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Original Research Article

ABC analysis of anti cancer drugs in a tertiary care Employees' State Insurance Corporation Hospital in Delhi

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ABSTRACT

Background: Material management is co-ordinated activities comprising of planning, acquiring, storing and controlling the supply of various items for optimal use. Effective inventory management can bring about a substantial decrease in expenditure. ABC analysis categorizes all items based on their annual drug expenditure into three categories A, B and C for better control by different level managers.
Methods: ABC analysis for anticancer drugs was done in ESIC Hospital, Basaidarapur which is a tertiary care hospital of ESI Corporation in Delhi. Total number of drugs analysed were 98 with total annual expenditure of Rupees 5.77 crores approximately.
Results: 12.2% (n=12), 16.3% (n=16) and 71.4% (n=70) items were found to be in A, B and C categories respectively.
Conclusions: ABC analysis identified the drugs which need more strict control by top level management. Inventory control techniques should be an integral part of any hospital store.

Keywords: Hospital store, Inventory management, ABC analysis, Anticancer drugs, ESI corporation

INTRODUCTION

Material management is co-ordinated activities comprising of planning, acquiring, storing and controlling the supply of various items for optimal use keeping in mind the organisational goals as well as requirement of customers (patients in case of hospitals). Materials management aims to provide the right goods, at the right price, at the right time to maintain a desired service level at minimum cost. It is estimated that materials in hospitals may cost from 30 to 40 per cent of the total budget.[1] Pharmacy is one department where much of this cost is incurred that too on recurring basis. Anticancer drugs also comprise a big chunk of pharmacy budget as number of patients are increasing and cost of anticancer drugs is also very high most of the times. Resources are scarce as is management time, so it is pertinent to have good material management practices for optimal utilisation of organisational resources. Inventory is an idle resource of any kind having an economic value.[1] Effective inventory management can bring about a substantial decrease in expenditure.[2] There are many inventory management techniques viz. ABC analysis, VED analysis, FSN analysis, SDN analysis etc. based on different criteria used. ABC analysis, also referred to as Always Better Control, is an intrinsic part of materials management and it categorizes all items based on their annual consumption cost into three categories A, B and C. It is based on the principle that a small number of items represent a large percentage of the cost value, in contrast a large percentage of the items represent only a small portion of the cost value.

METHODS

The present study is a descriptive study done in ESIC Hospital, Basaidarapur which is a tertiary care hospital of ESI Corporation in Delhi. The study was done from secondary data collected from the hospital store for the year 2016. The data was collected for unit cost, annual consumption and total expenditure incurred on anticancer drugs for the year 2016 for patients attending as in-patients as well as out- patients. The collected data contained unit cost of medicines along with number of units consumed during the year. The total data comprised of 119 drugs, but for 21 drugs either unit cost or no. of units used during the year was incomplete. So in all data for 98 drugs was analysed which were used during the year either procured from central drug store or purchased locally as and when required by patients. After transferring the data, statistical analysis was done using MS Excel statistical functions and ABC analysis was done based on annual drug expenditure.

ABC analysis

The total annual drug expenditure (ADE) for each drug was calculated by adding the annual expenditure on each drug. The drugs were then arranged in decreasing order of annual drug expenditure for each drug. After this, the cumulative cost of all items was calculated along with cumulative percentage of total number of items and cumulative percentage of expenditure on anticancer medicines. The drugs were then categorized into A, B and C categories based on total annual expenditure considering an expenditure of 70%, 20% and 10% of cumulative cost respectively.

Since most of the anticancer medicines will fall under essential category and very less in vital or desirable categories, hence VED analysis was not done in this study.

RESULTS

The total number of anticancer drugs analysed for the year 2016 was 98. The total cost incurred on these drugs during the year was Rupees 57740364.56 (Rupees five crore seventy seven lac forty thousand three hundred sixty four and paise fifty six only).

ABC analysis

The total annual drug expenditure (ADE) for each drug was calculated by adding the annual expenditure on each item and percentage of drugs in specific range against annual drug expenditure were calculated as shown in (Table 1).

Table 1: Percentage of drugs in specific range against ADE (year 2016).

Drug percentage	Total no. of drugs	ADE (in Rupees)	ADE (%)
10	10	37833077	65.5
20	20	48690176	84.3
30	29	52460978	90.8
40	39	55156786	95.5
50	49	56576007	97.9
60	59	57295640	99.2
70	69	57556938	99.6
80	78	57679623	99.8
90	88	57732408	99.9
100	98	57740365	100

Table 2: ABC analysis of anticancer medicines (year 2016).

Category	Number of items	Percentage of items	Total annual consumption (in rupees)	Percentage of total annual consumption
A	12	12.2	40405454.7	69.98
B	16	16.3	11747017.5	20.34
C	70	71.5	5587892.4	9.68
Total	98	100	57740364.5	100

On ABC analysis, 12.2% (n=12), 16.3% (n=16) and 71.4% (n=70) items were found to be in A, B and C category items, respectively. The 'A', category drugs amounting for 69.98% (Rs. 40405454.7) of the total annual expenditure, 'B' category drugs amounting to 20.34% (Rs 11747017.5) of the total annual expenditure and 'C' category drugs amounting to 9.68% (Rs. 5587892.4) of total annual expenditure on anticancer drugs (Table 2). There is slight variation from actual calculation of 70%, 20% and 10% of cumulative cost which is acceptable.

DISCUSSION

"Vital few-trivial many" is absolutely right phrase used for material management as there are hundreds of items required in a tertiary care multispecialty hospital. The hospital manager should try to identify these few vital drugs and need to have tight control over them through inventory control techniques for better management.[3] It has been estimated that apart from salaries of staff which constitute major expenditure for a large hospital, the expenditure on materials and supplies including the medicines is about one third of annual hospital budget. In any large hospital most of the budgetary outlay (excluding salaries of staff), is spent in the procurement of medicines.[4] Out of total budget on materials and supplies including the medicines, approximately two third is spent on medicines.[5] This huge amount spent on medicines in a large hospital can be controlled reasonably with better planning, organising and management of hospital store by hospital administrators. By better control, we mean there should not be shortage of any essential drug as well as no drug should expire for want of use. The right drug should be available in right quantity at right place and right time at right cost.

Anticancer drugs comprise a big chunk of pharmacy budget due to increase in number of cancer patients over the years and very high cost of many of the anticancer drugs. Newer anticancer drugs are being developed with companies incurring great expenditure on research leading to costly drugs to the patients. Cost of different medicines vary widely and annual consumption cost of medicines differ significantly, so effective management of store is necessary to ensure optimal use of money spent on these drugs.

Inventory control is a scientific system by which we identify what to order, when to order, how much to order, and how much to stock so that purchasing costs and storing costs are kept as low as possible.[6] There are many techniques of inventory control viz. ABC analysis, VED analysis, FSN analysis, SDE analysis etc. Of all the inventory control systems ABC and VED matrix are most suitable for medical stores**.**[5] In ABC analysis which is based on Pareto principle, the drugs are categorized into three categories based on annual consumption cost of all drugs under consideration. 'A' items comprise of 10% of drugs but consume about 70% of the budget, next 'B' category items comprise of 20% of drugs and consume about 20% of the budget while rest 'C' category items though comprise of 70% of drugs yet consume only about 10% of the budget. So it is desired that the 'A' category items should be under control of top hospital management, the 'B' category items should be under control of middle hospital management and 'C' category items should be under control of lower hospital management for better control of hospital store.

Several studies conducted at different places have identified that inventory management using scientific techniques as enumerated above can bring down the cost as well as improve patient care by making right drugs available at right time.[7,8] In one of the study it was concluded that inventory control techniques with review and control of expensive drugs brought about 20% savings on expenditure.[2]

ESIC is providing oncological management to its beneficiaries through tie up with different private hospitals. Oncology services are covered under super specialty category. For super specialty entitlement, the insured person should be in ESIC for at least 2 years and should fulfill other criteria also. The drugs are only given to the patient if he/ she is entitled for super specialty services. The various drugs prescribed by these tie up hospitals are procured by ESIC hospital from where the patient was referred and given to patients to be used at tie up hospitals. As discussed above many of the anticancer drugs are very costly and some are not so costly but in great use i.e. the number of units used during the year was very much. This causes big expenditure for the organisation. Making use of annual expenditure incurred on various drugs and using inventory control techniques, the hospital store can be managed in an efficient way. So, this study was conducted in a 600- bedded multispecialty hospital of ESI Corporation in Delhi having tie up super specialty oncology services to assess the hospital management using ABC analysis and suggest ways to improve these services.

There are many issues with anticancer drugs at this hospital as though some of the anticancer drugs are being provided through rate contract, still many of drugs are locally purchased and there is a substantial amount being incurred on anticancer drugs for the reason cited above like cost of drugs and increasing no. of cancer patients in the society. Prior to this study no inventory control technique was being used in the hospital store, so it was essential to do ABC analysis to identify drugs which need to be under direct control of top management before it is issued to the patient. Though it is good to do VED analysis also as many essential and desirable drugs also fall into A category drugs, yet VED analysis was not done in this study as is commonly done in most of the studies on inventory control as most of the anticancer drugs will fall into essential category with very few in vital or desirable category.

On ABC analysis, 12.2 (n=12), 16.3 (n=16) and 71.5% (n=70) drugs were found to be A, B and C category items, respectively, amounting for 69.98% (Rs. 40405454.7), 20.34% (Rs. 11747017.5) and 9.68% (Rs. 5587892.4) of ADE of the for anticancer drugs (Table 2). When comparing to other studies done in India over different periods in different settings, this study results are comparable to other studies (Table 3).

Table 3: Comparison of 'ABC analysis' of various studies done in India.

Category of drugs	This study (Data for 2016)	AFMC, (2015)[9]	ESIC (Data for 1989)[3]	Service hospital, (2003)[10]	Bangalore, (2011)[11]	PGIMER, (2010)[12]
A	12.2	6.77	15.7	14.0	13.5	13.8
B	16.3	19.27	21.2	22.4	21.0	21.9
C	71.5	73.95	63.1	63.7	65.5	64.3
Total	100	100	100	100.1	100	100

From the ABC analysis, it can be seen clearly that only 12 items from the total anticancer inventory of 98 drugs fall into "A" category. This group comprised of costly medicines like Trastuzumab (440 mg) with a unit cost of Rs. 47,000 and annual expenditure of Rs. 78.5 lacs. It also comprised of drugs like Nab-Paclitaxel (100 mg) with unit cost of Rs. 7199 only but with annual expenditure of Rs. 56.3 lacs due to its wide use. These drugs need to be under strict and focussed control of top management where entitlement status of the patient, identification and authentication of patient by biometric means, proper prescription and essentiality of the drug being used, alternative low cost drugs if allowed in literature etc. are to be checked strictly. There is a need to keep vigil on consumption of these items and by focussing on 'A' category items and not all the drugs, the hospital manager can spare his time to other essential hospital activities and operational efficiency of the hospital store can be increased. Other benefit that can be generated from this study is that it will help in scientific decision making on part of hospital managers for purchase, storage and distribution of anticancer drugs and selective control function leading to better patient care.[9]

Gandhi and Basur in a study in ESIC in 1989 have suggested ways to inventory management for various categories of items.[3] For "A" category items very strict control, no safety stock, frequent ordering or weekly deliveries, weekly control statements, rigorous value analysis, accurate forecasts in material planning, central purchasing and storage etc. have been suggested.[3] Communication between the medical stores managers and the clinician is also very important since the latter are responsible for prescribing the drugs and control of consumption pattern.[4]

CONCLUSION

To conclude ESIC hospital annual expenditure on anticancer drugs was approximately rupees 5.7 crores which is huge and by applying scientific inventory control techniques this expenditure can be managed in a more effective and efficient way by decreasing the cost and also improving patient care and increasing patient satisfaction to ESIC services. ABC analysis will identify the drugs which need more strict control.

Recommendations

The staff employed in management of hospital store should be provided training and reorientation for effective inventory management of hospital store. Automation in drug inventory management can be used for inventory management saving time and cost. It should be user friendly so that it is accepted by the staff.

This study was done in only one of the hospitals of ESIC and for anticancer drugs only. A larger study for total drug inventory should be carried out for best possible management of hospital store. The results represent only for the hospital studied and cannot be extrapolated to other hospital settings having different drugs and types of patient and different purchasing procedures.

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