

**Assessment of facility management practice for improvement of
public hospital buildings in Addis Ababa city**



Zebiba Kedir Tessi

**A Thesis Submitted to The Department of Construction
Engineering and Management**

School of Civil Engineering and Architectural

**Presented in Partial Fulfilment of the Requirement for the
Degree of Master's in Civil Engineering (Specialization in
Construction Engineering Management)**

Office of Graduate Studies

Adama Science and Technology University

September 2023

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Advisor: Lemma Beressa (PHD)

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DECLARATION

I hereby declare that this master thesis entitled “**Assessment of facility management practice of public hospitals building in Addis Ababa**” is my original work. That is, it has not been submitted for the award of any academic degree, diploma, or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation.

Zebiba Kedir Tessi

Name of the student

Signature

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RECOMMENDATION

I, the advisor of this thesis, hereby certify that I have closely advised/supervised the student while developing this thesis and read the draft thesis entitled “Assessment of facility management practice in public hospitals building in Addis Ababa” Prepared under my guidance by (Zebiba Kedir). Therefore, I recommend submitting the thesis to the department for further review and evaluation.

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APPROVAL PAGE

I, the advisor of the thesis entitled “**Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa**” and developed by (Zebiba Kedir Tessi); hereby certify that the recommendation and suggestion made by the board of examiners are appropriately incorporated into the final version of the thesis.

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Major advisor/supervisor	Signature	Date

We, the undersigned, members, of board of examiners of the thesis by Zebiba Kedir have read and evaluated the thesis entitles “**Assessment of facility management practice for improvement of public hospitals building in Addis Ababa**” and examine the candidate during open defense. This is, therefore, to certify that the thesis is accepted for partial fulfilment of the requirement of the degree of Masters of Science in Construction Engineering and Management.

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ABBREVIATIONS & ACRONYMS

CA	Condition Assessment
FM	Facility Management
IEM	International Electronic Maintenance
IFMA	International Facility Management Association
HVAC	Heating Ventilation and Air Conditioning
HCI	Health Care Institution
KPI	Key Performance Indicator
PPM	Planned Preventive Maintenance
QA	Quality Assurance
QC	Quality Control
SERVQUAL	Service Quality
VCT	Vinyl Composition Tile

ABSTRACT

Facility management plays a crucial role in maintaining and enhancing the physical infrastructure of organizations, aligning it with their core objectives. Despite its recognized importance in the construction industry, the adoption of facility management practices continues to face significant barriers. This study aims to address the need for a comprehensive assessment of facility management practices in public hospitals, aiming to identify areas for improvement as per the required standard. Consequently, this research end tries to bridge the gap in public hospital management in Addis Ababa there by developing a conceptual framework aimed at improving facility management practices in public hospitals. The study is conducted through mixed research approach utilizing both secondary and primary data. Primary data were collected in the form of Likert scale questionnaires. The questionnaire employed in this study is validated through the Pearson correlation coefficient, while the questionnaire's reliability is assessed using Cronbach's alpha in SPSS. Purposive sampling method was used to collect information from respondents in public hospitals. The data were analyzed using descriptive statistics with the assistance of SPSS version 26 software and presented in the form of table. The findings of this study highlight from average to bad inadequate condition of facilities in Addis Ababa public hospitals, average condition of facilities are (wall finishes, floor finishes and ceilings), and bad condition include Services (sanitary appliances, building service equipment, disposal installation, water, ventilation, electrical, light,, lifts, protection installation, drainages, external services), this indicating a pressing need for improvement. Users of these facilities expressed dissatisfaction with the quality of facility services provided (ventilation, performance of lighting and condition of elevators). Moreover, the study revealed a significant gap between international and local facility management practices, with the local practices lagging behind in various aspects. Therefore, this study provides conceptual framework for improvement of public hospitals facility management practice.

Keywords: *Building facility management, Hospital facilities, conceptual framework*

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Facilities management as an emerging profession and the practice has advanced in many of the developed countries but still in its elementary stages in Africa and other developing countries. It is a profession, which includes multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology (Ogebeifun, 2011). Facility management have been described as “the profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology” Therefore, one of the functions of FM is to ensure workplace efficiency for proper cohabitation of users, usually referred to as customers.(IFMA 2016)

Business success is characterized by not only annual revenue and profit margins, but also by the way, various aspects of the building portfolio and environment are maintained and operated. The key issue in facilities management is the specification and delivery of service quality.(Herman 2015) It is the role of Facility managers to ensure that everything is available and operating properly for building occupants to do their work. The facility manager generally has the most influence upon the quality of life within a facility (Chin, 2007))

The practical relevance of facilities management to organizations in all sectors of the economy is now increasingly recognized. Facilities management is continuing to grow in importance because of the flexibility it brings to organizations in a continually changing climate.(Alexander 1994) According to (Adenuga & Iyagba, 2005), it is impossible to produce buildings that are maintenance free, but maintenance work can be minimized by good design, and proper workmanship carried out by skilled experts or competent craftsmen using suitable codes of installation, requisite building materials and methods.

The increasing demand for public services in developing countries has resulted in increased development of public buildings(Wordsworth and Reginaled 2001). Great numbers of people for various services visits public hospital buildings. Healthcare has different groups of stakeholders such as patients, public or visitor, administrative and medical staff. These various

visits lead to increased wear and tear of the building components, which raises a strong need to have suitable maintenance practices for such buildings to ensure no interruptions to their functions caused by poor maintenance. The maintenance of hospital buildings is a major issue. Maintenance problems also start to set in immediately after buildings are constructed. Therefore, prolonged neglect of maintenance causes public buildings to be in a state of disrepair leading to the increased maintenance costs, collapse and abandonment of the buildings.(Blessing and Richard 2016)

1.2 Problem statement

In construction sector, building facility management is an important task for creating a comfortable and efficient working environment for the success of their goal. Furthermore, this task is important for the owner to save ownership cost. However, Poor building facility management is one of the critical problems confronting public hospitals in developing Countries. Despite the current practice models identified locally facility, the FM practices are very much different from the models being practice in the United States and the United Kingdom (in particular) (Nordiana et.al, 2016). Any healthcare organization needs a maintenance program in order to manage all facilities. According to (Alzaben 2015) it also needs to carry out maintenance at regular intervals to ensure the safety of users and patients and to make sure that the building is operating within specifications.

Buildings are built in accordance with construction standard and under tight supervision. However, facility management aspects of the building have continued to remain weak. Maintenance of public hospital buildings is often given minimal attention leading to the deterioration of these infrastructures from time to time. When building maintenance practices is neglected, defects occur, which results in extensive damage. This has led to poor building performance; poor user satisfaction and service break down. Other than that, (Bessa and Danat 2021) identified working conditions as one of the factors that most often contribute to employee dissatisfaction at work so employee dissatisfaction usually resulted, leading to less productivity at work.

(Judge and Remus 2004) Suggested that working conditions play a critical role in determining job satisfaction. When people go to hospitals to seek treatment, sometimes when they enter the hospital entrance, the condition of the space makes them feel uncomfortable. Previous studies have shown that good spatial design can reduce stress and physical effort among the patients or hospital users and increase the overall efficiency and effectiveness of the hospital design (Mollerup, 2009)). “Most studies focus on new designs that encourage more efficient use of natural resources, deliver pollution free and ecologically supportive urban landscape. When economic development is addressed, most focus on the increase of property value by these new designs. Unfortunately, there is very little discussion on the contribution of maintenance of existing buildings to sustainable development and those exceptions focus on environmental issues only (Yiu et.al. , 2020)

Although facilities management (FM) has been advocated in the construction industry to address the issues of facilities in buildings, their adoption is still plagued with barriers. Facility in hospital is poorly managed there is defect in hospitals buildings which deliver service. As universal health reports there is power outage and hospital was getting its water supply only once every week, which forced the hospital to use germ-infested water from an old tanker. The key issue in facilities management is the specification and delivery of service quality. It is easy to distinguish between facilities properly managed and ordinary support services. The final test of true service quality is user satisfaction. (Keith Alexander 2014) Moreover, as (Sari 2018) stated in his study different culture of eastern and western might be have different preference and challenge, so there might be different strategies which is more suitable and effective to be applied in certain culture.

1.3 Objective of the study

1.3.1 General objective

The main objective of the study is to assess facility management practice of public hospital in Addis Ababa city and compare with international standard of FM so that the existing can be improved.

1.3.2 Specific objective

1. To identify facility provided in public Hospital and their condition at Addis Ababa public hospital
2. To measure the service quality of facilities from user's perception
3. To identify the gaps that exist, on how FM is being practiced in comparison with the international FM standard.
4. To develop conceptual framework model that improves the current practice of facility management.

1.4 Significance of the study

The study aims at assessing facility management practices in public hospital buildings of Addis Ababa city, to improve performance of facilities with the goal of exploring how FM practices and quality of public buildings can be improved in the hospital, increase user's satisfaction by developing systematic approach and recommending the most efficient facility management strategies, and informing Facility managers and stakeholders on maintenance management practices for managing facilities to support activities in the healthcare center. In addition, the study will assist the ministry of health and facility managers of the public hospital buildings to become aware of the current state of buildings and health of its occupiers. Through this research, the study intends to contribute to the overall improvement of facility management practices in public hospital buildings. By identifying areas that require attention and recommending appropriate strategies, the study aims to enhance the efficiency, effectiveness, and quality of healthcare facilities.

1.5 Scope of the study

The study intended to assess Facility Management Practices in Public Hospital Buildings in Addis Ababa city. The scope of this study were subjected to assessing condition of facilities in public hospital by identifying facilities provided in hospital and measuring those facilities service quality. The study was conducted mainly focused public hospitals.

1.6 Delimitation scope

The research is limited only to Public Hospital in Addis Ababa city due to the constraint of time and money.

1.7 Expected outcome of the study

Facility management practice of public hospitals was assessed and conceptual framework is developed for improvement of facility management practice of hospitals buildings.

1.8 Organization of the Study

This research work will be organized under five chapters. Chapter 1 covers the general introductory and background of the study. It also includes the problem statement, research questions, and objectives, significance of the study and the scope of the research. The Second chapter deals with the review of relevant literature on the subjects. That is to say the ideas of some researchers and authors have been reviewed Chapter 3 will focus on the methodology adopted in undertaking the research. The analysis of the data gathered will be with in chapter four, whilst chapter five presents a summary of the key findings, recommendations and conclusion

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Facility management concept

2.1.1 Definition

Facilities management include multi-disciplinary activities in developing and managing the environment that affect the people and places of work. According to (Ihfasuziella et al, 2011) facilities management is a process where an organization provides and maintains services in a great quality environment by using the appropriate cost to meet the needs of the organization. It means the costs incurred in the organization need to be adjusted to actual needs Facilities management integrates the entire component of the built environment including people, process, place and technology to make sure that the built environment system works optimally. It offer important contributions to address the challenge of inefficiency in terms of building operation and maintenance thus make facilities management industry become one of the fastest growing industry in the world.(Sari 2018)

Facilities management is an age-old practice, which has existed out of necessity since buildings were first constructed to support human activities. The FM industry is generally acknowledged as having stemmed from services provided by janitors and caretakers during the 1970s. Facilities Management (FM) involves guiding and managing the operations and maintenance of buildings, precincts and community infrastructure on behalf of property owners.(FMA 2010) (Baldry and Barret)Defined facilities management as follows: —An integrated approach to maintaining, improving and adapting the buildings of an organization in order to create an environment that strongly supports the primary objectives of that organization.

Facilities management is part of the management of the building that needs to be emphasized by the management body. One of the facilities management objectives is to reduce maintenance costs while maintaining quality or the quality of facilities provided (Ariffin, Milala et al. 2022)) The key issue in facilities management is the specification and delivery of service quality.(Alexander 1994) Success in facilities management will ultimately be measured by the extent to which facilities support the "business" operation. Performance will depend on the effectiveness of facilities planning. In turn, the quality of service achieved in practice will depend on the effectiveness of the systems, which control service delivery — whether supplied

in-house or contracted out.(Chin 2007) According to (Atkin and Brooks 2009) The general goal of building facility management is to ensure the provision of attractive buildings, with properly functioning components and systems, that are properly operated, maintained and that provide surroundings and conditions conducive to quality instruction and learning. To fulfill the general goal of facility management unit: Identify and correct facility deficiencies and needs through periodic review of existing systems and system components, maintain buildings at a level that ensures facilities that are aesthetically pleasing, clean, sanitary, and safe and, manage facilities in a manner which minimizes usage conflicts, overcrowding, and retrofit costs

(Rozilah 2011)Stated, “The original concept of facilities management is very much associated with its role as “enabler” to support the core business of the organizations with the primary aim of minimizing costs and maximizing profit along the delivery process. Early understanding has seen facilities management as a coordinating function that integrates between people, place, process, and technology. This conventional function has a three-way interface between organizational culture, the people, and physical assets. This interface, somehow or rather, has created the original demand for facilities management services and expertise.” Facility Management finds management remedies by placing itself at the intersection of these three factors. This policy makes sense, since people, process and place are the three major factors of organizations, and Facility Management pertains to the whole organization. The position of Facility Management at the center signifies enhanced cooperation among the key factors in any organization. However, the Facility Manager is most active with factors relating to place. (Hampo, Ojo et al. 2022)

2.2 Scope of facility management

(Abdul-Rahman, Wang et al. 2015)divided facility management into three major components such as property, equipment and services for which it depends on the respective management to manage and provide the facility users. Scope of facility management includes a number of areas such as:

- i. Management and maintenance of buildings Maintenance engineering
- ii. Service building
- iii. Project management renovation and conservation

- iv. Management space
- v. Provision of security and cleaning
- vi. Offices and food service
- vii. Negotiate contracts and purchases
- viii. Revision rent
- ix. Negotiating leases and lease relations
- x. Information technology
- xi. Planning for the future portfolio

2.3 Role of facility managers

The Facilities Manager organizes controls and coordinates the strategic and operational management of buildings and facilities in order to ensure the proper and efficient operation of all its physical aspects, creating and sustaining safe and productive environments for residents. The Facilities Manager can consist of a single individual or a team, with services able to be delivered by dedicated ‘in-house’ professionals or ‘out-sourced’ in whole or part to external providers. An important role of the Facilities Manager is to provide services, meet varying expectations, support, and information, be a good listener, and deal with conflict to create community environment residents are willing to call home. Their role includes dealing with various contractors and suppliers in carrying out maintenance and upgrades, and providing services such as security, cleaning, and property maintenance. (Burt, 2012) Employees in the facilities management field are required to be trained in many fields including electrical, mechanical, plumbing, HVAC, and a host of other specialized areas (Lucas, 2017)

2.4 Facility Management Practice

Condition assessment (CA) is a fundamental practice of facility management (FM) that provides information regarding the current condition of the built environment to plan appropriate actions for preventing future deficiencies. (Deniz et al, 2021) Building maintenance is a fundamental practice in facility management, which supports the longevity of a building. Increasing costs of maintenance practices is a challenge for facility management professionals. Given that, building maintenance decisions often comprise complex and conflicting criteria. (Deniz et al, 2020) Facility management department responsible for the maintenance and operation of buildings as

well as the planning, design and construction of new buildings. (Sarel, 2008) Satisfaction with quality can be seen as one and possibly the major performance criterion in the management of facilities services (Heavisides and Price 2001).

2.5 Facility management categories

Facility Management can be sub-divided into “Hard Services” and “Soft Services”. Hard services include technical support like mechanical and electrical services. Soft services include the cleaning and conservancy works, lease management and tenant relations (Oladokun and Ajayi 2018). Hard services include I. Lift & escalator maintenance ii. Air conditioning maintenance iii. Plumbing & drainage Decoration & refurbishment v. Fire safety system maintenance. Soft services include I. Waste disposal ii. Pest control iii. Recycling IV. Cleaning v. Security Additional services also: I. Utility management ii. Catering services iii. Vehicle fleet management IV. Benchmarking v. Meeting room services VI. Reception services vii. Health & safety services viii. Telephone ix. Information systems x. Postal services xi. Space management xii. Environmental management

2.6 Health care facility management

The provision of FM and other non-core activities to healthcare organizations has been growing gradually, as has its impact on the quality and effectiveness of healthcare services. (Shohet and Lavy 2004) investigated the effect of the following five salient factors on the satisfaction of healthcare users: (1) level of communication between staff and patient (2) Competence, skills and experience of service providers; (3) Facility quality; (4) Positive staff reaction toward patients; and (5) Cost of treatment versus patient expectations.

The facility quality score was found to be the second highest for a single factor, rating 4.22 out of five points. Multiple regression analysis showed that facility quality has the least impact on user satisfaction (0.16), but in fact, the facility’s impact is quite high, considering the fact that financially it accounts for only 3 per cent of the total healthcare service provider turnover. Hospital management needs to get the most out of its current resources as well as minimizing the costs of operations to be able to attend to most of its needs. To enable these, the management

needs to implement plausible measures that may enhance productivity, efficiency, and sustainability and, minimize risks. (Dela Cruz, & Ortega-Dela , 2022)

2.7 Hospital facilities management

Hospitals are a vital component of the healthcare system (Healy and McKee 2002). According to Nours Hospital Consultants (2002), a hospital is not a mere building, but a complex social institution that handles the dynamics of life and death situations during the process of rendering health care. Furthermore, a mistake in a hospital building management can cost the lives of many human beings at a time. These characteristics represent unique operating conditions and a bottom-line that involves much greater stakes than the profit-only vision of most business ventures. There is need to evaluate the existing maintenance management practices of public hospital facilities in order to improve their standard for effective health care delivery. Factors that affect the performance of hospital such as actual occupancy relative to planned occupancy, age of the building, building surrounding, managerial resources invested and labor sources for implementing maintenance work either in-house or outsourced. Sometimes, what makes any organization fail is bad planning by the management.

(Kessler,et.al2011) stated a pleasant and clean healthcare environment has a positive impact on patient satisfaction and the apparent healthcare quality experience. It furthermore; increases staff performance and job satisfaction, and makes hospitals more patient friendly (Stankos and Schwarz 2007) Hospital buildings are places where care and cure should be available to the public but due to lack of maintenance, public hospital buildings have become a place where people working in the built environment and patients have allergic – like reactions to unspecified stimuli, reactions like dizziness, nausea, irritation of mucous membrane, eye and/or nasopharyngeal irritation and sensitivity to bad odor from human waste, poor toilet facilities, insufficient cleaning methods (Adenuga and Iyagba 2005)

2.7.1 Type of Hospital facilities

Achieving zero defects in facility management is crucial for ensuring the smooth 24-hour operation of a hospital. As mentioned in the study by (Baldwin, Green et al. 2005), patients often base their choice of hospitals on subjective assessments of patient-encountered facility

management (FM) services. These services include the hospital environment, ease of parking, facilities for visitors, and perceived cleanliness. Facility management in hospitals encompasses a wide range of services, both hard and soft FM. Hard FM refers to the maintenance and management of physical assets such as buildings, equipment, and infrastructure. This includes tasks like repairs, renovations, and ensuring the proper functioning of critical systems like HVAC and electrical systems.

On the other hand, soft FM involves managing services that directly affect patients' experience and satisfaction, such as housekeeping, security, parking facilities, and overall cleanliness. These services contribute to creating a welcoming and comfortable environment for patients and visitors.

Table 2-1 FM in hospital

FM in Hospital	Soft FM	✓ Cleaning/Domestic services ✓ Privacy and dignity ✓ Catering ✓ Ward housekeeping ✓ Security and safety ✓ Car parking ✓ Porterage ✓ Bedside communication systems ✓ Bedside communication systems ✓ Waste disposal ✓ Sustainable and environmental management
	Hard FM	✓ Asset Management ✓ Elevator Services ✓ Flooring/ Roofing Services ✓ Building Department Services ✓ Installations,

2.8 Hospital building characteristics and standards

Hospital buildings can be described as sophisticated public areas due to their functional organization's complexity and architectural configuration. (Elshorafa & Enshassi, 2015)Healthcare buildings represent, perhaps, the most difficult group of largely public sector buildings to maintain because of their complex engineering services and their heterogeneous

nature. Furthermore, safety and hygiene considerations make the condition of these buildings a particularly sensitive issue. (Chanter & Swallow, 2008)

2.8.1 Operating rooms

The size and number of ORs in a hospital depends on the total size of the facility, the number of beds and the type of medical treatment. The air in an OR must be aseptic, at a reasonably constant temperature and humidity and have relatively low velocity in order to avoid drafts and swirls that promote the recirculation of microbes and may disrupt the procedures during an operation.(Balaras et.al, 2007)

2.8.1.1 Heating, ventilation, and air conditioning

Heating, ventilation, and air condition (HVAC) systems consist of heating units (e.g., steam boilers), cooling units (e.g., compression and absorption chillers), air-handling units (AHUs), and related components. The primary objective of HVAC systems in any facility is to provide appropriate levels of temperature, humidity, and ventilation. HVAC systems in healthcare facilities have an important additional role in infection control.

2.8.1.2 Medical gas and vacuum systems

Medical gas and vacuum systems provide for the distribution of oxygen, air, and other gases used in patient care, as well as vacuum systems of various types. The primary objective for these systems is to provide appropriate levels of pressure, volume, purity (e.g., percentage of oxygen in the gas delivered to oxygen outlets), freedom from contaminants (e.g., pump lubricating oil and moisture), and reliability. This requires careful inspection and maintenance of the gas/vacuum supplies and the distribution system of manifolds, valves, and piping.

2.8.1.3 Environmental service

The environmental service worker maintains environmental and infection control standards within established policies and procedures of the health care center. The position performs a variety of general cleaning tasks to maintain patient rooms, offices, hallways and other assigned areas of the facility.(Lucas 2017)

2.8.2 Hospitals floor

Department of veterans (2008) recommend that hospital floors must perform criteria such as durability, slip resistance, hygiene and maintenance, these characteristics are vitally important to suit different healthcare environments. Floors in exam rooms, treatment rooms, and most other spaces should be vinyl composition tile (VCT). Floors in toilet rooms should be ceramic tile with a ceramic tile base. Floors in radiographic rooms require a 10 cm deep depression to facilitate installation of the floor trench duct system. Floors in interventional radiology rooms or radiographic rooms intended to support image- guided or minimally invasive procedures should be welded seam sheet flooring with an integral base

2.9 Facility assessment

Hospitals are sophisticated systems comprising varying stakeholder groups, ranging from medical staffs to patients. FM functions need to plan and develop processes that take into account and respond efficiently to the various needs and expectations of each group. In designing an effective FM function, the context is everything. The first step towards developing an efficient and effective facilities management plan requires an in-depth analysis of the facility. Facility Assessment is a procedure that analyzes the existing and projected future scenario of facilities and assets within those facilities. The process assesses the physical condition of facilities, analyzes opportunities for enhancement, and starts processes to improve the present state.

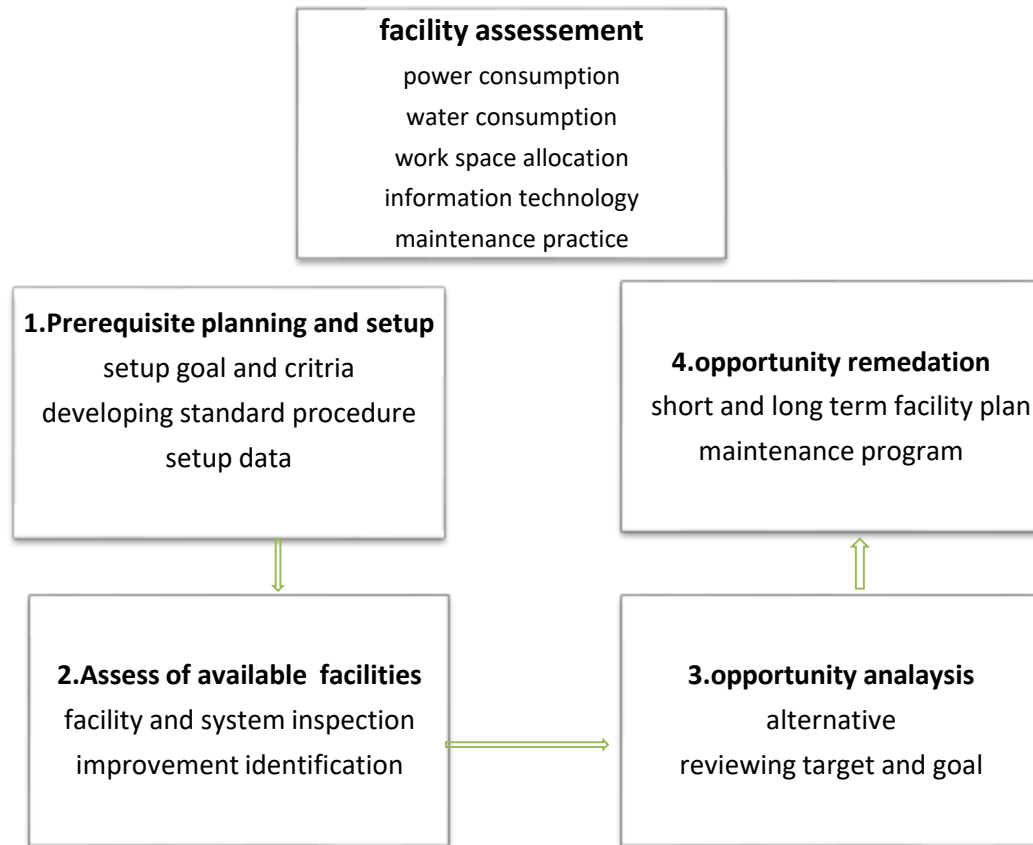


Figure 2-1 facility assessment

2.10 Facility management strategy

Managing facilities efficiently and effectively requires that a tough strategy is developed within the context of the organization's business plan. These should involve development of strategic objectives and a plan for the facilities management, with proper reference to the overall business plan within which it might be contained. A strategy (or business plan) for facilities management should (Atkin and Brooks, 2009)

According to (Abdul-Rahman, 2015) there are three-facility strategies level to achieve the principle of facility management. (i) The strategy analysis - in this stage all the data and facts will be collected including the objective of the organization, policies, and requirements, resources, processes, physical asset conditions, use of space and function, as well as analysis of the costs involved. (ii). The completion strategy - the result of information collected in stages 1, including the objectives of the organization will be evaluated and the analysis made for the 2nd

time onwards facility management strategy will be established. This means that an organization should choose a real strategy. (iii). The implementation of the strategy - the stage of implementation, it consists of the development strategy through the realization of an implementation plan containing a timetable planning, such period or periods and complete risk management ... it includes human and labor and the system, communications, planning, and resources acquisition (procurement). The aim of the analysis is to establish a thorough understanding of the present state of the organization's facilities management. This means assembling all relevant facts, including (British Institute of Facilities Management, 2010):

The organization's objectives, needs and policies (from the business plan); Physical assets and space utilization achieved (from the space/accommodation strategy); A review of resources, processes and systems to provide a broad picture of the current provision of services Once information from the analysis stage has been assembled, a robust and structured approach to the interpretation of the information can be adopted. It is essential that the interpretation of information derived from the analysis is open and allows new ideas and innovative solutions to be developed.

2.11 Empirical review

2.11.1 Facility management practice in Asia and Africa

The practice of buildings facilities management in Asia & Africa is still considered as a new comer in the industry if compared to those in Europe and USA. In Asia, the facilities management practices have developed rapidly in the more developed countries of Japan, Hong Kong and Singapore, while in the developing countries of Asia such as Malaysia and Thailand, facilities management practices are still considered in the level of infancy. Hong Kong as the "door" to the Asia and the meeting point of western and Asian culture has become one of the leading countries of facilities management practices in Asia.

Ghana

A study from Ghana was designed to assess the current condition of public buildings, identify the underlying principle causes of poor maintenance of public buildings, analyze the maintenance policy and practice and capacity of the maintenance and estate departments of public institutions and make suggestions and recommendations towards the adoption of

effective maintenance policy and innovations that would address the building maintenance problem in public institutions. The study has established that housing maintenance is a real problem among public institutions in Ghana, with about 83 percent of all residential buildings of public institutions surveyed having maintenance problems. The maintenance problems the study observed have been influenced by the age of the buildings, lack or absence of a national maintenance policy, inadequate funds and high cost of maintenance, low capacity of maintenance staff

Malaysia

In developed markets, FM administrations are firmly incorporated with some different administrations in the real estate sector, for example, rent collection and lease management. However, in Malaysia demonstrating that the idea of FM has already not sufficiently developed to give complete property management practices. As mentioned, FM is the provision and management of resources, physical environment and business support services to complement the strategic and operational objectives of an organization, integrating key functions like processes and technologies with people, with the flexibility for future integration.

Despite the current practice, models identified locally facility; the FM practices are very much different from the models being practice in the United States and the United Kingdom (in particular)

2.12 Customer satisfaction in FM

In the hospital business, support services in both tangible and intangible assets are equally important with the core medical treatment service. It is a business where the level of customer satisfaction can be measured through both tangible and intangible fact in terms of facilities, physical evidence is a factor that is integrated with other tangible service factors, where customers perceive and judge directly whether they are satisfied or not. Commonly, FM is perceived as purely the maintenance team, where repairing activities occur on a reactive basis; however, quite the contrary as FM can strategically add value to an organization(Pitt 2016) User satisfaction in common language has to do with fulfillment of a desire or a need through the users' feelings and attitudes towards the service or product. (Bahari & Ling, 2010). The phenomenon of the users' experiences involving the users' emotions reflects the users' satisfaction and that the service outcome is of quality.

In hospitals, facility functions such as parking, hygiene and catering are major issues that make customers dissatisfied. Therefore, if FM services are working, as they should, users are likely to become more satisfied with tangible facilities .(Pitt, Chotipanich et al. 2016)

Satisfaction is a part of measurement of the service quality and usability key factors, and is referred to as serviceability. Measuring user's satisfaction helps to identify user's expectations. Expectations would be vital because users judge quality of care, they accept according to standard internal they what state quality. Thus, this internal standard is based on the patients' expectations and perceptions through their experience of the service. (Haron et.al, (2012)

The role of service quality is widely recognized as being a critical determinant for the success and survival of an organization in a competitive environment. Additionally, how the service is being delivered irrespective of patients' expectations is the measurement of the service quality. Therefore, how well services are being delivered becomes a main focus of measuring customer or patient satisfaction, which is based on customer judgements on the satisfaction level of product and service matters.(Pitt, Chotipanich et al. 2016). Service quality is described as the discrepancy between customer's perceptions of services offered by a particular provider when its services meet or exceeds customers' expectation. For instance, in the healthcare sector, hospitals offer similar services but with varying degrees of service quality

2.13 Service quality in hospital and hospital facilities

Service quality can be defined as a function of customer satisfaction based entirely on perception. This perception in customer's mind is created and influenced by various factors in the environment around which the service is being offered. Perceived quality is being defined as the consumer's judgment about an offering's overall experience or superiority (Panda 2014) Owing to the importance of health in human life, healthcare services must be presented along with quality. The perceived/expected healthcare service quality plays an important role in determining the satisfaction level of patient have developed a service quality model that can frequently be used in healthcare service quality measurement. (Arsanam & Yousapronpaiboon, 2014)

Perceived quality is a measure of gap between consumer expectations prior to receiving the service, and their actual experience of the service (Parasuraman, Berry et al. 1990). Tangibles in services include physical evidence of the service and the physical evidence factor is divided into the following broad components: (1) physical facilities; (2) appearance of personnel; (3) tools or equipment used to provide the service; (4) physical representations of the service; (5) other customers in the service facility.

According to the Servqual scale, there are five dimensions/factors to assess the service quality perception; **Reliability**: ability to perform the promised service, confidential protection. **Tangibles**: physical facilities/conditions, modern equipment. **Responsiveness**: willingness to help patients and provide prompt service. **Assurance**: knowledge and courtesy of staff and their ability to inspire confidence. **Empathy**: caring and individualized attention that the institution provides to its patients. Some researchers' stated that Servqual measures hospital facility management service quality. Servqual is a scale based on the gap model comparing expectations of clients before receiving the services and perceptions of service quality after receiving the services. (Pekkaya et.al, 2019) Service quality measurement in FM is customer-oriented. Hence, a combination of hard and soft FM services that customers feel are significant should be included in the instrument, but customers' ability to assess those services' quality should also be considered; thus, an executable instrument can be developed

(Prugsiganont & Jensen, 2018)Described the concept of functional quality as a building that is suitable for the activities for which it was intended. The people inside the building must be able to function efficiently, comfortably, healthily, and safely. The Author provide nine aspects for functional evaluation: (1) reachability, (2) accessibility, (3) efficiency, (4) flexibility, (5) safety, (6) spatial orientation, (7) privacy, (8) health and physical well-being, and (9) sustainability

2.14 Criteria for assessment of healthcare facilities

Table below describes the criteria for the assessment of healthcare facilities with precise details. Healthcare facilities may include hospitals, clinics, outpatient care centers, and specialized care centers such as birthing centers, nursing homes, and psychiatric centers. Whereas the World Health Organization (2018) defines hospitals as health care institutions that have organized medical and professional staff, inpatient facilities, and deliver services 24 hours per day, 7 days

per week. They offer a varying range of acute, convalescent, and terminal care services using diagnostic and curative tools.

Table 2-2 criteria for assessment of healthcare facility

<i>Aspect</i>	<i>Requirements</i>
<i>Reachability</i>	Reachability by goods vehicles, private cars, and public transportation
<i>Accessibility</i>	Minimum requirement for corridor width that will not restrict the egress in the event of emergency evacuation (International Health Facilities Guideline, 2015) (1) patient corridor; inpatient units, operating units, intensive care unit minimum clear corridor widths of 2450 mm (2) staff only corridor (with no patient traffic) corridor may have a clear width of 1200 mm and length must not be greater than 12 meters (3) public corridor; interdepartmental corridor is 2450 mm and public corridor should not be less than 1600 mm
<i>Efficiency</i>	Favorable location provides suitable routes for people and good arriving and departing - Adequate access arrangements for the building - An efficient layout such as sort walking distances, clear hierarchy between public and private space - Sufficient floor area to allow the desire activities to be carried out Sufficient vertical dimension (care unit 3000 mm, corridor and public passage 2700 mm) (International Health Facilities Guideline, 2015) - Functional use of color and materials to support spatial orientation, reconcilability, and identity
<i>Flexibility</i>	Easily adjusted to suit changing circumstances, which means buildings should be easy to adapt without having to do much in the way of breaking down walls and without incurring high costs. - Plan for development of services 7- 15 years and spaces 3 – 30 years - Spatial flexibility must ensure that the organization continues to have satisfactory accommodation available in the event of change lot its primary activities or method of working

<i>Safety</i>	User safety includes safety accessible rooms, safe passageways, avoidance of sharp edge and corners, safe stairways, handrails and banisters appropriately installed, non-slip and level floor finished, unsafe place screened off, sufficient illumination, avoidance of loose leads, functional-specific measures e.g. separate sections between infection waste and normal waste
<i>Spatial orientation</i>	Clear overall shapes and easily understandable access routes - Clear distinction between public, semi-public, and private spaces - Map of the areas should be provided for easy identify the direction and wayfinding - Color and lighting should be implementing in coordination with wayfinding, and specific areas - Use of ornament or material to identify different locations and directions - Directional sign should be available at or before every major intersection, major destination - Signs should be place every 4.6 – 7.6 m if there are no key decision points along a route - Information desk or information points at the entrance of wards or clinics
<i>Privacy</i>	Clear separation between consultant rooms and examination rooms - A clear distinction between non-clinical area, staff area, and clinical wards - Separate entrance and route between each area - No direct connection between non-clinical areas and clinical ward
<i>Health and physical well-being</i>	Light: (1) provide windows for access to natural daylight in patient rooms along with provisions for controlling glare and temperature (Joseph, 2006) (2) the amount of light (for general-use rooms such as waiting rooms, corridors, day rooms) - Noise: the maximum recommendation for noise level in hospital is 30-45 dB (for general-use rooms) ((de Lima Andrade, 2021)

2.15 Factor affecting facility management implementation

(Talib et al, 2014) Stated the fundamental problems influencing FM in public buildings are a lack of preventive maintenance, insufficient funding for facilities and a shortage of FM regulatory requirements. According to (Mewomo et al, 2022) most predominant challenges in FM public sector buildings are insufficient funding, irregular or fixed budget, the absence of a policy guideline for the development of infrastructure and maintenance of facilities in buildings, poor workmanship, lack of discernable maintenance culture, construction of facilities, an

inspection of facilities, deterioration of structures or facilities as a result of their age and reckless use of facilities. The study concluded that structural/design errors, financial factors and awareness factors significantly affect effective FM practices.

2.16 Challenges with facility management process

Current facility management practices and processes have many data management challenges, including data loss, time wasted for searching information, lack of interoperability, and so on. Lack of proper decision-making approaches and lack of maintenance planning can increase the cost of operation, influencing the quality of facility management. (Sarel 2008). There are three challenges of facility management process identified from literatures. One major challenge faced by facility managers and staff is prioritizing work orders and creating work order schedules. Delays in processing work order can lead to asset failure and downtimes affecting the cost of operation, safety and satisfaction of occupants.

There are challenges associated with identifying and filtering relevant and necessary data and making it readily available to assist FM staff while performing maintenance tasks in the field. Capturing and storing data from different information sources and in different formats create several challenges. A third major challenge identified from the literature relates to tracking and improving quality assurance (QA) and control (QC) of field tasks. Traditional QA/QC is based on collecting data and reports and manually entering the information into the FM system. Such processes require a significant amount of time and cost which affects the QA/QC process. Additionally, shortage of labor or experienced staff can always result in challenges for the FM.

(Dela and Ortega 2022) Studied Challenges related to facility management in public health care institutions (HCIs) in a developing country. The study aims to identify these issues and recommend strategies to address them. The researchers used a survey research design and gathered information from 168 respondents from 12 public hospitals in the province of Laguna, Philippines. The findings reveal that the common issues and challenges in public HCIs are primarily due to limited financial resources and government procurement procedures. The lack of facilities and resources greatly affects the quality of health services provided. Facility managers face various challenges such as compliance, health and safety, funding, maintenance, efficiency, sustainability, and risk management.

To address these challenges, the study recommends implementing strategies such as enhancing efficiency and sustainability measures, minimizing risks, and adopting green building technologies. These measures are expected to help improve the facility management in public HCIs and ensure equitable services for the country.

2.17 Local building facility management practice

Ethiopia aims to be a middle-income country by 2025. For success, hospitals have its own contribution by promoting health and well-being of the nation and coordinate national development (Ministry of Health, 2014). In order to deliver decentralization of the health service system so that health centers need to have substantial facility. This often includes buildings. Inside the building, there are important elements like process, technology and people that are need and bear intricately linked relationship to each other in the organization so health centers require an efficient and effective facilities management system in terms of providing better services to the users. However, from my visualization of buildings, institutions often fail to be familiar with the importance of building facility management to their performance and success; this creates an obstacle to keep up the building within the required life of years. There is no regular survey of building condition and routine hospital building maintenance or they practice maintenance after problems occurred and they only concentrate for new building construction. Thus, am eager to do my research on investigating building facility management practices in hospital buildings in Ethiopia.

2.18 Comparison of facility management practice

A comparison between the American and the British approach from a social and demographic standpoint will serve as a good benchmark to understand the variance in FM practices due to cultural differences. Knowing how the subject evolved because of cultural differences will further strengthen the claim that FM practice widely varies across different cultures in different continent of the world. Strong sense of historical reasoning can be seen to have caused this different appreciation towards FM. When one compares FM practices, it is clear that the American, the British and other countries FM styles vary in terms of their approach and execution. This confusion is not new but has been proven through established research work.

The international FM style does take into consideration the emotions and feelings of people, which is very important in fostering high productivity and hence, efficiency in running the office. It looks like culture and history does play an important role in the orientation of definition and perception of the way business needs to be handled. The differences in the two approaches of FM from the two separate continents of the world could it be that the reason the approach is different is due to the demographics and history of evolution of the society significantly in terms of how things are perceived and executed. (Nor and Azman (2014) The selection of performance measures also depends upon the type of users, since different users like managers, supervisors and customers require different measures for different purposes state that customers and providers select metrics that reflect their respective expectations and goals. Customer-related metrics tend to converge upon output, while provider-related metrics emphasize the processes implemented (Lavy 2011) Summary of other literatures

Facility management is an integrated approach to maintaining, improving and adapting the buildings in order to create an environment that strongly supports the primary objectives of the universities. The general goal of facility management is to ensure the provision of attractive buildings, with properly functioning components and systems, that are properly operated, maintained and that provide surroundings and conditions conducive to quality services. (bin Syed Mustapa et.al , 2008) In practice facilities management can cover a wide range of services including, facility planning, building operations and maintenance, building design and construction and general /office services. However, there is no definitive guide as to what should be included. For example, considerably vary in their choice of functions, some concentrate primarily on maintenance whilst others include general office services. There are various ways to organize the facilities department. The size of the organization, location and services provided, should be taken into consideration when organizing a facilities department. (Tompkins et.al, 2010)

According to the study of (Okoro C. , 2023) the study determined the impact of facility management on office building performance in two Nigerian Universities. Facility management is required to provide a safe environment and satisfactory working conditions to users of office buildings. The study revealed that facility management has a direct positive impact on performance of office buildings in Nigerian universities

There are different possible relationships that could exist between facilities management and strategic planning in which, facilities management provides day-to-day operating support, facilities management largely reacts to corporate strategic initiatives. There is also reciprocal and interdependent relationship between facilities management and the corporate strategic planning process. Here facilities management is viewed as credible and important. It is proactive and fully involved in helping guide the development of strategic plans. The existence of specific organization or association that provides guidelines, support and control on the quality level is important in universities building facility management practice. Building maintenance policy is a written document, and provides a management framework to the maintenance personnel to determine appropriate maintenance strategy and standard. Building maintenance policy and strategy are one of the main aspects of management of building maintenance operation processes.

Detail record of buildings and facility history in the universities are important. A facility's history includes detailed information in the form of drawings, manuals, repairs, renovations, and alterations, accumulated in the process of developing and operating the facility. Continuous survey of the building is crucial to get the information about the condition of the building's major systems and public areas: plumbing, electrical, heating, structural systems, roof and windows, etc are necessary. The survey in form, which repairs, should be done immediately to eliminate hazardous conditions (like repairing bad electrical connections or faulty fixtures, or replacing broken windows) and which repairs can be postponed (Ergen, et.al, 2007)

Generally, there are different types of building maintenance, planned and unplanned maintenance of the buildings. Planned preventive maintenance /PPM is a schedule of actions aimed at avoiding breakdowns and failures. The objective of planned preventive maintenance is to prevent failure of equipment and components in service and to improve reliability by replacing worn parts. Tasks include inspections, equipment checks, diagnostics, adjustments and overhauls at specified intervals so if planned maintenance is absent these explained issues cannot do. Service personnel can record wear and other forms of deterioration so they know when to replace or repair worn parts in order to avoid failure. Periodic painting to protect building components and finishes is a common task within PPM.

Training is considered a vital element to the overall facility management program, especially for operation & maintenance staffs. When new equipment is installed or emerging technology is being employed, facilities personnel must be properly instructed and motivated. Training courses will familiarize personnel with the procedures necessary to operate and maintain complex systems and equipment. Operation and maintenance manuals likewise conducive for use in training, can be required as both paper and as an 'on-line' interactive electronic manual (IEM) developed. Training should be ongoing to keep up with technology and equipment changes in the facility. (Korsten, 2002)

(Nibrate 2015) Studied facility management practice in higher education, the finding of the study shows that there are problems and challenges facing facility management professionals; lack of organized facility management and lack of professional associations, conferences, and short courses to get updated information about building facility management. (Hashim 2011) Focused on assessing the performance of facilities management in international Islamic University Malaysia. The study opines that performance management has a strong relationship with facilities management practices. The results showed that performance management procedures are systematically defined, implemented and executed as part of their quality objectives creations by introducing the performance indicators, which are flexibility, effectiveness, efficiency and creativity.

2.19 Research gap

Facility management being an emerging profession, there is limited literature gap specifically on hospital facility management. Even the available literature shows function of FM separately such as maintenance management, space management. In developed country, organizations employ FM Service Company, so the existing literature shows how those companies deal with delivering the service efficiently and effectively rather than in house service. In addition, other country has their own standard to manage facility. There should be economic and social consideration for non-developed countries in international facility management standard. There is no performance improvement conceptual model for effective and efficient facility management practice in developing country like Ethiopia.

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the exact procedures and techniques employed to identify, select, process, and analyze the research data. It encompasses the research design, population sampling, data collection, and data analysis. In this study, a mixed research approach was utilized, combining both quantitative and qualitative methods. The data were collected through the administration of questionnaires and conducting interviews, while the analysis was conducted using the Statistical Package for the Social Sciences (SPSS).

3.2 Research Approach

Studies that do not attempt to quantify measurements are classified under the qualitative research approach. In this research approach, informal measurement techniques are used for data gathering like interviews and observations. It involves asking a broad question and gathering data in the form of words, photographs, and videos (Manual, 2015). On the other hand, the quantitative approach uses statistical analysis to get quantitative results. It involves an empirical investigation of quantitative properties, their phenomena and relationships (Bloomfield, & Fisher, , 2019). Furthermore, the mixed research approach involves gathering and analyzing both quantitative and qualitative data for a single study. It has the potential to provide a greater depth and breadth of information, which cannot be obtained from a single study approach (Almalki, 2016). A blend of the two (mixed research approach) was used for this study.

3.3 Research design

Research design is defined as the framework of procedures and strategies used by researchers to combine components of research in a reasonably logical manner so that research problems are efficiently handled (Bhat et.al, 2019). Research design provides a general framework for data gathering, measurement, and analysis (Akhtar, 2016). The research design of this study is illustrated in figure 3.1. It clearly shows the methods and procedures used to collect and analyze data to solve the research problem through specific objectives.

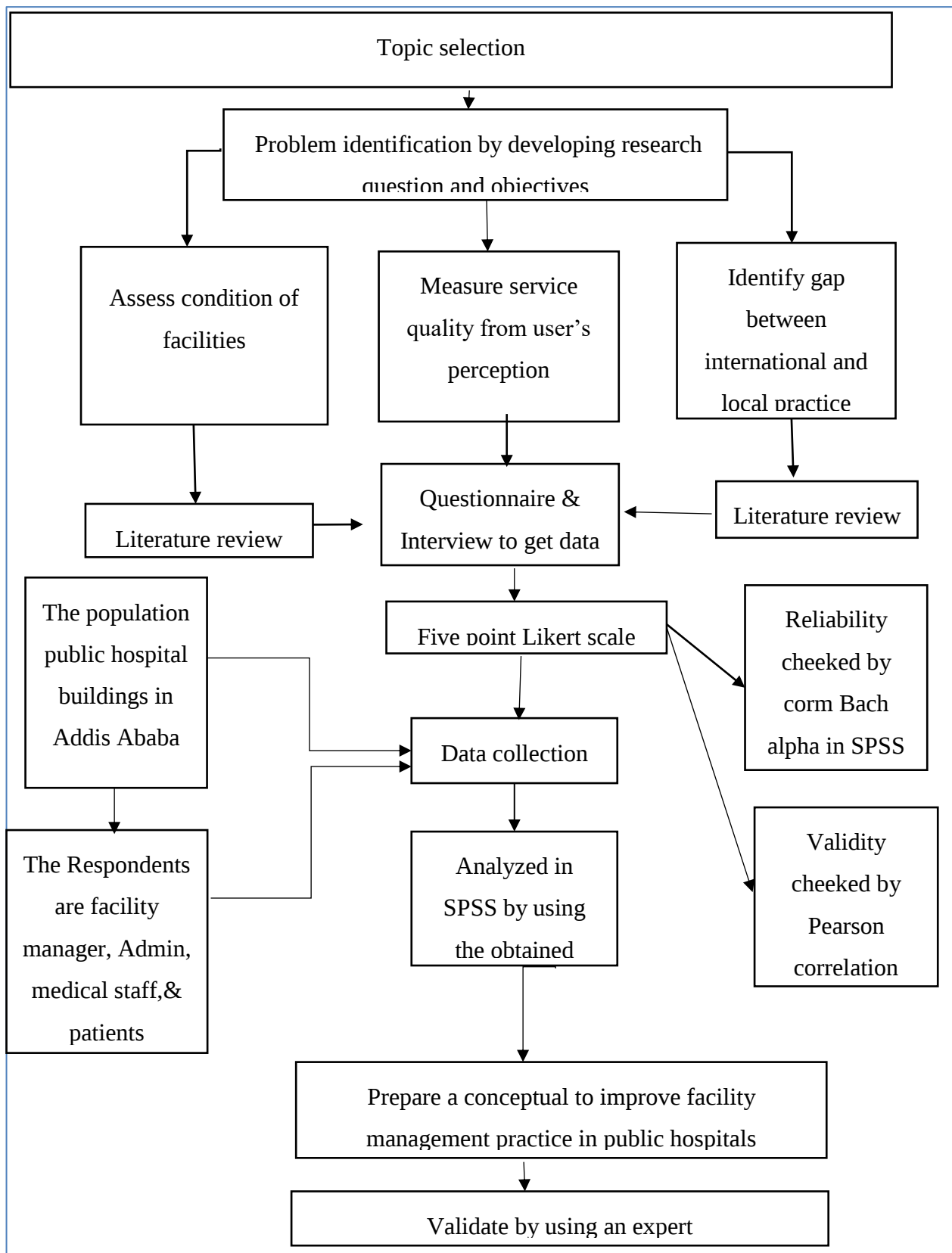


Figure 3-1 research design

3.4 Population

A research population is a well-defined complete set of individuals or objects that has common binding characteristics. The population for this study is public hospitals that are under of Addis Ababa city administration. The target population for this study is 12 public hospitals that are found in Addis Ababa city which are under different administration categories.

Table 3-1 categories of public hospital in Addis Ababa city

S/n	Administration	Name of the hospital
1.	Ministry of Health	Alert
2.		St. Amanuel
3.		St. Paul's
4.		St. Peter hospital
5.	Addis Ababa university	Black Lion hospital
6.	Addis Ababa Health Bureau	Gandi memorial
7.		Menelik II
8.		Yekatit 12
9.		Zeweditu memorial hospital
10.		Ras Desta Hospital
11.	Ministry of Defense	Armed Forces Hospital
12.	Federal Police	Police Hospital

3.5 Sampling technique

Purposive sampling is utilized in attaining the sample size because of the difficulties encountered in assessing the population size of the class. Purposive sampling refers to strategies in which the researcher exercises his or her judgment about who will provide the best perspective on the phenomenon of interest, and then intentionally invites those specific perspectives into the study. Purposive sampling is used is used to select respondents that are most likely to yield appropriate and useful information (Kelly et.al, 2010). It involved the selection of respondents based on assumptions regarding knowledge on building facility because the researcher is targeting a team that has technical knowledge in the area of facility management.

3.6 Sample size

In order to get adequate information and to reach a realistic and effective conclusion, the sample size for the structured questionnaire (quantitative data) was determined using subjective method that was covenant to the study. Sample size has determined by enough sampling size was taken to get deceive and reasonable information, therefore the sample size was taken from the 12 public hospitals. Accordingly, from a total of maintenance department 40 is taken, 60 medical staff, 35 of administrative staff, and 15 of patients were taken. Total 150 questionnaires were distributed to twelve public hospitals

3.7 Data collection

The information for this study is gathered from both primary and secondary sources. In order to find answers to the research questions and to achieve the objectives of the study, the case study method of qualitative and quantitative research is used to collect the research data. This is achieved through the combination of referring literature written on facility management and gathering data through questionnaire and structured interview.

3.7.1 Primary data collection

3.7.1.1 Questionnaire

This study used a questionnaire to gather data to achieve research objectives 1 and 2. Objective one aims to identify facility provided and their condition at Addis Ababa public hospital building. On the other hand, objective 2 deals with measuring service quality of the facilities from user's perception. The questionnaire used in this study is divided into two main sections.

The first section for objective one, (Appendix-A) (Part I) is a multiple-choice survey about the respondent's general profile and educational level. The second section (Part II) is a five-point Likert scale survey on the frequency of facility provided and their condition. Objective 2 is measuring service quality of facilities form users' perception. The first section is about general profile of the respondents and second section measures quality of facilities from user's perception and expectation by a five point Likert scale using SERVQUAL questioners (Appendix-B). It is not this study's purpose to assess the service quality of hospitals in Addis

Ababa, but the FM-related factors identified in previous hospital service quality studies can shed light on the design of this study's questionnaire for measuring FM service quality in hospitals.

Therefore, those factors are extracted and listed to help participants gain a basic understanding. A summary of facility management practice is provided in the questionnaire (Appendix-A). The pre-requisite requirement for being chosen as a respondent for this research is occupancy of public hospital building in Addis Ababa.

3.7.1.2 Interview

An interview was used in this research to obtain detailed information for the case study project, which will be used as an example to demonstrate the implementation of the conceptual framework in a real-life context. A purposive sampling technique was used to select the case study project.

3.7.2 Secondary source data

The information that has already been gathered from primary sources and made available for use by researchers in their studies is known as secondary data. Secondary sources offer data that has already been collected or produced by other scholars. (Ajayi 2017). The secondary data was obtained from the internet, thesis, journals, books, and different articles in published documents

3.8 Methodology for development of conceptual framework

The framework was designed by using a mind map from facility management practice that are identified from the literature review and questionnaires as input. The decision-supporting framework shows logical interconnection (flow) between local and international practice in such a way that improving the existing practice.

3.9 Data analysis

Data Analysis involves preparing data for analysis, running the analysis, reporting the results, and discussing them (Asaminew 2021).

The questionnaire that was employed in the study allowed the researcher to collect quantitative data, which was analyzed quantitatively by using descriptive statistics with the help of SPSS

version 29 software. The mean, standard deviation, percentage, and frequency were used to find out the summary statistics of the responses. The internal consistency of the questionnaire was checked by using Cronbach's alpha coefficient. Cronbach's alpha is a convenient test used to estimate the internal consistency of a composite score (Foster 2022). The Likert scale data that is used in this research is a composite score, which is why Cronbach's alpha is used to check the internal consistency.

The reliability of the questionnaire was checked by using the Pearson correlation coefficient. (Stratton 2018) when using a Likert scale survey to measure the central tendency use the Mean to measure Variability and use standard deviation to measure Associations using Pearson's (Boone and Boone 2012).

The Mean Score ranking is One of the most commonly used statistical approaches, mean score (M), uses the average (mean) of a questionnaire survey response that was filled out using a 5-point Likert scale. M is calculated by averaging all responses to an item (Lari, Hamid et al. 2020).

The data obtained from the questionnaire survey part 2.1 on the condition of facilities in the public hospital building of Addis Ababa. (Appendix-A) was analyzed by using the obtained mean value and it was interpreted as follows.

Note: 5 Very Good, 4 Good, 3 Neutral, 2 Bad, 1 Very Bad

Table 3-2 Five-point Likert scale on condition

Mean	Scale	Usage degree
1 - 1.80	1	Very bad
1.81 - 2.60	2	Bad
2.61 - 3.40	3	Neutral
3.41 - 4.20	4	Good
4.21 – 5	5	Very good

(Fortunasari, Fajaryani et al. 2021)

The data obtained from the questionnaire survey part 2.2 measuring of service quality by user satisfaction on the functionality of facilities (Appendix-B) was analyzed by using the obtained mean value and SERVQUAL instrument. The gap analysis was conducted and calculated as perception-minus-expectation finally attributes with low service quality is interpreted as follows

Note: 1 Very Satisfied, 2 Satisfied, 3 Neutral, 4 Dissatisfied, 5 Very Dissatisfied (perception)

Table 3-3 Five-point Likert scale on satisfaction

Mean	Scale	Importance degree
1 - 1.80	1	Very dissatisfied
1.81 - 2.60	2	Dissatisfied
2.61 - 3.40	3	Neutral
3.41 - 4.20	4	Satisfied
4.21 – 5	5	Very satisfied

(Fortunasari, Fajaryani et al. 2021)

3.9.1 Reliability and validity.

The main objective of a questionnaire in research is to obtain relevant information in the most reliable and valid manner. Thus, the accuracy and consistency of questionnaire survey forms are very significant in research (Taherdoost 2016).

3.9.1.1 Validity of the questionnaire

Validity is defined as the extent to which a concept accurately measures what it intends to measure and how well the data obtained is relevant to the research (Heale and Twycross 2015). (Stratton 2018) argues that parametric tests are more valid when using the survey scale method. To measure associations of a Likert scale, use Pearson's r (Boone and Boone 2012).

The validity of the questionnaire used in this study is tested by using the Pearson correlation coefficient in SPSS. A Pearson correlation coefficient (PCC) is a statistical metric that measures the strength and direction of a linear relationship between two random variables (Zhou, Deng et al. 2016).

3.9.1.2 Validity of the frame work

Experts usually validate frameworks. The experts can be academicians or practitioners in the field of study (Elangovan and Sundaravel 2021). Experts can validate the relevance and accuracy of a framework. To validate framework by using experts (AlHogail 2015). A reliable consensus from experts with a wide range of experience about the research subject matter is required. The framework is assessed based on its appropriateness, correctness, comprehensiveness, structure, and its associated elements (Da Veiga and Eloff 2010). An expert validates the framework of this research. The data that was used to validate the framework was gathered by using a questionnaire.

3.9.2 Reliability

Testing for reliability is important since it refers to the consistency of a measuring instrument. The most extensively used internal consistency statistic is Cronbach's alpha coefficient. When using Likert scales, it is regarded as the most appropriate measure of reliability (Taherdoost 2016). Cronbach's alpha measures internal consistency, which is, how closely related a set of items are as a group. Cronbach's alpha is a function of the number of test items and the average inter-correlation between them. (Singh 2017). Cronbach's is the most widely used test for determining an instrument's internal consistency. In this test, the average of all correlations in every combination of split halves is determined (Heale and Twycross 2015). Cronbach alpha is used to measure the reliability of the Likert scale questionnaire that was used for data collection in this study.

Table 3-4 Coefficient of alpha table

(Taherdoost 2016)	Coefficient of alpha (α)	Interpretation
	0.90	Excellent
	0.80-0.90	Good reliability
	0.70-0.80	Acceptable reliability
	0.60-0.70	Reliability is questionable
	0.50-0.60	Poor reliability
	0.50	Unacceptable

There are two scales in the questionnaire. The first scale is the usage degree scale, and the second one is the importance degree scale. Two Cronbach alphas are used to show the Cronbach alpha values indicate that the questionnaire used in the study is reliable, implying that if the study is repeated under similar conditions, the results will be consistent.

3.10 Ethical consideration

The rights of participants in this research is safeguarded, by maintaining the integrity of science, and enhancing research validity

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings, analysis, and discussions of the data collected. The research was conducted through physical inspection of the buildings, questionnaires distribution to patients/ visitors, public hospital staff and interviews of maintenance officers. Data presentation and analysis were based on the following research objectives: the availability of facilities and condition of public buildings; measuring of service quality of facilities from users perception, the gap between facility management practice and international standard of facility management practices in public institutions; and conceptual framework towards improvement of facility management in public buildings.

4.2 Demographic characteristics of the sample

4.2.1 Respondents position and response rate

During the survey, different peoples are participated in order to fulfill the objective of the paper. The respondent's position and number of returned questionnaires are show below.

Table 4-1 respondent's position

Sn	Position	No. distributed
1	Maintenance	40
2	Medical staff	60
3	Administrative staff	35
4	Patient/visitors	15
Total		150

For a sample size of 12 public hospitals, 150 questionnaires were distributed. Among 150 questionnaires, 133 were returned. The pre-requisite requirement for being chosen as a respondent is to be regular attendant of public hospitals in Addis Ababa. Out of the responses to 133 questionnaires, 125 of them were valid and eight were invalid. According to a response rate of 70% or more can help to draw a very good analysis. The current study response rate is

82.2 %, which means that the response rate is sufficient to draw a very good analysis the response rate of the questionnaire is shown in table 4.2 below.

Table 4-2 response rate

Number of Questionnaires Distributed	150
Number of Questionnaires Returned	133
Number of accepted questionnaires	125
Number of rejected questionnaires	8
Percentage of Survey Response rate	82.2%

4.2.2 Position of respondent

The Figure 4-1 below, shows the distribution of respondents according to their positions who participated in the questionnaire can be summarized as follows: Out of the total respondents, 28 individuals (18.6%) were maintenance staff, 24 individuals (16%) were administrative positions, 58 individuals (37.6%) were medical staff, and 15 individuals (10%) were patients.

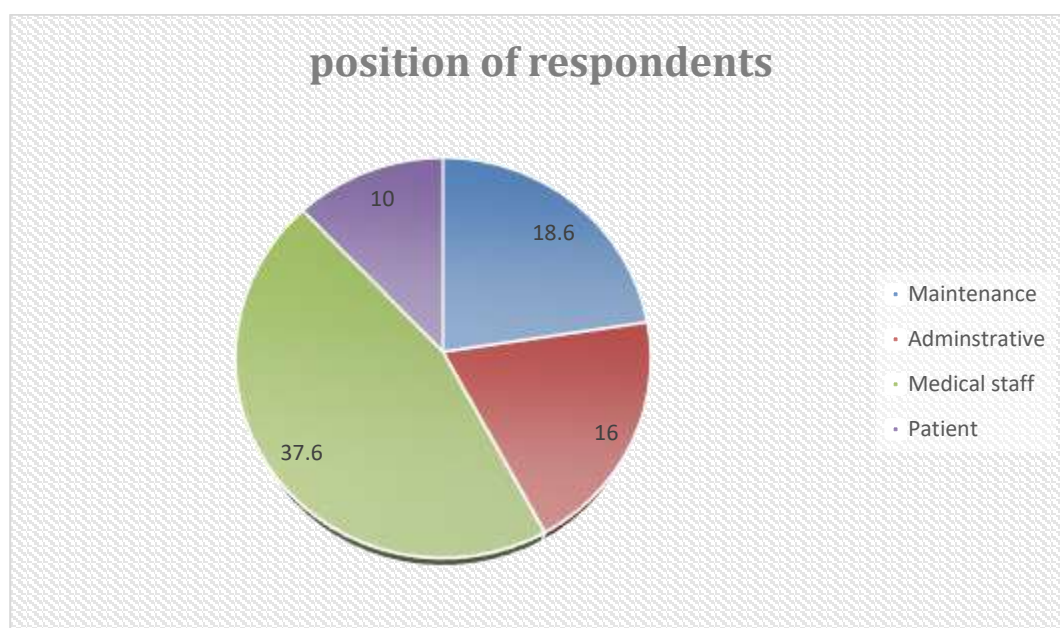


Figure 4-1 position of respondents

4.2.3 Education level of respondents

These statistics provide an overview of the educational qualifications of the respondents, reflecting a diverse range of backgrounds and expertise among the participants.

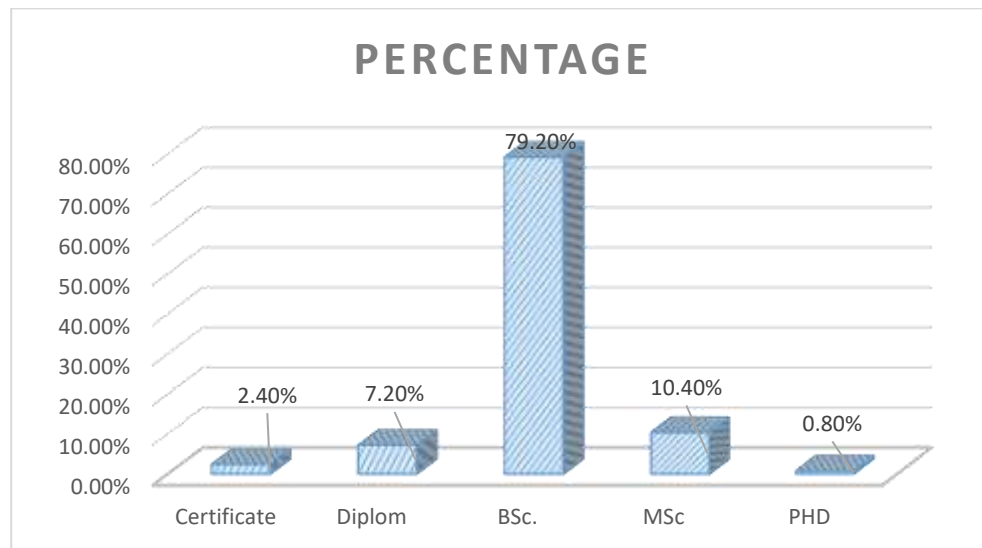


Figure 4-2 education level of respondents

Based on the findings presented in Figure 4-2, the backgrounds of the respondents who participated in the first and second objectives can be summarized as follows: Around 2.4% of the respondents held a certificate, 7.2% possessed a diploma, 10.4% of the experts had a Master's degree (MSc) as their educational qualification, 79.2% of the total respondents held a Bachelor's degree (BSc), and the remaining 0.8% had obtained a Doctorate degree (PhD.).

4.2.4 Work experience of respondents

The working experience of the participants in the study, expressed in percentage on figure below.

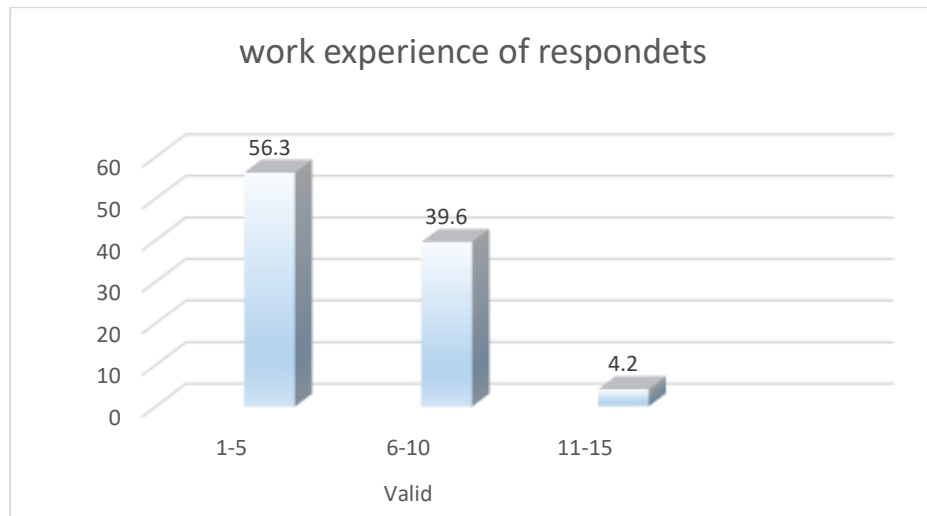


Figure 4-3 work experience of respondents

Figure above shows working experience of respondents are from 1-5 years of experience (56.3%), 6-10 years of experience (39.6%), and 11-15 years of experience (4.2%). This means that the majority of respondents have experience; the majority of respondents in this study possess substantial experience and expertise relevant to the subject matter, which enables them to understand and provide insightful responses to the questionnaire. Their extensive background and knowledge provide them with a solid understanding of the survey's content and enable them to offer informed perspectives based on their practical experience. This ensures that the data collected from these respondents is reliable, valid, and reflective of their expertise, enhancing the credibility and validity of the study findings.

4.3 Analysis of data collected on the study

4.3.1 Reliability test

In addition to respondent's rate reliability test has to undertake to measure repeatability and accuracy. Reliability test is essential to measure internal consistency of the scale the extent to which respondents rate the item in similar pattern. Cronbach's alpha coefficient is important measurement of reliability which, is discussed below in relation to the study

Table 4-3 Cronbach alpha result for condition of facilities

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.770	0.768	5

The result of Cronbach's Alpha (α) for the usage degree scale is 0.770 when interpreted based on Table 4-3. It is considered acceptable reliability because it is in the range of 0.70-0.80.

Figure 4-4 Cronbach alpha result for service quality measurement

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.739	0.758	5

The result of Cronbach's Alpha (α) for the usage degree scale is 0.758 when interpreted based on Table 4-4. It is considered acceptable reliability because it is in the range of 0.70-0.80. The Cronbach alpha values indicate that the questionnaire used in the study is reliable, implying that if the study is repeated under similar conditions, the results will be consistent.

4.3.2 Pearson correlation

Figure 4-5 Pearson correlation result

		Q1	Q2	Q3	Q4	Q5	Total
Q1	Pearson Correlation	1	.771**	.630**	.454**	.298**	.444**
	Sig. (2tailed)		.000	.000	.000	.000	.000
	N	150	150	150	150	150	150
Q2	Pearson Correlation	.771**	1	.770**	.530**	.468**	.405**
	Sig. (2tailed)	.000		.000	.000	.000	.000
	N	150	150	150	150	150	150
Q3	Pearson Correlation	.630**	.770**	1	.672**	.531**	.489**

	Sig. (2tailed)	.000	.000		.000	.000	.000
	N	150	150	150	150	150	150
Q4	Pearson Correlation	.454**	.530**	.672**	1	.643**	.566**
	Sig. (2tailed)	.000	.000	.000		.000	.000
	N	150	150	150	150	150	150
Q5	Pearson Correlation	.298**	.468**	.531**	.643**	1	.754**
	Sig. (2tailed)	.000	.000	.000	.000		.000
	N	150	150	150	150	150	150
**. Correlation is significant at the 0.01 level (2-tailed).							
*. Correlation is significant at the 0.05 level (2-tailed).							

Step 1: The Sig. (2-tailed) value should be less than ($<$) 0.05 it should be checked for every question.

- All of the questions from the questionnaire have a value of Sig. (2-tailed) less than 0.05 this means all of the questions are valid for step 1.

Step 2: Obtained value $>$ critical value in the table

- N =sample size
- Degree of freedom= $N-2$
- Obtained value $>$ critical value in the table
- Sample size is 150 = N
- $DF=N-2=150-2=148$
- See the critical value of 148 DF in the table for 95% confidence interval in table of critical value for Pearson correlation coefficient
- 148DF (0.05) =0.244
- Check all items of the questionnaire one by one
- Example: obtained value is 0.444, which is $>$ 0.244 critical value and is highly significant so it is a valid question.

- All of the questions from the questionnaire satisfy step two so all of the questions are valid.

The Pearson correlation result obtained from this study's questionnaire satisfies all the parameters to be valid. This means that the questionnaire accurately measured what it set out to measure, and the data collected from it was of better quality, accuracy, and credibility.

4.4 Condition of facilities in public hospitals

To identify the condition of facilities of public hospitals, a questionnaire was distributed, and the following result was obtained. The results that were obtained from the five-point Likert scale questionnaire part II, (Appendix A) on the condition of facilities were analyzed with the help of SPSS.

Table 4-4 result for condition of facilities on building structure in Addis Ababa public hospital

Sn	Facilities	N	Mean	St. Deviation
	Building structure			
1.	Structural components (beams, columns, upper floor slabs and stairs)	110	3.44	0.501
2.	Walls (external and internal walls)	110	1.22	1.444
3.	Finishes (wall finishes, floor finishes and ceilings)	110	2.24	1.207
4.	Windows and doors (internal and external)	110	2.25	1.407
5.	Condition of elevators	110	2.31	1.323
6.	Condition of ramps	110	1.22	1.444
7.	Performance of lighting system in ward	110	1.44	0.501
8.	Performance of ventilation system in ward	110	1.22	1.444
9.	Provision of patient privacy	110	1.24	1.207
10	Fittings and furniture	110	2.25	1.407
11	Roofing	110	2.46	0.719

Examination of the facilities condition were done by assessing significant defects in the following main elements: floor finishes, roof covering, walls and wall finishes, ceilings, windows and doors, condition of elevator condition of ramp, Performance of lighting system in ward, Performance of ventilation system in ward, Provision of patient privacy, Fittings and furniture and Roofing.

Based on the response in the table 4-4, the structural elements of the buildings that comprises beams, columns, upper floor slabs and stairs are in an average state, but, the response of the respondents' believed that rest of structural element of the buildings is in bad condition

Table 4-5 result for condition of facilities on housing utility in Addis Ababa public hospital

Sn	Facilities	N	Mean	St. Deviation
	Housing utility			
1.	Performance of drinking Water	110	4.48	0.989
2.	Performance of Electricity	110	1.94	0.753
3.	Provision of Electrical appliance	110	3.54	1.010
4.	Provision of Sanitary appliance and non-drinking water(flush for toilet, at sink)	110	1.25	1.052

Performance of electricity and Provision of Sanitary appliance and non-drinking water (flush for toilet, at sink) shows very bad condition while provision of electrical appliance is at average state and performance of drinking water is at good condition.

Table 4-6 result for condition of facilities on recreational in Addis Ababa public hospital

Sn	Facilities	N	Mean	St. Deviation
	Recreational			
1.	Parks and garden	110	4.44	1.041
2.	Cafeteria	110	3.92	0.942
3.	Common room or waiting area	110	1.75	0.944

Except common room or waiting area parks and garden and cafeteria is at good condition.

Table 4-7 result for condition of facilities of waste management in Addis Ababa public hospital

Sn	Facilities	N	Mean	St. Deviation
	Waste management			
1.	Waste disposal	110	3.54	1.010
2.	Sewage disposal	110	1.25	1.052
3.	Performance of pest control in hospital	110	1.70	1.041
4.	Cleanliness of overall environment(including bathrooms)	110	2.69	1.035

Table 4-8 result for condition of facilities on security and emergency service in Addis Ababa public hospital

Sn	Facilities	N	Mean	St. Deviation
	Security and emergency services			
1.	Fire safety	110	2.46	0.719
2.	Adequacy of security prevalent in hospital	110	2.75	0.934
3.	Street light	110	4.48	0.989

Generally, The other building components in the average state are finishes (wall finishes, floor finishes and ceilings, roofing and Fittings, lifts, and furniture), Services (sanitary appliances, building service equipment, disposal installation, ventilation, electrical, ramp, drainages, external services), and Sanitation, waiting area, pest control of the environment are very bad conditions. Cleaning of overall environment and pest control also shows bad condition. Other facilities that compromise recreational like garden are in good condition. While space management, lighting and ventilation in common room or waiting area are in very bad condition.

From observation, there is Derelict Ceiling: Dirty and collapsing soft board ceiling, stained ramp support, stained ceiling boards due to roof leakages makes the buildings unsuitable for occupation. Defective Electrical Elements: Electrical insulation breakdowns, loose wires, and faulty fittings are among the electrical defects identified. This indicates that inspection, testing, and maintenance of electrical installations is not regularly carried out, yet electricity is a very potentially dangerous system in a building, due to the serious risk of electrocution.

Defective Plumbing and drainage System: Dilapidated plumbing (i.e., blocked water pipes and broken wash hand basins) results in frequent disruption of water supply in the taps and sanitary appliances. Broken sewerage system with signs of leakages is also identified. Ineffective Waste Disposal Services: This was identified as one of the common facility maintenance problems in public buildings. Piles of garbage, dilapidated vehicles, and old vehicle tires can be seen in almost all corners of the public hospital building

4.5 Measure the service quality of facilities from user's perception

The following result was obtained from the questionnaire survey that was distributed to get data on service quality measurement of facilities from user's perception. The data are measured by using servqual model, which is perception of user's minus expectation they have on functionality of the facilities. The data was analyzed into two categories: the first category was based on their perception of users and the second category was based on expectation of users. The data was analyzed by using its mean value with the help of SPSS software. It was interpreted and the mean value of each attribute is calculated finally gap score is analyzed by perception-minus-expectation and presented on table below

Table 4-9 expectation and perception of participants about building structure service quality

Sn	Facilities	ES	PS	gap score
	Building structure			
1.	Structural components (beams, columns, upper floor slabs and stairs)	4.19	3.95	-0.24
2.	Walls (external and internal walls)	4.37	4.21	-0.14
3.	Finishes (wall finishes, floor finishes and ceilings)	4.37	4.17	-0.14
4.	Windows and doors (internal and external)	4.37	4.20	-0.17
5.	Condition of elevators	4.37	2.27	-2.1
6.	Condition of ramps	4.37	2.27	-2.1
7.	Performance of lighting system in ward	4.23	1.83	-2.54
8.	Performance of ventilation system in ward	4.14	1.75	-2.39
9.	Provision of patient privacy	4.22	1.93	-0.89
10	Fittings and furniture	4.41	4.27	-0.17
11	Roofing	4.40	4.15	-0.25

Table 4-9 shows an assessment of users' perception-minus-expectation scores to evaluate service attributes within the hospital facility management (FM) services. The analysis revealed that users hold high expectations for these services, yet their perception of them falls significantly below these expectations. Specifically, users expressed considerable dissatisfaction with regards to the provision of patient privacy, the performance of lighting and ventilation systems. Their perception of these aspects was notably low. Similarly, users reported dissatisfaction with the condition of elevators and ramps within the facility. However, in the case of structural

components such as walls, finishes, and roofing, users' perception was found to be neutral, indicating a lack of strong positive or negative sentiment towards these elements.

Table 4-10 expectation and perception of participants about housing utility service quality

Sn	Facilities	ES	PS	Gap score
	Housing utility			
1.	Performance of drinking Water	4.19	3.95	-0.24
2.	Performance of Electricity	4.37	1.27	-3.1
3.	Provision of Electrical appliance	4.24	3.95	-0.26
4.	Provision of Sanitary appliance and non-drinking water(flush for toilet, at sink)	4.22	1.95	-2.27

The above table 4-10 shows perception-minus-expectation scores of users regarding various service attributes related to housing utility within the hospital facility management (FM) services. The evaluation of the gap scores revealed that users hold certain expectations for these services, but their actual perception of them is notably low. Specifically, users expressed high expectations for the performance of electricity, as well as the provision of sanitary appliances and non-drinking water (flush for toilet or sink). However, they reported significant dissatisfaction with the actual delivery of these services, indicating a substantial gap between their expectations and the perceived performance. On the other hand, users expressed satisfaction with the remaining services related to housing utility.

Table 4-11 expectation and perception of participants about recreational service quality

Sn	Facilities	ES	PS	Gap score
	Recreational			
1.	Parks and garden	4.48	4.48	0.00
2.	Cafeteria	4.43	4.27	-0.17
3.	Common room or waiting area	4.23	1.83	-2.40

On table, 4-11 Users' perception-minus-expectation scores for each service attribute on recreational service quality were analyzed. The evaluation of gap score presented shows that users have expectations for hospital FM services and their perception is high except for common room or waiting area. Regarding, common room or waiting area they have high expectation but

they are very dissatisfied. They are satisfied with other services like recreation, which is, garden the result shows 0.00 which means there is no difference between their expectation and perception.

Table 4-12 expectation and perception of participants about waste management service quality

Sn	Facilities	ES	PS	Gap score
	Waste management			
1.	Waste disposal	4.54	4.37	-0.17
2.	Sewage disposal	4.37	2.27	-2.1
3.	Performance of pest control in hospital	4.46	4.17	-0.29
4.	Cleanliness of overall environment(including bathrooms)	4.37	2.27	-2.1

The perception-minus-expectation scores of users regarding service attributes in waste management service quality were analyzed as presented in Table 4-12. The evaluation of these scores revealed that users expressed dissatisfaction with sewage disposal and the cleanliness of the overall environment, including bathrooms, within this service. However, their perception indicated satisfaction with the performance of pest control.

Table 4-13 expectation and perception of participants on security and emergency service

Sn	Facilities	ES	PS	Gap score
	Security and emergency services			
1.	Fire safety	4.42	4.20	-0.22
2.	Adequacy of security prevalent in hospital	4.40	4.35	-0.05
3.	Street light	4.30	4.24	-0.06

Users' perception-minus-expectation scores for each service attribute were analyzed, as seen in the table above. The evaluation of gap score is also presented, it shows that users generally have high expectations for hospital FM services and their perception is also high in security and emergency services

4.6 The gaps between international FM standard and Addis Ababa facility management practice

To address research question number three, which focuses on identifying gaps in building facility management practices, a comprehensive assessment was conducted in selected public hospitals. This assessment involved reviewing international practices as well. The findings of this assessment are presented in Table 4-10, highlighting the observed gaps in the studied hospitals across various aspects of facility management.

Table 4-14 gap between international and local facility management

S.no	List of criteria that are used to compare local and international facility management practice	Addis Ababa public hospitals FM												International hospital FM standard
		Aman	Paulos	Peter	Black.	Police	Armed	Zewed	Gandi	Alert	Menel	Yekati	Rasde	
1.	Facility management department													✓
2.	Strategic planning for facility management													✓
3.	Building condition survey											✓		✓
4.	Building maintenance	✓			✓					✓		✓		✓
5.	Technology and data base availability													✓
6.	Integrated sustainability energy management initiative													✓
7.	Present specific leading body to support facility management	✓												✓
8.	Availability of planning and scheduling team for facility maintenance									✓				✓
9.	Documentation of facility history									✓				✓
10.	Training for building maintenance staffs (short courses, conferences, magazines)													✓

The international facility management (IFMS) is globally recognized facility management guidelines and best practice for managing facilities in contrast to local facility management practices in public hospital leads to range of negative outcomes.

The gaps observed in the studied hospitals are categorized based on the structure of the facility department, building condition survey, building maintenance type, availability of a senior planning and scheduling team for building maintenance, presence of a specific leading body or separate unit to support facility management, availability of an archiving team to provide necessary documentation, documentation of facility history, and training for building maintenance staffs. Additionally, the assessment encompassed evaluating the overall facility scopes. The presented gaps shed light on deficiencies and areas for improvement in building facility management practices within the selected public hospitals. In the context of all the hospitals assessed, it was found that only Amanuel Hospital conducted a building condition survey. This survey helped identify the current state of the hospital's facilities. Meanwhile, Alert Hospital was found to have a specific leading body that supports facility management. This body plays a crucial role in providing guidance and support for effective facility management practices in the hospital.

Additionally, Alert Hospital was found to have a documentation system in place to maintain a history of facility-related information. This documentation helps in tracking maintenance activities, repairs, and improvements carried out in the hospital. Moreover, Alert Hospital has a planning and scheduling team dedicated to facility maintenance. This team ensures that maintenance activities are planned, scheduled, and executed in a systematic manner.

4.6.1 Maintenance type in selected Hospitals

Maintenance management stated that most common maintenance type are preventive maintenance corrective maintenance, immediate maintenance and routine maintenance. Respondents answer shows that all maintenance type are used in the hospitals but majority of the hospitals use corrective and immediate maintenance management practice.

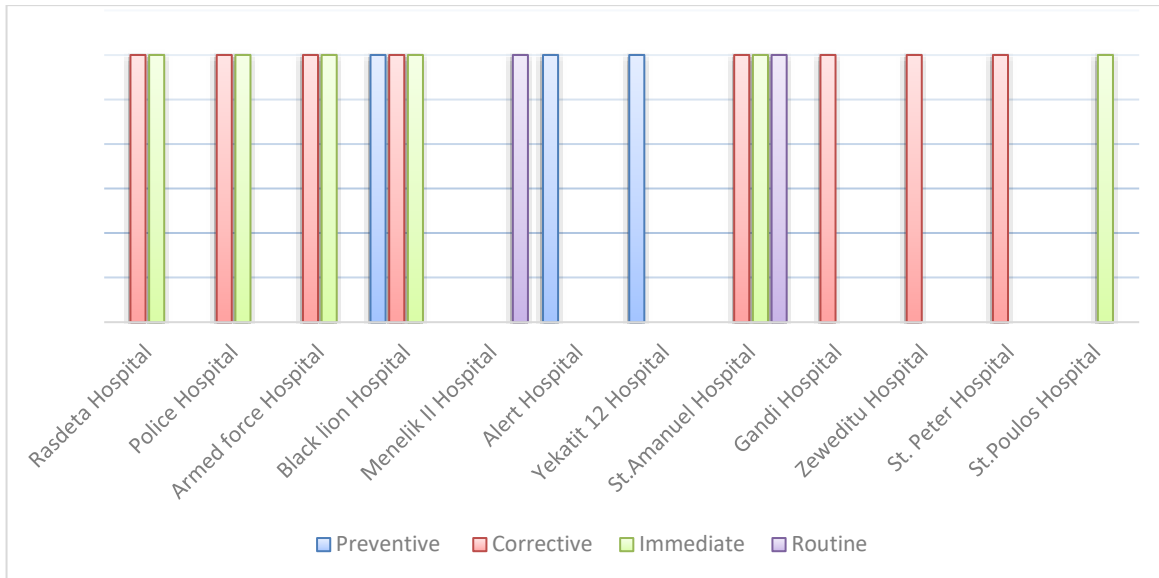


Figure 4-6 building maintenance type

The interview results with the heads of maintenance department's indicated that all hospitals under study have implemented the immediate maintenance, besides the corrective maintenance. Figure 4-6 illustrates that there is routine and preventive maintenance only in three hospitals; Alert hospital, St. Amanuel hospital and Black lion hospital.

4.6.2 Data base used for facility management practice

Even though there are different, Data base documentation of drawings used for building facility management purpose, like computerized maintenance management system, building maintenance control system and CAD none of the hospital use these systems.

4.6.3 Facility management department

Administrative staff explained that there is no structural unit of facility management in the hospital but maintenance department is responsible for building facility and the hospitals admin leads the unit.

4.7 Conceptual framework for improving public hospitals facility management practice

The development of a conceptual framework begins with a deductive assumption that a problem exists, and the application of processes, procedures, functional approaches, models, and other tools are used to solve the problem (Zackoff, Real et al. 2019). A conceptual framework is constructed based on the research objective by using relationships between the particular factors in the research (Regoniel 2015). As per (Liyanage & Egbu, , 2004) development of conceptual framework standard involves four main step. These are

1. Step 1 identify the central focus of the framework
2. Step 2 identify key issue related to subject matter
3. Step 3 developing main areas of framework using key area identified
4. Step 3 development of framework

In developing conceptual framework for improving the poor facility, management following these steps are important. This framework address various aspects, including infrastructure maintenance, equipment management, waste disposal, energy efficiency, infection control, and patient safety. It should incorporate best practices, industry standards, and local regulations. Collaboration between facility management experts, architects, engineers, healthcare professionals, and policymakers is essential in designing and implementing. Establish a system for regular evaluation and monitoring of facility management practices in public hospitals. This can include periodic assessments of infrastructure conditions, service quality audits, user satisfaction surveys, and performance indicators to track progress. By monitoring key metrics, hospital administrators can identify areas that require further improvement and take timely corrective actions. The purpose of this conceptual framework is to provide a clear and professional roadmap for improving the facility management practices in public hospitals in Addis Ababa. The framework aims to address the identified gaps between local and international facility management practices and improve the condition of facilities, service quality, and user satisfaction. The key areas that require improvement include light level, daylight, sound level, privacy, air and surface contamination, humidity, ventilation, lifts, ramps, sanitary appliances, and sanitation of the environment.

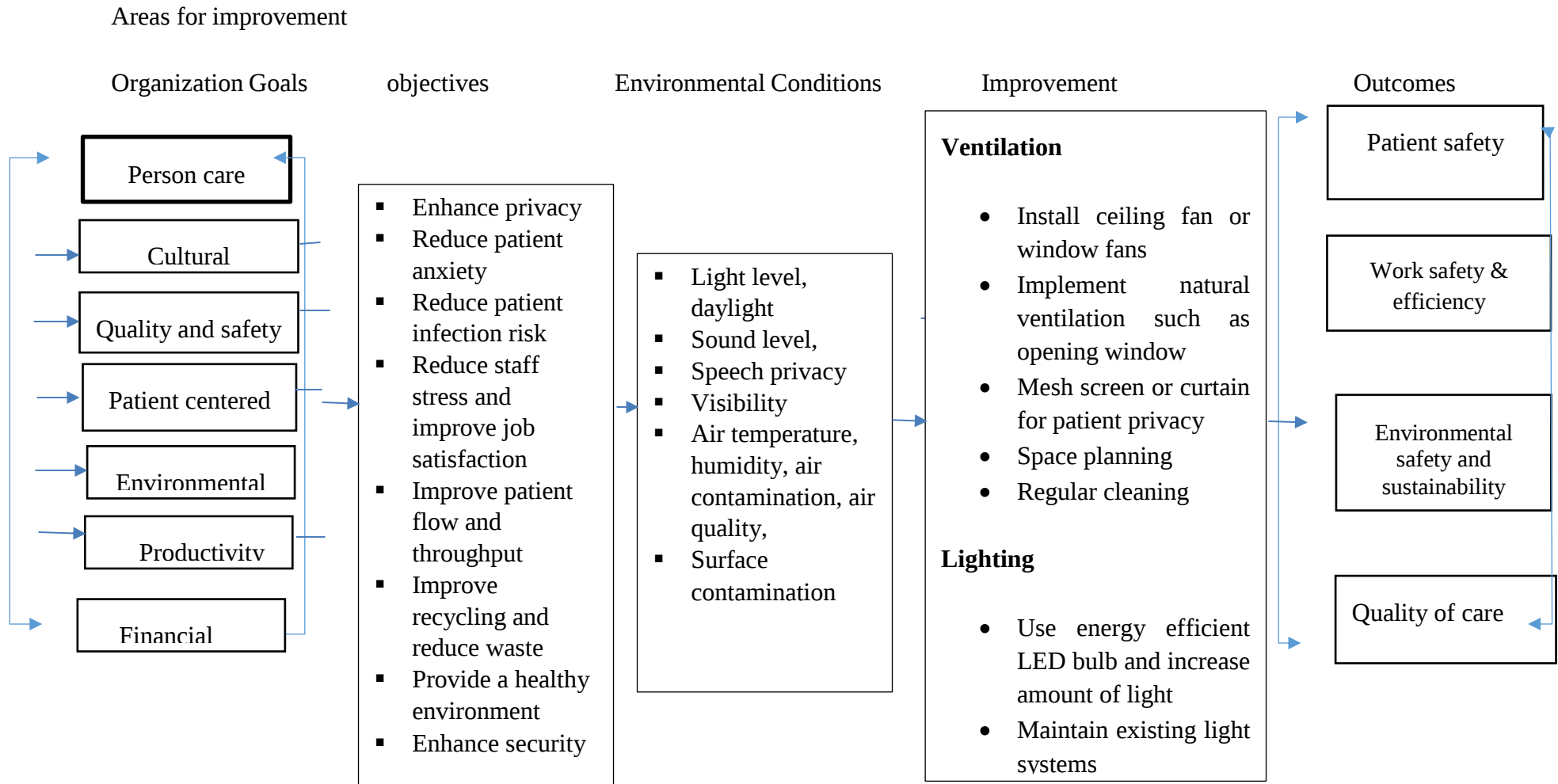


Figure 4-7 areas of improvement

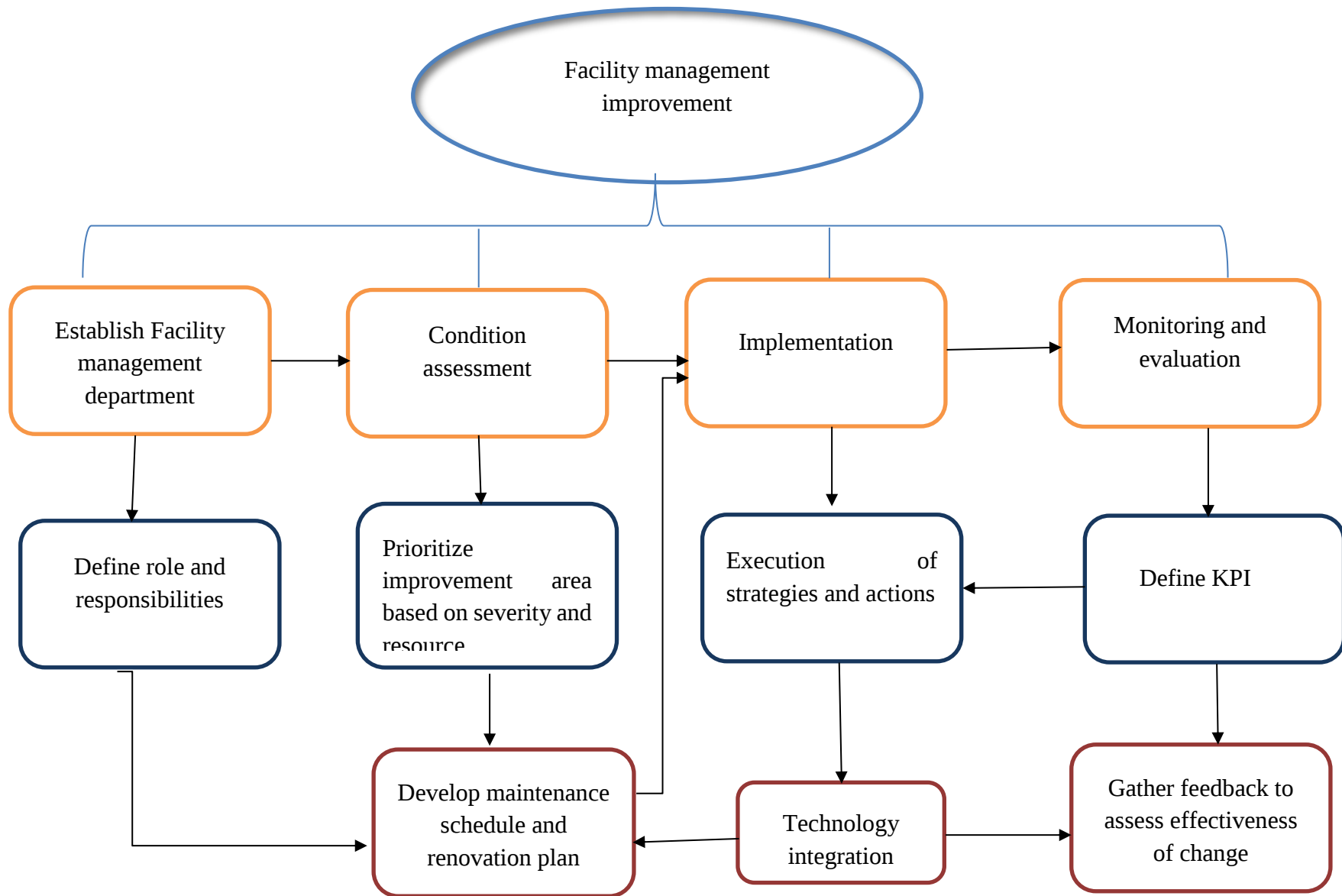


Figure 4-8 Facility management improvement proce

4.8 Framework Justification

The above improvement of facility management practice framework was developed followed by research analysis and direction setting, in which data is collected and analyzed to ascertain what is known of the research subject, picking up perspectives and analyzing facts, and searching for lessons learned and best practice that we can adopt from other countries. The purpose of the framework is to identify ways in which to overcome poor condition of facilities, user's dissatisfaction on the service, also to ensure a safe and comfortable environment for patients, staff, and visitors in Addis Ababa public hospitals.

4.8.1 Key Components of the Conceptual Framework

Facility Management Department: Establish a dedicated facility management department within the public hospital, comprising qualified professionals responsible for managing and maintaining the facilities. Define the roles, responsibilities, and reporting structure of the facility management department. Provide the necessary resources, including personnel, budget, and technology, to support effective facility management.

Facility Assessment and Planning: A comprehensive assessment is the initial step in improving facility management. It involves conducting a thorough evaluation of the current state of facility management practices, infrastructure, systems, and processes. Conduct a comprehensive assessment of the condition of facilities, including lighting, sound levels, privacy, air and surface contamination, humidity, ventilation, lifts, ramps, sanitary appliances, and sanitation of the environment. Develop a prioritized plan for addressing the identified deficiencies, considering the urgency, impact on patient care, and available resources. Implement a regular facility assessment schedule to monitor and maintain the condition of facilities over time.

Technology Integration: Adopt modern technology solutions to enhance facility management practices. Implement a computerized maintenance management system (CMMS) to track maintenance schedules, work orders, and asset management. Utilize sensor technology to monitor environmental factors such as light levels, sound levels, air quality, and humidity. Explore the use of smart building systems to optimize energy consumption and improve facility operations.

Training and Capacity Building: Provide training programs for facility management staff to enhance their knowledge and skills in modern facility management practices. Collaborate with international experts, organizations, or institutions to facilitate knowledge exchange and capacity building. Establish partnerships with local universities or training centers to develop specialized facility management programs.

Documentation and Knowledge Management: Develop a centralized facility documentation system to record and track maintenance activities, repairs, and improvements. Regularly update the facility documentation history to ensure accurate and up-to-date information is available for reference. Establish knowledge sharing platforms or databases to promote the exchange of best practices and lessons learned in facility management.

Implementation Plan: Create a detailed implementation plan that includes specific actions, timelines, responsible parties, and resource requirements. Prioritize the improvement areas based on their impact on patient care and available resources. Develop a budget for implementing the improvement initiatives and seek funding from relevant government agencies, donors, or international organizations. Communicate the plan to all stakeholders, including hospital management, staff, and users, to ensure their support and involvement.

Decision Making and Planning: Decision making and planning are ongoing processes throughout the improvement initiative. This component involves making informed decisions based on the findings of the comprehensive assessment and aligning them with the organization's goals and objectives. It includes identifying priorities, setting targets, determining resource requirements, and developing strategies to address identified issues. Decision making and planning ensure that actions are well thought out, achievable, and aligned with the desired outcomes.

Monitoring and Evaluation: Establish a monitoring and evaluation framework to assess the progress and effectiveness of the improvement initiatives. Define key performance indicators (KPIs) related to facility condition, service quality, and user satisfaction. Conduct regular assessments and surveys to gather feedback from users and stakeholders. Use the collected data to identify areas for further improvement and make informed decisions.

4.9 Frame work validation

Table 4-15conceptual framework validation

S.no	Question	Strongly dis agree	Dis agree	Neutral	Agree	Strongly Agree
1.	The key elements and stages of the framework are appropriate enough to obtain improve facility management practices in Addis Ababa public hospital				6	4
2.	The framework covers all the steps needed to achieve improvement			1	5	4
3.	This framework is relevant to improve facility management in hospital context			1	3	6
4.	The framework is logical and well organized			1	5	4
5.	The framework is clear and easy to understand			1	4	5
6.	Description of the framework and its layout is comprehensive			1	5	4
7.	The framework is a workable/practicable.		1	1	5	3

Based on Table 4-7 the responses were certain, with six respondents agreeing and four strongly agreeing that the framework is appropriate to improve facility management practice of public hospital

To evaluate the framework, which covers all the steps needed to improve facility management practices, five respondents agree and four respondents strongly agree that the framework considered all issues and solutions to obtain public hospitals in Addis Ababa city; while one respondent says he is neutral for the framework was appropriate. To justify the framework relevant to improve hospital facility management practice in context to Addis Ababa, six respondents strongly agree and three respondents say agree for the relevance of this proposed framework. Similar to the previous question, the respondents were asked to assess the level of logicity of the developed framework. Table 4-7, shows that four participants responded to indicate that they found the framework to be logical strongly agree, while five respondents agreed that the framework is logical. In addition, one respondent responded to neutral agreement.

Responding to the question is the framework clear and easy to understand, most participants were of the opinion that the framework is clear and very easy to understand. On the other hand, one respondent has disagreed and one was neutral. Agreed and strongly agreed respondents considered the framework to be clearly designed by defining the target and how this target can be reached

In addition, participants were asked their opinion about the description and layout of the framework. Table (4-7) demonstrates that five of the respondents ' given responses agree and four of strongly agreed by considered that the framework is comprehensive; while one respondent believed that the response for this framework evaluation may not comprehensive enough.

Additionally, framework evaluation the participants were asked to now the level of the workability and practicability of the framework. Table (4-7) shows that five of the participants agreed and three respondents strongly agreed that the framework is workable, while one respondent was neutral and one disagrees about the practicability of the framework.

As table 4-7 indicated, the overall agreement level of experts on the proposed checklist was almost more than 25% of experts were scored Agree & Strongly agree for the questions raised to validate the checklist.

CHAPTER FIVE

5 CONCLUSION AND RECOMMENDATION

5.1 Conclusion

- In conclusion, this study aimed to assess the facility management practices in order to improve public hospital buildings. The first objective of assessing the condition of facilities revealed that the facilities in public hospitals are in a poor state. At present level of performance facilities present in public hospitals, it is clear that almost half percentage of the facilities are not being managed by professionals, hence this study is able to identify various facilities provided as well as their condition. This finding highlights the urgent need for attention and investment in improving the physical infrastructure of these hospitals to ensure the provision of adequate healthcare services.
- The second objective aimed to measure the service quality from the users' perspective, it also analysis users perception and expectation based on functionality of facilities. Moreover, the results indicated that users are not satisfied with the facilities provided in public hospitals. This dissatisfaction can have a significant impact on the overall patient experience and may hinder the effectiveness of healthcare delivery.
- The third objective of comparing local and international results exposed a significant gap between the two. The local public hospitals were found to be lacking in various aspects compared to international standards. This gap underlines the importance of benchmarking against global best practices and adopting effective strategies to bridge the difference.
- Lastly, the fourth objective focused on developing a conceptual framework to improve public hospital facilities. The framework address the identified issues, take into account the users' perceptions, and incorporate international standards to ensure sustainable and efficient facility management practices. Implementing this framework will require collaboration between relevant stakeholders, including hospital administrators, policymakers, architects, engineers, and facility management professional

In summary, this study highlights the urgent need for improvements in public hospital facilities. The poor condition of the facilities and the dissatisfaction expressed by users necessitates immediate action. By developing and implementing a comprehensive conceptual framework, public hospitals can enhance their facility management practices, bridge the gap with international standards, and ultimately provide better healthcare services to the public.

5.2 Recommendation

Based on the findings of this study on the assessment of facility management practices to improve public hospital buildings, the following recommendations are proposed:

- Given the poor condition of the facilities identified in this study, immediate attention and investment are required to improve the physical infrastructure of public hospital buildings. This includes addressing issues such as outdated equipment, inadequate maintenance, and structural deficiencies. Adequate funding should be allocated to ensure timely renovations, repairs, and upgrades to create a safe and conducive environment for patients and healthcare providers.
- Since users expressed dissatisfaction with the facilities provided in public hospitals, it is crucial to focus on enhancing service quality. This can be achieved by incorporating user feedback mechanisms, such as surveys and suggestion boxes, to gather insights into their needs and expectations. Hospital administrators should analyze this feedback and take appropriate actions to address the identified concerns, ensuring that patients receive quality care and have a positive experience during their hospital stay.
- To bridge the gap between local and international practice, it is recommended to benchmark against international standards and best practices in hospital facility management. To effectively overcome these challenges and gaps, proper data management approaches and tools should be implemented also adopting and implementing proven strategies; local public hospitals can raise their standards and align with global benchmarks.
- To guide and streamline the improvement process, a conceptual framework should be adopted specifically for public hospital facilities. Training and capacity building programs should be organized for hospital staff involved in facility management. These programs should focus on equipping them with the necessary knowledge and skills in

areas such as maintenance, equipment handling, energy conservation, and infection control. Continuous professional development should be encouraged to keep up with emerging trends and advancements in facility management.

By implementing these recommendations, public hospitals can significantly improve their facility management practices, enhance service quality, and provide better healthcare services to the public. These improvements will contribute to a safer, more comfortable, and efficient healthcare environment for patients, while also positively influencing the overall effectiveness and reputation of public hospitals.

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APPENDICES

Appendix A- Questionnaire for hospital staff

Questionnaire

Dear Sir/Madam,

Re: Questionnaire for MSc thesis on Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa.

My name is Zebiba Kedir; I am a student at Adama science and technology university School of Graduate Studies/SGS/ Department of construction engineering and management. I am currently working on research entitled “**Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa**” I believe your experience and educational background will greatly contribute to the success of my research. So it is with great respect that I ask you for a little of your time to fill this questionnaire. The questionnaire is prepared to gather information from selected public hospital buildings. The outcome of the research will serve as partial fulfillment of MSC in construction engineering and management. The purpose of the research is to prepare a conceptual framework to improve current facility management practice of public hospitals. The questionnaire categorized into three major parts. Part I solicited general information about the respondents. Part II contains questions about the availability of the facility and their conditions. Your response is highly valuable and contributory to the outcome of the research. All of your responses to any of the question kept strictly confidential and used for this academic research only. No report of the study will ever expose your identity. You kindly requested to answer & fill the questionnaire accurately & with truthfully.

Thank You! Best Regards

Zebiba Kedir, Postgraduate student, construction engineering and management

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Addis Ababa, Ethiopia

Introduction

Greetings dear participant I would like to, kindly ask you to fill out this questionnaire. This questionnaire is categorized into three major parts. Part I solicited general information about the respondents. Part II availability of facilities and their condition.

Part 1: General Information of the Selected Hospitals Buildings

1. Hospital Name: _____
2. Hospital location: _____
3. Respondents position

Administrative

☐

Medical staff

☐

Maintenance staff/

☐

Facility manager

☐

4. Year of experience:

1 – 5 years ☐ 6-10years ☐ 11-15 years ☐

Section II. Below are list of facilities in hospital buildings. Please choose your practice for each specific list by ticking on the appropriate cell.

Note: - Availability (A-Available, NA– Not Available) Condition (VG-Very Good, G-Good, F-Fair, N-Neutral, BD- Bad, VB- Very Bad)

Identifying the availability of facilities and their condition in Addis Ababa public hospital

Sn	Facilities	Availability		Condition				
		A	NA	VG	G	N	BD	VB
1	Building structure							
	Structural components (beams, columns, upper floor slabs and stairs)							
	Walls (external and internal walls)							
	Finishes (wall finishes, floor finishes and ceilings)							
	Windows and doors (internal and external)							
	Elevators							
	lighting system in ward							
	ventilation system in ward							
	Fittings and furniture							
	Drinking Water							
	Electricity							
	Electrical appliance							
	Sanitary appliance							
2	Recreational							
	Parks and garden							
	Sport center,							
	Staff club							
	Common room							
4	Security and emergency services							
	Fire safety systems (alarms fire extinguisher and etc.							
	Guard							
	Street light							

APPENDICES

Appendix B- Questionnaire for all

Dear Sir/Madam,

Re: Questionnaire for MSc thesis on Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa.

My name is Zebiba Kedir; I am a student at Adama science and technology university School of Graduate Studies/SGS/ Department of construction engineering and management. I am currently working on research entitled “**Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa**” I believe your experience and educational background will greatly contribute to the success of my research. So it is with great respect that I ask you for a little of your time to fill this questionnaire. The questionnaire is prepared to gather information from selected public hospital buildings. The outcome of the research will serve as partial fulfillment of MSC in construction engineering and management. The purpose of the research is to prepare a conceptual framework to improve current facility management practice of public hospitals. The questionnaire categorized into three major parts. Part I solicited general information about the respondents. Part II contains questions about the availability of the facility and their conditions. Your response is highly valuable and contributory to the outcome of the research. All of your responses to any of the question kept strictly confidential and used for this academic research only. No report of the study will ever expose your identity. You kindly requested to answer & fill the questionnaire accurately & with truthfully.

Thank You! Best Regards

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Addis Ababa, Ethiopia

Introduction

Greetings dear participant I would like to, kindly ask you to fill out this questionnaire. This questionnaire is categorized into three major parts. Part I solicited general information about the respondents. Part II availability of facilities and their condition.

Part 1: General Information of the Selected Hospitals Buildings

1. Hospital Name: _____
2. Hospital location: _____
3. Respondents position

Administrative

☐

Medical staff

☐

Maintenance staff/

☐

Facility manager

☐

4. Year of experience:

1 – 5 years ☐ 6-10years ☐ 11-15 years ☐

Section II. Below are list of facilities in hospital buildings. Please choose your practice for each specific list by ticking on the appropriate cell.

Note: Condition (VG-Very Good, G-Good, F-Fair, N-Neutral, BD- Bad, VB- Very Bad)

Identifying the availability of facilities and their condition in Addis Ababa public hospital

Sn	Facilities	Condition				
		VG	G	N	BD	VB
1	Building structure					
	Structural components (beams, columns, upper floor slabs and stairs)					
	Walls (external and internal walls)					
	Finishes (wall finishes, floor finishes and ceilings)					
	Windows and doors (internal and external)					
	Elevators					
	lighting system in ward					
	ventilation system in ward					
	Fittings and furniture					
	Drinking Water					
	Electricity					
	Electrical appliance					
	Sanitary appliance					
2	Recreational (Parks and garden, Sport center, Staff club and Common room					
4	Security and emergency services					
	Fire safety systems (alarms fire extinguisher and etc.					
	Guard					
	Street light					
5	Health services (Medical equipment, Pharmacy, Laboratory Ambulance services)					

APPENDICES

Appendix C- Questionnaire for All

Dear Sir/Madam,

Re: Questionnaire for MSc thesis on Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa

My name is Zebiba Kedir; I am a student at Adama science and technology university School of Graduate Studies/SGS/ Department of construction engineering and management. I am currently working on research entitled “**Assessment of facility management practice for improvement of public hospital buildings in Addis Ababa**” with a focus on the eleven public hospitals. Therefore, be very appreciative if you participated in the research study by responding to the attached questionnaire. The questionnaire has been designed in such a way that you can make suggestions as part of your invaluable contributions to this work. The information provided is for study purposes only and will be treated with stringent confidentiality.

Part 1: General Information of the Selected Hospitals Buildings

1. Hospital Name: _____
2. His/her stayed in hospital _____
3. In general, describe the situation of the building
Bad ☐
Good ☐
Very Bad ☐

Section II How satisfied are you with the functionality of the available facilities in the hospital

VS=Very Satisfied S=Satisfied U=UN decided DS=Dissatisfied VD=Very Dissatisfied

Sn	Facilities	Satisfaction level									
		Perception					Expectation				
1	Building structure	VS	S	N	D	VD	Should be VS	Should be S	Should be N	Should be D	Should be V
	Structural components (beams, columns, upper floor slabs and stairs)										
	Walls (external and internal walls)										
	Finishes (wall finishes, floor finishes and ceilings)										
	Windows and doors (internal and external)										
	Condition of elevators										
	Performance of lighting system in ward										
	Performance of ventilation system in ward										
	Provision of patient privacy										
	Fittings and furniture										
	Roofing										
2	Housing										
	Performance of drinking Water										
	Performance of Electricity										
	Provision of Electrical appliance										
	Provision of Sanitary appliance and non-drinking water(flush for toilet, at sink)										
3	Recreational										
	Parks and garden										
	Sport center										
	Cafeteria										
	Common room or waiting area										
4	Waste management										
	Refuse disposal(										

	Sewage disposal										
	Performance of pest control in hospital										
	Cleanliness of overall environment(including bathrooms)										
5	Security and emergency services										
	Fire safety										
	Adequacy of security prevalent in hospital										
	Street light										

Appendix D- Interview Questions

Interview questions

1. Is there maintenance unit in facility management department?
2. Are well-trained staffs available for maintenance unit?
3. What type of building maintenance is practiced in your hospital?
4. Does your hospital use databases for facility management purpose?
5. Does the maintenance/estate department undertake regular inspection of the building?
6. How long does it takes maintenance requests to be responded?
7. Is there documentation of facilities in your hospital?
8. If your answer for question is yes.
 - I. What documents are available in your hospital?
9. Is there organized space inventory system that includes detail records of all hospital buildings and properties?

Appendix –E checklist for identification of gap between international practice and Addis Ababa public hospitals FM

S.no	List of criteria that are used to compare local and international facility management practice	Addis Ababa public hospitals FM												International hospital FM standard
		Aman	Paulos	Peter	Black.	Police	Armed	Zewed	Gandi	Alert	Menel	Yekati	Rasde	
1.	Facility management department													
2.	Strategic planning for facility management													
3.	Building condition survey													
4.	Building maintenance type													
5.	Technology and data base availability													
6.	Integrated sustainability energy management initiative													
7.	Present specific leading body to support facility management													
8.	Availability of planning and scheduling team for facility maintenance													
9.	Documentation of facility history													
10.	Training for building maintenance staffs (short courses, conferences, magazines)													

Appendix F- Checklist for conceptual framework validation

Dear Sir/Madam,

My name is Zebiba Kedir; I am a student at Adama science and technology university School of Graduate Studies/SGS/ Department of construction engineering and management. I am currently working on research entitled “assessment of facility management practice for improvement of public hospital buildings in Addis Ababa city” I believe your experience and educational background will greatly contribute to the success of my research. So it is with great respect that I ask you for a little of your time. The outcome of the research will serve as partial fulfillment of MSC in construction engineering and management. Your response is highly valuable and contributory to the outcome of the research. Which is a conceptual framework that helps to improve facility management practice based on their project condition. I kindly request your point of view and opinion on the ease of use, clarity, practicality, relevance and effectiveness of the conceptual framework.

Zebiba Kedir, Postgraduate student, construction engineering and management

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Addis Ababa, Ethiopia

S.no	Question	Strongly dis agree	Dis agree	Neutral	Agree	Strongly Agree
1.	The key elements and stages of the framework are appropriate enough to obtain improve facility management practices in Addis Ababa public hospital					
2.	The framework covers all the steps needed to achieve improvement					
3.	This framework is relevant to improve facility management in hospital context					
4.	The framework is logical and well organized					
5.	The framework is clear and easy to understand					
6.	Description of the framework and its layout is comprehensive					
7.	The framework is a workable/practicable.					