(Research Article)

Management of medical store in a tertiary level public hospital in Dhaka city

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Abstract

Cross-sectional descriptive study at Dhaka Medical College Hospital from January to December 2013. This study evaluated the medical supply chain in a Dhaka public tertiary hospital. Respondents were hospital shop employees who kept data on medicine procurement, storage, and distribution. 51-59-year-olds made up 36.6% of respondents. 68.3% of the store's workforce were pharmacists. 82.9% of respondents have a diploma or degree. 70% of personnel lacked retail management training. The investigated store had no AC or chiller. Store had a fridge. The pharmacy's drug procurement and selection committee was present. More than half (55%) of drugs were purchased using open tender. Direct purchases made up 30%, donations 13%, and other methods 2%. The store has an expiration-date section. The store contains updated volatile drug storage, safety stock, a stock ledger, vouchers, and invoicing. The shop had no electronic ledger. Lack of space, shelves, a damp or cracked wall, and a refrigerator were issues. Labor was scarce. Shop managers say improve quality management. During the drug receiving procedure, analytical testing ensures preservation and efficacy. Store management in our nation can be improved by giving refresher training on regulations and legislation and maintaining an electronic ledger via a database system.

Keywords: Store management; Hospital administration; Stock balance; Electronic ledger; Medical supply chain

1. Introduction

Bangladesh has improved dramatically in terms of health outcomes. The nation has made significant progress in delivering primary healthcare, the majority of health indicators indicate sustained improvements, and the population's fundamental health has improved. In Bangladesh both the governmental and commercial sectors offer health services. Preventive, inpatient, and outpatient care are typically provided by the public sector, whereas outpatient and inpatient curative treatment are usually offered by the private sector. Planning and managing curative, preventative, and promotional health services for the nation's population are under the responsibility of the Ministry of Health and Family Welfare (MoHFW). But in urban areas, the Ministry of Local Government, Rural Development, and Cooperatives (MoLGRD&C) is responsible for delivering health care, including Primary PHC services.

The costs associated with providing medical care have risen in direct proportion to the rapid development of new treatments and pharmaceuticals [1]. As a result, approximately one-third of the total budget for the hospital is allocated to the purchase of a variety of materials and supplies, including medicines [2]. This requires competent and efficient management of the medical store by closely monitoring critical pharmaceuticals, preventing pilferage, and defining

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purchase and distribution priorities. Review and control of expensive medicines can save medical stores 20%, according to a study. Continuous quality management at a medical store can help patients[3]. In this case ABC and VED matrix is the most recommended inventory control system for medical establishments [4]. Almost one-third of a hospital's annual budget goes into the purchase of equipment, supplies, and medicines [5]. The vast range in prices of these products necessitates careful stock management to make the most of available resources.

There are several types of pharmacies in the current public health system, including the Central Medical Supply Department (CMSD), the District Reserve Pharmacy, and numerous more (DRS). District Health Center Pharmacy, Upazilla Health Center Pharmacy, Union Health Sub-Center Pharmacy, etc [6].

The term "store keeper" is used to describe the person in charge of a pharmacy. An essential part of every successful medical supply store's management is the responsibilities of the store keeper. In running a medical supply store, he is instrumental. Because of his extensive background, he is qualified to oversee a pharmacy or medical supply store[7].

Medical store turnover and prescribing practices are not always rational, generating drug shortages. Proper management of a medical store depends on the acquisition, storage, and distribution of medicines. Effective and efficient management at all levels is the key to a hospital's success. An effective medical store administration ensures uninterrupted supply of vital drugs, optimal budgetary spending, good item turnover, and minimal resource waste[8].

This study could help in determining the current guidelines and practices, including any irregularities, and it will provide information on how to manage the medical supply better, one of the key responsibilities of tertiary level hospitals that will help ensure Bangladeshi hospital patients receive high-quality care. The study might improve our nation's health care delivery system by having some beneficial effects on the Medical College Hospital's administration of it's own medical store, particularly drug procurement, storage, and distribution.

2. Material and methods

2.1. Type of Study

The research was a cross sectional type of study.

2.2. Place of Study

This study was conducted at the medical store of a selected tertiary level Hospital that is Dhaka Medical. College Hospital at Dhaka city.

2.3. Period of study

The study was conducted from January to December, 2013.

2.4. Study Population

- All of the staff working in medical store of the DMCH.
- Records related with procurement, storage and distribution of drugs from January 2013 to December 2013 in medical store of DMCH.

2.5. Sample size

Purposively selected 41.

2.6. Sampling approach

Purposive sampling technique was followed for the selection of respondents on the basis of willingness to participate the interview. Several difficulties were encountered during data collection. Many refused to provide interview because, being unfamiliar with such studies.

2.7. Eligibility criteria

Employees working in medical stores at least six months of Dhaka Dental College Hospital, Dhaka.

2.8. Research Approach

Data were collected by face to face interview with the help of Semi-structured questionnaire and an observational check-list was used.

2.9. Data Analysis Procedure

Data was verified, checked and edited manually for consistency, to reduce error. The important variables considered for analysis of data keeping in view of the objectives of the study. Descriptive statistics, mean, median, standard deviation, percentage, frequency was analyzed through t test through SPSS (16 version).

2.10. Ethical Considerations

Permission of the hospital authority, permission of the medical store in charge and permission of the respondents were taken for ethical purpose. Involvement in this study as being a sample or any sorts of participation or contribution was completely on voluntary basis. Each of the participants of this study was listed out in a register and before that they were provided with consent forms. The enrolled participants were provided with written assurance that information acquired in course of the study was not be released to any other individual unless authorized by the participant and the information gained was used in such a way that identity of the participant was not be revealed. The objectives, method of data collection and utilization of the findings of the study were clearly conveyed to the respondents of this study.

3. Results

Hospital supply systems should ensure adequate stock of all the required items to maintain uninterrupted supply. Advances in medical care and drugs have disproportionately increased the expenditure on health care delivery. Therefore, about one-third of the hospital budget is spent on purchasing various materials and supplies including medicines [2]. This necessitates the effective and efficient management of medical store by keeping a close supervision on important drugs, prevention of pilferage, and priority setting in purchase and distribution of drugs. A study suggested that review and control measures for expensive drugs can bring about 20% savings in medical store budget. Continuous quality management in medical store can provide the value added services to the patients. Of all inventory control systems available, the ABC (always better control) and VED (vital, essential and desirable) matrix is the most preferred for medical stores.

Table 1 Distribution of the respondents by age

Age of the respondent	Frequency	Percent
Between 21-30 years	6	14.6
Between 31-40 years	12	29.3
Between 41-50 years	8	19.5
Between 51-60 years	15	36.6
Total	41	100.0

Table 1 shows that highest number of respondents {15(36.6%)} were in age group between 51-60 years and lowest number {6(14, 6%)} of the respondents were in the age group between 21-30 years.

Table 2 shows that distribution of the respondents by designation. Among the respondents 68.3% were pharmacist. M.L.S.S and Intern were 7.6% and 7.3% respectively. The others were an Asst. Director (Admin), an Asst. Director (store, finance), a Deputy Director, a Senior lecturer practical pharmacology, a Store keeper, a Store keeper (Instrument) and a Store officer.

Table 2 Distribution of the respondent by designation

Designation of the respondent	Frequency	Percent
Asst. Director (Admin)	1	2.4
Asst. Director (store, finance)	1	2.4
Deputy Director	1	2.4
Internship	3	7.3
M.L.S.S	3	7.6
Pharmacist	28	68.3
Senior lecturer of Practical		
Pharmacology	1	2.4
Store keeper	1	2.4
Store keeper (Instrument)	1	2.4
Store officer	1	2.4
Total	41	100.0

Table 3 Distribution of the respondents by educational status

Educational status of the respondent	Frequency	Percent
Up to Secondary completed	3	7.3
Diploma/ graduation	34	82.9
Post-graduation completed	4	9.8
Total	41	100.0

It is revealed in table 3 that majority of the respondents that is 82.9% completed Diploma/ graduate. Among the total respondents, lowest number that is 7.3% were found to be completed their secondary education. Rest of them who completed post-graduation was 9.8%.
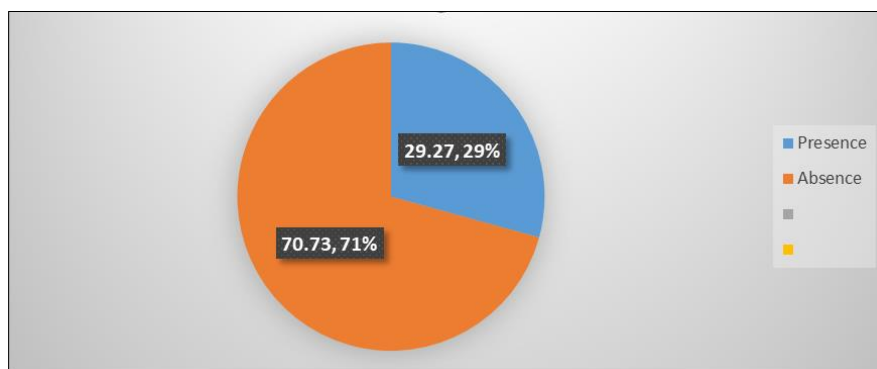

Figure 1 Distribution of the respondents on the basis of presence of training on store management

Figure 1 shows the distribution of the respondents on the basis of presence of training on store management. 70.73% respondents did not have any training on store management. 79.77% respondents had training on store management

Table 4 Physical facility of store

Physical facility of store	Existing situation
Ventilation of the store room	not well ventilated
Air cooler/ air conditioner	not present
Refrigerator	Present
Recording of the Room Temperature	Recorded
Recording of Humidity	Not recorded

Table 4 describes the existing status of physical facility of the store. The store room was not well ventilated. There was no air cooler or air conditioner. Refrigerator was present in the store room. The room temperature was observed to be recorded. They did not record humidity

Table 5 Cleanliness status of the store

Status of the room	existing situation
Cleanliness status of floor	all the 3 sub stores are found dirty
Rat, Rodent, Cockroach	Present in all the 3 sub store

It is revealed from the above table that the floor was dirty with the presence of rat, rodent, cockroach in the sub stores and store.

Table 6 Methods of procurement of drug

Methods of procurement of drug	Existing situation
Committee for drug selection and procurement	Present
Essential drug list	Present

Table 6 reveals the distribution of methods of procurement of drug. It was observed that there was committee for drug selection and procurement in the store. The store also had Essential drug list.

Above figure reveals the other sources of procurement of drugs. About 55% drugs were purchased by open tender method. The rest of methods included direct purchase by 30%, donation by 13% and others by 2%.

Table 7 Distribution of storage system of medicine

Storage system of medicine	Existing situation
Drug receiving committee	Present
Drug survey committee	Not present
Separate place for date expiry drug	Present
Arrangement for storage of volatile drug	Present
Safely stock	Maintained
Maintenance of stock ledger	Present
Maintenance of electronic ledger	Absent
Maintenance of voucher and invoice	Present

Table 7 shows the distribution of storage system of medicine. It was observed in the store that there was presence of drug receiving committee. Drug survey committee was found to be absent. There was separate place for date expiry drug in the store. The store also had arrangement for storage of volatile drug. Safety stock was maintained. There was maintenance of stock ledger. The store did not maintain electronic ledger. Voucher and invoice was observed to be maintained.

Table 8 Distribution process of medicine from medical store

Distribution process of medicine from medical store	Existing situation
Time schedule for distribution	Present
List of emergency drug in the store	Present

Above table reveals the distribution process of medicine from medical store. The store had observed to have time schedule for distribution. There was presence of list of emergency drug in the store.

Table 9 Distribution process followed in medical store

Distribution Process	Method followed
Inventory analysis	ABC method
Distribution system	Outdoor and indoor
E.O.L/ R.O.L	Re order level

Above table shows that inventory analysis was done by ABC method. Distribution system was outdoor and indoor method sand Reorder level was followed.

Table 10 Rank order of opinion of the respondents regarding problems they are facing in managing the store

Opinion regarding problem	Frequency	Percent	Ranked Order
Insufficient air Conditioner/Cooler ,space	30	73.2	1
Lack of Manpower	8	19.5	2
Lack of shelf, rack	1	2.4	3
Damp/crack wall	1	2.4	4
Lack of refrigerator	1	2.4	5
Total	41	100.0	

Table 9 shows the rank order of opinion of the respondents regarding problem they are facing in managing the store. The first problem they faced was insufficiency of air Conditioner/Cooler and space mentioned by 30(73.2%) respondents. Then the problems were pointed out as lack of Manpower by 8(19.5%) respondents. Lack of shelf/rack, damp/crack wall and lack of refrigerator were mentioned as problems by only 1(2.4%) respondents.

Table 11 Rank order of the opinion of the respondents regarding suggestion for improvement of store management

Suggestion regarding store management	Frequency	Percent	Order
Air Conditioner/Cooler needed	35	85.4	1
Increase manpower	4	9.7	2
Improvement of the cleanliness status of the store	2	4.9	3
Total	41	100.0	

Table 10 reveals the rank order of the opinion of the respondents regarding suggestion for improvement of store management. The first priority was given in the need of Air Conditioner/Cooler by 35(85.4%) respondents which was followed by increase manpower {4(9.7%)} and improvement of the cleanliness status of the store was suggested by 2(4.9%) respondents only.

Table 12 Suggestion given by the store managers for improvement of the store management (n=32)

Suggestion given by the store managers	Number	Percent	Ranked Order
Improvement of quality management	28	80	1
Performing analytical test during drug receiving time	1	2.9	2
For quality control of the drugs maintenance of efficacy, preservation, moisture and duration of action	1	2.9	3
Refresher training on store management including rules and laws	1	2.9	4
To maintain electronic ledger by database system	1	2.9	5

Above table reveals the suggestions given by the store managers for improvement of the store management. The first priority was given for the improvement of quality management mentioned by 28(80%) store managers out of 35. Then the suggestion was given to perform analytical test during drug receiving time mentioned by 1(2.9%) store managers. The next suggestion was prioritized for quality control of the drugs for which efficacy, preservation, moisture and duration of action should be maintained by 1(2.9%) store managers. Another important suggestion was given to train the refreshers on store management including rules and laws mentioned by 1(2.9%) respondent and to maintain electronic ledger by database system by 1(2.9%) respondent only.

4. Discussion

The primary goal of this study was to evaluate the current medical store management system with the intention of further improving it by making optimal use of the limited resources to provide deserving people with high-quality healthcare. As a result, the study's design and planning, data collection, tabulation, analysis, and interpretation.[9]

For the management of medical stores to be profitable and therapeutically effective, respondents must have knowledge of medical store management [10]. Based on the presence of store management training. 70.73% of respondents said they had no experience managing a store. 29.27% of respondents had store management training.

There was no computerized ledger maintained by the shop. It was seen that the receipt and invoice were kept up to date. According to what is known about stock records, stock balances, prices, stock receipts, stock issues, and stock losses are all included in stock records in addition to information about suppliers, clients, and prices. These facts are necessary for distribution planning. For each item in the inventory, a stock record must be kept—either manually or electronically. The stock record lists every transaction involving a certain item. It could include data on lead time, stock on hand, expected consumption rate, reorder level, reorder interval, and quantity. Additionally, many stores keep bin cards for each product in each storage location to keep track of issues, receipts, and stock levels. This bin card may be the most recent and accurate record of inventory movement in some stores. Depending on the inventory control system selected, stock cards and bin cards will have a different design [11]

The pharmacy has a committee for choosing and purchasing drugs. The store also had a list of necessary medications. The store was seen to have a distribution timetable. In the store, there was a list of emergency medications. The ABC approach was used to analyze the inventory. Outdoor and indoor methods of distribution were used, and reorder levels were observed. It was demonstrated in another investigation. Either an external organization or a department within the medical stores can manage procurement. The (internal or external) procurement unit receives a list from the medical supplies unit of the types and quantities of medicines required for operation. The procurement unit notifies the medical storage unit about suppliers, unit costs, the quantities ordered, the anticipated arrival dates of shipments, and other critical information after a supplier is chosen and a purchase order is placed. The procurement department keeps track of data on inventory levels, fresh shipments that are received and added to the stock, issues with healthcare facilities, issues with expired or damaged medications, and audit information from physical stock checks. The medical stores unit keeps track of concerns that pertain to specific medical facilities, including delivery methods, times, and

confirmation of receipts from user units. This tracking should produce data on issue quantities, issue values on a monthly and annual basis, individual product information, and budget allocation usage. [12]

All 12 of the aforementioned requirements were not met with relation to the physical facilities in the drug storage. Proper storage facilities are crucial to preventing waste and quality degradation [2]. The storage area lacked adequate ventilation. Neither an air conditioner nor a chiller were present. The store area contained a refrigerator. It was noticed and noted what the room's temperature was. Humidity was not recorded. It was discovered that the floor was filthy and that there were rats, mice, and cockroaches throughout the substores and the main store. However, it has been discovered in previous research that there are four fundamental storage systems: shelves, floor pallets, block-stacked pallets, and pallet racks. Given that their contents could be harmed by moisture, direct storage of cartons on the warehouse floor should be avoided. The following variables influence the system of choice: total number of items that need to be stored, each product's average volume, the storage building's internal height, Equipment for mechanical handling is accessible locally, as are the abilities to operate and maintain it. When storing goods in quantity at the national and regional levels, pallets are typically employed [13].

Shelves are most frequently used for storage at the district level and below. Every pallet should be used for a single product line exclusively, according to the fundamental rule of pallet storage. Pallets keep items together and impose a structured system of storage, among other benefits. Mechanical handling equipment makes it simple to transport large loads. Pallets don't need to be unpacked and repacked, making them simple to transship. Pallets keep products away from potentially damp flooring. Whether products are delivered by the manufacturer on pallets that have been shrink-wrapped, it is simple to detect when tampering has occurred. It is simple to execute a damage and brief shipment inspection. When stock rearrangement is required, moving pallets using mechanical handling equipment is far simpler than moving a significant amount of loose product that has been stocked on shelves.[14]

Cleaning, pest management, routine checks for problems like temperature and roof leaks, stock disposal, fire safety procedures, and stringent security protocols are all part of a store's housekeeping duties. Cleaning and pest management. A busy store should have its floors cleaned once a day, and it should be kept tidy and cleaned at least twice or three times every week. These results differed from those of a research by[15], who discovered that three people were involved in store administration. Only one storekeeper received the seven days of store management training. The drug selection and receiving committee was present, but there was no survey committee for the storage system. The store's physical amenities weren't great. Refrigerator, humidity and temperature recording, and ventilation. There was no air conditioning system. Analysis of ABC and VEN was not performed. The drug distribution method was terrible. Timetable and emergency medication list were not kept up with.

A pharmacist oversaw 68.3% of the hospital's tertiary level medical store. M.L.S.S. and Intern both scored 7.6% and 7.3%. The others were a Deputy Director, a Senior Lecturer in Practical Pharmacology, an Assistant Director (Admin), an Assistant Director (Store, Finance), a Store keeper, an Assistant Director (Store, Instrument), and a Store officer [16].

It was discovered that none of the store management staff had received long-term training in medical store management, which is crucial for the smooth operation of hospitals. 70.73% of respondents said they had no experience managing a store. Not many respondents 29.27% had training in store management. In another study, the structure of a typical central medical shop is used to illustrate the management of human resources in medical stores. An intermediate store's organizational structure is often a condensed version of this framework [14].

The director and section leaders typically utilize these documents to informally resolve procedural disputes and to train new employees. The manual should be available in each work area. Review and explanation of the document's contents should take place in group presentations. Every employee should have access to the manual, and they should be encouraged to use it when carrying out their duties. As new systems or procedures are implemented or operations change, the manual should be updated on a regular basis. [15].

Insufficient space and air conditioner/cooler were mentioned as the first issue by 73.2% of respondents. The shortage of manpower was then cited as an issue by 19.5% of respondents. Only 2.4% of respondents cited the lack of a refrigerator, a shelf or rack, or a damp or cracked wall as issues [16].

Regarding a plan to enhance store management, opinions were sought. The demand for an air conditioner or cooler was ranked #1 by 85.4% of respondents, followed by the need for more staff (9.7%), and just 4.9% of respondents advised improving the store's cleanliness.

Keeping things at an unregulated room temperature many goods can be kept at unregulated room temperature without risk. Even in temperate countries, the temperature in a store's upper section can approach +40°C. Unheated stores might experience below-freezing temperatures in colder climates. Some items may be harmed by such temperature extremes.

The effectiveness of vaccines, sera, test kits, and many other goods depends on cold storage. From the moment of manufacture through the point of delivery, vaccines in particular must be stored at precisely controlled temperatures [14]. A common source of issues in immunization regimens is cold-chain flaws. The Department of Immunization, Vaccines, and Biologicals of the World Health Organization (WHO) gives thorough guidance on creating and operating a cold chain (see the WHO Immunization, Vaccines and Biological website). For thorough technical guidance, go to this document.

The shop managers made some crucial recommendations for enhancing retail management. Out of 32 store managers, 80% named the improvement of quality management as their top priority. The suggestion was then made to run an analytical test during the drug delivery window that the 8.5% store managers had stated. The following recommendation was given priority for quality control of the medications, for which 2.9% store managers should maintain efficacy, preservation, moisture, and duration of action. Another significant recommendation was made by 2.9% of respondents, who also recommended training refreshers on store administration, including the regulations and laws previously mentioned, and the maintenance of an electronic ledger using a database system.

5. Conclusion

Medical store management is new in Bangladesh and globally. Education and technology always improve. It's crucial to know the latest medical store management system technology and how to train health staff in this field because of its impact on the individual, family, community, and nation. To conclude, more research is needed. Physical facilities and drug procurement analyses were insufficient. ABC or VEN/VED system analysis wasn't followed, and all physical facilities weren't met, indicating that the drug storage system wasn't suitable. Buffer stock should be estimated and kept separately in the medical store to prevent patient care interruptions. Drug management staff have no official training. Poor medical store management knowledge among staff. Pharmacy and shop management training is vital for store staff in health care facilities. The study shows that proper health care delivery systems do not prioritize medical store management in drug procurement, storage, and distribution.

Compliance with ethical standards

Acknowledgments

Disclosure of conflict of interest

There is no conflict of interest among the authors.

Statement of ethical approval

The study was also approved by the ethical review committee of the Department of Dental Public Health, City Dental College, Dhaka, Bangladesh, with the certificate number CDC/2013/E-283.

Statement of informed consent

All participants will be informed about the objectives, methodology and purpose of the study in an easily understandable way. All information regarding benefits and hazards regarding the study will be delivered to the all participants who agree to participate in the study. Informed written consents will be obtained from all participants without any influences prior to data collection. Data obtained from the study will be used only for the research purpose. The confidentiality of all study information will be maintained strictly. Participants can withdraw themselves from the study at any time even after giving consent.

Author's contribution

The experiments were designed and conceived by AKS, PRK and NZ. ASB, KEH and FK performed the experiments and analyzed the data. The manuscript was drafted by PRK, AB and MB. It was critically reviewed by PRK for its intellectual content. The final version to be published was approved by AKS and KEH.

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