care Service Quality: *Quantitative Evidence from Jordanian Private Hospitals.* Vol. 4, No. 2;

Baki, B., Basfirinci, C.S., Ilker Murat, A.R., & Cilingir, Z. (2009) "An application of integrating SERVQUAL and Kano's model into QFD for logistics services: *A case study from Turkey"*

Baltacioglu, T., Ada, E., Kaplan, M. D., Yurt, O., & Kaplan, Y. C. (2007). A new framework for service supply chains. *The Service Industries Journal,* 27(2), 105-124. 43

Boon-itt, S., & Pongpanarat, C. (2011). Measuring service supply chain management processes: The application of the Q-sort technique. I*nternational Journal of Innovation, Management and Technology,* 2(3), 217-221.

Boon-itt, S., & Wong, C. Y. (2011). The moderating effects of technological and demand uncertainties on the relationship between supply chain integration and customer delivery performance. *International Journal of Physical Distribution & Logistics Management,* 41(3), 253-276.

Brady, J. T., & Cronin, J. J. (2001). Some new thoughts on conceptualizing perceived service quality: A hierarchical approach. *Journal of Marketing,* 65(3), 34-49.

Bryman, A., & Bell, E. (2015). *Business research methods.* Oxford University Press, USA.

Chahal, H., & Kumari, N. (2010). Development of multidimensional scale for healthcare service quality (HCSQ) in Indian context. *Journal of Indian Business Research,* 2(4), 230-255.

Cooper, D. R. & Schindler, P. S. (2010). *Business Research Methods,* 11th edition. McGraw-Hill Publishing, Co. Ltd. New Delhi-India.

Coyle, J., J. and Largely, C.J. (2020). *The Management of Business Logistics:* A Supply Chain Perspective 7th Ed. Canada, South Western: Thomas Learning.

Creswell, J.W., (2017). *Research design. Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks CA: Sage.

Dagger, T. S., Sweeney, J. C., & Johnson, L. W. (2007). A Hierarchical Model of Health Service Quality. Scale Development and Investigation of an Integrated Model. *Journal of Service Research,* 10(2), 123-142.

David, S. et al. (2017) *‘Conflict in South Asia and its impact on health’,* BMJ (Online), 357, pp. 1–5. doi: 10.1136/bmj.j1537.

Desmond Kuupiel, I. et al. (2019) *‘Poor supply chain management and stock- outs of point-of-care diagnostic tests in Upper East Region ’ s primary healthcare clinics,* Ghana’, PLOS ONE, 14(2), pp. 1–15. doi: 10.6084/m9.figshare.7640252. Funding.

Dobrzykowski, D., Nathen, T., & Vonderembse, M. (2012). *Integrating the decentralized healthcare delivery supply chain.* POMS 21st Annual Conference. Vancouver, Canada.

Ferreira, A., & Otley, D. (2010). *Design and use of management control systems:* an analysis of the interaction between design misfit and intensity of use. CIPFA (Chartered Institute of Public Finance and Accountancy), London.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research:* An introduction. Boston: Pearson/Allyn & Bacon.

Gbadeyan, R. A. (2010): Customer Relationship Management and Hospital Service Quality in Nigeria. African Research Review. *An International Multi-Disciplinary Journal, Ethiopia.* 4 (2); 168 – 184.

Gefen, D. (2012). “Customer Loyalty in E-Commerce”, *Journal of the Association for Information Systems,* Vol. 3, No. 1:27-51.

Gones, V. (2016). *Hospital Pharmacy Management:* Australian and Indonesian Perspectives. The University of Sydney.

Grant, R. and Thompson, D. (2013) ‘The Development Complex, rural economy and urban-spatial and economic development in Juba, South Sudan’, *Sagepub.co.uk/journals Permissions. nav,* pp. 218–230. doi: 10.1177/0269094212468400.

Green, A. (2012) *‘Health care in South Sudan at a crossroads’,* The Lancet. Elsevier Ltd, 379(9826), p. 1578. doi: 10.1016/s0140-6736(12)60661-8.

Hald, K. S. (2019) ‘*How the block chain enables and constrains supply chain performance’,* (March). doi: 10.13140/RG.2.2.13413.04325.

Health Pooled Fund (2018). *Health service delivery* - HPF South Sudan. Available at: http://www.hpfsouthsudan.org/health-service-delivery.

Hosseini, S. et al. (2019) ‘Resilient Supplier Selection and Optimal Order Allocation Under Disruption Risks’, *International Journal of Production Economics.* Elsevier B.V. doi: 10.1016/j.ijpe.2019.03.018.

Irfan, S.M and Ijaz, A. (2011). Comparison of service quality between private and public hospitals: *Empirical evidences from Pakistan Journal of Quality and Technology Management.*

Jones, A., Howard, N. and Legido-Quigley, H. (2015) ‘Feasibility of health systems strengthening in South Sudan: A qualitative study of international practitioner perspectives’, *BMJ Open,* 5(12), pp. 1–9. doi: 10.1136/bmjopen-2015-009296.

Johnson, M., Hazemba, O., Kimeu, J., Kirika, R. & Thuo, M., (2008). *Assessment of Kenya Medical Supplies Agency* April 2008.

Joseph, N. P. (2019) *‘Uncertainty Management of Supply Chain Manufacturing Cost using Genetic Algorithm’,* 14(3), pp. 678–683.

Katamba, P., & Nsubuga, T. (2014). *Basic research: simplified for university.* Kampala, Uganda: MK Publishers.

Katy Magiro (2016). *Lives at risk due to massive drug shortages in South Sudan, Reuters Health News.* Available at: https://www.reuters.com/article/us-southsudan-health/lives-at-risk-due-to-massive-drug-shortages-in-south-sudan-idUSKCN0X4252 (Accessed: 19 October 2018).

Kazemzadeh, R., Jahantigh, F., Rafie, S., & Maleki, N. (2011). Designing a conceptual model for qualitymeasurement in supply chain of health care services. *3rd International Conference on Advanced Management Science, IACSIT Press, Singapore.*

Kazi, S.K. (2012). Supply Chain Management Practices and Performance at Kenya Medical Supplies Agency. *Unpublished University of Nairobi.*

Kevany, S. et al. (2012) *‘Diplomatic and operational adaptations to global health programmes in post-conflict settings:* Contributions of monitoring and evaluation systems to health sector development and “nation-building” in South Sudan’, Medicine, Conflict and Survival, 28(3), pp. 247–262. doi: 10.1080/13623699.2012.714654.

Koh, S. C. L., Demirbag, M., Bayraktar, E., Tatoglu, E., & Zaim, S. (2007). The impact of supply chain management practices on performance of SMEs. *Industrial Management & Data Systems,* 107(1), 103-124.

Krejcie, R. V. and Morgan, D. W. (1970) *‘Determining Sample Size for Research Activities’, Educational and Psychological Measurement. S*AGE Publications Sage CA: Los Angeles, CA, 30(3), pp. 607–610. doi: 10.1177/001316447003000308.

Lambert, D.M. (2014). T*he eight essential supply chain management processes.* Supply Chain Management Review, 8 (6), 18 - 26.

Lee, H.L., & Billington, C. (1995), *"The evolution of supply chain management models and practices at Hewlett Packard',* Interface, Vol. 25, no.5, pp.42–63.

Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Rao, S. S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *The International Journal of Management Science,* 34, 107-124,

Macharia, P. M. et al. (2017) ‘*Spatial accessibility to basic public health services in South Sudan’, Geospatial Health,* 12(1), pp. 1–16. doi: 10.4081/gh.2017.510.

Manias, E. (2010). Medication communication: a concept analysis. *Journal of Advanced Nursing,* 66(4), 933–943.

Montrose (2018). *Monitoring health service delivery* | Montrose - International development consultancy and project management company providing services to bilateral and multi-lateral development agencies, non-governmental organisations, private sector clients, and other development stakeholders operating in Africa and Asia-Pacific., South Sudan Health Pooled Fund. Available at: http://www.montroseint.com/projects/monitoring-and-quality-assuring-health-service-delivery-across-south-sudan/ (Accessed: 16 March 2019).

Morali, O. and Searcy, C. (2013) *‘A Review of Sustainable Supply Chain Management Practices in Canada’,* pp. 635–658. doi: 10.1007/s10551-012-1539-4.

Mugo, N. S. et al. (2018) ‘Side & quot; The system here isn’t on patients’ side & quot;- perspectives of women and men on the barriers to accessing and utilizing maternal healthcare services in South Sudan.’, BMC health services research. *BioMed Central,* 18(1), p. 10. doi: 10.1186/s12913-017-2788-9.

Nickerson, J. W. (2015). *‘Ensuring the security of health care in conflict settings: An urgent global health concern’*, Cmaj, 187(11), pp. E347–E348. doi: 10.1503/cmaj.140410.

Pettit, T. J., Croxton, K. L. and Fiksel, J. (2019) ‘The Evolution of Resilience in Supply Chain Management : A *Retrospective on Ensuring Supply Chain Resilience’*, pp. 1–10. doi: 10.1111/jbl.12202.

Plinere, D. and Aleksejeva, L. (2019). *‘Production scheduling in agent-based supply chain for manufacturing efficiency improvement’,* Procedia Computer Science. Elsevier B.V., 149, pp. 36–43. doi: 10.1016/j.procs.2019.01.104.

Saunders, M., Lewis, P., & Thornhill, A. (2015). *Research methods for business students.* New York: Pearson Education.

USAID (2017). *SIAPS framework for strengthening pharmaceutical systems in South Sudan.* Available at: http://siapsprogram.org/publication/altview/technical-brief-building-pharmaceutical-management-capacity-in-south-sudan/english/ (Accessed: 19 October 2018).

World Food Programme (2015) *‘WFP supply chain annual report 2015*’, p. 44.

WHO (2010a). *Applications of artificial neural networks in health care organizational decision-making:* A scoping review. Geneva. doi: 10.1371/journal.pone.0212356.

WHO (2010b). *Health service delivery.* Available at: https://www.who.int/healthinfo/systems/WHO\_MBHSS\_2010\_section1\_web.pdf (Accessed: 27 March 2019).

WHO (2010c). *Lived experiences of seeking support for rural and remote children with developmental challenges*. For further information. Geneva. Available at: https://www.who.int/healthinfo/systems/WHO\_MBHSS\_2010\_section1\_web.pdf.

Yousefi, N. et al. (2019) ‘Policies to improve access to pharmaceutical products in shortage: the experience of Iran food and drug administration’, *DARU Journal of Pharmaceutical Sciences. Springer International Publishing,* pp. 1–9. doi: 10.1007/s40199-019-00259-2.

**APPENDENCES**

**APPENDIX I: TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N  | S  | N  | S  | N  | S  | N  | S  | N  | S  |
| 10  | 10  | 100  | 80  | 280  | 162  | 800  | 260  | 2800  | 338  |
| 15  | 14  | 110  | 86  | 290  | 165  | 850  | 265  | 3000  | 341  |
| 20  | 19  | 120  | 92  | 300  | 169  | 900  | 269  | 3500  | 346  |
| 25  | 24  | 130  | 97  | 320  | 175  | 950  | 274  | 4000  | 351  |
| 30  | 28  | 140  | 103  | 340  | 181  | 1000  | 278  | 4500  | 354  |
| 35  | 32  | 150  | 108  | 360  | 186  | 1100  | 285  | 5000  | 357  |
| 40  | 36  | 160  | 113  | 380  | 191  | 1200  | 291  | 6000  | 361  |
| 45  | 40  | 170  | 118  | 400  | 196  | 1300  | 297  | 7000  | 364  |
| 50  | 44  | 180  | 123  | 420  | 201  | 1400  | 302  | 8000  | 367  |
| 55  | 48  | 190  | 127  | 440  | 205  | 1500  | 306  | 9000  | 368  |
| 60  | 52  | 200  | 132  | 460  | 210  | 1600  | 310  | 10000  | 370  |
| 65  | 56  | 210  | 136  | 480  | 214  | 1700  | 313  | 15000  | 375  |
| 70  | 59  | 220  | 140  | 500  | 217  | 1800  | 317  | 20000  | 377  |
| 75  | 63  | 230  | 144  | 550  | 226  | 1900  | 320  | 30000  | 379  |
| 80  | 66  | 240  | 148  | 600  | 234  | 2000  | 322  | 40000  | 380  |
| 85  | 70  | 250  | 152  | 650  | 242  | 2200  | 327  | 50000  | 381  |
| 90  | 73  | 260  | 155  | 700  | 248  | 2400  | 331  | 75000  | 382  |
| 95  | 76  | 270  | 159  | 750  | 254  | 2600  | 335  | 100000  | 384  |

Note: “N” is population size; “S” is sample size.

**Source:** Krejcie, Robert V., and Morgan, Daryle W., (1970): “Determining Sample Size for Research Activities”: Educational and Psychological Measurement:

# APPENDIX II: DOCUMENTARY REVIEW CHECKLISTS

**Documentary Review**

1. Procurement Policy of Tonj State Hospital
2. Tonj State Hospitals’ internal and external audit reports
3. Procurement and Disposal Unit Reports of Tonj State Hospital
4. Procurement and Systems Audit Reports of Tonj State Hospital

# APPENDIX III: QUESTIONNAIRE

Dear Respondent:

My name is Sekwat Solomon. I am a Master of Procurement and Logistics Management degree student at Nkumba University. In partial fulfillment of the requirements of this course, I am conducting my academic research entitled “**Medical Supply chain practices and Health Service Delivery in South Sudan: A Case Study of Tonj State Hospital in Warrap State”.** The University has permitted me to carry out this research and I will treat your opinions with confidentiality. Your honesty is both critical and paramount when responding to the questionnaire.

Thank you so much for your cooperation.

**Section A: Background Information**

BIO DATA (Please do provide the following information. Indicate appropriate code in box)

|  |  |  |  |
| --- | --- | --- | --- |
| 01 | Sex | Male …………………………1Female ………………………2 | Enter the correct code |
| 02 | Age | Below 26 years…….. ………126---35 years……...…………236----45 years………………..346----55 years……………..…4Above 55 years….…….……..8 | Enter the correct code |
| 03 | Marital Status | Married………………..….......1Single……………….….…..…2Separated .……………..…......3Divorced...……………..…......4Widowed.……………...…......5 | Enter the correct code |
| 04 | Highest Level of Education | PHD …………………..….......1Master’s Degree…….….…..…2Bachelors ……………..…......3Diploma ……………………....4Certificate ……….………..…..5 | Enter the correct code |
| 05 | Department to which you belong | Procurement…………………...1Marketing……………….….…2Accounting & Finance…….….3Stores and Inventory Management…………………...4ICT and Systems Administration …………….…………………...5 | Enter the correct code |
| 06 | Your period of work with this public hospital | 0-4 years ……………..……....15-9 years ….……………...…..210-14years………………...….315 and above years….………..4 | Enter the correct code |

**For sections B, C and D use the scale/ranking below to tick in the box that corresponds with number that best indicates your opinion on the statement or question.**

1. Strongly Disagree; **2-**Disagree; **3-**Neutral; **4-**Agree; and **5-**Strongly Agree

**SECTION B: Effect of warehousing management practices on health service delivery in Tonj State Hospital.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **1** | **2** | **3** | **4** | **5** |
| 1. | The hospital management does proper selection and location of warehouses |  |  |  |  |  |
| 2. | The hospital’s distribution center enables order processing and delivery of goods directly to customers under one roof |  |  |  |  |  |
| 3. | The hospital’sdistribution centers generally keep goods for longer periods |  |  |  |  |  |
| 4. | The hospital has a storage system of holding and preserving goods |  |  |  |  |  |
| 5. | This hospital maintains adequate inventory size and mix. |  |  |  |  |  |
| 6. | In this hospital, supplies are delivered in the right place and on time to the right customer |  |  |  |  |  |
| 7. | In this hospital, effective service of customers depends on the operations of the warehouse |  |  |  |  |  |
| 8. | This hospital has got an IT function which ensures that technology for the efficiency of storage is use |  |  |  |  |  |

**SECTION C: Effect of inventory management practices on health service delivery in Tonj State Hospital.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **1** | **2** | **3** | **4** | **5** |
| 1. | The hospital’s storage system is carefully planned and coordinated to achieve the objectives of storekeeping |  |  |  |  |  |
| 2. | The hospital’s storage system aims at smooth functioning of the whole organisation, perfect coordination |  |  |  |  |  |
| 3. | The hospital’s responsiveness is within the expectations of customers and this response is continuously improved |  |  |  |  |  |
| 4. | At this public hospital, stock management is essential for the efficient management of organizations |  |  |  |  |  |
| 5. | At this public hospital, lead time management encourages us to deliver services in accordance with customers’ needs |  |  |  |  |  |
| 6. | At this public hospital, there are best practices of thriving operational strategies which are accepted by the stores’ management  |  |  |  |  |  |
| 7. | The hospital recognizes the role of capacity utilization in the formation and maintenance of competitive advantage |  |  |  |  |  |
| 8. | The hospital has enough the tools to quickly assess the level of capacity utilization |  |  |  |  |  |

**SECTION D: Effect of information flow management practices on health service delivery in Tonj State Hospital.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **1** | **2** | **3** | **4** | **5** |
| 1. | There is smooth information flow to all logistics functions of the hospital |  |  |  |  |  |
| 2. | In this hospital, there is practice of internal information sharing  |  |  |  |  |  |
| 3. | The hospital management has invested on information communication systems  |  |  |  |  |  |
| 4. | The hospital has achieved accurate demand forecasting  |  |  |  |  |  |
| 5. | The hospital has achieved timely respond to customer references  |  |  |  |  |  |
| 6. | The hospital has achieved optimal inventory  |  |  |  |  |  |
| 7. | The hospital has achieved smooth flow of materials and products  |  |  |  |  |  |
| 8. | There is electronic order processing and electronic customer feedback in the hospital |  |  |  |  |  |

**SECTION E: The Level of health care service delivery in Tonj State Hospital.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Item** | **1** | **2** | **3** | **4** | **5** |
| 1. | There is ability of the health practitioners and all staff to perform the required health services dependably. |  |  |  |  |  |
| 2. | There is a standards body that checks all the equipment and drugs supplied to the hospital |  |  |  |  |  |
| 3. | The hospital has enough equipment to address most health complications in South Sudan. |  |  |  |  |  |
| 4. | The bed to patient ratio meets the WHO standards in all health facilities. |  |  |  |  |  |
| 5. | There is always assured storage for delicate health products like vaccines and other drugs |  |  |  |  |  |
| 6. | Emergence services are facilitated with all the requirements like ambulances and personnel. |  |  |  |  |  |
| 7. | There is willingness by the practitioners in the hospital to respond to the necessary needs at any time. |  |  |  |  |  |
| 8. | The health facility administration have hired qualified personnel to handle the products you supply for them to perform their duties. |  |  |  |  |  |

***Thanks for your participation.***

# APPENDIX IV: INTERVIEW GUIDE

**Dear Sir/Madam,**

My name is Sekwat Solomon. I am a Master of Procurement and Logistics Management degree student at Nkumba University. In partial fulfillment of the requirements of this course, I am conducting my academic research entitled “**Medical Supply chain practices and Health Service Delivery in South Sudan: A Case Study of Tonj State Hospital in Warrap State”.** You have been selected to participate in this study. The information got from you will be kept confidential and will be used strictly for academic purposes.

1. What warehousing management strategies have been implemented for improved health service delivery in public hospitals in Tonj State Hospital in Warrap State?
2. What inventory management strategies have been implemented for improved health service delivery in Tonj State Hospital in Warrap State?
3. What information flow management strategies have been implemented for improved health service delivery in Tonj State Hospital in Warrap State?
4. Any other benefits that logistics provide to your firm? List them down
5. Are there any challenges in the implementation of logistics management by your firm? If YES, List them down

***Thank you for cooperating!***