COSTING A HOSPITAL SERVICE PRODUCT : MARGINAL Vs ABSORPTION COSTING

Lt Col PK GUPTA^{*}, Col NK PARMAR^{vrC⁺}

Abstract

Costing a service product is a challenging but important tool for cost control. Different methods used for costing may provide varying costs and the choice of the method used becomes important. Use of absorption costing and marginal costing method and treatment of labour cost as variable and fixed cost provided different results in the present study of the cost of below knee patellar tendon bearing prosthesis. The study shows that marginal costing should also be done along with the absorption cost as it provides better indicator for cost control.

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KEY WORDS: Absorption Costing; Cost Control; Marginal Costing; Prosthesis.

Introduction

The best care at the cheapest cost is a challenge to hospitals over the past few decades. The provision of free health care in the state owned hospitals is crumbling. So far as the quality of care is concerned, and in anticipation of better care, considerable patient participation in meeting costs has been the pattern [1]. Economic efficiency with which hospital services is a research tool for financial management, the hospitals has a key role in planning, budgeting and ultimately financial control [2].

A cost is defined as the value attributed to a resource, when used [3]. The cost of a product or process is ascertained by the following methods :

1. Absorption Costing

The cost of the product is determined after considering both fixed and variable costs. Fixed costs are apportioned on a suitable basis over different products. The cost accumulated by this system is also called accounting cost.

2. Marginal Costing

Only the variable costs are considered in calculating the cost of the product, while the fixed costs are charged against the revenue of the period. There are differences between product and process costing. It is easier to cost a product as most of the costs can be directly or indirectly allocated to the product. Accounting cost in case of a product is quite close to its cost.

It is difficult to carry out process costing. The difficulties include the following :-

- Most salaries and supplies are department specific. However, there is an element of cost that services department provide to each other and they need to be allocated.
- A department has a variety of resources used for providing variety of service processes. Patients' consumption of these resources varies widely and suitable method of their appropriation needs to be found.
- Difficulties are experienced in valuing the resources consumed, when they are used by different processes and none of the methods provide fully satisfactory solutions.

Generally charges by health care institutions are equated with costs. Distinguishing between two, Finkler emphasised that charges, are not equal to, nor necessarily a good approximation of, what a hospital pays for the resources it consumes in providing services [4].

Material and Methods

The present study, based on costing of below knee PTB prosthesis, was conducted in a large rehabilitation centre. The cost was calculated both by the absorption and marginal costing system. Following methods of allocation were followed:-

1. Direct Costs

Direct costs were allocated directly to the prosthesis based on the time taken at every stage of production and actual cost of the material. Monthly salary of the worker was multiplied by 12 and divided by 365, to obtain the daily salary. It was further divided by 8 to obtain per hour productive time wages. Average salary of the trade is taken into account for calculation.

For absorption costing fixed material costs, such as equipment, furniture etc were depreciated and apportioned on the basis of total production, calculated from the workload, based on average time

^{*}Commanding Officer, 305 Field Ambulance, C/o 99 APO, ⁺Professor and Head, Department of Hospital Administration, Armed Forces Medical College, Pune - 411 040.

taken for production. Average time taken was obtained from the time standards available in the workshop. For marginal costing the labour cost was also taken as fixed cost [3].

2. Indirect Costs

Indirect costs mainly pertain to the costs in maintaining the administrative elements of the unit as a whole. The cost of material used indirectly was difficult to ascertain because many elements such as stationery, rations for service personnel, residential accommodation etc are obtained from service supply sources, where the centre is not charged. The records of consumption of many sundry items were also not available. It was estimated that they will not affect the overall cost beyond 3-5% of the final cost of the prosthesis and were therefore not considered in the study. Cost of labour and other expenses contributing indirectly were taken into consideration.

Costs of Administrative wing of the centre were apportioned between Hospital wing and Workshop wing in the ratio of 60:40, which is the ratio in which manpower and resources are distributed.

The costs of the administrative elements of workshop and fitting wing, and the apportioned costs of administrative wing of the centre were summed, and further apportioned in the ratio of production level of prosthesis. It was assumed that the annual product-mix of various prostheses and orthoses is representative of the average product mix at all times. The standard production in the workshop should be 400 limbs, as ascertained from work-study carried out earlier.

3. Expenses

Following costs contributed to expense. All except the stationery were fixed expenses.

- a. Stationery : The actual cost of essential and common stationery used in documentation was taken.
- b. Building Capital Value : The existing building is almost 100 years old. The depreciated cost of the building was therefore taken as zero, and therefore not apportioned towards the cost. However, it was calculated separately for new construction at current rates to find out the effect.
- c. Building maintenance : Currently prevailing MES rates were taken for arriving at the maintenance cost, and it was apportioned on the basis of area and production proportion.
- d. Electricity and water : Total electricity and water bill of the centre was apportioned initially at 60:40 ratio for hospital and workshop wing, and then the apportioned cost of the workshop was further apportioned based on production proportion.
- e. Equipment and Machinery : Most of the equipment and machinery is old requiring replacement. Their depreciated cost was taken into consideration, taking life as 20 years. Straight line depreciation method was used. Apportioning was done based on the proportion of production.

Maintenance cost of the equipment was taken @ 5% of the cost of the equipment, and apportioned accordingly.

Calculation of unit cost:

Unit cost was calculated based on both absorption and marginal cost.

For absorption costing method:

The total direct and indirect unit costs were added to arrive at the cost of the prosthesis.

For marginal costing method :

The direct variable costs were summed to arrive at the marginal cost of the prosthesis. The unit cost of prosthesis was calculated by adding the fixed cost proportion at the current level of production, and at the standard level of production.

Results

The total output of various types of prostheses was related to the standard time for production of the prostheses. Total production time of various types of prostheses / orthoses was obtained by their product. The proportion of BK PTB prosthesis was obtained in terms of numbers and production time, and was 16% and 23.55% respectively.

Total cost per limb (absorption costing method)

The cost is worked out by summing the costs of various elements, as shown in Table-1. The costs are Rs.4503.21 and Rs.4005.98 respectively at the current and standard production level. The cost will be Rs.4649.62 and Rs.4108.73 respectively if building capital value is taken into consideration.

TABLE 1
Cost of below knee PTB prosthesis (Absorption costing)

Element of cost	At current production level (Rs.)	At standard production level (Rs.)
Variable costs		
1. Labour	990.43	990.43
2. Material	1838.30	1838.30
3. Expense	11.20	11.20
Total variable cost	2839.93	2839.93
Fixed costs		
4. Equipment depreciation value	7.30	5.13
5. Equipment maintenance	7.30	5.13
Total fixed cost	14.60	10.26
Other expenses		
6. Electricity	130.75	91.85
7. Water	0.20	0.14
8. Building maintenance cost	162.76	114.76
Total other expenses	293.71	206.75
Indirect costs		
9. Labour	1273.32	859.28
10. Electricity	58.84	41.33
11. Water	0.50	0.35
12. Building maintenance	68.31	47.98
Total other expenses	1364.97	948.94
Total cost of the limb	4503.21	4005.88

Total cost per limb (marginal costing method)

The cost is worked out by summing the costs of various elements, as shown in Table-2. The costs derived by this method are much higher than the absorption costing method because in the latter the labour costs were apportioned on the actual time used.

Total cost of the limb at standard production level	Rs.6830.33+
	1849.50
(64 BK PTB limbs per month)	= Rs.8679.83
Total cost of the limb at current production level	Rs.9714.24+
	1849.50
(45 BK PTB limbs per month)	= Rs.11563.74

TABLE 2

Cost of below knee PTB prosthesis (Marginal costing)

Element of cost	Cost (Rs)
Variable costs	
1. Material	1838.30
2. Expense	11.20
Total variable cost	1849.50
Fixed costs (per month)	
3. Labour	417541.50
4. Equipment depreciation value	328.263
5. Equipment maintenance	328.26
6. Electricity (direct)	5878.08
7. Water (direct)	9.03
8. Building maintenance cost (direct)	7317.22
9. Electricity (indirect)	2654.14
10. Water (indirect)	22.56
11. Building maintenance (indirect)	3070.88
Total fixed cost (per month)	437140.93
Fixed cost of the limb (at standard production level)	6830.33
Fixed cost of the limb (at current production level)	9714.24

Discussion

Cost analysis is a tool of ensuring economic efficiency. In hospitals, little effort is made towards appraising the costs and over a period of time the charges set on historical costs become unrealistic.

In the present study two different costs were obtained for BK PTB limb by applying two different methods of costing. The difference was essentially due to the manner in which the labour costs were treated and will be minimal if all the labour is fully productively employed. The difference indicates the unproductive utilisation of labour.

The difference in cost by two methods was found to be gross being Rs. 7510.53 at current level of production, and Rs. 4673.95 at standard level of production. This indicates that contribution of indirect labour cost towards production is very high, which is not fully accounted for in the absorption costing method. The cost of prosthesis increases by 32.33% due to the lower level of production when standard and current production level is compared indicating that the cost could be brought down by better utilisation of labour productivity. By marginal costing method the labour cost was found to be 95.51% of total fixed cost. As fixed cost constitutes 75-80% of total cost, control of labour costs is very important in achieving economic efficiency.

The direct material cost, which is true marginal cost, constitutes 45.89% by first method, and 21.18% by second method, at the standard level of production. It is 40.82% and 15.9% at current level of production.

This is the only truly controllable cost, besides labour productivity. Incorrect choice of costing method may make cost control difficult.

The costs were based on current product mix where BK PTB constitutes 23.55% of production level. It was also seen that 17.86% of contribution in production time is by the production of items, such as, shoe ordinary, LS belt and miscellaneous including walking stick and crutches, which can be easily procured from the market at cheaper rate. They constitute 35.73% of items being produced. This indicated that change in product mix by outsourcing easily available items and concentrating on core services is important.

Marginal costing of product separates the fixed variable elements of the cost whereas in absorption costing elements of fixed cost are appropriated at the current production level. Appropriate costing of labour is always difficult. If labour costs are treated as variable costs and apportioned based on the time taken for an activity in service delivery, it tends to show labour costs very low when the labour is not utilised fully in production or service delivery as is often the case in hospitals. It is better to treat labour cost as fixed cost unless it is possible to lay them off when the production level is low. The analysis for achieving cost efficient utilisation of labour is possible only when marginal costing method is used.

In the present study the actual cost of BK PTB prosthesis is Rs. 11563.74 which can be reduced to Rs.8679.83 if labour productivity is improved. The cost can be further brought down if product mix is changed and administrative costs are reduced. By using the absorption costing method the costs indicated are only Rs.4503.21 and Rs.4005.88 respectively.

In hospitals it is very difficult to cost the service product due to intangible nature of the product and difficulty in costing elements such as labour which contribute to the cost significantly. This will also influence the decisions of pricing the product and cost control. The pricing decisions would also be influenced by the policy of the hospital where some services may be priced at cost and some other marked up. Inefficient cost allocations can make the task of hospital administrator difficult.

Marginal costing of product helps in focusing the attention to significant fixed costs in the hospital and can be applied to other services such as inpatient cost where volume of demand is unpredictable. Marginal costing provides insight into unproductive utilisation of resources, which may not be possible with absorption costing. Inherent inefficiencies in allocation of

cost where product-mix is varied and labour is used for more than one task as in hospitals is also overcome by use of marginal costing.

References

1. Ray DB. Optimal utilisation of Hospital resources through cost per case information system JAHA (India) 1989;1(2):22-5.
2. Bukhari SIA. Utilisation of cost accounting for hospital management. Journal of Medical Sciences, 1998;1:23-4.
3. Kulkarni GR. Hospital management accounting, planning and control. Bombay National Health Management Institute, 1995.
4. Finkler SA. The distinction between cost and charges. Ann Int Med 1982;96:102-9.

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