

Assessing Of Pharmaceutical Store Management Conditions: The Case of Saint Paul's Hospital Millenium Medical College's, Addis Ababa, Ethiopia

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Abstract

Purpose- The purpose of this study was to assess of pharmaceutical store management conditions in Saint Paul's hospital millennium medical college.

Methods- the study adopts a descriptive cross-sectional quantitative study. Data was collected using questionnaires and observational check list, entered and analyzed using SPSS version 26 and the results are reported using descriptive statistics such as frequency, percentage, mean, and standard deviation.

*Findings-*The major findings of the study was physical conditions are not fully satisfactory, especially the condition of the roof, ceiling, floor, and walls. And also Environmental protection needs improvements, especially protection from direct sunlight and stronger control of temperature and humidity. The staffs did not take training on store management.

Conclusion and recommendation- The major conclusion of the study, Saint Paul's has a workable storage system, yet several critical gaps still put medicine quality and storage reliability at risk and pharmaceutical store is not aligned with the standard set by USAID/DELIVER guideline. The study recommends that the hospital should provide regular trainings for store personnel pharmacists on storage standards and record keeping.

Keywords: *Pharmaceutical, Store management, Storage condition*

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I. INTRODUCTION

1.1. Background

Quality healthcare requires safe, effective pharmaceuticals, with proper storage essential for maintaining quality until it reaches to end-users. The expiration date set by manufacturers is crucial to preserve quality under ideal storage conditions. Failure to adhere to prescribed storage standards can shorten shelf-life and render products unusable before the labeled expiry date. Health facilities must have secure, well-constructed storage rooms for safekeeping of medicines and medical supplies(FDREMOH, 2019).

Storage ensures the pharmaceutical products safety and physical appearance and their package until pharmaceutical products dispensed to the clients through various storage places (USAID/DELIVER, 2011).

A health facilities supply system should make available the required pharmaceutical items in adequately to make the supply uninterrupted. The efficient and effective store Management System(MS) like store keeping availability of vital and essential drugs in the pharmacy store, a good plan on purchasing and distribution of drugs and prevention of theft will help for good performance of pharmacy store. Poor inventory management in health institutions, especially the public health facilities, results in wastage of financial resources, poor availability of some essential medicines, stock outs, and stock losses (MSH, 2012).

Standard pharmaceutical stores need to have adequate storage installation, efficient layout, good housekeeping, internal quality control, strong Stock Management System(SMS) and the store should be organized in to sections or zones in line with the intended function they will have types of pharmaceutical products they will hold(MSH, 2014).

Medical Store Management (MSM) should assist both the flow and reliability of supplies from the source to use as economically and reliable as possible, and without significant wastage, loss of quality, or theft. The primary purpose of a store is to receive, hold, and dispatch stock. This material management process implemented through inventory control and Warehouse Management System (WMS), which may be manual or computer based. The primary purpose of inventory control is to manage stock and ensure the smooth flow of goods by determining what, how much, and when to order stock, it provides essential information for procurement management. Ware house management comprises the physical movement stock into, through and

out of a medical store warehouse. The system should also be designed to provide information for performance monitoring(MSH, 2013).

1.2. Statement of the Problem

Proper pharmaceutical storage is essential to maintain medicine quality, prevent damage, and ensure safe and effective patient care. Drug management in hospitals includes the stages of planning, procurement, storage, distribution, and use which are interrelated with each other, so they must be well coordinated that each can function optimally (Setiawan, 2022).

Pharmaceutical warehouses are among the centers that play a critical role in the delivery of medicines from the producers to the consumers (Erdogan, 2022). Appropriate storage places for pharmaceuticals ensure the safety, effectiveness, and quality of drugs. Drugs need to be stored separately from non-pharmaceutical items to keep the drugs shelf life as expected and to prevent damage until it reaches to the consumers (Kokilam et al., 2015).

Proper environmental controls, including temperature, light, humidity, sanitation, ventilation, and segregation, are essential for storing drugs and supplies. Warehouses should have ample storage space, heavy-duty racking systems, pallets, hand-trolleys, and electric stackers to handle medicines efficiently. Storage areas must be secure and accessible only to authorized personnel. Safety considerations are crucial, especially for the storage of flammable items. Personnel responsible for handling drugs should be carefully selected and supervised (Iqbal, 2017).

Premise and other areas utilized for storage purposes should comply with the minimum standards. They must be located, designed suitable for operation and should be protected potentially harmful influences like undue variation of temperature and humidity, dust, odor and entry of animals, vermin and insects (EFMHACA, 2015).

The main challenges of medicines supply are poor information, communication and consumption data, inadequate storage facilities and poor pharmaceutical management, lack of guidelines for good storage procedures, inappropriate planning, monitoring and evaluation and inadequate budget allocation (Schöppler, 2013).

The poor performance of inventory management is caused by the type of professionals who works the task and job dissatisfaction of staff due to lack of different incentives, inadequate human resource in pharmaceutical store which leads to burden on the staffs not to record, update and control the store properly. The pharmaceuticals stock out is occurred due to receiving near expiry date drugs and budget constraints. In addition to this only few health facilities had fulfilled the standard storage conditions set by USAID DELIVER/LIAT tool (Ibrahim, 2017).

The study done in Uganda in 2007 in public health facilities revealed that the availability of essential drugs in the public sector was inconsistent and insufficient. In addition to that high stock out of drugs, most facilities did not meet the minimum requirement of storage of drugs, the quality of drugs were not guaranteed as they were expiring prematurely, inadequate record keeping and information system was seen. The poor drug management is attributed in adequate human resource to health. Lack of training and inadequate skill in drug management had negative impact on the shortage of drugs in health facilities(Nahamya, 2007).

Pharmaceuticals have a shelf life which is specified by the manufacturer. The pharmaceuticals which their shelf life comes to end will be expired not to be used for patients. Some pharmaceutical products have short shelf life that needs proper storage conditions and procedures(FDREPFSA, 2017).

Poor inventory management is explained by in accurate stock records, lack of systemic monitoring of the stock, unplanned quantification and ordering frequency of pharmaceuticals as a result of knowledge gap and lack of skill on inventory management due to inefficient and ineffective performance of store management(MSH, 2014).

Despite of the importance of proper pharmaceutical storage, many facilities continue to experience storage related challenges such as inadequate storage conditions, weak infrastructure, poor space utilization, and limited operational capacity can lead to loss, expire, contamination, and reduce availability of medicines. In contrary, there is limited facility level evidence describing the actual status of storage conditions, infrastructure, lay out, and operational capacity in the health facilities.

Therefore, the purpose of this study is assessing of pharmaceutical store management conditions at St. Paul Millennium Medical College's Hospital for providing valuable information related to pharmaceutical store management performance.

1.3. Research questions

1. What are the **storage conditions** in the pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025?

2. What is status of the store infrastructure pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025?
3. How **space utilized** and arranged is in the pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025?
4. What is the **operational capacity** of the pharmaceutical store at St. Paul's Hospital Millennium Medical College's?

1.4 Objective of the Study

1.4.1. General Objective

The general objective of this study is to assess pharmaceutical store management conditions in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025.

1.4.2. Specific Objectives

1. To assess the **store storage conditions** of the pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025.
2. To evaluate the **infrastructure** of pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025.
3. To evaluate the **space utilization and layout** of pharmaceutical store management in St. Paul's Hospital Millennium Medical College's, Addis Ababa, Ethiopia in 2025.
4. To assess the **operational capacity** of the pharmaceutical store at St. Paul's Hospital Millennium Medical College's Addis Ababa, Ethiopia in 2025.

II. Literature Review

2.1. Theoretical Literature

2.1.1 Pharmaceutical Store Management

Firms in the storage and distribution of medical items should have a premise that suitable located designed, constructed and maintained to ensure appropriate operation such as receiving, storage, picking, packing and dispatch. Storage areas should have adequate space, lighting, and ventilation to ensure required segregation, appropriate storage conditions and cleanliness, enough security should be provided to control products, requires special handling or storage conditions suitable temperature and relative humidity conditions for products. In addition to that a rodent and pest control program should be applied to protect products from damage, a separate space for handling damaged or expired products, a fire control system need to be maintained(EFDA, 2021).

Highly toxic and radioactive materials, narcotics and other hazardous, sensitive and/or dangerous materials and pharmaceutical products, as well as substances presenting special risks of abuse, fire or explosion (e.g., combustible liquids and solids and pressurized gases) should be stored in a dedicated area that is subject to appropriate additional safety and security measures Materials and pharmaceutical products should be handled and stored in such a manner as to prevent contamination, mix-ups and cross-contamination. Materials and pharmaceutical products should be stored in conditions which assure that their quality is maintained, and stock should be appropriately rotated. The "first expired/first out" (FEFO) principle should be followed. Rejected materials and pharmaceutical products should be identified and controlled under a quarantine system designed to prevent their use until a final decision is made on their fate. Narcotic drugs and other controlled materials and pharmaceutical products should be stored in compliance with international conventions, and national laws and regulations on narcotics(EFMHACA, 2015).

A warehouse is a structure used to store commodities. Manufacturers, importers, exporters, wholesalers, transportation companies, customs, and others use warehouses(Jokiniemi, 2008).

A warehouse management application's desired features and functionality to improve the efficiency and effectiveness of warehouse operations. The real-time inventory tracking feature enables livestock monitoring, minimizes the risk of stock shortages, and improves customer satisfaction through better responsiveness(Sihombing, 2024).

Pharmaceutical management is a highly technical and professional work that should be done by well trained, highly qualified and skilled person in managerial and ground level. Appropriate care and measures should be done at the selection, quantification, procurement, storage, distribution, and use of medicines to make the supply chain effective and efficient. Health facilities should have specific policies and procedures with SOPs that are suitable with the standards. This would help the hospitals to assess their practice and help them to use their resources efficiently(Iqbal, 2017).

An inventory control system is the general duty of the store man about when to order and receive and issues how much to order, receive and issue and how to maintain the required stock levels to avoid overstocks and stock outs of pharmaceuticals(USAID/DELIVER, 2011).

2.1.1 Storage Management

Warehouses, clinics, and any facility that stores pharmaceutical products need to have an inventory management system to determine when to order products, how much to order, and how to maintain an appropriate stock level for all products to avoid shortages and over supply. In general, there are two ways to manage inventory in a warehouse: manually or an automated system(USAID/DELIVER, 2014)

2.1.2 Storage conditions, infrastructure, equipment, space utilization, allocation, layout, and operational capacity

Storage space utilization measures the percentage of total storage space being used. This indicator allows managers to monitor and assess storage capacity. By evaluating utilization, they can identify opportunities for improvement, such as removing expired products, reorganizing, or re-evaluating the layout and material flow to maximize storage efficiency.

Ensure door dimensions are wide enough for easy movement of products and equipment, matching the overall building size to the needs of warehouse operations. For large facilities using forklifts, doors should be strong, reinforced, and secured with two locks and metal grills. Limit key access to a few individuals. If electricity supply is unreliable, consider installing a solar panel generator for cold rooms and refrigerators.

To minimize air-conditioning needs, install high and wide windows for proper ventilation, ensuring shelves don't obstruct them. Use wire mesh to keep out insects and deter burglars. Maximize natural light in the storeroom to reduce reliance on fluorescent and incandescent bulbs, as fluorescent lights emit harmful UV rays and incandescent bulbs generate heat. Ensure products are not exposed to direct sunlight. If the main electricity source is unreliable, consider installing a solar panel generator or an alternative power supply for cold rooms and refrigerators. If using a non-solar generator, keep a fuel stock for several days. Regularly run the generator at least once a month to ensure it functions properly. Warehouse managers oversee all aspects of materials management, focusing on planning, acquiring, storing, moving, and controlling inventory. Effective warehouse operations require well-organized materials and appropriate equipment, such as racking systems and material handling tools. The size of the cold store facilities should be adequate for the inventory and the equipment should have maintenance schedule. The layout should incorporate a plan for managing unusable commodities by separating them from usable stock and designating a specific area for their storage until they can be evaluated and disposed of properly. Unusable stock includes expired or damaged items, rejected goods, and anything that cannot be reused, such as equipment, pallets, and packing materials(USAID/DELIVER, 2014).

2.2. Empirical Review

A study done in South Sudan that drug products were protected from direct Sun light, drug products were stored in a systematic way (alphabetic order), windows had curtain and secured with grills, store ceiling was in good condition without any dampness, the proper fire prevention and extinguishing equipment were present, store was kept locked at all times when not in use, there were doors with adequate locks and keys, there was proper lighting in the store room for the medicines all the time, store room for medicines was well ventilated, dispensing was not done from the main warehouse, store was free of pests (i.e. cockroaches, rats, mice) with no sign of infestations, and store was tidy, shelves were not dusted, floor was swept and walls were clean. Expired medicines management was found to be good. Expired drugs in the health stored separately from the unexpired drugs set procedure for disposal of expired drugs available Bold expiry labels on all the drugs the health facility dispatch stock based on the following: First in First out (FIFO) and Last in Last out (LIFO), physical count is made at regular time. Findings showed that most of the PHCUs had poor storeroom conditions as compared to the hospitals and Medical stores assessed. For instance, the storage equipment was not adequate, and narcotic and psychotropic substances were not stocked in separate double locked storage space as per the ABCS of medical storage. However, the inventory and storeroom management practices were overall found to be good in the Primary Health Care Unit (PHCUs), Expired and damaged medicines were quarantined and separated from items in the storage area. Procedures for disposal of expired drugs in the hospitals was found to be poor(Manyuat, 2021).

A study conducted Gaza strip on assessment of the status of private and non-governmental pharmaceuticals supply warehouses found that most warehouses showed that Most warehouses do not have conducive and adequate storage space and medicines are stored in areas that may lead to fast deterioration. In addition to that the cold chain system is not working as required, most of pharmacy professionals did not receive trainings on the handling and operating of equipment medical supplies storage(TABASH, 2018).

The study conducted in Udupi District, Karnataka on assessment of Public Pharmaceutical Supply Management System at Rural Primary Health Centers showed that in the primary health centers the pharmaceutical records, vouchers, invoice copies are not arranged in orderly manner, drugs are stored in loose unnamed boxes. In most pharmacies of primary health centers, the expired and black list drugs are stored

separately in the main store and have accumulated over the years and are not disposed appropriately (Kokilam, 2015).

A study done in Lesotho showed that none of the facilities had a practice of putting separately the damaged or expired products from the usable ones (Desale, 2013).

A study conducted in public Hospitals of Tanzania to inquire stock-outs of essential medicines and medical supplies, 94% of the hospitals assessed were reported being out of stock of one or more essential medicines and medical supplies (SIKIKI, 2011).

A study conducted in India showed that 40% of the pharmaceutical store had ceiling which is found in a good condition and all the pharmaceutical products were protected from direct sun light, 45% of the stores had tidy shelves, the floor was swept and the walls were clean (Iqbal, 2015).

A study done in Arsi zone governmental centers out of the health facilities assessed 75% of them had no functional refrigerators at their store, from the rest of the health facilities (25%) none of them had temperature recording tool for monitoring of the daily temperature status, in addition to that from 40 assessed health centers only 37 health centers or 92% of them were stored cold chain items in appropriate temperature condition. The survey assures that 92% of medical stores from 40 assessed health Centers not free from harmful rodent and insects. More than 2/3 of facilities were not have an adequate space when it compared to the availability of medical supplies (BEKELE, 2018).

The study conducted in health facilities in South Wollo zone showed that majority of (55.6% of the health facilities) the public health facilities practiced unacceptable storage condition and only 44.4 % of the health facilities are acceptable storage conditions, most of the health facilities fulfilled Packaging of Medicines criteria. All health facilities Packages and containers are closed, 77.8 % of the facilities Packages are clean in both pharmacy and store room and 88.9% of the facilities Packages and boxes are not crushed (Mahammed, 2018).

The study done Dessie on Inventory management practices of pharmaceuticals in public health institutions revealed that in inventory management process calculation errors, recording errors, lack of automatic recording, absence of wall thermometers, absence of humidity and fire control system, absence of lockable cabinets and holding combustibles with drugs were found to be the major pitfalls of these institutions (Bayked et al., 2021).

A study conducted on assessment of assessment of Pharmaceutical Logistics System in Health Centers of Addis Ababa showed except one health center which was in maintenance all the health centers have lock and key for security and only 8(34.8%) of the health centers had sufficient store size while 5(21.7%) of them store drugs at least 30 cm away from the wall (Mudzteba, 2014)

The study conducted in public hospitals in Addis Ababa showed that 81.8% of the stores had a good ceiling, 63.6% of the products were put protected from direct sun light, the stores that had brushed shelves, swept floors, and clean walls were only 45.5%. on the safety of the store, only 36.4% of the stores had a functional fire extinguisher and none of the store personnel were trained how to use fire extinguisher and none of the store personnel were trained how to use the fire extinguisher beside this the stores had no smoke detectors. Regarding special storage requirements, only 36.4% of the stores had at least one functional thermometer and only 27.3% of the store's temperature record was up to date. Most refrigerators 81.8% of them had a thermometer but only 27.3% of them had recorded the temperature twice per day (TESFAYE, 2020).

III. Methodology

3.1 Research Design

A research design serves as a comprehensive blueprint or framework that guides the systematic collection, measurement, and analysis of data within a study (Creswell & Creswell, 2018). Descriptive Design focuses on systematically portraying the characteristics of a population, situation, or phenomenon with precision and accuracy (Sekaran & Bougie, 2016). Its primary objective is to present a detailed and reliable depiction of the variables or factors being examined, without manipulating or altering them.

The study was used descriptive cross-sectional study design method for assessing of pharmaceutical store management conditions at St. Paul's Hospital Millennium Medical Colleges.

3.2. Research Approach

A quantitative research approach is grounded in positivist epistemology and relies on empirical evidence to generate knowledge (Creswell & Creswell, 2018).

This study utilized a quantitative approach. The quantitative approach was used to measure the extent to which pharmaceutical store management conditions performed at St. Paul's hospital millennium medical colleges.

3.3. Study Period

Data collection period was from August 7 to August 21, 2025

3.4 Target Population

The target population for this study comprised of professionals that were directly involved in the management store activities at St. Paul's hospital millennium medical college.

3.5. Sampling and Study Participants

Census sampling was taken and the study participants were St. Paul's hospital millennium college pharmacy store and pharmacy professionals who are working in the Hospital were selected.

3.6. Sources of Data

Data was gathered from St. Paul hospital millennium medical college pharmacy store and pharmacy professionals who are working in the hospital were selected.

3.7. Data Collection Tools and Procedures

The study used a structured questionnaire to assess pharmaceutical store storage conditions, infrastructure, space utilization and layout, and operational capacity. A closed-ended structured questionnaire is designed to ensure the accuracy and reliability of responses while minimizing the possibility of misleading information (Sekaran & Bougie, 2016). Data collectors were trained on the aim of the study, the study procedures, data collection instruments, and research ethics and pre testing of the tool was done then data was collected by two data collectors using observation check list which is structured questionnaire checklist adapted from a supervisory checklist to assess pharmaceutical management activities at the facility level (MSH, 2014) and logistic indicator assessment tool (LIAT) (USAID | DELIVER PROJECT, 2008), and close ended self-administered questionnaires. The questionnaires was employ a 5-point Likert Scale, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5), enabling systematic quantification and comparative analysis of responses across respondents. The questionnaires were distributed to the participants after getting their verbal consent to participate on the study.

Methods of Data Analysis

This study employs descriptive techniques to analyze the collected data comprehensively. Descriptive statistics provide a summary of the dataset's key characteristics through measures such as mean, median, mode, standard deviation, and frequency distributions (Polit & Beck, 2017). In this study, the collected data was organized, classified, and coded. The variety of information collected from questionnaires was entered to SPSS, and then analyzed using SPSS version 26 (Statistical Package for the Social Sciences) software. Responses were summarized using descriptive statistics such as frequency, percentage, mean, and standard deviation.

Data Quality Assurance

The data collected was checked daily, by giving supportive supervision for the data collection process, kept and handled in safe way to prevent loss of the collected data and checked the clarity of the data collected and data clearing was done when the data entered to the SPSS.

Ethical Considerations

Ethical approval was obtained from National Aviation College of Examiners Committee and written supportive letters to Saint Paul's hospital millennium medical college. After that Saint Paul's hospital millennium medical college Internal Review Board approved the proposal and gave permission to collect data. The participants were asked verbal consent before participating to the study. All participants were informed about the purpose of the study, and assured that their confidentiality and privacy would be kept and they are informed not to write their name and not to mention their identity. They were informed that the study is for academic purpose. Then the questionnaires were distributed after the respondents agree to participate on the study. They filled the questionnaire without mentioning their identity, their names.

IV. Data Presentation, Analysis, and Discussion

Table 4.1: Respondents' profile

Respondents Personal Profile			
		Frequency	Percent
Gender	Male	49	62.4
	Female	16	37.6
	Total	65	100
Age	20-30	21	21.6

	31-40	44	32.1
	Total	65	100
Type of Educational	Pharmaceutical technician (Druggist)	0	0
	Pharmacist	65	100
	Supply chain specialist	0	0
	Total	65	100
Work Experience	Between 1 and 3 Year	8	12.3
	Between 4 and 6 Years	26	40
	Between 7 and 9 Years	25	38.5
	Above 10 Years	6	9.2
	Total	65	100

Source: Own Survey, 2025

The study result showed that out of 65 pharmacy professionals who participate on the study, 44 (67.7%) of them are between the age range of 31-40 years and the rest 21(32.3%) are between 20-30 years respectively. The study shows that out of 65 participants the majority of respondents were male (62.4%), while female respondents accounted for 37.6%. The study shows that all the respondents were pharmacist. The experience distribution of respondents shows that the highest proportion of respondents were 26(40%) of respondents between 7-9 years, followed by those with 25(38.5%) of respondents between 4-6 years and 8(12.3%) respondents is between 1-3 years. Only 6(8.2%) had above 10 years of experience. This indicates that relatively young professionals and experienced practitioners were included.

4.2. Descriptive Statistics Analysis

This study assesses pharmaceutical store storage conditions, infrastructure, space utilization and layout, and operational capacity. Pharmacy professionals' perceptions towards these variables are analyzed using descriptive statistics. Accordingly, the overall mean (M) score between 4.50-5.00 is considered as the respondents strongly agreeing (SA), if the respondents score between 3.50-4.49 means they agree (A), the score between 2.50-3.49 is considered the respondents are neutral (N), the respondents score between 1.50-2.49 shows that they disagree, and if the respondents score between 0-1.49 shows that they strongly disagree (Marenesh, 2018).

Table 4.2: Store Storage Conditions

No	Statement	No	Mean	Std. div.
1	Medicines are stored at appropriate temperature conditions.	65	2.06	0.496
2	Medicines are stored at appropriate humidity levels.	65	2.11	0.476
3	Medicines are protected from direct sunlight.	65	3.82	1.000
4	The pharmaceutical store is clean and organized.	65	3.20	1.077
5	Medicines are stacked and spaced according to recommended standards.	65	2.00	0.629
6	Medicines are stored off the floor and away from walls.	65	2.45	0.629
7	Temperature and humidity are monitored and recorded regularly.	65	2.05	0.062
8	Expired, damaged, and hazardous medicines are stored separately in a designated area.	65	3.32	0.986
9	Cold-chain products are stored under recommended conditions.	65	3.04	1.117
Average		65	2.67	0.719

Source: Own Survey, 2025

Based on table 4.2 above the mean values of each of the measurement items of store storage conditions were calculated between 2.00 and 3.82 with almost similar standard deviations that range between 0.062 and 1.117. The lowest mean value is registered in the case of medicines are stacked and spaced according to recommended standards and temperature and humidity are monitored and recorded regularly in the second place followed by the mean score for medicines are stored at appropriate temperature conditions.

The strongest area are cold-chain products are stored under recommended conditions, the pharmaceutical store is clean and organized, and expired, damaged, and hazardous medicines are stored separately in a designated area which is very comparably close mean values of 3.04, 3.20 and 3.32 respectively; while medicines are protected from direct sunlight 3.82, comes last in the ascending order. This implies the St. Paul hospital millennium medical college has some basic store discipline and is partly following recommended storage practices.

The noticeably represented mean scores of the measurement items of medicines are protected from direct sunlight indicator suggest that respondents in the St. Paul hospital millennium medical college believe that lower efforts have been made by their individual facilities to enhance pharmaceutical store management performance in the case of store storage conditions both in the temperature and humidity are monitored and recorded regularly and medicines are stored at appropriate temperature conditions the mean score is lower suggesting that relatively lower efforts have been exerted. This implies that the store appears to be functional, but not yet at an optimal standard for pharmaceutical storage at St. Paul hospital Millennium Medical College. The average mean value of store storage conditions at St. Paul hospital Millennium Medical College was 2.67 this implies that there is a risk to medicine quality, safety, and regulatory compliance if store storage conditions are not improved. Medicines exposed to sunlight, unstable temperature, or humidity can lose effectiveness, become damaged, or fail to meet expected standards.

Table 4.3: Store Infrastructure

No	Statement	No	Mean	Std. div.
1	The pharmaceutical store has adequate lighting.	65	2.58	0.998
2	The pharmaceutical store has adequate ventilation.	65	2.63	0.846
3	The roof, ceiling, floor, and walls are in good condition for medicine storage.	65	1.64	0.609
4	The store has sufficient shelves, pallets, and storage equipment.	65	2.83	0.744
5	Functional temperature and humidity monitoring equipment is available.	65	3.09	0.969
6	The store has a reliable backup power supply for cold-chain products.	65	3.33	1.214
7	The store has adequate fire safety equipment.	65	3.2	1.077
8	The store has adequate security facilities for safe storage.	65	3.04	1.117
Average		65	2.79	0.947

Source: Own Survey, 2025

The result shows that the mean values of each of the measurement items of store infrastructure indicator were calculated between 1.64 and 3.33 with standard deviations that range from 0.609 to 1.214. The lowest mean value is registered in the condition of the roof, ceiling, floor, and walls, with a mean of 1.64. That is a serious concern because poor building conditions can expose medicines to contamination, moisture, heat, dust, and physical damage which are different from the requirement stated on the USAID/ DELIVERY guidelines.

While, lighting, ventilation, and storage equipment items scored comparably close mean values of 2.58, 2.63, and 2.83 respectively. This implies that the store is functioning, but not yet meeting strong pharmaceutical storage standards across all dimensions which are different from the requirement stated on the USAID/ DELIVERY guidelines.

The relatively strongest areas are backup power supply, fire safety equipment, security facilities, and temperature/humidity monitoring, with means above 3.0. This indicates the organization has some important safeguards in place for protecting medicines, especially cold-chain and high-risk products.

As the aggregated mean that the store's store infrastructure conditions are moderately satisfactory overall, with an average mean of 2.79, but there are clear gaps in infrastructure quality and basic storage support. This means storage performance at St. Paul hospital millennium medical college is not uniform: some critical protections exist, but the physical facility itself may still threaten medicine quality and safety. This implies that, weak building condition can undermine even good monitoring or security systems.

Table 4.4: Space Utilization and Store Layout

No	Statement	No	Mean	Std. div.
1	The available storage space is used efficiently.	65	3.69	1.131
2	The store layout allows easy movement of personnel and materials.	65	3.32	0.986

3	Medicines are arranged systematically on the shelves.	65	3.44	0.935
4	Separate areas are available for receiving, storing, and dispatching medicines.	65	3.39	0.953
5	The store layout supports efficient inventory management.	65	3.43	0.897
Average		65	3.45	0.980

Source: Own Survey, 2025

Based on the table 4.4 above the mean values of each of the measurement items of space utilization and store layout indicator were calculated between 3.32 and 3.69 with almost comparable standard deviations that range between 0.897 and 1.131. The lowest mean value is registered in the case of The store layout allows easy movement of personnel and materials and followed by separate areas are available for receiving, storing, and dispatching medicines, store layout supports efficient inventory management, medicines are arranged systematically on the shelves, and available storage space is used efficiently . The scores of the scale of space utilization and store layout indicators which is very comparably close mean values of 3.32, 3.39, 3.43, 3.44, and 3.69 as showed on the aforementioned table above.

The noticeably represented mean scores of the measurement items of space utilization and store layout indicator suggest that respondents in the St. Paul hospital millennium medical college believe that high efforts have been made by their individual facilities to enhance pharmaceutical store management performance in the case of space utilization and store layout This implies the fact that there are Good space utilization and store layout implies that the available area is being used efficiently with enough room for movement, clear product placement and easy access to goods.

Table 4.5: Operational Capacity

No	Statement	No	Mean	Std. div.
1	FEFO principles are consistently applied in the pharmaceutical store.	65	3.97	0.984
2	FIFO principles are consistently applied where appropriate.	65	3.80	0.943
3	Inventory records are accurate and updated regularly.	65	3.78	0.927
4	Standard operating procedures are available in the store.	65	3.22	1.033
5	The store has adequately trained personnel to perform storage operations.	65	2.36	0.598
6	Store equipment and monitoring devices are regularly maintained.	65	3.46	1.001
7	The pharmaceutical store has sufficient operational capacity to meet the institution's storage needs.	65	3.73	1.036
Average		65	3.47	0.931

Source: Own Survey, 2025

The above table 4.5 shows that the store has good operational capacity overall, with an average mean of 3.47 meaning most core operating practice are being carried out reasonably well at St. Paul hospital millennium medical college.

The highest mean value is registered in the case of operational capacity indicator is FEFO implementation, with a mean of 3.97, followed by FIFO use, accurate inventory records and adequate overall storage capacity. This implies St. Paul hospital millennium medical college is fairly effective at stock rotation and inventory control, which helps reduce expire, wastage, and stock mismanagement.

Standard operating procedures are available but only moderately rated, and the weakest item is the availability of adequately trained personnel to perform storage operations, with a mean of 2.36. This means the system may perform its activities, but human resource capacity is not strong enough to fully support reliable operations.

Overall, the operational capacity St. paul hospital millennium medical college operational systems are mostly in place, but staff competency is the main bottleneck. Even if FEFO, FIFO, and records are good, poor training can still cause errors in handling, storage, and stock rotation.

V. Summary of Major Findings, Conclusions, and Recommendations

• Major Findings

In this part major findings of the study are summarized and presented as follows:

- Physical conditions are not fully satisfactory, especially the condition of the roof, ceiling, floor, and walls.

- Environmental protection needs improvements, especially protection from direct sunlight and stronger control of temperature and humidity.
- Storage practices are relatively better, with FEFO, FIFO, and inventory recording showing stronger performance.
- Operational system exist, however, trained personnel are insufficient, which weakens overall performance.
- Some support systems are already in place, such as backup power, fire safety, and security facility.

VI. Conclusions

This research was conducted to assess the pharmaceutical store management in Saint Paul's hospital millennium medical college based on the findings from the study, the following conclusions are done.

A total of 67 questionnaires were distributed and 65 respondents have filled and returned and 2 participants had not filled and return the questionnaires which make the response rate 97%. Out of 67 respondents 16(24.6%) are females and the rest 49(75.4%) are males. 44 (67.7%) of the respondents are between the age range of 31-40 years and all (100%) of the respondents are pharmacists. Majority (40%) of respondents work experience is between 7-9 years and only 6(9.2%) of the participants' work experience is over 10 years, respectively.

Generally, the study concludes that the pharmaceutical store appears moderately functional overall, with strengths in stock rotation, inventory control, security, fire safety, and some operational procedures, but with clear weaknesses in facility condition, environmental protection, and staff training on store management. The pattern suggests that the organization has a workable storage system, yet several critical gaps still put medicine quality and storage reliability at risk and pharmaceutical store is not aligned with the requirement stated by USAID/DELIVER Guide lines.

VII. Recommendation

- Based on the conclusion of the study the following points were recommended
- As show form the finding of the study store conditions of Saint Paul's hospital millennium medical college should repair and maintain the storage facility, especially the roof, floor, and walls.
- Regarding with the pharmaceutical store management the hospital should provide regular trainings for store personnel pharmacists on storage standards and record keeping. Because the pharmacists are expected to practice and align with the requirements of pharmaceutical store stated standards by USAID Guidelines for Warehousing Health Commodities.
- Saint Paul's hospital millennium medical college work aggressively to provide sufficient improve protection from sunlight and strengthen temperature and humidity control.
- The hospital should expand or improve pharmaceutical equipment that are used for pharmaceutical stores like shelving, pallets, and storage equipment where needed.
- Saint Paul's hospital millennium medical colleges strengthen supervision to ensure SOPs are consistently followed.
- Saint Paul's hospital millennium medical colleges should continue maintaining backup power, fire safety, and security systems.
- Saint Paul's hospital millennium medical colleges should also; conduct routine monitoring and internal assessments to identify weaknesses early.

References

- [1]. Bayked et al. (2021). Inventory management practices of pharmaceuticals in public health institutions of dessie city administration, Ethiopia: a descriptive cross-sectional study. *Innovate journal of health science*, 9(3). doi: 10.30880/rmtb.2020.01.01.006
- [2]. Bekele, s. (2018). Assessment of pharmaceutical storage system: the case of arsi governmental health centers.
- [3]. Desale, e. a. (2013). Assessment of laboratory logistics management information system practice for HIV/AIDS and tuberculosis laboratory commodities in selected public health facilities in Addis Ababa, Ethiopia.
- [4]. EFDA. (2021). Guidelines for Good Storage and Distribution Practice of medical devices.
- [5]. EFMHACA. (2015). Guide lines for Good Storage Practice, Good Distribution Practice Pharmaceutical product recall.
- [6]. Erdogan. (2022). Investigation of the pharmaceutical warehouse locations under COVID-19—A case study for Duzce, Turkey. *Engineering Applications of Artificial Intelligence*, 116. doi: 10.1016/j.engappai.2022.105389
- [7]. FDREMOH. (2019). Good dispensing practice and pharmaceutical supply chain management.
- [8]. FDREPFSA. (2017). Standard Operating Procedures (SOP) Manual for the Integrated Pharmaceuticals Logistics System in Health Facilities of Ethiopia.
- [9]. Ibrahim, G. a. (2017). Inventory management performance of key essential medicines in health facilities of East Shewa Zone, Oromia Regional State, Ethiopia. *Jimma University, College of Health Sciences, Department of Pharmacy, Ethiopia, Cukurova Medical Journal* 42(2), 277-291. doi: 10.17826/cutf.322908
- [10]. Iqbal, e. a. (2015). Indicator Based Assessment of Medicine Storage and Inventory Management Practices in various Public Sector Hospitals of District Srinagar.

- [11]. Iqbal, e. a. (2017). Medicines Management in Hospitals: A Supply Chain Perspective. *Systematic Reviews in Pharmacy*, 8(1), 80-85. doi: 10.5530/srp.2017.1.14
- [12]. Jokiniemi, D. (2008). Dictionary of Architecture and Building Construction
- [13]. Kokilam, e. (2015). Assessment of Pharmaceutical Store and Inventory Management in Rural Public Health Facilities—A study with reference to Udupi District, Karnataka. *Journal of Pharmaceutical Methods*, 6(2), 53-59.
- [14]. Kokilam et al. (2015). Assessment of Public Pharmaceutical Supply Management System at Rural Primary Health Centers in Udupi District, Karnataka.
- [15]. Kothari. (2004). Research Methodology: Methods and Techniques. 2nd Edition, New Age International Publishers, New Delhi.
- [16]. Mahammed, T. (2018). Assessment of pharmaceutical inventory management performance at health facilities: the case of public health facilities found in south wollo zone, Amhara region.
- [17]. Manyuat, e. a. (2021). Assessment of Storage and Inventory Practices to Improve Medicine Supply Chain in Jubek State South Sudan. *Rwanda Journal of Medicine and Health Sciences*, 4(2), 310-320. doi: 10.4314/rjmh.v4i2.9
- [18]. MSH. (2012). MSH (2014) Managing Access to Medicines and Health Technologies, Natural Science.
- [19]. MSH. (2013). Managing Access to Medicines and Health Technologies, Natural Science.
- [20]. MSH. (2014). Managing Access to Medicines and Health Technologies, Natural Science.
- [21]. Mudzteba, M. (2014). Assessment of Pharmaceutical Logistics System in Health Centers of Addis Ababa, Ethiopia.
- [22]. Nahamya, D. (2007). Assessment of essential drug management in the public health facilities in Uganda.
- [23]. Schöpperle. (2013). Analysis of challenges of medical supply chains in sub-Saharan Africa regarding inventory management and transport and distribution.
- [24]. Setiawan, et. al. (2022). Stock Management in the Drug Warehouse of Maritime Health Office in Indonesia. *International Journal of Innovative Science and Research Technology*, 7(5).
- [25]. Sihombing, D. J. C. (2024). Enhancing Inventory Management in Dental Clinics through Agile Methodology: A Practical Approach *Jurnal Ekonomi*, 13(02).
- [26]. SIKIKA. (2011). Medicines and medical supplies availability report using absorbent gauze availability survey as an entry point a case of 71 districts and 30 health facilities across mainland Tanzania
- [27]. TABASH. (2018). Assessment of the Status of Private and Non-Governmental Pharmaceuticals Supply Warehouses in Gaza Strip, Palestine. *Asian Journal of Pharmaceutical and Clinical Research*, 11(2), 300. doi: 10.22159/ajpcr.2018.v11i2.22639
- [28]. TESFAYE, A. (2020). Assessment of pharmaceutical store management in public hospitals, Adiss Ababa, Ethiopia.
- [29]. USAID/DELIVER. (2011). The Logistics Handbook A Practical Guide for the Supply Chain Management of Health Commodities.
- [30]. USAID/DELIVER. (2014). Guidelines for Warehousing Health Commodities.