Analysis of Inventory of Drug and Pharmacy Department of a Tertiary care Hospital

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Abstract: *The health care in modern days has become more complex sophisticated and more expensive in terms of cost of drugs, surgical equipment and hospital stay. The study was undertaken with the prime objective of studying the drugs stored in pharmacy department according to their cost and criticality. To access the inventory of drugs at SKIMS, the area of study included- main drug and pharmacy store. It was a retrospective study carried out for a period of one year from 1-4-2005 to 31-3-2006. The study revealed that 156 items in total were stored during the study period. The value of annual consumption of the inventory was worked out to be Rs.9303507.Out of these drugs,15.38% consumed 70% of annual drug expenditure comprising group 'A' items. 22.43% consumed 20% of annual drug expenditure forming group 'B' items. Rest 62.17% items consumed only 10% of total budget, classified as group 'C' items. VED classification of the inventory revealed that out of 156 items stored, 19.23% were considered 'Vital' by the constituted medical panel; 39.10% were 'Essential' and the rest, 41.66% were considered 'Desirable'. The results of the study are expected to guide the management to delegate the responsibility to different officers and apply the "Principle of Management by Exception". Moreover it will facilitate the management in controlling the cost and ensure the availability of vital and essential items in the hospital which will be in the interest of patients and the administration.*

INTRODUCTION

The health care in modern days has become more complex sophisticated and more expensive in terms of cost of drugs, surgical equipment and hospital stay. With rise in per capita income of general population and also with rise in the level of general information and education of people, the demand for more sophisticated medical care has come up. However, the rise in hospital costs has been substantially more than the rise in general consumer price. "Since 1950, the cost of one day's stay in a hospital has increased more than 1,000 percent compared with 135 percent climb in the consumer price index".[1]

Economics of materials control is a matter of self presentation in today's competitive environment. Materials control is a matter of rupee control; it is axiomatic that stringent controls must be placed on higher value items. The management of inventory pares the avenues for optimizing the costs of Medicare services besides making available materials to the patients which increase the quality of health care services.

Out of materials, drugs consume a major portion of hospital budget. The basic social issue confronting medical practice today is how to improve the organization of utilization of the fruits of medical knowledge, the technological advancement and managerial innovation in Health Care Institutions on most economical terms. The rising hospital cost and methods to contain this have attracted the attention of one and all be it the professionals, the public and private sector management and even the trade union activist.[2]

The hospital management has to ensure the availability of various drugs round the clock as these are essential and vital for patient care. The Pharmacy Departments are most often charged with responsibility for managing drug and delivery system costs. Systems should develop to utilize drug and delivery resources in a cost effective fashion. The pharmacy management team should focus on developing effective strategies to maximize leverage of drugs and human resource cost.

Since there is widespread concern about the cost of health care, a variety of cost containment initiatives have been pursued.

The main health concern now-a-days is allocation of resources on a rationale basis. Management must therefore lay stress on the cost analysis and formulate guidelines for the definitions of cost and established standards through cost analysis. Cost analysis is a research tool for the financial management in a hospital. The objective of the study was to analyze the drugs stored in Drug and Pharmacy of Sher-i-Kashmir institute of Medical sciences according to their cost and criticality (ABC and VED analysis).

MATERIAL & METHODS

It was a retrospective study carried out for a period of one year from 1-4-2005 to 31-3-2006. The data was collected by checking the stock registers and the bills of the supplies of main drug store. The data included only those drugs which were provided to the patients by the hospital and does not include the drugs for sales counter, surgical items, disposables, and dressing items. The researcher visited the main drug store daily on working days and the items were recorded on predesigned and pretested proforma developed for the same purpose. The proforma enlisted the inventory of drugs stored for the study period as well as additional characteristics like cost per unit, units stored as well as the total cost for each drug. The proforma also categorized drugs in accordance with VED analysis. The total cost of the drugs stored was entered on the proforma in descending order with highest cost item at the top and lowest cost item at the bottom. The cumulative cost was calculated and entered on the same proforma. Cumulative cost of the drugs was compared with actual no. of drugs and the results drawn on a graph showing percentage of A, B and C category drugs.

A-category being the highest cost items.
B-category the intermediate cost items and
C-category the lowest cost items.

To study the inventory of drugs on the basis of their criticality (VED analysis), a team of five medical experts including a physician, a surgeon, a cardiothoracic surgeon, a gastroenterologist and a cardiologist was constituted. The inventory of drugs stored for the study period was presented to each member of the team for categorization of drugs on the basis of VED analysis.

The final list of drugs arranged on the basis of VED analysis by medical experts was analyzed for concurrence of opinion regarding classification. Up to 60% concurrence was taken as cutoff limit. Drugs having concurrence of opinion less than 60% were not considered for the category.

RESULTS

Cost accounting has become an essential part of healthcare management. The increasing costs have forced the healthcare managers to know the costs of different alternatives, approaches to providing care. These costs can only be known if the organization has the knowledge and capability to measure.[3]With the advent of advanced medical technology and drugs, the

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expenditure on health-care delivery is increasing disproportionately as compared to the resources available. Armed forces medical services (AFMS) provide state of art medical care through a network of over 100 hospitals with a central procurement system. In one of their studies, they found that the drugs consume approximately 60% of the total consumable budget.[4, 5] This necessitates effective and efficient management of medical stores. Efficient priority setting, decision making in purchases and distribution of specific drugs, close supervision of drugs belonging to important categories, and prevention of pilferage depends on drug and inventory management. In a study from a large state funded hospital, control measures for expensive drugs have resulted in 20% savings.[6]

Inventory control is the tool of management which is used to maintain an economic minimum investment in materials and products for the purpose of obtaining a maximum financial return. ABC analysis is the analysis of stores on cost criteria. VED analysis analyses inventory on the basis of criticality in relation to the functioning of the hospital. The study revealed that 156 items in total were stored during the study period. These items included the drugs provided by the hospital to the patients and does not include the drugs for sales counter, surgical items, disposables and dressing materials. The value of annual consumption of the inventory was worked out to be Rs.9303507/-.

This amount does not include the inventory carrying cost, inventory storage cost and inventory acquisition/replacement costs.

Out of these drugs, 24 items (15.38%) consumed 70% (Rupees 6512454) of annual drug expenditure comprising group 'A' items.35 items (22.43%) consumed 20% (Rs.1860701) of annual drug expenditure forming group 'B' items. Rest 97 items (62.17%) consumed only 10% (Rs.930350) of total budget, classified as group 'C' items- Table 1.

Table-1: *ABC analysis of drugs at SKIMS Drug and pharmacy deptt.*

Drug analysis	Category			Total
	A	B	C	
Total annual consumption(%)	70	20	10	100
Value of annual consumption(Rs)	6512454.9	1860701.4	930350.7	9303507
No. of items	24	35	97	156
%age of items	15.38	22.43	62.17	100

The annual drug consumption in terms of rupees was plotted against the inventory of items stored during the study period and is depicted in Fig-1.

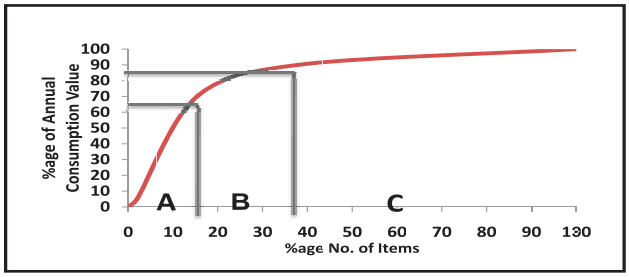

Figure 1: *ABC Analysis of drugs at SKIMS Drug & Pharmacy Department*

For ABC analysis it is the annual value of consumption which is taken into consideration and has nothing to do with the unit cost of the item.

The curve clearly depicts the percentage no. of items (A=15.38%, B=22.43, C=62.70%) and their percentage annual consumption value (A=70%, B=20%, and C=10%).

VED classification of the inventory depicted in Table-2 revealed that out of 156 items stored 30 items(19.23%) were considered 'Vital' by the constituted medical panel; 61 items (39.10%) were 'Essential' and the rest 65 items (41.66%) were considered 'Desirable'. Out of 30 vital items, 10 items had 100% concurrence of opinion of the medical panel, 7 items had 80% concurrence while 13 items had 60% concurrence of opinion on drug classification. 61 items which were considered essential, 25 items had 100% concurrence of opinion of medical panel for being included as 'Essential items'. Only 33 items of the remaining 65 items considered desirable had 100% concurrence of opinion of the medical panel.

Table-2: *Distribution of drugs into VED classification.*

Category of drugs	No. of drugs	% of drugs	Concurrence of medical panel on drug classification		
			100%	80%	60%
Vital	30	19.23	10	7	13
Essential	61	39.10	25	20	16
Desirable	65	41.66	33	20	12
Total	156	100	68	47	41

The ABC-VED matrix classification of the inventory depicted in Table-3 reveals that 49 items (31.41%) out of 156 items constituted Category-I items.10 items of Category-I items were both high cost and vital, 11 items were high cost and essential, 8 items were high cost and desirable. Category-II items (39.10%) was constituted by intermediate cost and essential items numbering 17, intermediate cost and desirable items numbering 11 while 33 items were low cost and essential.

Table-3: *Showing ABC-VED matrix*

Category of Drugs	V	E	D	Matrix Classification
A	(AV) 10	(AE) 11	(AD) 8	Category-I (31.41%)
B	(BV) 9	(BE) 17	(BD) 11	Category- II (39.10%)
C	(CV) 11	(CE) 33	(CD) 46	Category -III (29.48%)

Category-III, items (29.48%) numbered 46, were low cost and desirable items.

DISCUSSION

The rising cost of the health care has become a matter of great concern allover the world. Today's healthcare is more complex, more sophisticated and it is hoped to be more effective. Increase in costs of hospital care, modern technology, inflation, increasing demands and expectations of public are necessitating the development of financial policies and mechanisms. The main healthcare concern nowadays is development of resources on rationale basis.

Approximately 35% of the annual hospital budget is spent on buying materials including drugs. This necessitates effective and efficient management of medical stores. Efficient priority setting, decision making in purchase and distribution of specific drugs, close supervision on drugs belonging to important categories, and prevention of pilferage depend on the drug and inventory management.

ABC analysis of the drugs stored at Drug and Pharmacy deptt. of SKIMS revealed that 156 items were stored in total during the period of study. The annual value of consumption for the inventory worked out to be Rs.9303507. Of these drugs 15.38% items (n=24) consumed 70% of annual drug expenditure comprising group "A" items. 22.43% items (n=35) consumed 20% of annual drug expenditure, forming group "B" items. Rest 62.17% inventory consumed only 10% of the annual budget and were classified as group "C" items.

Research by Lt.Col.R Gupta et al in 2007, studied ABC and VED analysis in medical stores of a 190 bedded hospital. The results of the study showed that 14.4% (n=47) items consumed 70% of annual drug consumption comprising group "A" , 22.46% (n=73) items 20% of annual drug consumption forming group "B" items and rest 205 (63.7%) drugs merely consumed 10% of the annual drug expenditure, grouped as "C" items. The findings of the study are

in complete agreement with the findings of the present study.
Another study inline with the findings of present study by Ridhi Prakash Doshi et al observed that about 70% of the annual drug expenditure was on 35 drugs, 20% on 56 drugs and 10% on 308 drugs.[7]
The drugs belonging to group "A" category should be controlled strictly by top management of the institution. The group "B" items require a moderate control by the middle level managers while the "C" items can be left for the lower management as it requires lesser control measures for order and purchase.
Also in line with the findings of the present study, research by Ashraf Khan et al at a tertiary care institute revealed that cumulative cost of Rs.87 lac was spent on 198 items stored during the period of study.[8]
Most of drug budget was spent on "A" items which was 75% and rest 25% on "B" and "C" items which was found as 18% and 7% respectively. Further in comparison with the results of present study, research by D Mario et al observed that 822 drugs were stored during the period of study. Out of 822 drugs, 10.83% were classified as "A" category and consumed around 69.82% of the annual budget. "B" category items constituted 20% and consumed 20.13% of annual consumption budget. Group "C" items constituted 69.10% of the total inventory and consumed 10.05% of the annual budget.
VED classification of the inventory revealed that out of 156 items stored,30 items (19.23%) were considered "Vital" by the constituted medical panel; 61 items (39.10%) were "Essential" and the rest 65 items (41.66%) were considered "Desirable". Out of 30 vital items, 10 items had 100% concurrence of opinion of the medical panel, 7 items had 80% concurrence while 13 items had 60% concurrence of opinion of the constituted medical panel on drug classification. 61 items which were considered essential, 25 items had 100% concurrence of opinion of the medical panel for being included as essential items.
Only 33 items of the remaining 65 items considered desirable had 100% concurrence of opinion of the medical panel. Lt.col.Gupta et al in their research observed that 24 (7.3%) items constituted vital, 160 (49.3%) items were considered essential and the rest 141 (43.4%) were considered desirable. Inline with the findings of the present study, Ridhi Prakash Doshi et al also observed that 13% (n=54) drugs were vital for the patients life, 51% (n=203) drugs were essential and 36% (n=142) were considered desirable.
The ABC-VED matrix revealed that 10 items of Category-I drugs were both high cost and vital, 11 items were high cost and essential and 8 items were high cost and desirable.
Category-II items were constituted by intermediate cost and essential items (n=17), intermediate cost and desirable items (n=11), and 33 items were low cost and essential.
The Category-III items were both low cost and desirable. Inline with the findings of the present study, Lt.Col.Gupta et al observed that 68 items were classified as Class-I items, 159 items constituted Class-II, while 98 items were constituted as Class-III.
In a comparable study by Sikder SK et al ABC-VED matrix shows that out of 292 items, 63 (21%) items were Class-I, 164 items (56%) Class-II and 65 items (22%) were Class-III. In agreement with the findings of the present study, research by Ridhi Prakash et al showed that Category-X consists of expensive and vital drugs accounting for 20.6% of drugs. Category-Y consists of less expensive and essential drugs accounting for 50.9% and Category-Z consists of cheap and non-essential drugs accounting for 28.6%.

CONCLUSION

The study has analyzed the inventory of drugs as per their cost and criticality. It is expected to guide the management to delegate the responsibility to different officers and apply the ***"Principle of Management by Exception"***. Moreover it will facilitate the management in controlling the cost and ensure the availability of vital and essential items in the hospital which will be in the interest of patients and the administration. It is also suggested that the sales counter inventory be also analyzed which involves more costly drugs and have much more financial implications.

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