ASSESSMENT OF AGILE SUPPLY CHAIN PRACTICES TOWARDS PERFORMANCE OF HEALTH CARE SECTOR, IN TANZANIA

A CASE OF SELECTED PUBLIC HOSPITALS IN DODOMA MUNICIPALITY

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A CASE OF SELECTED PUBLIC HOSPITALS IN DODOMA MUNICIPALITY

BY

SHADRACK MWAISEJE

A dissertation Submitted in Partial Fulfillment of the Requirement for the Award of the Degree of Master of Science in Procurement and Supply Chain Management (Msc- PSCM) of Mzumbe University.

2018

CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled the **assessment of agile supply chain practices towards performance of healthcare sector Tanzania** in partial fulfillment for the Award of the degree of Master of Science in Procurement and Supply Chain Management of Mzumbe University.

Signature

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I **Shadrack Mwaiseje** declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for similar or any other degree award.

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DEDICATION

This work is dedicated to my wife Gift Mushi, my son Gabriel and all teachers who taught me from primary level until the university level for bringing to me knowledge which are lasting longer and forever.

LIST OF ABBREVIATIONS

DV	-	Dependent variable
ICT	-	Information Communication Technology
IS	-	Information system
IVs	-	independent variables Management
MSC	-	PSCM- Masters of Science in Procurement and Supply Chain
PAT	-	Principal Agency Theory
PMU	-	Procurement Management Unit
RBV	-	Resource Based Theory
SC	-	Supply Chain
SHAMS	-	Smart Healthcare Agility Management System
SPSS	-	statistical package for social science
USA	-	United States of America
VIF	-	Variance inflation factor

ABSTRACT

The study was all about agile supply chain practices towards performance of healthcare sector. This research was conducted at Dodoma Municipality in Benjamin Mkapa hospital and Dodoma general hospital. The specific objectives of the study were to assess timely delivery of treatment to the patients on performance of healthcare in Dodoma Municipality, to evaluate integration and coordination of process towards performance of healthcare in Dodoma Municipality, to assess the extent to which quick response to patients enhance performance of healthcare in Dodoma Municipality and to ascertain the effects of agile supply chain practices on performance of healthcare in Dodoma Municipal. Data were collected by using both primary source of data and secondary source of data. Primary data was collected by using questionnaire and interview while the secondary data was collected by using documentary review and the study used the sample size of 236 respondents. Data was analyzed by both qualitative and quantitative analysis. To determine the effects of agile supply chain practices on performance of healthcare logistic regression model was used and Pearson chi-square was used to determine the influence of timely delivery of treatment, integration and coordination of process and quick response to the patients towards performance of healthcare in terms of patient's satisfaction. Results indicated that treatment conducted at reasonable time, waiting for registration, ICT uses in healthcare operations, reduction of path flows and quick medical assistance have positive significantly relationship on performance of healthcare in terms of patients satisfaction whereas time to contact medical personnel, effective communication and quick response with change number of patients has insignificant relationship towards patients satisfaction. Results from Pearson chi-square indicated significant relationship between timely delivery of treatment, integration and coordination of process with performance of healthcare in terms of patient's satisfaction, whereas quick response to the patients has insignificant relationship with performance of healthcare. The study recommends that the Government should employ adequate number of doctors, nurses, pharmacists and laboratory technicians in order to smoothen the daily operations of public hospitals

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CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

This chapter describes the background of the study which was carried out, which is expressed from broad perspective to the local perspective comprised of the relevant studies carried out by different researchers. Furthermore the chapter composed of the statement of the problem, through which the researcher describes the reasons to undertake the prescribed study. Objectives of the study both general and specific objectives are clearly elaborated in this chapter. To make it more precise, research questions expressing both general objectives and specific objectives are provided. Significance of the study to be carried out is provided within this chapter, where descriptions is extended in such a way that all each beneficiaries are pointed out clearly and how they are going to benefit once the study is accomplished.

1.2 Background of the study

The rapid emerging challenge of value chain environment is forced in many healthcare organizations to decide on looking for better opportunities in order to improve the efficiencies of operations through reducing cost and continuity to improve of quality care (Mustaffa & Potter, 2009). Supply chain is more complicated in the healthcare compared to other industries especially manufacturing industry because of the nature of service conducted in the health care (Mustaffa & Potter, 2009). So that there is different number of supply chain tactics which have been adopted nowadays to reduce the problems but still there are barriers to use supply chain techniques such as lean and agile techniques continue to exist (Arrison *et al*., 2011).

In today's competitive business and increasing levels of awareness by customers concerning goods and services it forces the organization to become more responsive to the needs of customers, which leads into the increase interest in the concept of agile supply chain in order to meet the changing condition of the competition and increase the performance of hospital (Mehralian *et al*., 2015).

By considering health care service, the agile supply chain refers to the ability of being flexible in providing service to the patients without a limitation of fixed numbers of patients to be attended per day, quick response to the patient, reducing the number of process to be followed by patient in acquiring services by integrating and coordinating properly the processes, and to avoid long waiting times of services by ensuring quick delivery of the service to the patient (Arronson *et al*.,2011).

Presence of long lead time in healthcare for waiting necessary care or treatment from the doctors, nurses influence negatively to the patient's quality of life because their condition may deteriorate significantly when waiting to receive the treatment (Meijboom *et al*., 2011). So that the healthcare delivery system which the elongated waiting time is just a common practice to them will actually be evaluated as low quality care because they fail to treat patients/customers in short delivery time as perceived by the patients. Meijboom, *et al*. (2011) revealed that the waiting time in healthcare differs from one country to another, for example in USA and Canada the sick adults were considerably less likely to report quick access and are supposed to wait at least six days for an appointment compared to patients in other countries. The application of agile supply in healthcare can reduce the longest waiting time of patients to receive treatment by providing quick response to the customers and shortest delivery of service to the customers.

Agile supply chain strategies in healthcare through responding quickly to the patients requires the competent and experienced service providers such as nurses, doctor, specialists, medical expert and general practitioners for responding quickly to the various needs of the patients (Rahimnia & Moghadasian, 2010). In this regard it leads to hospital to increase investment on the recruitment of the best service providers (nurses, doctors, specialists and practitioners) in order to cope with the needs of patients and healthcare organization itself (Rahimnia & Moghadasian, 2010).

Also the process such as patient pathway through the healthcare arrangement from the initial time to make contact with reception until the final time for a particular medical problem, addressing the question of how supply chain theories especially

agile supply chain process and strategies are applicable in helping to design the more efficient and suitable patient flow in healthcare (Arronson *et al*., 2011).

In Tanzania healthcare industry both private and government hospitals was faced with the large number of patients which in turn leads into the availability of queue in waiting services from doctors/nurses/laboratory technicians (Leshabari *et al*., 2008). Also there is presence of too many process or procedures which the patients must follow in securing treatment because of the limited use of information communication technology (ICT) software especially to the government hospital and health centers for integration and coordination of the process together in order to reduce the number of the process. Due to the presence of large number of patients which cause queue in waiting service and the availability of many procedures or process of the pathways of patients, it leads to long lead time in many government hospitals in Tanzania to be a problem (Leshabari *et al*., 2008).

Performance of healthcare organization can be described in terms of bed occupancy, mortality rate, growth and accreditation (Kakooza *et al*., 2015). Performance measurement in hospitals as said by Elg *et al*. (2013) includes the patient's satisfaction, financial performance and processes which involve patient safety, waiting time and length of stay. Bloom *et al*. (2009) said that most hospitals management was poor compared to manufacturing firms, also the performance of public hospital in terms of delivering of services to the patients is very worse compared to private hospitals. Bloom *et al*. (2009) recommend that the public hospital management must make sure that they employ strategic decisions which accelerate the highest delivering of services through good standards of patients care and achieving the overall financial performance of the hospitals.

Therefore the presence of lead time, many processes to follow in securing treatment and the delay in providing service to the patients even in emergency case in healthcare industry, motivates the researcher to conduct research on the assessment agile supply chain practices towards performance of healthcare industry in Tanzania

1.3 Statement of the problem

Most of the researchers pointed out that the use of agile supply chain in hospitals help to combine their internal efficiency and external effectiveness to adopt their services to a constantly changing and extremely unpredictable environment (Mehralian *et al* ., 2015). As observed by many researchers that the healthcare organizations are becoming increasingly uncertain hence the great efforts should be done to alleviate the situations (Mehralian *et al*., 2015). Tolf *et al*. (2015) found that agile supply chain in healthcare can be a promising strategy towards helping the healthcare organization to improve their ability to adopt the unchanging environment, however agile supply chain practices in healthcare is very limited due the absence of knowledge concerning supply chain in healthcare organization.

Despite of the importance of agile supply chain practices in health care like fast delivery of service, flexibility in meeting changing of demand, time management, cost minimization and profit achievements still agile supply chain practices lagging behind in healthcare organization (Arronson *et al*.,2011). The study done by Simwita (2017) in Tanzania observe that agile supply chain applicability in healthcare organization can help to smoothen the operations through improving quality of service by reducing time spent of patients in hospital, flexibility on healthcare processes and improving healthcare delivery system. As discussed by many literature that lean and agile strategies nowadays become a tools for improving healthcare processes (McLaughlin and Hays 2008; Vries and Huijsman 2011)

Tanzania government through ministry of health employs many efforts to strengthening the health sector industry, example in Tanzania eHealth strategy 2012-2018 the government emphasizes using of information and communication technology in order to transform healthcare delivering by enabling information access and supporting healthcare operations, management and decision making. So that through eHealth strategy the desire of the government is to deliver high quality, efficient and sustainable health system which responds quickly to demand pressures. But still the efforts fail to achieve their objectives due to the presence of too long process which the patients must follow in acquiring services (pathway of patients to

acquire treatment), absence of quick response to the patients even if in the emergency case and queue in waiting service. This motivated the researcher to conduct research on agile supply chain practices towards performance of healthcare industry by looking on agility in terms of integration and coordination of process, timely delivery of service, quick response and the effects of agile supply chain practices towards performance of healthcare.

1.4 Research objectives

The study was achieve the following objectives

1.4.1 General objectives

To assess agile supply chain practices on performance of health care sector in Dodoma, Tanzania.

1.4.2 Specific objectives

i. To assess timely delivery of treatment to the patients in Dodoma Municipal.
ii. To evaluate integration and coordination of treatment processes towards performance of healthcare in Dodoma Municipal.
iii. To assess the extent to which quick response to patients enhance performance of healthcare in Dodoma Municipal.
iv. To ascertain the effects of agile supply chain practices on performance of healthcare in Dodoma Municipal

1.5 Research hypothesis

i. There is significance relationship between timely delivery of treatment to the patients and performance of healthcare in Dodoma Municipal
ii. There is significance relationship between integration and coordination of process and performance of healthcare in Dodoma Municipal
iii. There is significance relationship between quick response to patients and performance of healthcare in Dodoma Municipal

iv. There is significance relationship between agile supply chain practices and performance of healthcare in Dodoma Municipal

1.6 Significance of the Study

This study will be of benefit to the following areas;

The findings provide useful understanding in organizations on the issue concerning agile supply chain practices in healthcare operations. The results of the study will be used by the health care organization to take necessary action to address how agile supply chain in terms of timely delivery, quick response to the patients and integration and coordination of the process will be used in the organization in order to increase efficiency and customer satisfaction. The findings of the study also will help the researchers and academicians to discover issues which are needed to conduct a further research and actually carry out research on them. This will add value to the body of knowledge in bridging the gap between theories and practices. Also the study will enable the researcher to be awarded a Masters of Science in Procurement and Supply Chain Management (Msc-PSCM) of Mzumbe University.

1.7 Organization of the study

This study is organized in six chapters. Chapter One covers background to the study, research problem, research objectives, research questions, significance of the study and organization of the study. Chapter two covers literature review, Chapter three covers research Methodology, chapter four covers the presentation of the findings, chapter five covers the discussion of the findings and chapter six covers summary, conclusion and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section describes theoretical literature review which specifically covers the meaning of key terms and related theories to be incorporated in the study. Furthermore the section presents empirical literature review where the numerical data from different scholars will be critically narrated to provide a clear snapshot on how they relate with study being carried out. Also to build a comprehensive literature, a conceptual model and measurement of the variables provided accordingly in this chapter.

2.2 Definition of key terms

2.2.1 Agile supply chain

Agility might be defined as the ability of a supply chain to rapidly respond to changes in market and customer demands (Tolf *et al*., 2015). Supply chain agility is usually defined as the ability to respond to unanticipated changes of demand (Sheffi, 2008). Mehralian, (2015) defines supply chain agility as the ability to respond quickly and adequately to short-term changes in demand, supply or the environment. It is derived from the flexibility, responsiveness and effectiveness of the supply chain

In this study agile supply chain is the situation of being responsive to deliver services to the patients by being quickly response, reasonable time in providing treatment and integrate and coordinate all process of healthcare operations in order to smoothen the operations.

2.2.2 Health care

The concept health of care has being broadly elaborated as ability possessed by people to grow to their full potential during their entire lives, (Beristain,2004). Health is an important element required for national development and poverty alleviation by all Tanzanians. To achieve this, the government through national

health policies since independence has emphasized on delivery of equitable and quality preventive, promotive, curative and rehabilitative health services at all levels (URT, 2007). In this study, health is an asset b which individuals possess in order to survive and having intrinsic and instrumental value

2.2.3 Agile organization

An agile company can be defined as an enterprise that is capable of operating profitably (example of coping strategies) in a competitive environment of continually, and unpredictably, changing customer opportunities (Tolf *et al*., 2015). In this study agile organization is the healthcare organization which is capable to deliver the treatment in reasonable time and ability to change quickly with the changing number of demand of patients.

2.2.4 Agile supply chain in healthcare

Agile supply chain in healthcare refers to the ability of being flexible in providing service to the patients without a limitation of fixed numbers of patients to be attended per day, quickly response to the patient, reducing the number of process to be followed by patient in acquiring services by integrating and coordinating properly the processes, and to avoid long waiting times of services by ensuring quickly delivery of the service to the patient (Arronson *et al*., 2011).

In this study agile supply chain in healthcare is situation of being responsive towards provisions of treatment by providing treatment with reasonable or short time and through reduction of all unnecessary procedures which can cause delay in treatment provision to the patients.

2.2.5 Performance

Performance is defined as a measure of how well or poorly the firm is doing (Mohutsiwa, 2012). Also Richard *et al.* (2009) viewed organizational performance as the actual output of the results of an organization as measured against its intended goals and objectives.

In this study performance defined as ability to deliver the service to the patients at maximum level in order to enhance high level of patients satisfaction.

2.3 Theoretical literature review

2.3.1 Theories

The study uses two theories which are Resource Based View Theory (RBV) and Principal Agency Theory (PAT)

2.3.1.1 Resource based view theory

Resource Based View Theory (RBV) was developed by Barney in 1986 and suggests that internal resources and capabilities of the firm is the major source of competitive advantage (Kay, 2007). The theory believing that the firm is a combination of assets and capabilities where by any successes of the firm or organization based on the firm resource capabilities that are distinctive (Kay, 2007). RBV recognize the firm as a collection of productive resources which are tangible or intangible assets, competences, capabilities, organizational processes and information and knowledge owned by organization by enabling them to easily implementing of the strategies in order to improve efficiencies and effectiveness (Lian, 2014) .The core argument of the resource-based view is that there are significantly different resources and capabilities across the organization (Grantt, 2001).

The resource based view in agile supply chain in health care can be built from the proposition that organizations which have the resources such as human resource, physical/tangible resources and socio-cultural resources can be able to apply the agile supply chain in their operation, because applicability of agile supply in terms of being quick to respond to the customers, integration of process, and to reduce lead time in serving the patients it require the healthcare organization to have the resources such as large number of personnel (doctors, nurses and support staff) to facilitate the quick response and reducing lead-time through shortening of the number of queue by serving the large entering number of patients at once with the different service providers.

Also in healthcare organizations it requires to have the tangible resources such as buildings, furniture and fittings, and other equipment which can be able to accommodate the large number of patients without segregating others. So that by having the resources the healthcare organization can be able to apply the agile supply chain strategies their operations.

This theory tries to explain the competency of organization in terms of resources they own. So that the organization which has enough resources such as capital, labor, materials, equipment and technology seems to be more powerful in competition compared to the organization or company that doesn't have the mentioned resources (Su, 2013). From a theoretical perspective, agile supply chain in healthcare organization can be applicable if the organization has enough resources such as financial strength, technology adopted, Management capability, quality system and process in order to support the application of agile SC strategies in the healthcare operations. This theory contends that the reasons for internalization extend beyond the cost of transacting through the market to the conditions that enable organizations to establish, maintain, and use capabilities more efficiently than market can do. Therefore, and according to this theory, in the decision regarding the agile supply chain strategies, the organizations evaluate and make assessment on internal capabilities by comparing the needs of external customers (patients), and consider how these capabilities might best be integrated to produce the greatest value of customer satisfaction.

In this study Resource Based View theory (RBV) was used to determine the resources capabilities of the healthcare organization in terms of capital, labor, buildings, equipment, technology and quality system and process which can be used to apply agile supply chain strategies in their operations. Because agile supply chains practices requires resources especially large number of labor and information technology systems (Rahimnia & Moghadasian, 2010). Therefore, the relevance of this theory in this study is that it guides in assessing whether an organization has improved or added value under using resources and capabilities they have in order to ensure the practices of agile supply chain and then achieving a sustainable competitive advantage in practicing agility in healthcare operations.

2.3.1.2 Principal Agency Theory (PAT)

For the duration of the previous four decades, agency theory has been extensively used in different disciplines but little work was conducted on how agency theory can be used to demonstrate the relationships of the organizations within the supply chain (Fayezi *et al*., 2012). Agency theory is applicable where one party (principal) delegates the power and responsibilities in terms of making decision of a certain tasks, and control to another party (agent) (Zsidisin & Ellram, 2003). But nowadays there is increasing interest on using the agency theory on the issue concerning supply chains like to understand the nature of relationship within supply chain partners, to understand how partners within supply chain manage risks (Fayezi *et al*., 2012)

Agency theory demonstrates the relationship between one party to another party. In agency relationship one party is doing the work/activities on behalf of the other party, the one who perform work is known as agent and the owner of the work is known as principal (Fayezi *et al*., 2012). For example in our case the public healthcare organization is the agent who performs the activities or work on behalf of the citizens (principal). So that in providing the services to the citizens, the healthcare organization must employ well their effort towards delivering good service to citizens (principal).

Health care organization must make sure that they use agile supply chain strategies in their operations in order to improve the services rendered to the citizens/customers. Agile supply chain strategies can help the healthcare organization to become responsive to the customers through quick, fast delivery of service and shorter the process through integration and coordination of the processes (Fayezi *et al*., 2012)

Hence, the theory is applicable to the study through showing how the healthcare organizations as an agent being able to fulfill the requirements of the citizens (patients) as principal. This is because the healthcare organization depends on the patients in order to operate, so that it requires the healthcare organization to work effectively and efficiently in order to satisfy the requirements of the customers (patients) who are normally the ones who make the organization to survive through payment which are made to secure treatment. Therefore the agency theory is used in

this study to understand how the agent (healthcare organization) can use agile supply chain strategies in their operations in order to fulfill the goals of the principal (patients).

2.4 Empirical literature review

Rahimnia and Moghadasian, (2010) on the study of Supply chain leagility in professional services: how to apply decoupling point concept in healthcare delivery system in Iran indicated that due to the agility being very important for the treatment process in healthcare supply chain operations because of the special condition of service offered by healthcare organization it required to be considered. Also Rahimnia and Moghadasian, (2010 found that , the less flexibility to cope with the uncertain environment/demand it require the healthcare organization to apply agility in treatment process by making sure that all numbers of patients entering into the hospital get desired treatment through absorbing additional work to employee by paying overtime in order to meet the demand.

Hakan *et al.* (2011) indicate that, an observation from a case study of the one biggest hospital in Sweden shows that fifty percent of the patients admitted to the hospital arrived through the emergency department, which shows the necessity of the hospital to organize their operations in quick response, flexibility that is to be agile. Also Hakan *et al*. (2011) observed that the presence of large number of patients which exceed the planned capacity of the healthcare organization results into longer lead-times and queues. The authors compare the principle of 'produce to stock" as long queues and long waiting times for the patients. They suggest that in order to avoid the long lead times, the healthcare organization must work with flexible capacity and flexible lead-time as compared to the principle of "produce to customer order". But this move towards requires the presence of high availability of extra personnel and other resources that are needed to perform the process and all activities in healthcare on time, independently and in the actual volume.

Al-Saada, *et al.* (2013) on the study of supply chain management and its effect on healthcare service quality; Quantitative evidence from Jordian private hospital, the

study tries to explain the existing difference between supply chain management and quality of health service due to some geographical variables which include (gender, age, education level, and years of experience in the field of supply. The study uses Quantitative design approach. This study uses both qualitative and Quantative design and the aim is to analyze the agile supply chain practices towards performance of healthcare.

Rust, (2013) on the study of adopting agile strategies to healthcare service delivery, tried to investigate and test on agile operational practices in simulated healthcare environment by establishing the comparative effectiveness of changes to system structures which promote market responsiveness, demand information sharing and centralized planning. But this study aims to analyze agility in terms of quick response, integration and coordination of process and timely delivery of treatment to the patients

Also according to Meijboom *et al*. (2011) on their study indicated that recruiting the competent, experienced and skilled workforce is not the only way to improve agility in health care organization. But there is issue of capabilities of the healthcare organization to cope with the uncertain demand or environment and the collaboration with the different hospitals in the healthcare industry is necessary to exchange the newest ideas and findings about applicability of agile supply chain in healthcare organization. Exchanging ideas can be met through having continuous meetings held by different hospitals by interaction of medics' expertise with different skills and experiences from different hospitals. The limitation of this study is not showing the capabilities of health care which can be used to cope with uncertain demand and fail to show how agile supply chain adoptability in healthcare organization. this can lead into coping with the uncertain demand. So this study intended to show the applicability of agile supply chain in healthcare.

Charles *et al*. (2010) in the study of "A model to define and assess the agility of supply chains: Building on humanitarian experience, the study indicates that the organization should implement the agility strategies in order to deal with the volatility of demand, imbalance between supply and demand and disruptions of all

factors which affect supply chains in humanitarian organization. And the use of qualitative research design by employing interview as a means of data collection techniques. This study used both qualitative and quantitative research design by employing both interview and questionnaire as means of collecting data.

The study conducted by Mathur *et al.* (2015) aimed to provide a conceptual framework showing the relationship between the components of supply chain management and healthcare performance for Indian healthcare industry. But this study aimed to use the strategies of supply chains such as agile supply chain and performance of healthcare for Tanzanian health care industry.

According to Hagiwara *et al.* (2014) on the study of "smart healthcare agility management" the paper aimed to propose the new ideas about smart healthcare agility management system (SHAMS). The proposed system will be used to support pre-patients who need unique personalized protocol and guideline together with each descriptive manual due to having the problem of medical risks factors.

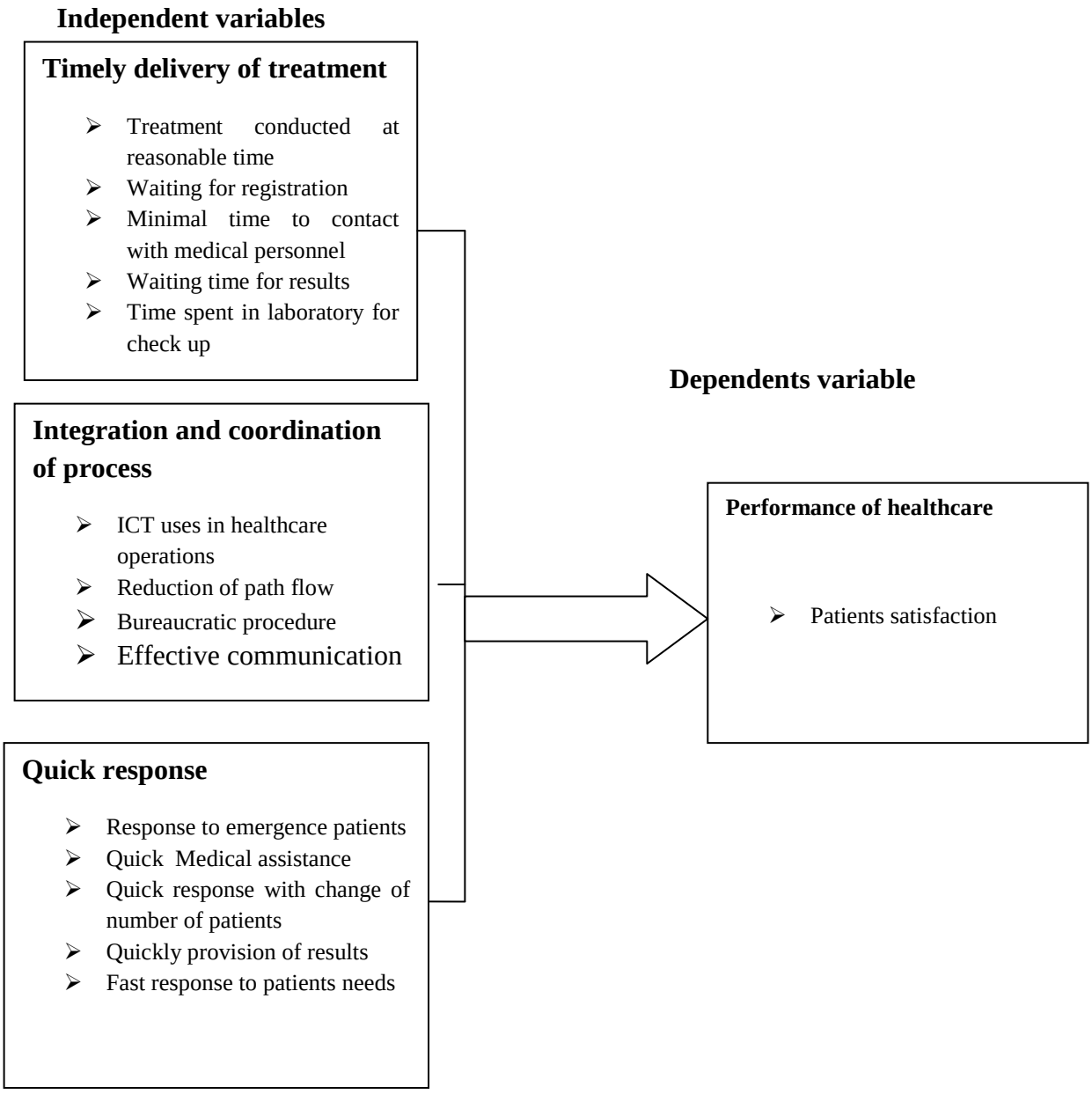
Tolf *et al*. (2015) on the study of Agile, a guiding principle for health care improvement in Sweden indicated that in order to cope with the increasing unstable environment and to become agile organization the hospitals should require to shift from an assumption of continuity and transform the operations to the assumption of discontinuity and focus adaptive capacities meeting the frequently changing needs inherent in healthcare provision.

Therefore most of revealed studies failed to show agile supply chain practices in healthcare in terms of quick- response, integration and coordination of the process, and timely delivery of service how can increase performance, cope with un-certainty, and smoothen the operations of the healthcare organization in order to make patients satisfied with services.

2.5 Conceptual framework for the proposed study

This study considers quick response, timely delivery and process integration and coordination to be independent variables, and performance of healthcare to be dependent variable as shown in figure 2.2 below

Figure 2.1 Conceptual framework of the study



Source; The Researcher's own constructs, (2018)

From the conceptual framework the linkage between variables of interest in this study is clearly shown in the figure 2.1 above. The independent variables according to this study involve timely delivery of treatment, integration and coordination of process and quick response. The variables under each independent variable includes treatment conducted at reasonable time, waiting for registration, time to contact medical personnel, ICT uses, reduction of path flows, effective communication, quick medical assistance, quick response with change number of patients and dependent variable include performance of healthcare which measure by patients satisfaction. The links between these variables are as explained below

2.5.1 Timely delivery of treatment and performance of healthcare

Pillay *et al*. (2011) in their study indicated that in hospital there is average of more than two hours patients wait from registration to getting the prescription slip and physical contact with the medical personnel is almost the average of 15 minutes. Also the study of pillay *et al*. (2011) identifies five factors which lead into the waiting time in public hospital.

a) Employee attitude
b) Work process
c) Heavy workload
d) Management and supervision problem
e) Inadequate facilities such as buildings and equipments

Waiting time for treatment in healthcare can be frustrating given that time is un-productively spent and people are intolerant and do not want to see the waiting time (Pillay *et al*., 2011). Also the literature on service quality indicates that waiting of services is experienced as typically negative to the customers, and has been observed to affect the overall customer's satisfaction with the service encounter which indicates poor performance of the service provider (Barlow, 2002)

H1: There is significant relationship between timely delivery of treatment and performance of healthcare organization.

2.5.2 Integration and coordination process and performance of healthcare

Healthcare operations are needed to be integrated and coordinated in order to ensure that there is short pathway of the patients from the registration until the patients meet physically with the medical personnel. Also the researcher indicates that the intensive coordination and integration between the operational processes influence the good performance of healthcare supply chain (Huijsman, 2011). Generally supply chain management emphasizes much on the integration of operation processes which include physical product such as pharmaceuticals, medical devices, health aids as well as the process which involves the flow of patients from one section to another section

Arronson *et al.* (2011) said that the integration and coordination of process it requires the organization to use or to install the information system (IS) which enables the all operations and activities within the organization to be conducted in electronics means which will facilitate the fast delivering of the services to the customers without any delays which can be caused by the manual operations of works.

H2: There is significant relationship between integration and coordination of treatment processes and performance of healthcare organization

2.5.3 Quick response and performance of healthcare

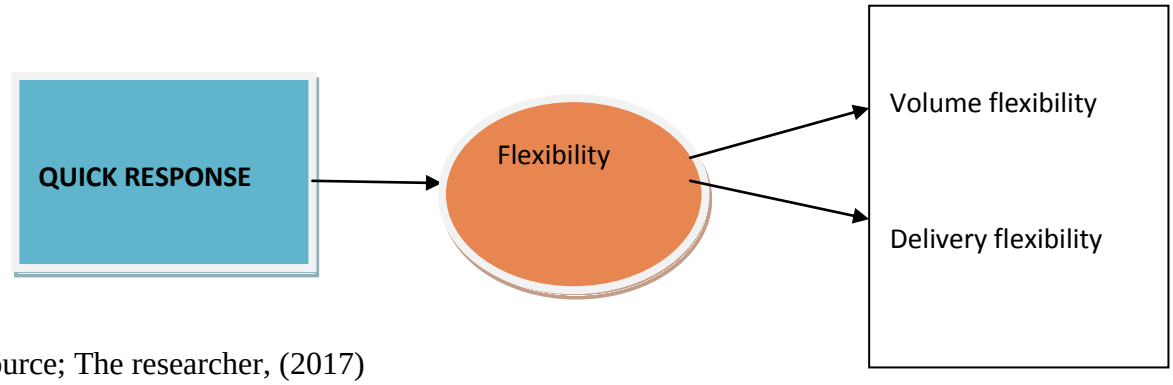
Charles *et al*. (2010) explains quick response as ability of responding quickly to the customer requirements and being able to solve the customer problems immediately which in turn leads into increase of the performance of the healthcare in responding quickly to the patient's requirements. In explaining the quick response in service the Charles *et al*. (2010) identify three characteristics of defining the quick response in services as follows;

a) Flexibility; the researcher said that in achieving quick response there must be flexibility in an organization to cope with quick changes of demand. In achieving flexibility the two characteristics should be observed such as volume flexibility and delivery flexibility as explained below:-

Volume flexibility is the ability to change the level of aggregated output, in order to meet unexpected demand (slack, 2005).

Delivery flexibility the ability to change planned or assumed delivery dates (slack, 2005).

Figure 2.2 Quick responses with flexibility



Source; The researcher, (2017)

b) Effectiveness: quick response accompanied with the effectiveness which is doing all the right things, in achieving effectiveness in quick response the two characteristics such as reliability and completeness should be put in place (Charles *et al*., 2010).

c) Responsiveness; Charles *et al*. (2010) indicates that quick response can be achieved through showing responsiveness which means that ability to respond to change within an appropriate time frame.

H3: There is significant relationship between quick responses to the patients and performance of healthcare organization

2.5.4 Effects of Agile supply chain practices on performance of health care

Agile supply chain practices in healthcare includes the adoption of the elements of agile supply chain in health care operations, healthcare organization as service oriented organization should employ some agility strategies and lean strategies in order to increase the efficiency and effectiveness of healthcare operations through responsiveness to the patients and cost reduction strategies (Meijboom *et al*.,2011).. Furthermore Meijboom *et al*. (2011) indicate that lean and agile practices if adopted

in healthcare organizations will facilitate the performance of the healthcare organization through reduction of cost and patients satisfactions.

Most commonly used as agility practices in services oriented organization are those elements which encourage responsiveness and effectiveness in delivering services to the customers such as faster delivering of services and quick response towards the needs of the customers for the purpose of increasing the performance of the organization and ensuring competitive advantages (Brun & Castelli, 2008).

This study uses treatment conducted at reasonable time, waiting for registration, time to contact with medical personnel, effective communication, quick medical assistance, quick response to change in number of patients, ICT uses and reduction of path flows as agile supply chain practices which influence the performance of healthcare through patient's satisfactions. This is in consistence with the study of Anderson et al. (2007); Chiu et al. (2007); Hakan et al. (2011) which uses waiting time for registration, time to contact medical personnel and reduction of path flow as agile supply chain practices which influence the satisfaction of the patients.

H4; There is significant relationship between agile supply chain practices and performance of healthcare organization.

2.5.5 Performance of healthcare organization indicators

This study uses one performance indicator of healthcare organization which are patient's satisfaction. This is supported by Pelone *et al.* (2012) in their study they use average length of stay, impatient raw mortality rate, bed turnover and patients satisfaction as the performance indicators of the healthcare organization. Example in length of stay as performance indicator, Pelone *et al*. (2012) said that healthcare organization can try their level best to collect information on how long patients stay in the hospital after certain procedures or in a certain departments, and they suggest that hospital should do more investigation on possible causes if the patients stay in hospital is lengthy.

Also pelone *et al*. (2012) found that patients satisfaction is a most appropriate indicator for performance of healthcare organization because patients if are satisfied

with the treatment and all other services given in hospital they become loyal to the hospital and numbers of claims will be reduced due to the good performance of hospital

Also using patient's satisfaction as performance indicator in this study supported by Oche & Adam, (2013) found that patient's satisfaction is necessary criteria to evaluate if the hospital is performing well or poorly in terms of treatment and other services offered by hospital. The study uses patient satisfaction as performance indicator.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design which specifically is cross sectional design, it further provides clarification on the study area, study population, unit of analysis, variables and their measurements; data collection methods are clearly illustrated as well as the types of data to be collected as Primary and Secondary data. The population of the study which involves workers and patients is provided accordingly in this chapter. Furthermore the chapter describes the sample size and sample techniques as well as the specific procedure used to select the sample size. Reliability and validity of data is elaborated in detail and how it was achieved; and data analysis methods also are part of this chapter. Finally the ethical issues section is clearly described.

3.2 Area of study

The study was conducted in Dodoma municipality (now Dodoma city) Tanzania at Dodoma general hospital and Benjamin Mkapa. Dodoma is located at the center of Tanzania. Dodoma municipality covers 2576 km2 with a population of around 500,000 people. The rationale of selecting Dodoma municipality is because of the rapid growing population of people due to the shifting of government from Dar es Salaam to Dodoma, statistics shows that the population of Dodoma municipality increases at the growth rate of 2.8% and currently there is steady increase of the population due to the shifting of the government. In 2015 population of Dodoma municipality was estimated to be 447,097, in 2016 population was 459,616 and in 2017 the estimated population was around 500,000 (National Bureau of Statistics, 2013) .So that this shift of the government to Dodoma will increase more deficit of qualified human resource of hospital because before government shifting to Dodoma the human resource of healthcare were 58% indicating the deficit of 42% (Regional Health Management Team (RHMT), 2015). Also the selected public hospitals Benjamin Mkapa and Dodoma general hospital is because of having the largest

number of the patients admitted per month compared to the other hospitals in Dodoma municipality. According to Hospital register (2018) Benjamin Mkapa hospital having an average 3800 patients admitted per month and Dodoma general hospital having an average of 6500 patients admitted per month which is large number compared to other public hospitals in Dodoma municipal. The total number of public hospitals in Dodoma municipality is three (3) which include Mirembe hospital, Benjamin Mkapa hospital, and Dodoma general hospital (Regional Health Management Team (RHMT), 2015).

3.3 Research Design

The study used cross sectional research design. Using cross sectional research design enabled the researcher to collect data just once over a period of one month. Cross sectional design as stated by Magigi, (2015), data was collected in one point of time, whereby one variable was examined in different groups that are similar in other characteristics. In this design, both quantitative and qualitative approaches were used with quantitative approach dominating the study. Justification of domination of quantitative approach is because of having four objectives which will measure the causal relationships between independent and dependent variables.

3.4 Unit of analysis

The unit of analysis for this study was the selected public hospitals in Dodoma Municipality. The selected public hospitals include Benjamin Mkapa and Dodoma general hospital. The selected institutions are located in Dodoma Municipality

3.5 The study population

The population of this study comprises outpatients, doctors, nurses, laboratory technicians and procurement and supply department in two hospitals. The total number of workers mentioned above for both hospitals are 300 people. In this study patients were included because they are the ones who receive direct treatment from hospitals. Doctors, nurses, laboratory technicians were included because they provide service (treatment) directly to the patients so it was possible to enhance information so as to get the relevant information and to ease the discussion of the variables in the

study. Procurement and supply department was included as targeted population because they are the ones who are familiar and understand critically the applicability of agile supply chain

3.6 Sampling technique and sample size

The researcher used non-probability sampling technique, because in non-probability sampling each element in the population has unknown element of being selected. Non probability sampling does not involve random selection of samples. Non probability sampling procedure provides a range of alternative techniques to select samples based on researcher's subjective judgement (Magigi, 2015). To accomplish non-probabilistic sampling, the researcher used the following technique:-

3.6.1 Purposive sampling

Regarding the nature of the research and the methodologies, purposive sampling was used in order to obtain a required sample purposely to meet the objectives of the study. The main rationale of adopting purposive sampling in this study is its usefulness in exploring and constructs historical reality and description of phenomenon on the knowledge concerning agile supply chain practices in healthcare. By using purposive sampling, patients, doctors, nurses, laboratory technician and procurement and supplies department were selected, in order to provide the relevant technical information a researcher is looking for to achieve the stated objectives. Saunders, et al., (2007) said that purposive sampling is the technique which gives adequate and relevant information regarding the study which requires a researcher to select units of interest depending on his knowledge and judgment.

3.6.2 Sample size

Sample size of the study was 236 respondents include doctors, nurses, laboratory technicians, procurement and supplies department and outpatients at Benjamin William Mkapa hospital and Dodoma general hospital. The total number of workers mentioned above for both hospitals are 300. From this, a sample of 156 workers was calculated using the sampling formula by Slovene. This comprised 30 doctors, 100

nurses, 13 laboratory technicians and 13 procurement and supplies department.

Table 3.1 sample size of workers

Population	Benjamin Mkapa hospital	Dodoma general hospital	Sample size	% of sample size
Doctors	16	22	30	78.9%
Nurses	89	114	100	49.2%
Laboratory technicians	17	22	13	33.3%
Procurement and supplies department	9	11	13	65%
Total	131	169	**156**	52%

Researcher's own constructs (2018)

In addition the researcher purposively selected 80 out patients in order to obtain their information which was very important to accomplish research objectives and to obtain reliable information. The total sample size of respondent after addition of patients was 236 respondents.

Table 3.2 sample size of outpatients

Population	Benjamin Mkapa Hospital	Dodoma General Hospital	Sample size	% sample size
Male	10	20	30	37.5%
Female	20	30	50	62.5%
Total	30	50	80	100%

Researcher's own constructs (2018)

3.7 Data collection techniques

Both primary data and secondary information were collected. Primary data refers to the information which is collected in the first time while secondary information

refers to data collected by someone else other than user (Kothari, 2010). Primary data were collected through questionnaire and interview as follows;

3.7.1 Questionnaire

A set of structured questionnaires were distributed to the key respondents specifically to doctors, nurses, laboratory technicians and procurement and supply department staff purposely to collect views on the subject matter to be observed. The likert scale questionnaires were used, where the respondent was able to select the most preferred answer for a particular question. The justification for choosing the questionnaire in this study is that the researcher was able to establish a relationship with respondents and, therefore, be able to explain and clarify the purpose of the study and possibly, anything thereof, which might seem to be ambiguous to the respondents. Questionnaire included six parts in which part one is general background information, part two is first objective of the study which are timely delivery of treatment on performance of healthcare, part three is second objective of the study which are integration and coordination of process on performance of healthcare, part four is third objective of the study which was quick response to the patients on enhancing performance of healthcare and part five concerning the questions of objective four of the study which was effects of agile supply chain practices on performance of healthcare and part six is questions concerning dependent variable (performance of health care in terms of patients satisfaction),

3.7.2 Interview

Structured interview was conducted to the out patients in order to get information on how service is provided in hospital. The interview was carried out to the outpatients who were available during data collection for the purpose of getting more data to support data collected from questionnaires. As described by Magigi (2015), purpose of selecting structured interview is that an activity could be carried out as quickly as possible, and the possibility of interviewing many respondents is assured.

But secondary data were collected through reviewing various documents which were applicable to the study example organization policy to see whether the policy

indicated the issue of responsiveness to customer through reducing waiting time, quick response and other aspects regarding patient's satisfaction.

3.8 Reliability and Validity

Reliability and validity are the two most important quality control variables in research design. Therefore, it is crucial for the researcher to ensure that the research results are reliable and valid.

3.8.1 Reliability

In testing reliability of this study the researcher used Cronbach alpha coefficients. The above of 0.7 Cronbach alpha indicate that there is reliability of the data. In this study the Cronbach alpha of all variables is above 0.7 as indicated in table 3.2 which shows that the data are reliable and measure what was intended to be measured. Getting wrong answers to the research questions was avoided. Bryman and Bell, (2007) said that reliability as used in research refers fundamentally to consistency of measures which allows for replication of the same results when similar studies are carried out.

Table 3.3 Reliability

ITEMS	CRONBACH'S ALPHA
Treatment conducted at reasonable time	.824
Minimal time to contact medical personnel	.830
Waiting for registration	.833
ICT uses	.825
Reduction of path flow	.830
Effective communication	.835
Quick response with change number	.842
Quick medical assistance	.838

Source, Research findings, (2018)

3.8.2 Validity

Bengesi, (2013) describe validity as referring to whether the index/instrument is describing what was intended to be described or measured. It is the ability to which the results of a study can be verified against the stated objectives. The validity of this study was ensured by matching research objectives with actual observation/results.

Despite this the researcher also used ‘Cronbach alpha’ in testing reliability and validity

3.9 Measurement of variables

The major key variables of this study include the independent variables: - treatment conducted at reasonable time, waiting for registration, time to contact medical personnel, response to emergency patients, quick medical assistance, quickly response with changing number of patients, ICT uses and reduction of path flows with dependent variable performance of healthcare. Most constructs in this study were measured by existing measurements which involve various numbers of items in order to ensure reliability and validity (Mungai, 2013). In order to measure the performance of healthcare organization in terms of patient’s satisfaction, dummy variables were created as 1 indicating satisfaction and 0 not satisfied.

All independent variables included in the model as continuous variables which were measured by using five point likert scale ranging from 1 to 5 in order to measure the level of agreement. So that a score of 1- strongly agree to 5-strongly disagree were used. For example the variable treatment conducted at reasonable time was included in the model as continuous variables which impact the continuous variable performance of healthcare, and it was hypothesized that treatment conducted at reasonable time has positive impact on performance of healthcare. So that all independent variables in this study were treated like those shown example above

Table 3.4 Measurement of variables

	Variables	Indicators	Scale of measurements
i.	Timely delivery of treatment	➢ Treatment conducted at reasonable time ➢ Waiting for registration ➢ Minimal time to contact with medical personnel	5 point likert scale
ii.	Integration and coordination of process	➢ ICT uses ➢ Reduction of path flows ➢ Effective communication	5 point likert sale
iii.	Quickly response to the patients	➢ Response to emergence patients ➢ Quickly Medical assistance ➢ Quickly response with change of number of patients	5 point likert scale
iv.	Performance	➢ Patients satisfaction	Dummy variable 1= satisfied 0= not satisfied

Researcher own constructs (2018)

3.10 Data analysis

Analysis of data was done both qualitatively and quantitatively. The qualitative approach entails analysis of data through describing and analyzing them (comparing them and aggregating into themes). The quantitative analysis was performed by using both descriptive and inferential statistics with help of Statistical Package for Social Sciences (SPSS) version 20. In order test hypothesis of the study chi-square test and Binary logistic regression analysis was used.

3.10.1 Descriptive analysis

By using descriptive analysis the analyzed data were presented in tables, which show the frequencies and percentages to represent different aspects of agile supply chain practices from the two hospitals. The descriptive analysis was used as a means of transforming the primary data into a form that makes them easily understood and interpreted, rearranged and manipulated to give a meaningful sense (Zikmund, 2003). In addition chi- square was used to test the association between two categorical variables in objective one, two and three in order to determine if there is relationship between independent and dependent variable in these objectives.

3.10.2 Inferential statistics

For the purpose of drawing conclusion in this study, the inferential statistics were used in data analysis. According to Bengesi, (2013) inferential statistics are used to make an inference about population from sample. This study used binary logistic regression model as the main statistical operations performed under inferential statistics. Binary logistic regression analysis model was performed for the sake of establishing the relationship between independent variables:- treatment conducted at reasonable time, waiting for registration, time to contact with medical personnel, ICT uses reduction of path flows , effective communication quick medical assistance, and quick response with changing number of patients, with dependent variable performance of healthcare in terms of patients satisfaction.

3.10.2.1 Binary logistic regression analysis model

In objective four Binary logistic regression model was performed in order to determine the relationship of eight factors of independent variables (treatment conducted at reasonable time, waiting for registration, time to contact with medical personnel, ICT uses reduction of path flows , effective communication quick medical assistance, and quick response with changing number of patients) with dependent variable performance of healthcare. Dependent variable was treated as binary response which measure whether the patients satisfied or not satisfied. In this case dummy variable was formulated indicating that 1=satisfied and 0= not satisfied Before running the binary logistic regression analysis model the researcher tested the assumptions of multicollinearity outlier and influential cases in order to avoid the violation of assumptions. Mathematically the binary logistic regression models are as follows:-

$$\text{Logit } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$

Whereby;

Logit Y = is a probability of patients satisfaction ranging from 0 to 1 (0=not satisfied, 1= satisfied)

α = is the constant figure estimated in the regression model

β_1, β_2, β_3, β_4, β_5, β_6, β_7, and β_8 coefficient of independent variables showing its effect on the dependent variable

E is the estimated error in the model.

X_1= Treatment conducted at reasonable time

X_2= Waiting for registration

X_3= Time to contact medical personnel

X_4= ICT uses

X_5= Reduction of path flow

X_6= Effective communication

X_7= Quick medical assistance

X_8= Quick response with changing number of patients

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the findings and analysis made under this research study. Data were presented, analyzed basing on the study objectives which were to assess timely delivery of treatment to the patients on performance of healthcare in Dodoma Municipal, to evaluate integration and coordination of process towards performance of healthcare in Dodoma Municipal to assess the extent to which quick response to patients enhance performance of healthcare in Dodoma Municipal to ascertain the effects of agile supply chain practices on performance of healthcare in Dodoma Municipal. The presented data based on specific objective were analyzed by using IBM SPSS version 20

4.2 Response rate

During data collection the researcher distributed 156 questionnaires to the respondents in Benjamin Mkapa hospital and Dodoma general hospital. Out of that questionnaire the researcher was able to collect 146 questionnaires from respondents out 156 questionnaires which is equivalent to 94% as indicated in table 4.1 below

Table 4.1 Response rate

Targeted population	**No of issued questionnaire**	**No of returned questionnaire**	**Response rate (%)**
Doctors	30	23	76.7%
Nurses	100	97	97%
Lab technician	13	13	100%
Procurement and supplies department	13	13	100%
Total	156	146	**94%**

4.3 Timely delivery of treatment and performance of healthcare organization

To obtain the information in this objective the researcher formulated different questions on questionnaire in accordance with treatment conducted at reasonable time, waiting time for registration to get the prescription slip, and time contact with medical personnel. Also it was hypothesized that there is positive significant relationship between timely delivery of treatment and performance of healthcare organization.

The relationship between timely delivery of treatment and performance of healthcare in terms of patient's satisfaction was performed by using chi-square test. The findings in table 4.2 indicate that there was relationship between timely delivery of treatment and patient's satisfaction because p value is less than 0.05. Hence the alternative hypothesis of the study was accepted because the results show positive relationship between timely delivery of treatment and performance of healthcare in terms of patient's satisfaction.

Table 4.2 Association between timely delivery of treatment and patient's satisfaction

Timely delivery of treatment	**Patients satisfaction**		**Total**	**Chi-square value**	**Df**	**P-Value**
	Satisfied	Not satisfied				
If there is timely delivery of treatment	95	28	125			
If there is no timely delivery of treatment	20	3	21	3.979	1	**0.046****

Research findings, (2018)

4.3.1 Treatment conducted at reasonable time

From this question the researcher aimed to find the information concerning the treatment if conducted at reasonable time in selected healthcare organization. This is important because reasonable time for treatment leads to performance of healthcare in terms of patient's satisfaction.

Table 4.3 shows that 25.3% of all respondents strongly disagree that treatment was not conducted at reasonable time in Dodoma general hospital and Benjamin Mkapa hospital 38.4% of respondents disagree that treatment was not conducted at reasonable time, 13% of respondents they are not sure, about 18.5% and 4.8% of respondents agree and strongly agree on the formulated statement respectively. This implies that the treatment in Dodoma general hospital and Benjamin Mkapa hospital was not conducted at reasonable time.

Table 4.3 treatment conducted at reasonable time

treatment conducted at reasonable time	Frequency	Percent
Strongly disagree	37	25.3
Disagree	56	38.4
Not sure	19	13.0
Agree	27	18.5
Strongly agree	7	4.8
Total	146	100.0

Research data (2018)

4.3.2 Timely contact with medical personnel

In this indicator the researcher wanted to know if time to contact medical personnel is reasonable or not. Table 4.4 shows that 19.9% of all respondents strongly disagree on the statement that there is minimal time of patients to contact with the medical personnel, 50% of all respondents disagree that there is minimal time of patients to contact with the medical personnel, 13.7% of all respondents were not sure, while 14.4% and 2.1% of all respondents agree and strongly agree on the statement respectively. This implies that in Dodoma general hospital and Benjamin Mkapa hospital there was presence of waiting time to receive medicine from medical personnel.

Table 4.4 Time of patients to contact with the medical personnel

It takes minimal time of patients to contact with the medical personnel	Frequency	Percent
Strongly disagree	29	19.9
Disagree	73	50.0
Not sure	20	13.7
Agree	21	14.4
Strongly agree	3	2.1
Total	146	100.0

Research data (2018)

4.3.3 Waiting time for registration to get the prescription slip

From this indicator the researcher aimed to find information concerning the waiting time for registration to get the prescription either by using healthcare insurance or without using healthcare insurance in order to know if the time for registration is reasonable or not.

Table 4.5 shows that 2.1% of all respondents strongly disagree that patients take a lot of time in waiting for registration to get the prescription slip, 15.1% of all respondents disagree that patients take minimal time in waiting for registration to get the prescription slip, 11.6% of all respondents were not sure, while 55.5% and 15.8% of all respondents agree and strongly agree that patients takes a lot of time in waiting for registration to get the prescription slip respectively. This implies that in hospitals there was the presence of waiting time for registration to get the prescription slip.

Table 4.5 Waiting time for registration to get the prescription slip

P**atients takes a lot of time in waiting for registration to get the prescription slip**	**Frequency**	**Percent**
Strongly disagree	3	2.1
Disagree	22	15.1
Not sure	17	11.6
Agree	81	55.5
Strongly agree	23	15.8
Total	146	100.0

Research data (2018)

4.4 Integration and coordination of treatment processes and performance of healthcare

This objective aimed to find information concerning integration and coordination of treatment processes in healthcare organization. To obtain information on this objective the researcher formulated four questions in the questionnaire in relation to effective use of ICT in processes and operations of the hospital, bureaucratic procedure in treatment provision, inter-departmental communication in our health facility and number of path flows in securing treatment. And it was hypothesized that there is positive significant relationship between integration and coordination of process with the performance of healthcare.

The relationship between integration and coordination of process and performance of healthcare was performed by using chi-square test. The findings as shown in the table 4.6 indicate that there was association between these two variables ($p< 0.05$). So that the alternative hypothesis of the study was accepted because the findings show positive relationship between integration and coordination of process and performance of healthcare in terms of patients satisfaction

Table 4.6 Association between integration and coordination of process and patient's satisfaction

Integration and coordination of process	**Patients satisfaction**		**Total**	**Chi-square value**	**Df**	**P-Value**
	Satisfied	Not satisfied				
If there is integration and coordination of process	97	0	97			
If no integration and coordination of process	17	32	49	4.264	1	0.038**

Research findings, (2018)

4.4.1 Effective use of ICT in processes and operations of the hospital

In this part the researcher wanted to know if the healthcare organization incorporated the use of ICT in daily operations. Table 4.7 shows that 13.0% of all respondents strongly disagree that there is no effective use of ICT in daily healthcare operations and 57.5% of all respondents disagree that there is effective incorporated use of ICT in daily healthcare operations, 11% of all respondents were not sure, but 10.3% and 8.2% of all respondents agree and strongly agree that there is effective use of ICT in processes and operations of the hospital.

Table 4.7 Effective use of ICT in processes and operations of the hospital

O**rganization incorporated effective use of ICT in process and operations**	Frequency	Percent
Strongly disagree	19	13.0
Disagree	84	57.5
Not sure	16	11.0
Agree	15	10.3
Strongly agree	12	8.2
Total	146	100.0

Research data (2018)

4.4.2 Number of path flows in securing treatment

In this part the researcher wanted to know the number of path flows in securing treatment in hospital. Table 4.8 shows that 15.1% of all respondents strongly disagree that in Dodoma general hospital and Benjamin Mkapa hospital there is small number of path flows in securing treatment, 52.1% of all respondents disagree that there is small number of path flows in securing treatment, 15.1% of respondents were not sure, but 10.3% and 7.5% agree and strongly agree respectively on the statement.

Table 4.8 Number of path flows in securing treatment

Does the hospital having small number of path flows	Frequency	Percent
Strongly disagree	22	15.1
Disagree	76	52.1
Not sure	22	15.1
Agree	15	10.3
Strongly agree	11	7.5
Total	146	100.0

Research data (2018)

4.4.3 Effective communication in healthcare organization

From this part the researcher wanted to know if there is smooth and effective inter-departmental communication within the healthcare organization. Table 4.9 indicated that 20.5% of all respondents strongly disagree that there is effective communication in healthcare organization, 52.1% of all respondents disagree that there is no effective communication in healthcare organization, 12.3% of all respondents were not sure, but 9.6% and 5.5% agree and strongly agree on the statement respectively.

Table 4.9 Effective communication in healthcare organization

Is there any good interdepartmental communication in our health facility?	Frequency	Percent
Strongly disagree	30	20.5
Disagree	76	52.1
Not sure	18	12.3
Agree	14	9.6
Strongly agree	8	5.5
Total	146	100.0

Research data (2018)

4.5 Agile supply chain in terms of quick response to patients and performance of healthcare

To obtain the information in this objective the researcher formulated different questions in the questionnaire in accordance with emergency patients who were responded quickly in hospital, quick response towards change number of patients within appropriate time frame, in medical assistance patients were responded quickly and process to the emergency admitted patients. Also it was hypothesized that there

is significant relationship between quick response to the patients and performance of healthcare organization.

The relationship between quick response to the patients and performance of healthcare was performed by using chi-square test. The findings in table 4.10 indicate that there was no association between these two variables (p> 0.05). Hence the alternative hypothesis of the study was rejected because the findings show insignificance relationship between quick response to the patients and patients satisfaction.

Table 4.10 Association between quick response to the patients and patient's satisfaction

Quick response to the patients	Patients satisfaction		Total	Chi-square value	Df	P-Value
	Satisfied	Not satisfied				
If there is quick response	47	12	59			
If otherwise	68	19	87	0.047	1	0.828NS

Research findings, (2018)

4.5.1 Quickly response towards change number of patients within appropriate time frame

From this question the researcher wanted to obtain information on quick response towards change numbers of patients within appropriate timeframe. Table 4.11 indicates that 13.7% of all respondents strongly disagree that there is quick response towards change number of patients within appropriate time and 52.1% disagree that there is quick response towards change number of patients within appropriate time frame, 17.1% of all respondents were not sure, but 13.0% and 4.1% of all respondents agree and strongly agree on statement. This implies that Dodoma

general hospital and Benjamin Mkapa hospital failed to respond quickly towards change number of patient within appropriate time.

Tables 4.11 Quick respond towards change number of patients within appropriate time frame

Does hospital respond quickly towards change number of patients within appropriate time frame?	Frequency	Percent
Strongly disagree	20	13.7
Disagree	76	52.1
Not sure	25	17.1
Agree	19	13.0
Strongly agree	6	4.1
Total	146	100.0

Research data (2018)

4.5.2 In case of medical assistance patients are responded quickly

In this part researcher intended to obtain information concerning quick response in case of medical assistance. Table 4.12 shows that 3.4% of all respondents strongly disagree that there is quick response in case of medical assistance in hospital, 1.4% of all respondents disagree, 12.3% of all respondents were not sure, but 59.6% and 23.3% strongly agree that there is quick response in case of medical assistance in hospital. Implies that if patients needed medical assistance there is quickly respond to them

Table 4.12 quickly response in medical assistance

In case of medical assistance patients are responded quickly?	Frequency	Percent
Strongly disagree	5	3.4
Disagree	2	1.4
Not sure	18	12.3
Agree	87	59.6
Strongly agree	34	23.3
Total	146	100.0

Research data (2018)

4.6 Effects of agile supply chain practices on performance of healthcare

Basing on the fact that the objective four is causal, binary logistic regression model was used to predict the effects of agile supply chain practices on performance of healthcare organization. Before

4.6.1 Factor Analysis

Factor analysis was performed using SPSS Version 20 on all 14 items of their respective constructs as independent variables. From the initial solution, the result of Bartlett's Test of Sphericity was significant at p value = .000 (Chi-square 1074.820, DF =91 and the sampling adequacy was 0.875 and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.875 as indicated in the table 4.13 below.

Table 4.13 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.875
Bartlett's Test of Sphericity Approx. Chi-Square	1074.820
Df	91
Sig.	0.000

Source: Research findings (2018)

4.6.1.1 Rotated Components Matrix

For factor rotation, the Varimax method was used. The number of factors or components was limited to three with respect to the specified model. The results of the factor rotation indicated that for the first component, three items (V1, V2, V3) from the variable “Timely delivery of treatment” loaded fairly higher than other items in the same component. For the second component, three items (V7, V8, V9) from the variable “Integration and coordination” loaded higher than other items in the same component. Finally, on the last component, only two items (V13, V14) from the variable “Quick response” had higher factor loadings than others in their component.

Table 4.14 Rotated Components Matrix

code	Item	Component		
		1	2	3
V1	Treatment conducted at reasonable time	.796		.325
V2	Minimal time to contact medical personnel	.830		
V3	Waiting for registration	.685		
V4	Waiting time for results	.650	.343	
V5	Time spent in laboratory for checkup	.655	.345	
V6	Bureaucratic procedure		.714	
V7	ICT uses		.826	
V8	Reduction of path flow		.864	
V9	Effective communication		.807	
V10	Response to emergency patients	.393	.477	
V11	fast response to the patients' needs	.463		.588
V12	quickly provision of results	.443		.549
V13	Quick response with change number			.849
V14	Quick medical assistance			.807

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Source: Research findings (2018)

4.6.2 Testing binary logistic regression assumption

As advised by many literatures that before running regression model there must be checking of the fundamental assumptions of binary logistic regression model (Pallant, 2007). The following are the fundamental assumptions of binary logistic regression model which were checked by the researcher

4.6.2.1 Multicollinearity

In order to test this assumption the researcher looked at two aspects, first is to test the predictors if they are not highly correlated by looking on correlation table. As Abbas, (2011) argue that, the aim of multicollinearity test is to ensure that the independent variables are weakly related to each other ($r < 0.90$). Correlation which is beyond 0.9 ($r=9$ and above) it indicate that there is problem on independent variables to predict the dependent variable; it is required to remove one independent variable. From the correlation matrix as indicated in table 4.15 the highest correlation of this data is $r=0.642$ which is below 0.9 which indicates that the correlation was very small among the variables which imply that there is no Multicollinearity exist.

Table 4.15 correlation matrix

	Constant	Treatment conducted at reasonable time	Minimal time to contact	Waiting time for registration	ICT uses	Reduction of path flow	Effective communication	Quick response with change number of patients	Quick medical assistance
Constant	1.000	-.301	-.157	.093	-.277	.110	.066	.069	-.351
Treatment conducted at reasonable time	-.301	1.000	-.594	-.347	.073	-.053	-.204	-.064	.045
Minimal time to contact	-.157	-.594	1.000	-.120	.017	-.052	.064	-.051	-.047
Waiting time for registration	.093	-.347	-.120	1.000	-.260	.065	.030	.179	-.218
ICT uses	-.277	.073	.017	-.260	1.000	.642	-.283	-.262	.286
Reduction of path flow	.110	-.053	-.052	.065	.642	1.000	-.231	.186	-.225
Effective communication	.066	-.204	.064	.030	-.283	-.231	1.000	.004	-.118
Quick response with change number of patients	.069	-.064	-.051	.179	-.262	.186	.004	1.000	-.635
Quick medical assistance	-.351	.045	-.047	-.218	.286	-.225	-.118	-.635	1.000

Research findings, (2018)

4.6.2.2 Outlier and influential case

Cook measure were used to measure the influential cases of this study. As indicated in SPSS the cook measure value was less than 1.0 which implying that there is no influential cases in the research data. Moreover the outlier in this was tested by using standardized residuals performed in the SPSS and the results show that all the standardized residual values was less than -3 and 3. Anderson (1982) indicates that in order the data to be free from outliers it requires the standardized residual to be within -3 and 3**.**

4.6.2.3 Evaluating of the model

The goodness fit of the model was shown by looking omnibus test of model coefficients in table 4.16 which show all predictors in the model explain a significant amount of the original variability with X^2 (8) of 24.517 and significant at p value less than 5% ($p<0.05$), which implies that the model fitted the data well.

Another measure which are used to test the goodness fit of the model was Hosmer and Lemeshow test, in table 4.16 all predictors in the model produced X^2 (8) of 4.166 which was not significant because p value is greater than 5% (P=0.842) which implies that, there is good fit of the data into the model. Pallant, (2011) indicating that for Hosmer and Lemeshow test a significance value less than 0.05 show poor fit of the data in the model.

Moreover the usefulness of the model was shown by looking Nagelkerke R^2 and Cox and Snell R square. In this study the Cox and Snell R square value are 0.155 and Nagelkerke R^2 0.240 implying that independent variable in the model explain 15.5% and 24% variance in dependent variable (patients satisfaction). So that the amount of Cox and Snell R square and Nagelkerke R^2 (Pseudo R^2) show the amount of variation explained in the model.

Table 4.16 Omnibus tests of model coefficients and Hosmer and Lemeshow test

		Chi-square	Df	Sig.
Step 1	Step	24.517	8	.002
	Block	24.517	8	.002
	Model	24.517	8	.002

Hosmer and Lemeshow test

Chi-square	Df	Sig
4.166	8	.842

Research findings, (2018)

4.6.3 Binary logistic regression result analysis of agile supply chain practices on affecting the performance of healthcare.

Table 4.17 presents the results of binary logistic regression analysis model between performance of healthcare as dependent variable with the independent variables; treatment conducted at reasonable time, waiting for registration, time to contact with medical personnel, ICT uses reduction of path flows , effective communication quick medical assistance, and quick response with changing number of patients.

The results show that treatment conducted at reasonable time has beta value of 0.721 and significant because p value is less than 5% ($p<0.05$). Implying that the unit change in treatment conducted at reasonable time will increase 72% of patient's satisfaction. This means that the results supported alternative hypothesis and reject null hypothesis by indicating that there is positive significant relationship between treatment conducted at reasonable time and performance of healthcare organization

The coefficient of waiting time for registration was positively (0.725) related to patients satisfaction and significant because p value is less than 5% ($p <0.05$), also it indicates that the unit improvement of waiting for registration will result into the 72.5% increase of patients satisfaction. Also the findings support the alternative

hypothesis because the coefficient of waiting for registration was positive and more contributions towards performance of healthcare.

Moreover minimal time conduct of medical personnel has negative significant relationship with patients satisfaction because of having the beta value of -0.99 and p value of greater than 5% ($p > 0.05$). The null hypothesis was accepted and alternative hypothesis was rejected due to the negative contribution of minimal time to contact medical personnel towards the performance of healthcare.

Also the coefficient of ICT uses in healthcare operations was positively 0.835 related to patients satisfaction and significant because the p value is less than 5% ($p<0.05$), suggesting that the unit increase of ICT uses in healthcare operations will increase 83.5% of patients satisfaction. The alternative hypothesis of the study was accepted because the result shows that there was positive significance of ICT uses in health care operations and performance of healthcare.

On other hand the findings indicated that there is positive significant relationship between reduction of path flow and patients satisfaction as coefficient beta value was positive 0.790 and significant at p values is less than 5% ($p<0,05$), which indicates that the patients satisfaction will increase by 79% through the increase unit of reduction of paths flow. Also the alternative hypothesis was accepted due to the positive contribution of reduction of path flow towards performance of healthcare.

Furthermore the coefficient of effective communication was negatively 0.233 related to performance of healthcare and statistically not significant because the p value is greater than 5% ($p > 0.05$), indicating that the performance of healthcare will decrease by 23.3% through the increase of unit of response to the emergency patients. The alternative hypothesis was rejected and null hypothesis was accepted due to the negative contribution of response to emergency patients towards performance of healthcare.

Concerning quick medical assistance, the coefficient beta was positively 0.814 related to patients satisfaction and statistically significantly at p value was less than 5% ($p<0.05$), suggesting that the increase of unit of quick medical assistance will

increase 81.4% of patients satisfaction. The alternative hypothesis was accepted because the findings indicate the positive relationship between quick medical assistance and performance of healthcare in terms of patients satisfaction

Also the findings indicate that there was negative relationship between quick response with change number of patients and performance of healthcare as coefficient beta value was negative 0.346 and not statistically significant because p value is greater than 0.05 indicating that the performance of healthcare will decrease by 34.6% through increasing the unit of change of number of patient within time frame. The null hypothesis was accepted because the findings show negative contribution of quick response with change number of patients towards performance of healthcare.

Table 4.17 Effects of agile supply chain practices on patients satisfaction

	B	**S.E.**	**Wald**	**Df**	**Sig.**
Treatment conducted at reasonable time	.724	.428	6.264	1	.012*******
Minimal time to contact	-.993	.398	.062	1	.804**NS**
Waiting time for registration	.725	.292	6.149	1	.013*******
ICT uses	.835	.355	5.531	1	.019*******
Reduction of path flow	.790	.344	5.261	1	.022*******
Effective communication	-.233	.272	.734	1	.392**NS**
Quick response with change number of patients	-.346	.254	1.855	1	.173**NS**
Quick medical assistance	.814	.346	5.555	1	.018***
Constant	3.693	1.048	12.409	1	.000

Dependent variable; patients satisfaction, *** denote the significance level at 5% and NS denote not significant

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter gives the discussion of the findings based on the specific objectives which were to examine agile supply chain in terms of timely delivery of treatment to the patients on performance of healthcare in Dodoma Municipality, to identify agile supply chain in terms of integration and coordination of process on performance of healthcare in Dodoma Municipality, to assess the extent to which agile supply chain in terms of quick response to patients enhance performance of healthcare in Dodoma Municipal and to determine the effects of agile supply chain practices on performance of healthcare organization in Dodoma Municipality.

5.2 Timely deliveries of treatment and performance of healthcare

This objective aimed to determine if the treatment in hospital is conducted at reasonable time. The researcher used three indicators in assessing the timely delivery of treatment in hospitals, the indicators includes treatments conducted at reasonable time, waiting time for registration to get the prescription slip, and time to contact medical personnel. Also in this objective the researcher assessed the factors which contributed towards lead time in hospital. The findings revealed that the deliveries of treatment in hospital is not at reasonable time which leads to poor performance of healthcare in terms of patients satisfaction

The study was hypothesized that there is positive significant relationship between agile supply chain in terms of timely delivery of treatment and performance of healthcare in terms of patients satisfaction, and the findings of the study indicate that there is positive relationship between agile supply chain in terms of timely delivery of treatment and performance of healthcare in terms of patients satisfaction ($p<0.05$) which implies that the improvement of timely delivery of treatment leads to increase the performance of healthcare organization. These results supported the study done by Anderson *et al*, (2007) which found that waiting time in hospital is a major contributor towards patients satisfaction and dissatisfaction, the study indicated that

the presence of long waiting time of treatment leads to decrease of the hope of patients to improve their health while short waiting time encourages more hope to the patients to improve their health hence satisfied.

63.7% (93) of all respondents agreed that the delivering of treatment in hospital is not conducted at reasonable time due the presence of delay which requires the patients to stay in hospital for a long time. As presented earlier in table 4.3 indicated that 63.7% of all respondents said that treatment in Benjamin Mkapa and Dodoma general was not conducted at reasonable time. This implies that the patients in Dodoma general hospital and Benjamin Mkapa hospital stay for a long time in securing treatment in hospitals. One respondent from Dodoma general hospital and Benjamin Mkapa hospital stated the following during interview

One of the Respondents in Dodoma general hospital said that, normally when securing treatment in hospital the average time of stay is approximately 3 up to 4 hours until receiving the whole treatment as outpatients

One of respondents in Benjamin William Mkapa hospital said that securing treatment especially in government hospital requires to be patient and no needs of being too much demanding on receiving treatment in short time, because experience which the respondents have when securing treatment is to stay in hospital at average of two to three hours until receiving the treatment as outpatients.

Also 71.3% (104) of all respondents agreed that there is too much time the patients spend for registration to get the prescription slip by using health insurance or without health insurance. This implies that the patients spend a lot of time in registration or on reception point before receiving treatment which causes the whole process of receiving treatment to be for long waiting time. This supported the study by Chiu *et al,* (2007) who found that the time which the patients spent on registration before receiving treatment as impact to the patients towards staying in hospital for a long time.

Despite waiting time for registration to get the prescription slip also 69.9% (102) of all respondents agreed that there is waiting time to contact medical personnel. This

implies that the patients in securing medicine from medical personnel or pharmacist they take time due to the queue which is available during receiving the medicine and this contributes towards the waiting time in securing treatment in hospital.

During interview 50 respondents out of 80 respondents said that there are factors which contribute towards lead time in hospital and the major ones are *large number of patients, heavy workload, treatment process and inadequate facilities.* But of all mentioned factors above *large number of patients* is identified as the major factor which contributes highly towards lead time in hospital because majority of respondent during interview mentioned repetitively. This implies that the waiting time in hospital is influenced much by the too many number of patients entering into the hospital for securing treatment. Also other factors such as heavy workload and treatment process in hospital contribute much to have lead time in securing treatment. This supported the study of Pillay et al (2011) who found that there are five factors which cause the waiting time in hospital such as employee attitude, work process, heavy workload, management and supervision problem and Inadequate facilities such as buildings and equipments. In supporting this issue, one respondent stated the following during interview

"The ratio of patients and staff who engaged directly towards treatment in hospital is not equivalent which causes to have waiting time due to the workload which the staff have compared to the large number of patients"

5.3 Integration and coordination of treatment processes and performance of healthcare

Integration and coordination of treatment processes towards performance of healthcare are measured through observing three indicators which are effective use of ICT in processes and operations of the hospital, effective communication in healthcare organization and number of path flow in securing treatment. The result shows that there is little integration and coordination of process in Dodoma general hospital and Benjamin Mkapa hospital which leads to hinder best performance of healthcare in terms of patient's satisfaction. The study hypothesized that there is significant relationship between integration and coordination of process and

performance of healthcare and results from the findings indicate that the alternative hypothesis was accepted because there is significantly positive relationship between integration and coordination of treatment processes and performance of healthcare in terms of patients satisfaction were $p < 0.05$. This implies that there is association between integration and coordination of treatment processes and performance of healthcare in terms of patient's satisfaction, every improvement of integration and coordination of process leads to increase the performance of healthcare in terms of patient's satisfaction. This supported the study done by Arronson *et al*. (2011) who found that the use of information system in daily operations of healthcare shorten the waiting time which leads to patients satisfaction.

70.5% (103) of all respondents agree that there is no effective use of ICT in processes and operations of the hospital. This implies that most of the activities and operations in hospital are conducted manually without incorporating the use of ICT which can help in smoothing the processes and operations by removing unnecessary process which can be performed by computer such as the use of ICT in integration of registration unit with doctors and doctors with laboratory technicians without moving with paper from one unit to another. The Resource Based Theory (RBV) is applicable to this study because it explains the availability of resource in an organization in order to perform better, so due to inadequate use of ICT facilities in healthcare organization it leads the hospital to fail to integrate all process and operation by using computer technology.

This supported the study done by Odiwuor *et al*. (2015) which found that the application of computer technology in healthcare operations facilitate the improvement of operations through less time and efficiency in records of patients.

The following are the responses of respondent from interview:-

One of respondent said that the hospital failed to use effective application of computer technology in operations which cause unnecessary waiting during registration. Further the respondent said that if the hospital uses computer technology in storing information of patients there is no need of using too much time in waiting for a file from records unit because everything will be computerized.

Also 67.2% (98) of all respondents agreed that there are too many numbers of flows in securing treatment in hospital. This implies that in hospital there is too much number of flows from one point to another point until the whole treatment process is accomplished, this brings much to long of stay of patients in hospital. Normally the number of flows is available because of processes which the patients must follow in securing treatment from the registration point to getting prescription slip, to doctors, nurses, to laboratory technician and last to the pharmacist to get indicated medicine. All these processes lead to having too many flows in hospital. In terms of effective communication 72.6% (106) of all respondents said that there is proper communication in hospital. This implies that in hospital the channel of communication from one person to another is effective which in turn leads to patient's satisfaction because effective communication leads to good service hence satisfaction.

5.4 Quick response to the patients and performance of healthcare

The third objective of the study was to determine the agile supply chain in terms of quickly response by looking at quick response to the emergency patients, quick response towards change number of patients within appropriate time frame and quick response in case of medical assistance to the patients. The findings indicate that in hospital both Benjamin Mkapa hospital and Dodoma general hospital there is quick response to the patients.

The study hypothesized that there is significant relationship between quick response to the patients and performance of healthcare organization. The results show insignificant relationship between quick response to the patients and performance of healthcare in terms of patients satisfaction as $p>0.05$. This implies that there is no association between quick response and performance of healthcare organization because every improvement of quick response leads to decrease the performance of healthcare. So that the findings support the null hypothesis by rejecting alternative hypothesis which is contrary to the study done by Hakan et al. (2011) which found that the responsiveness in hospital by being quick increases the level of satisfaction to the patients hence the patient's are led to speak positively towards the

performance of the hospital. From interview the following are the statements of one respondent from Dodoma general hospital.

"*According to the experience of attending hospitals there is too much care to the emergency patients when arriving to the hospital. The emergency patients were treated so fast/quickly due to the seriousness of sickness which they have. Also respondents add that in terms of responding quickly to the emergency patients the hospital is doing much better.*

The findings support the agency theory in terms of the principal who are the patients/citizens who receive good treatment as responsibilities of agency that is healthcare organization to comply with it. So that the agency as healthcare organization/hospital make sure that delivering of treatment to the patients as principal is conducted at efficiently and in good manner because the responsibilities of agency to principal as stated in this theory is to ensure agency meets all responsibilities efficiently in order to satisfy the principal

82.9 % (121) of all respondents agree that in Benjamin Mkapa and Dodoma general hospital quick medical assistance is practiced. This implies that when patients need quick medical assistance from doctors and medical personnel there is quick response and assistance. One of respondents said during interview said that "*when it comes to medical assistance especially to the very serious patients, doctors , nurses and other staff they put more effort to assist patient in receiving the treatmen*t". But in terms of quick response towards change number of patient within time frame the findings indicate that there was no flexibility towards quick response towards change number of patients within the time frame. This implies that when the number of patient increase within the time frame the hospitals failed to accommodates quickly the increase number of patients because of shortage of resources which will enable to accommodates easily the change number of patients, as results the patients stay in long time in hospital to receive treatment. The findings was aligned with the study of Simwita, (2017) which indicate that most of hospital in Tanzania facing with challenges of resources which leads to fail to be flexible in terms f increasing number of patients.

5.5 Effects of agile supply chain practices on performance of healthcare

In this objective the researcher wanted to determine the effects of agile supply chain practices on performance of healthcare. Multiple regression model was performed for the sake of establishing the relationship between independent variables; treatment conducted at reasonable time, waiting for registration, time to contact with medical personnel, response to emergency patients, quick medical assistance, quick response with change number of patients, ICT uses and reduction of path flows with dependent variable performance of healthcare. And it was hypothesized that there is positive significant relationship between agile supply chain practices and performance of healthcare.

The results show that treatment conducted at reasonable time has statistically significant relationship with performance of healthcare as p value is less than 5% and coefficient beta was 0.724. This implies that there is association between treatment conducted at reasonable time and performance of healthcare and the coefficient beta implies that the performance of healthcare organization increase by 72.4% by improving the single unit of treatment conducted at reasonable time. So that Benjamin Mkapa hospital and Dodoma general hospital should make sure that there is improvement of time in conducting treatment to the patient in order to increase the performance of hospital through patient's satisfaction. From these findings the alternative hypothesis was accepted as there is positive significant relationship between treatment conducted at reasonable time and performance of healthcare.

These findings were aligning with that study reported by Anderson *et al*, (2007) which indicates that patient's satisfaction with service offered by hospital was influenced by the minimal time in provision of treatment to the patients. Also the finding was supported by those reported during interview in Dodoma general hospital "*most of us our complaint is about spending much time in securing treatment in hospital which leads to dissatisfaction with the service offered by hospital even if the treatment is good. So that I am satisfied with the treatment when I am spending less time in hospital"*

Moreover the coefficient beta of waiting time for registration was positively 0.725 related to performance of healthcare in terms of patients satisfaction and significantly at p <0.05, which implies that there is positive contribution of waiting time for registration towards performance of healthcare because the improvement of single unit of waiting time for registration will increase 72.5% of performance of healthcare. The finding support an alternative hypothesis as there is significant relationship between waiting time for registration and performance of healthcare.

These findings are consistent with that study reported by Eilers, (2004) which indicates that the waiting time for registration influences the patient's satisfaction. Also from the interview one of respondents said that. **"***there is too much time we spent on reception desk for registration purpose in order to get the prescription slip which allow to see the doctor, the time spent for registration will cause majority of us to be un happy hence dissatisfaction with the hospital service".*

Furthermore minimal time to contact medical personnel has negative significant relationship with performance of healthcare because of having the beta value of -0.993 and p value of greater than 5% (p >0.05). These imply that the contribution of minimal time to contact medical personnel influences negatively towards performance of healthcare, so that there is no association between minimal time to contact medical personnel and performance of healthcare in terms of patient's satisfaction. The null hypothesis was accepted and alternative hypothesis was rejected due to the negative contribution of minimal time to contact medical personnel towards the performance of healthcare.

Also the coefficient of ICT uses in healthcare operations was positively 0.835 related to performance of healthcare organization and significantly because the p value is less than 5% (p<0.05), implying that the unit increase of ICT uses in healthcare operations will increase 83.5% of performance of healthcare organization. Alternative hypothesis of the study was accepted because the result shows that there was positive significance of ICT uses in health care operations and performance of healthcare. ICT uses in healthcare operations accompanied with the availability of equipment such as computers hardware and software in order to implement it for

better performance of the hospital. These supported the theory of resource based view (RBV) which emphasizes the organization to have resources for better performance and achieving competitive advantages.

The findings are consistent with the study done by Lee et al. (2011) which indicates that the smooth healthcare operation towards achieving better performance such as reduction of waiting time was influenced by using information technology (IT) in daily operation of healthcare. Also the findings was aligned with the study done by Ruxwana *et al*. (2010) which indicates that ICT application as e-health contributes towards the performance of hospital.

On other hand the findings indicated that there is positive significant relationship between reduction of path flow and performance of healthcare as coefficient beta value was positive 0.790 and significantly at p values is less than 5% ($p<0,05$), which indicates that the performance of healthcare will increase by 79% through the increase unit of reduction of paths flow. Also the alternative hypothesis was accepted due to the positive contribution of reduction of path flow towards performance of healthcare. These imply that to have minimal path flow in hospitals requires the patients to move from one stage to another leading to the patients satisfaction with the services offered by hospital, so that the hospital should make much efforts to reduce the number of path flows in order to increase the performance of healthcare through patients satisfaction.

These findings supported by the study of Huijsman, (2011) which indicates that reduction of procedures to be followed by patients when securing treatment in healthcare increases the rate of patient's satisfaction through reducing time for stay in hospitals. Also the qualitative data which was obtained from interview supported these findings by some of respondents who said that. "*Most of us we are happy if the hospitals reduce the process which requires the patients to follow in securing treatment from one stage to another. Too many procedures cause to stay in hospital for a long time hence reduces the satisfaction with the services."*

Furthermore the coefficient of effective communication was negatively 0.233 related to patients satisfaction and statistically not significant because the p value is greater

than 5% indicating that the performance of healthcare in terms of patients satisfaction will decrease by 23.3% through the increase of unit of effective communication. The alternative hypothesis was rejected and null hypothesis was accepted due to the negative contribution of response to emergency patients towards performance of healthcare. This implies that the performance of healthcare in terms of patient's satisfaction was not influenced by the effective communication within section and patients. These findings were contrary to the study of Hakan *et al*. (2011) which indicates that the smooth communication and better flow of information in healthcare from workers to patients influences the high rate of patient's satisfaction.

Concerning quick medical assistance the coefficient beta was positively 0.814 related to patients satisfaction and statistically significant at p value being less than 5% ($p<0.05$), implying that the increase of unit of quickly medical assistance will increase 81.4% of patients satisfaction in healthcare organization. The alternative hypothesis was accepted because the findings indicate the positive relationship between quick medical assistance and performance of healthcare.

The findings were consistent with that study done by Van der Geer *et al*. (2009) which indicates that responsiveness to the patients in terms of medical assistance contribute towards the patients satisfaction, hence the hospitals performance will increase due to the goodwill spoken by the patients after receiving the hospital treatment.

Also the findings indicates that there was negative relationship between quick response with change number of patients and performance of healthcare in terms of patients satisfaction as coefficient beta value was negative 0.346 and not statistically significant because p value is greater than 5% ($p>0.05$), indicating that the performance of healthcare will decrease by 34.6% through increasing the unit of change of number of patients within time frame. The null hypothesis was accepted because the findings show negative contribution of quick response with change number of patients towards performance of healthcare. This implies that the performance of healthcare through patient's satisfaction was not influence by having quick response towards change number of patients within time frame. As resource

based theory (RBV) indicate that the organization must have resources and capability in order to meet competition and customer satisfaction. So that the shortage of enough resources such as human resources and buildings it leads the hospitals to fail to accommodate the increase number of patients within the time frame.

These findings were contrary to the study done by Al-Saada *et al.* (2013) which indicates that the capability of the hospital to handle the increase in number of patients within the time frame without any problem of delay to deliver treatment to the patients influences the performance of hospital through patients satisfaction

CHAPTER SIX

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

6.1 Introduction

This chapter is divided into four main parts. The first is about the summary of findings, second is conclusion made under this research study, third part is about policy implication and last main part is recommndations. The conclusion and recommendations made under this study are based on the study findings. The chapter also provides area for futher research study and limitation of the study.

6.2 Summary of findings

The main target of the researcher was to assess agile supply chain practices on performance of healthcare organization. The specific objectives of the study were to examine the agile supply chain in terms of timely delivery of treatment to the patients on performance of healthcare in Dodoma Municipality, to identify agile supply chain in terms of integration and coordination of process on performance of healthcare in Dodoma Municipality, to assess the extent to which agile supply chain in terms of quick response to patients to enhance performance of healthcare in Dodoma Municipality and to determine the effects of agile supply chain practices on performance of healthcare in Dodoma municipality.

The findings revealed that, in Dodoma general hospital and Benjamin Mkapa hospital agile supply chain practices in terms of timely delivery of treatment is very low due to the presence of long lead time which the patients face when receiving the treatment in the hospitals. Also the study found that the long lead time in Dodoma general hospital and Benjamin Mkapa hospital is caused by the five major factors which are large number of patients entering at once in the hospital, heavy workload to the treatment providers, work process, inadequate facilities and employee attitude. There is positive significant relationship between agile supply chain in terms of timely delivery of treatment and performance of healthcare. This means that there is association between timely delivery of treatment and performance of healthcare.

Also in findings it was observed that agile supply chain practices in Dodoma general hospital and Benjamin Mkapa hospital in terms of integration and coordination of the process is very low because the hospitals fail to integrate all process and operations by using information and communication technology. Also the study found that the application of computer technology such as information system to enhance smooth conduct of activities such as record keeping is very low to the Dodoma general hospital and Benjamin Mkapa hospital because of inadequate of the facilities/equipment such as computers. There is significant positive relationship between agile supply chain in terms of integration and coordination of process and performance of healthcare. This means that integration and coordination of the process has impact to the performance of healthcare.

The study revealed that agile supply chain in terms of quick response to the patients is practiced in Dodoma general hospital and Benjamin Mkapa hospital through responding quickly to the medical assistance to the patients, there is quick response from the medical personnel to assist the patients. Also the study found that when it comes to quick response towards change number of patients the hospitals failed to accommodate changes due to insufficient resources. So that the practices of agility in terms of quick response is good in Dodoma general hospital and Benjamin Mkapa hospital. The study failed to find the link or association between agile supply chain in terms of quick response to the patients and performance of healthcare.

The study found that treatment conducted at reasonable time, waiting time for registration, ICT uses in healthcare operations, reduction of path flows and quick medical assistance contribute positively towards the performance of healthcare in terms of patient's satisfaction. But the study failed to establish the contribution of effective communication and quick response with change number of patients towards the performance of healthcare

6.3 Conclusions

The main objective of the study is to assess agile supply chain practices on performance of health care industry in Dodoma, Tanzania. In order to achieve this objective the Binary logistic regression model were used to assess the agile supply chain practices in terms of timely delivery of treatment, integration and coordination of treatment processes and quick response to the patients. All variables such as treatment conducted at reasonable time, minimal time to contact medical personnel, waiting time for registration, ICT uses, reduction of path flows, effective communication, quick response with change number of patients, and quick medical assistance included in the model as independent variables while patients satisfaction represent dependent variable. The study concludes that healthcare organization practicing agile supply chain in their operations is much better towards patient's satisfactions. The findings indicate that treatment conducted at reasonable time, waiting time for registration, ICT uses in healthcare operations, reduction of path flows and quick medical assistance have shown significant contribution on patient's satisfactions. Generally the study concludes that agile supply chain practices improves performance of healthcare organization through patient's satisfactions.

6.4 Policy implication

The findings which were generated from this study provide the important implication to the government, healthcare organization both public and private healthcare, and citizens generally. Furthermore the findings should be used by the government to be as tools to enhance efficient and effective operations of healthcare for the purpose of satisfying their citizen's because most of citizens receive healthcare services.

6.5 Recommendations

Basing on the study findings, the following are the recommendations which the researcher managed to formulate.

The government must ensure there is adequate number of doctors, nurses, laboratory technicians and pharmacists through frequent employment in public hospitals in order to make the public hospitals to have adequate numbers of treatment providers.

Through having adequate number of treatment providers will enable to have reasonable ratio of balance between patients entering in secure treatment and treatment providers which will enhance the efficiency and effectiveness operations of hospitals. Agile supply chain practices it requires the organization to have adequate number of workers in order to smoothen the operations.

The hospitals must make sure that they have adequate facilities such as equipments and buildings in order to accommodate the large number of patients who enter to secure treatment within appropriate time frame. Because the agile supply chains requires the organization to meet any changes of demand very quickly and efficiently, so that having resources will enable the organization to meet all changes of number of patients entering into the hospitals at required time frame.

Also the hospitals through management should encourage or motivate the employees to work hard and efficiently in order to reduce numbers of claims like lead time or delaying of treatment. So that the management should motivates workers through incentives, extra duty allowances and good environment to work. Hence the motivation to workers will encourage the employees to use much of their efforts in provision of treatment to the patients which leads to high responsiveness.

The policy maker of the healthcare industry should make sure that, they develop good policy which emphasizes much on the issue of responsiveness in healthcare industry in order to ensure the concepts of agility is properly applied in healthcare operations.

6.6 limitation of the study

The Researcher during collection of data faced with the limitation of respondents to delay to provide information through filling of questionnaire, which made the researcher to use much effort to make follow up and to ensure the questionnaires are returned in reasonable time to meet university deadline.

6.7 Area for further study

The study was to analyze the agile supply chain practices towards performance of healthcare industry a case of selected public hospital in Dodoma Tanzania. The further study can be conducted on agile supply chain practices to private selected hospitals. Also the study can be conducted on the effects of lean and agile practices on performance of healthcare industry in Tanzania.

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APPENDICES

Appendix I: Questionnaire

Questionnaire No_____

ASSESSMENT OF AGILE SUPPLY CHAIN PRACTICES TOWARDS PERFORMANCE OF HEALTH CARE SECTOR, TANZANIA.

The data provided in this survey is confidential and will be used only for Scientific purposes by the researcher

A CASE OF SELECTED PUBLIC HOSPITAL IN DODOMA MUNICIPAL

BY SHADRACK MWAISEJE
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QUESTIONNAIRE

PART I: <u>GENERAL BACKGROUND INFORMATION</u>

Dear respondent, the purpose of this questionnaire is to enable the researcher to collect data. The questions asked in this section will be used for classification purpose only. The information gathered will not be used in any other way and will be kept strictly *confidential*. Please tick the most appropriate alternative/s.

(1) What is your highest education level?

i. Primary school ( )
ii. Secondary/High school ( )
iii. Certificate/Diploma ( )
iv. Bachelor degree ( )
v. Masters ( )
vi. Others specify

(2) Which of the following category best describe your age?

i. Below 20 years ( )
ii. 21 – 40 years( )
iii. 41 – 60 years( )
iv. Above 60 years( )

3) What is your gender type?

i. Male ( )
ii. Female ( )

Part II: TIMELY DELIVERY OF TREATMENT AND PERFORMANCE OF HEALTHCARE

1. Does the treatment conducted at reasonable time without any delay?

A. Strongly disagree ( )
B. Disagree ( )
C. Neutral ( )
D. Strongly agree ( )
E. Agree ( )

2. Does patients take a lot of time in waiting for registration to get the prescription slip either by using health insurance or without health insurance?

A. Strongly disagree ( )
B. Disagree ( )
C. Neutral ( )
D. Strongly agree ( )
E. Agree ( )

3. It takes minimal time of patient to contact with medical personnel?

A. Strong disagree ( )
B. Disagree ( )
C. Neutral ( )
D. Strongly agree ( )
E. Agree ( )

4. Patients take a lot of time in waiting results ?

A. Strong disagree ( )
B. Disagree ( )
C. Neutral ( )
D. Strongly agree ( )
E. Agree ( )

5. Patients spent a lot of time in laboratory for check up

A. Strong disagree ( )
B. Disagree ( )
C. Neutral ( )
D. Strongly agree ( )
E. Agree ( )

Part III*:* INTEGRATION AND COORDINATION OF PROCESS AND PERFORMANCE OF HEALTH CARE?

1. Does the organization incorporated the effectively use of ICT in processes and operations of the hospital
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )
2. Does the hospital have significantly reduced bureaucratic procedures in service provision?
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )
3. Is there any good inter-departmental communication in our health facility?
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )

4. Does the hospital having small number of path flows?
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )

5. There is good cooperation between staff and patients in hospital?
    A. Strong disagree ( )
    B. Disagree ( )
    C. Neutral ( )
    D. Strongly agree ( )
    E. Agree ( )

Part 1V: QUICKLY RESPONSE TO PATIENTS AND PERFORMANCE OF HEALTHCARE

1. Does the emergence patients are responded quickly in hospital?
    A. Strong disagree ( )
    B. Disagree ( )
    C. Neutral ( )
    D. Strongly agree ( )
    E. Agree ( )
2. Does the hospital respond quickly towards change number of patients within appropriate time frame?
    A. Strong disagree ( )
    B. Disagree ( )
    C. Neutral ( )
    D. Strongly agree ( )
    E. Agree ( )

3. In case of medical assistance patients are responded quickly?
    A. Strong disagree ( )
    B. Disagree ( )
    C. Neutral ( )
    D. Strongly agree ( )
    E. Agree ( )

4. There is quick provision of results in hospital?
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )

5. Does the hospital respond quick towards patients needs?
   A. Strong disagree ( )
   B. Disagree ( )
   C. Neutral ( )
   D. Strongly agree ( )
   E. Agree ( )

PART V: EFFECTS OF AGILE SUPPLY CHAIN PRACTICES ON PERFOAMNCE OF HEALTHCARE

Use the following scale and put a tick (√) on the level of your agreement
5=STRONG AGREE 4=AGREE, 3=NOT SURE, 2=DISGREE, 1=STRONGLY DISAGREE

A	To what extent do you agree with the following statements	1	2	3	4	5
i)	If treatment conducted at reasonable time leads to patients satisfaction					
ii)	If there is no waiting time for registration leads to patients satisfaction					
iii)	Minimal time to contact with medical personnel leads to patients satisfaction					
iv)	Minimal time in waiting of results leads to patients satisfaction					
v	Average time spent in laboratory for check up leads to patients satisfaction					

B	To what extent do you agree with the following statements	1	2	3	4	5
i)	ICT uses in hospital daily operations leads to patients satisfaction					
ii)	Reduction of path flows leads to patients satisfaction					
iii)	Reduction of bureaucratic procedure leads to reduction of patients satisfaction					
iv)	Effective communication in hospital leads to patients satisfaction					
v)	Cooperation with patients lead to patients satisfaction					

C	To what extent do you agree with the following statements	1	2	3	4	5
i)	Quickly response to emergence patients leads to patients satisfaction					
ii)	Quickly medical assistance leads to patients satisfaction					
iii)	Quickly response with change number of patients leads to patients satisfaction					
iv)	Quickly provision of results leads to patients satisfaction					
v)	Fast response to patients need leads to patients satisfaction					

Part VI: ASSESSING THE PERFORMANCE OF HEALTHCARE ORGANIZATION?

In this part please put a [√] mark on the best option among the three responses on each question that suits your opinion

1. Does the patients satisfied with all process of treatment offered in hospital?
    A. Satisfied ( )
    B. Not satisfied ( )

Thank you for cooperation

INTERVIEW GUIDE

Interview guide

Appendix II:

1. Do you think the service offered by doctor and attending staffs are very responsive?
2. How long do you stay in hospital until securing treatment and discharge?
3. What is you level of satisfaction of service offered in this hospital?
4. What do you think on the factors contribute towards long lead time in hospital
5. Do you think the process (path flows) to follow in securing treatment is appropriate and effective to this hospital?
6. Do you think long waiting time to secure treatment is the problem to this hospital?
7. What do you think the solutions in response to question five (6)
8. What is your suggestion on improving service to the hospital in terms of time and process to follow?