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Research Article

ASSESSMENT OF PHARMACEUTICAL STORE MANAGEMENT IN WOREDA HEALTH OFFICES OF WEST HARARGHE ZONE, ETHIOPIA

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ABSTRACT
In order to ensure the prompt availability in adequate quantity of drugs at the time of need, they must be kept ready in stock. This requires good pharmaceutical store management and planning. The main purpose of this study was to assess the pharmaceutical store management practices in Habro, Darolebu, Odabultum, Gemechis and Chiro Woreda Health office pharmaceutical stores, West Hararghe Zone, Ethiopia. A district based prospective cross-sectional study design was conducted using check lists prepared based on WHO criteria to assess the pharmaceutical store management. A total of five Woreda health office pharmaceutical stores were included in the study with response rate of 100 %. In all (n = 5) of the study stores, there were no fire extinguisher, ladder, refrigerator/ freezer/, ventilators, wall thermometers and computer. All the study stores had adequate lighting, functional locks, protected from direct sun light, roof ceiling and windows in a good repair and 4 of them were dry, adequately ventilated and shady. The study findings show that the drug storage, arrangement and issuing practice were found good in Habro, Darolebu and Gemechis and Chiro store but poor in odabultum store. There were no sufficient storage and reception area, in Habro, Darolebu and Odabultum, shelves in Habro, Odabultum and Chiro and floor pallets in Gemechis, Odabultum and Chiro stores. Bin cards and stock cards were used only in Habro and Chiro stores. There were no means of maintaining and recording the room temperature of the drug store in all of the study stores.
Keywords: Stock management, stock out, bin card, stock card, West Hararghe.

INTRODUCTION

In any health facility, be it a small health center or a big teaching hospital, drugs form an essential and indispensable resource element. Since almost all finished pharmaceuticals have a defined shelf- life and many of them require compliance with precise storage conditions, the matter became a little more complex. Besides, a balance between the service level and the stock position must always be maintained. The total activity of such stock maintainace should be done keeping in view the essential drugs concept. Inventory management in health policy addresses all these issues[1]. The proper storage of drugs ensures the efficacy, safety, stability and quality of drugs. Unless drugs are properly stored and separately kept from non-pharmaceuticals, very long shelf- life of drugs is not a guarantee. Even the best quality is not proof against the adverse effect of incorrect handling. Drugs need to be stored properly to maintain the intended quality and keeping safely without damage until they ultimately reach the consumer[2]. Pharmaceuticals should be controlled by inventory management systems. Items on shelves should be tagged with bin cards. The necessary information on the bin card should be filled and up to dated. The stock record cards should also show an up to dated stock balance for received/ issued items[3]. Most leading cause of each and disability in developing countries can be prevented, treated or at least alleviated with cost effective essential drugs. Despite of this fact thousands of people do not have access to essential drugs. The primary reason for holding stock in a drug supply is to ensure availability of essential items all time for the final consumer[4]. In health care system, proper pharmaceutical store management is very important and crucial in developing countries due to the impact of wide spread of disease and poverty and so, effective use of pharmaceuticals and essential health commodities by providers, patients and the public is the most challenging issue[5]. Because inventory control is a difficult task in many countries, poor inventory management system in the public drug supply system lead to financial wastage, shortage of essential drugs and decrease in quality of patient care. Lack of accurate stock cards, and systematic performance procedures and rules to guide staff, lack of understanding of the basic issue of proper inventory management system are directly related to ineffective management[6]. Over stocking of certain items may lead to expires and deterioration this affect budget funded for other lifesaving drugs and also affect the economy of the health care system. In contrary to this under stock or stock out drugs and other pharmaceutical products may lead to worsen of patient condition, a patient may die if lifesaving drug is stock out. The community will lose confidence in the health facility, frequent stock outs maybe stabiles or reinforce poor prescribing habits[8]. The quality of drugs especially in countries with tropical climates is severely affected by high temperature and atmospheric humidity. Unless special storage conditions are stated, it is vital that drugs be stored in a dry, adequately ventilated, shady and cool store room. Drugs need to be protected from moisture, heat, sunlight, physical damage and dust[2]. Appropriate data on drug consumption and stock position may not collect regularly at the service center. This may have serious consequences on the rational use of medicines, quantification and availability of medicines at the health facilities and this can be attributed to lack of application of stock management tools. Therefore, this study aimed to forward information about existing problems associated with poor store management practice. So that it will help policy makers and service providers to take

important measures. It has also provided base line information for further similar study.

MATERIALS AND METHODS

The study was conducted in pharmaceutical stores of Habro, Darolebu, Gemechis, Odabultum and Chiro woreda health offices which are found in Oromia region, west Hararghe zone, East Ethiopia. Except Gemechis Woreda, which has a high land climate condition, the rest 4 woredas have a mid-land climatic condition. The study was conducted from February 15-25, 2013. A district based prospective cross-sectional study design was conducted using check lists prepared based on WHO criteria to assess the pharmaceutical store management. through observation of storage facility conditions, arrangement of drugs and medical equipment's, format stock record cards, access of equipment's and furniture's, and other secondary record keeping methods like computer or ledgers. All functioning pharmaceutical store, item in the store, management tools and all complete documents for document review were included in the study whereas Non –functioning pharmaceutical store, item in the store, management tools and incomplete documents were excluded. Observational check list (data collection format) was used. The data was collected by the principal investigator and the check lists were filled by physical observation of the pharmaceutical store, items in the store, stock management tools and some questions were asked to a person in charge of store management. Data quality assurance measures for the clarity of check lists and completeness of the data were done before and after data collection process. The analysis was then performed by using scientific calculator. The collected data was kept confidential.

RESULTS

Storage facility conditions

All of the stores had ceiling and windows adequate for ventilation and adequate lighting. All of them had no air conditions, ventilators and separate store for ARVs. Out of 5 study stores, 2 of the stores have sufficient storage and reception area. Four of the stores were dry, clean and pest free while only one was not dry, clean and pest free. Three of the study stores had placement of door or windows with grills of iron bars to keep store safe and secure while two stores had no placement of door/or windows with grille or iron bars.

Table 1: Storage facility conditions of 5 Woreda health office pharmaceutical stores, west Hararghe zone, June, 2013

S. No.	Storage facility conditions	Yes	No
1	Roof ceiling and windows available	5	0
2	Air conditions installed	0	5
3	Ventilators installed	0	5
4	Adequate sighting	5	0
5	Sufficient storage area	2	3
6	Sufficient reception area	2	3
7	Dry, clean and pest free store	4	1
8	Placement of door /window/ grills or Iron bars	3	2
9	Separate store for ARVs	0	5

Availability of equipment's and furniture's

All of the stores had a table with two chairs for the store keepers. Four of the stores had thermometers for refrigerators while one of them had no thermometers. Out of the total five observed study stores two of them had sufficient shelves and wooden pallets while the rest three had no sufficient shelves and wooden pallets. Only one (Chiro woreda) had a lockable cabinet for narcotics and psychotropic drugs while the rest four had no a lockable cabinet for controlled drugs. All of the stores had no computer, ladder, refrigerator, freezer, fire extinguisher and wall thermometers.

Table 2: **Availability of equipment's and furniture's in the selected 5 woreda health office pharmaceutical stores, west Hararghe zone, Jun 2013**

S. №	Availability of equipment's and furniture's	Yes	No
		№	№
1	Sufficient shelves	2	3
2	Sufficient wooden pallets	2	3
3	Computers (s) available	0	5
4	Ladder available	0	5
5	Refrigerator available	0	5
6	Freezer availability	0	5
7	Wall thermometers	0	5
8	Thermometers for refrigerators	4	1
9	Fire extinguisher	0	5
10	Lockable cabinet	1	4
11	Office table with two chairs	5	0

Arrangement of drugs and medical equipment's

In this study, the arrangement of pharmaceutical products in the Woreda health office drug stores was also observed. Accordingly, all the 5 stores were properly labeled their shelves, arrange and issued the drugs and medical supplies on FEFO/FIFO basis and arrange the drugs according to pharmacologic- therapeutic order. None of them arranged their drugs according to alphabetical or pharmaceutical order. In 4 of the stores all drugs were arranged on shelves while in 1 (Odabultum) of the stores all drugs were not arranged on shelves. In 2 of the stores packages were placed on pallets where as in 3 of the stores packages were not placed on pallets. Out of the study stores, only 1(Darolebu) had adequate space for the movement of goods while 4 stores had no adequate space.

Table 3: The arrangement of drugs and medical equipment's in the selected5 woreda health office pharmaceutical stores, west Hararghe, Jun 2013

S. №	Arrangement of drugs and medical equipment's	Yes	No
		№	№
1	Arrangement of drugs a. Pharmacologic- therapeutic order	5	0
	b. Alphabetical order	0	5
	c. Pharmaceutical order	0	5
2	All shelves properly labeled	5	0
3	Arranging and issuing of drags and medical supplies on FEFO/FIFO basis	5	0
4	All drugs arranged on shelves	4	1
5	Packages placed on pallets	2	3
6	Adequate space for movement of goods.	1	4

Storage condition of pharmaceuticals

In all of the study stores expired/ damaged/ obsolete products were isolated, vaccines, sera, biological and blood products were kept in cold room and Freezers temperature was maintained and recorded. In 4 of the stores corrosive substances were kept separately and non-pharmaceutical products were not stored with drugs but in 1 (Odabultum) store corrosives were not kept separately and non-pharmaceutical products were stored with drugs. Medical supplies and equipment's were stored properly among 2 of the stores but there were not properly stored in 3 of the stores. Out of the total 5 stores, 4 of them were dry, adequately ventilated and shady whereas 1of the stores were not dry, adequately ventilated and shady and all of them were not stored combustible substances in fire proof area. Controlled substances were kept in securely locked cabined only in 1 (Chiro woreda) of the stores where as the rest 4 stores had no controlled substances and securely locked cabinet. In all stores wooden or metal buckets filled with sand were not used and room temperature was not maintained and recorded.

Table 4: **Storage condition of pharmaceuticals in the 5 selected Woreda health office pharmaceutical stores, west Hararghe, Jun 2013**

S. №	Storage condition of pharmaceuticals	Yes	No
		№	№
1	Dry, adequately ventilated and shady store	4	1
2	Controlled substances are kept in securely locked cabinet	1	4
3	Combustible substances are stored in fire proof area	0	5
4	Wooden or metal buckets filled with sand are used (if fire extinguisher is absent)	0	5
5	Corrosives kept separately	4	1
6	Freezer (s) temperature maintained and recorded	5	0
7	Room temperature maintained and recorded	0	5
8	Vaccines, sera, biological and blood products kept in cold room	5	0
9	Expired/ Damaged/ Obsolete pharmaceuticals isolated/	5	0
10	Medical supplies and equipment are stored properly	2	3
11	Non pharmaceutical products not stored with drugs	4	1

Stock management techniques

Regarding stock management, in all n = 5 of the study stores, essential drugs were available, reconciliation of drug receipts and issues and exchange of commodities with other health facilities were practiced. Among the total of 5 study stores, bin cards and stock cards were used, update, reconciliation of balance on bin and stock cards and physical inventory yearly or twice per year were done only in 2 (Habro and Chiro) but stock cards were not kept separately and not reflect max/min levels where as in the rest 3 stores there were no bin cards and stock cards available and physical inventory yearly or twice a year: but they used other tool like registration book, in place of stock cards for stock management. Out of the study stores, 3 stores were encountered an incidence of stock outs but not incidence of over stocking during the last three months while 2 stores were not encountered incidence of stock outs but they encountered incidence of over stocking during the last three months. All of the study pharmaceutical stores had no computer for stock management and there were no recent expired drug disposal event. Regarding personnel in charge of store management, there were a pharmacist in 1(Darolebu), a druggist in 3 and a nurse in 1 (Odabultum) of the study stores.

Table 5: Some stock management techniques in 5 selected Woreda health office stores, west Hararghe zone, Jun 2013

S. №	Stock management techniques	Yes	No
		№	№
1	Availability of enough essential drugs	5	0
2	Bin cards and stock cards used	2	3
3	Bin cards available in the store	2	3
4	Stock cards kept separately	0	5
5	Undated stock cards and Bin cards	2	3
6	Stock records reflect max/min levels	0	5
7	Computer are used for stock management	0	5
8	Reconciliation of balance on bin cards with stock cards and physical inventory-yearly or twice a year	2	3
9	Reconciliation of drugs receipts and issues	5	0
10	Any incidence of stock outs during the last there months	3	2
11	Incidence of over stocking during the last three months	2	3
12	Practice of commodity exchange with other health facilities	5	0
13	Recent expired drug disposal event during the last there months	0	5
14	Other tools used for stock management	3	2

15	Persons in charge of store management a. Pharmacist b. Druggist c. Nurse	 1 3 1	

DISCUSSION

The results of this finding regarding the adequacy of storage condition of the study stores revealed that all stores (n = 5) were protected from direct sunlight, roof ceiling, windows and functional locks were available and most of them (n = 4) were clean and no signs of pests but none of them had an essential drug list in the store. When comparing and rating these data with WHO criteria's provided for an ideal drug storage condition, the average scores for the study stores were about 5.6 which indicates that not adequate storage condition. Similar study conducted by WHO, in 2002, on the assessment of pharmaceutical sector in Ethiopia indicates that the percentage of public health facilities with essential drug list (Facility or regional EDL) were less than 1 % and on the average, the overall score for storage conditions were 6 and 8 on scale of 0-11 in public health facilities and regional drug stores, respectively[9]. Storage areas should be of sufficient capacity to allow the orderly storage of the various categories of materials and products; starting and packaging materials, intermediates, bulk and finished products, products in quarantine and released, rejected, returned or recalled products. Storage areas should be clean and free from accumulated wastage and vermin. There should be appropriate procedures for the clear up of any spillage to ensure complete removal of ant risk of contamination[3]. In contrast to the literature, all the stores had no separate store for ARVs, 3 (60 %) of them had no sufficient storage and reception area and 4 (80 %) had no adequate space for movement of goods. In this study there were no ladders, fire extinguisher/ wooden or metal buckets filled with sand refrigerators, freezer, computers and 4 (80 %) of the stores had no lockable cabinet for storage of controlled drugs stores and there were no pallets and sufficient shelves among 3 of them. But in the literature it is recommended that drug stores should have sufficient shelves, functional well thermometers refrigerators and locked cabinets in which controlled drugs are kept[2,10]. This indicates that there were no sufficient storage facilities in the study stores. The study tried to show that the arrangement and issuing of drugs in the study area were could in Habro, Darolebu, Gemechis and Chiro store but poor in odabultum store. Most of them were dry, clean and pest free, corrosives were separately kept and non-pharmaceutical products were not stored with drugs. In all stores expired /damaged/obsolete pharmaceuticals were isolated while vaccine was kept in cold room (in MCH department) and freezers temperature was maintained and recorded. And also in 2 of the stores packages were placed on pallets. Similarly, a WHO guide to good storage practices for pharmaceuticals recommends that Materials and pharmaceutical products should be handled and stored in such a manner as to prevent contamination, mix-ups and cross-contamination. The FEFO principle should be followed; rejected damaged and expired items should be withdrawn from usable stock and separated. The cold room temperature should be regularly monitored and recorded[11]. The study conducted in USA, city of new Jersey, in 1999 showed that increase in the MKT may cause significant decrease in the shelf-life for example, an increase in the MKT form 25^{o}c to 30^{o}c results in a decrease in the effective shelf – life of about 43 %, based on the temperature dependence used by the USP for atypical pharmaceuticals[12]. Similar to the literature, there were no air conditioner, ventilators and wall thermometers in all of the study areas. This may adversely affects the shelf-life of atypical pharmaceuticals during temperature fluctuations. All stocks should be checked before drugs and medical supplies are issued form the store. Inspecting packages for expired or damaged products and all original boxes and unopened bottles are in a good condition[13]. Similar to this there was a good practice of isolation of expired/ damaged/ obsolete/ products in all study areas but there were no expired drug disposal events. Regarding stock management, all the study subjects made reconciliation of drug receipts and issues. Bin cards and stock cards were avail be and used only in 2 (40 %) of the stores but they were not separately kept and not indicate the minimum/ maximum levels where as 3 (60 %) of the stores had never used bin cards and stock cards were not available in the store. But similar study done in the Kalahari region of Northern Cape; indicates that stock cards were successfully introduced in a number of sites. For instance, these cards have enabled the pharmacist of Karuman hospital to document the quantity of drugs used in each ward. The northern cope department of health is now applying the system across the province cards that record more detail are being introduced in the Eastern Cape. In contrast to this in majority of stores registration books were used as another tool for stock management.

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