

Optimizing the Medicine Procurement Process

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Abstract

Purpose: The major focus of the research was to improve and suggest cost effective medicines to the hospital by identifying, documenting and analyzing the various issues in drug utilization pattern. It also aimed to optimize the rational use of medicines in the selected Hospital in Tamil Nadu.

Approach: The Inventory Management techniques like ABC and VEN analysis were done on 414 medicines by utilizing the annual consumption and expenditure data extracted from the Hospital records.

Results: The research could identify the medicines (A category- ABC) which require stringent management managerial control and also identified the vital drugs (VEN) which should be made available at all times in the hospital in order to improve the hospital efficiency.

Keywords: Consumption; Utilization; Inventory Management; Categorization; Optimization.

1. Introduction

According to the Indian constitution, Health is the responsibility of state Government. The health care delivery in India has been envisaged at 3 levels namely - primary, secondary and tertiary level. The hospital care of government set-up is cheaper and accessible to rich and poor people. Hospital services at secondary level play a vital and complimentary role to the tertiary and primary health care systems and together form a comprehensive district based health care system. Primary healthcare denotes the first level of contact between individuals and families with the health system. According to Alma Atta Declaration of 1978, Primary Health care was to serve the community it served; it included care for mother and child which included family planning, immunization, prevention of locally endemic diseases, treatment of common diseases or injuries, provision of essential facilities, health education, provision of food and nutrition and adequate supply of safe drinking water. In India, Primary Healthcare is provided through a network of Sub centres and Primary Health Centres in rural areas, whereas in urban areas, it is provided through Health posts and Family Welfare Centres. The Sub centre consists of one Auxiliary Nurse Midwife and Multipurpose Health worker and serves a population of 5000 in plains and 3000 persons in hilly and tribal areas. The Primary Health Centre (PHC), staffed by Medical Officer and other paramedical staff serves every 30000 population in the plains and 20,000 persons in hilly, tribal and backward areas. Each PHC is to supervise 6 Sub centres (P K Abdul Kareem, 1996). Secondary Healthcare refers to a second tier of health system, in which patients from primary health care are referred to specialists in higher hospitals for treatment. In India, the health centres for secondary health care include District hospitals and Community Health Centre at block level. Pharmaceuticals comprise a vital place in the healthcare system and contributes a major significant share in the health expenditure. Medicine or therapeutic drugs can be defined as chemical compounds or substances that are administered to living beings as an aid for treatment, diagnosis, prevention of diseases and other abnormal conditions, relief to

pain, to improve or control any pathological or physiological state. With the advent of essential drug concepts, essential medicines defined by WHO need to be dispensable and satisfy the requirements of the majority of the population. Thereby, the drugs need to be available and accessible whenever required, in all appropriate dosage forms at affordable pricing. Improvement of pharmaceutical services and inventory management can ease in more efficient and better quality of health care services. The World Health Organization (WHO) in 1977 defined drug utilization research (DUR) as the study of the "marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical, social and economic consequences" (World Health Organization 2003). Drug utilization research helps in describing the patterns of drug use in specific population, defines the likely problems, analyzes the problems, establishes decisions on how to solve the problems and assesses the impact of the interventions" (World Health Organization 2003).

The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. Pattern of drug utilization is studied to estimate the incidence and prevalence of drug use, to analyze that the recommended guidelines for prescription are being followed or not (Kunders GD, Gopinath S, Katakam, Kidwai M. Pillans PI). For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose, together with the correct information, at an affordable price. Without knowledge of how drugs are being prescribed and used, it is difficult to initiate a discussion on rational use of drug or to suggest measures to improve prescribing habits (Gupta S, Kant S, 2000). Throughout last few years, plentiful research studies have been conducted globally to determine the safe and effective drug utilization specifying that inappropriate drug use is a universal phenomenon.

Drug utilization pattern varies from countries to countries and even among hospital within the same country and sometime within the same hospital at different point of time possibly because of changing disease trends over a period of time. (Das JK, Ramathan). The pharmacy is one of the most extensively used therapeutic facilities of the hospital and one of the few areas where a

large amount of money is spent on purchases on a recurring basis. This emphasizes the need for planning, designing and organizing the pharmacy in a manner that results in efficient clinical and administrative services. The goal of the hospital supply system is to ensure that there is adequate stock of the required items so that an uninterrupted supply of all essential items is maintained (Kunders GD, Gopinath S, Katakam). A study conducted by the Department of Personnel and Administrative Reforms in India has revealed that not only does the quantity of medicines received fall short of the requirement but also the supply is often erratic. Even common medicines are out of stock and remain so for a considerable period. (Kidwai M) Inventory control in hospital pharmacy is very essential in a developing country like India (Gupta S, Kant S). As resources are limited, it is essential that the existing resources be appropriately utilized. Stocking hospital pharmaceuticals and supplies can be expensive and tie up a lot of capital, and bringing efficiencies to such important cost drivers - often 30-40% of a hospital's budget - can present meaningful savings (Health Facility Manage). Thus, a hospital must establish efficient inventory system policies for normal operating conditions that also ensure the hospital's ability to meet emergency demand conditions (Duclos LK). But, it is impossible and unnecessary too to monitor every drug used in the health system. High-cost and high-volume drugs come in priority, whose intervention is likely to cause the greatest clinical and economic impact. In the whole process, it is important to trace first the costliest medicinal products i.e., those that consume the major portion of the budget, and then design a strategy to further study and identify their use pattern. The study of use pattern will help in designing appropriate corrective measures. ABC analysis is an important tool used worldwide, identifying items that need greater attention for control (Gupta S, Kant S., Gopalakrishnan P, Sundaresan M). ABC analysis is a method of classifying items or activities according to their relative importance. The analysis classifies the items into three categories: the first 10-15% of the items account for approximately 70% of cumulative value (cost) (category A), 20-25% are category B items that account for a further 20% of the cumulative value and the remaining 65-70% are category C items, amounting for a mere 10% of the total value. (Gupta S, Kant S, Thawani VR, Turankar AV, Sontakke SD, Pimpalkhute SV, Dakhale GN, Jaiswal KS). The limitation of ABC analysis is that it is based only on monetary value and the rate of consumption of the item. In a hospital, an item of low monetary value and consumption may be very vital or even life saving. Their importance cannot be overlooked simply because they do not appear in category A. Therefore, another parameter of the materials is their criticality (Das JK). VED analysis is based on critical values and shortage cost of the item. Based on their criticality, the items could be classified into three categories: vital, essential and desirable. If essential items are not available beyond a few days or a week, the functioning of the hospital can be adversely affected. The shortage of desirable items would not adversely affect patient care or hospital functioning even if shortage is prolonged (Das JK, Gupta S, Kant S., Vaz FS, Ferreira AM, Kulkarni MS, Motghare DD, Pereira-Antao I.). A combination of ABC and VED analysis (ABC-VED matrix) can be gainfully employed to evolve a meaningful control over the material supplies. Category I includes all vital and expensive items (AV, BV, CV, AE, AD). Category II includes the remaining items of the E and B groups (BE, CE, BD). Category III includes the desirable and cheaper group of items (CD) (Vaz FS, Ferreira AM, Kulkarni MS, Motghare DD, Pereira-Antao I). In the present study, ABC, VED and ABC-VED matrix analysis of the pharmacy store of a secondary hospital was performed to identify the categories of drugs needing stringent management control. (Devnani M, 2008)

2. Research methodology

The method of procurement of drugs in the sampled hospital is as follows: The demand for any given drug is generated by a group

of doctors who belong to different specialities (Drug Purchase group). This list is forwarded to another group (Stores Management) comprising of doctors, purchase personnel and pharmacists who scrutinize the stock and the transaction history. Subsequently, this is presented to another group (Quality Engineering) which verifies the transaction history and estimates the projected need for the next one year or six months and finally approves the quantity to be purchased. Subsequently the list is forwarded to the purchase unit. There are three different procedures that are adopted for the procurement of drugs: a) For a given annual quantity, a long term contract is signed with different suppliers which are called as Rate Contract (RC). b) Every time there is a need to buy a given drug, an indent is raised for the same and it is processed through the committees mentioned above and the file is forwarded to the purchase unit. Then an order is prepared audited and forwarded to the supplier who had signed the rate contract. These drugs are called as the drugs under rate contract. In this method the same method could be procured from the same supplier multiple times at the same rate within a stipulated time period (usually one year). c) Alternately the drugs are also procured on a "one time purchase" by inviting quotes from different suppliers. Based on the competitiveness of the price and the quality of the drug the purchase order is placed with the most reasonable and technically acceptable quote. This method is called as manual tendering. Sometimes this is done through an online process called as e-tendering. The specific objectives of this study were to:

- 1) To generate the estimate of consumption (annual) of each drug.
- 2) The drugs belong to different classes; they could be classified based on their nature; viz., the diseases for which they are used. These drugs could also be divided based on which speciality uses this drug; viz., ophthalmology, cardiology, paediatrics, orthopaedics, general medicine and so on. The aim also is to identify a pattern of consumption of each of these categories and to analyze the annual consumption of items of pharmacy and expenditure incurred on them for the year 2015-16.
- 3) To evolve a priority system based on ABC and VED and ABC-VED matrix analysis.
- 4) To identify the item categories requiring greater supervisory monitoring.

The data of annual consumption and expenditure incurred on each item of the pharmacy for the financial year 2015-16 were collected. The data were then transcribed in an MS Excel spreadsheet. The statistical analysis was carried out using the MS Excel statistical functions.

3. Data analysis and interpretation

3.1. ABC analysis

In this study, ABC cost analysis was conducted on 414 medicines. The annual expenditure of medicines was arranged in the descending order. Then, the cumulative percentage of expenditure and the cumulative percentage of number of medicines were calculated. Medicines accounting to 70% of the cumulative cost were labelled as category "A"; medicines accounting to 20% of cumulative cost were labelled as category "B"; and medicines accounting for 10% of cumulative cost as category "C". (Table No 1)

Table 1: ABC Analysis

ABC Category	Number of Items	% of Items	Annual Expenditure (TL)	% of Annual Expenditure
A	98	23.7%	62472648	70.3%
B	95	22.9%	17688019	19.9%
C	221	53.4%	8726816	9.8%
Total	414	100.0%	88887483	100.0%

3.2. VEN analysis

VEN analysis was conducted based on the criticality of medicine. VEN is used to determine drug's clinical importance, usually classified by pharmacists in a hospital once a year to prioritise procurement. VEN helps pharmacists to determine which items should be kept in stock and which can be ordered when needed. "V" is for vital drugs that are needed for clinical therapy. "E" type drugs are moderately important drugs to cure less severe diseases than V items. "N" are non-essential drugs that are least important drugs and are seldom used in the treatment of illness. (Table No 2).

Table 2: VEN Analysis

VEN Category	Number of Items	% of Items	Annual Expenditure (TL)	% of Annual Expenditure
V	176	42.5%	32866742	37.0%
E	195	47.1%	44249213	49.8%
N	43	10.4%	11771528	13.2%
Total	414	100.0%	88887483	100.0%

3.3. ABC-VEN matrix analysis

ABC-VEN analysis is useful for determination of medicines that need highest attention and strict control for effective and optimal use of funds and prevent stock-out situations of drug store. The ABC-VEN matrix formulated by cross-tabulating the ABC and VEN analysis. (Table No 3)

Table 3: ABC-VEN Analysis of Medicines

ABC-VED Matrix	V			E			N			Total Number of Items	Total Annual Expenditure (TL)	Percentage of Items
	Combined Category	Number of Items	Annual Expenditure (TL)	Combined Category	Number of Items	Annual Expenditure (TL)	Combined Category	Number of Items	Annual Expenditure (TL)			
A	AV	33	22428048	AE	55	31210600	AN	10	8834000	98	62472648	70.3%
B	BV	37	6680710	BE	49	9330240	BN	9	1677069	95	17688019	19.9%
C	CV	106	3757984	CE	91	3708373	CN	24	1260459	221	8726816	9.8%
Total		176	32866742		195	44249213		43	11771528	414	88887483	100.0%

From the resultant combination, three categories were classified (I, II and III).

Category I: AV+BV+CV+AE+AD

Category II: BE+CE+BD

Category III: CD

The findings of the VEN analysis are shown in Table 2. On VEN analysis, 176 (42.5%), 195(47.1%) and 43 (10.4%) items were found to be V, E and N category items, respectively, amounting for TL 3,28,66,742 (37%), TL 4,42,49,213 (49.8%) and TL 1,17,71,528 (13.2%) of the expenditure of the medicines (Table2).

The research findings of the ABC - VEN analysis are shown in Table 3. The medicines were allocated to nine different subcategories (AV, AE, AN, BV, BE, BN, CV, CE and CN) using ABC-VEN matrix analysis. These nine were further grouped into three main categories (I, II and III).

There were 241 (58.2%) items in category I, 149 (36%) in category II and 24 (5.8%) in category III, amounting for TL 7,29,11,342 (82.03%), TL 1,47,15,682 (16.56%) and TL 12,60,459 (1.42%) of expenditure of the medicines respectively (Table 4).

Table 4: ABC-VEN Matrix Analysis of Medicines

Category	Number of Items	% of Items	Annual Expenditure (TL)	% Annual Expenditure
I (AV+AE+AN+BV+CV)	241	58.2%	72911342	82.03%
II (BE+CE+BN)	149	36.0%	14715682	16.56%
III (CN)	24	5.8%	1260459	1.42%
Total	414	100.0%	88887483	100.00%

The management of class I (241 items) vital medicines would help in keeping a check on the annual budget and their availability. Category I medicines are either vital or expensive, and should be managed with the greatest attention. The consumption and its effect on the stock level should be monitored continuously, and the safety stock must be kept low to reduce carrying cost. These medicines should always be available in stock since they are very important. Low safety stock should be maintained to prevent the locking up of capital by these medicines. A strict control is necessary for category I medicines, because all the vital and costly items. The management of class II (149 items) could help in providing all the essential medicines. Category II consists of essential medicines. These medicines can receive a little less priority, but their consumption must also be watched with moderate control. Category III (24 items) consists of medicines that are non-essential and cheap which are lowest in the hierarchy of priority. Thus these medicines should be purchased periodically.

4. Conclusion

During the year 2015-16, items of approximately Rs. 88887483 were issued by the pharmacy store of the secondary hospital. This necessitates application of scientific inventory management tools for effective and efficient management of the pharmacy stores, efficient priority setting, decision making in purchase and distribution of specific items and close supervision on items belonging to important categories. ABC and VED analysis identifies the drugs requiring stringent control for optimal use of funds and elimination of out-of-stock situations in the pharmacy. ABC-VEN analysis should be applied routinely in the drug store as it will help to improve the use of the limited resources and improve patient care. The study identified the Class A drugs where the hospital management should increase managerial control as it is in this

class that major savings can be achieved. VEN classification of all the drugs identified the vital drugs which should be available at all times in the hospital. The study also identified Category I drugs which are expensive and vital and these should be available at all times to avoid more expensive emergency purchases. The drugs listed in the CE category can be purchased in bulk as these are cheap and essential and this will help reduce ordering costs. These measures will help to improve drug selection and control in the hospital. Class B drugs can be handled by middle level managers, whereas Class C drugs will require minimum control and these can be delegated to lower level managers. Class C drugs do not contribute significant savings. Categorization of drugs by ABC-VEN matrix will assist to narrow down to few drugs where major savings can be achieved.

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