

STUDY OF COST ANALYSIS OF IN HOUSE DIETARY SERVICES IN A TERTIARY CARE ACADEMIC HOSPITAL

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Introduction

All over the world the hospitals are viewed as essential and indispensable community assets that should be managed for the benefit of the public. Therefore the hospital administration has an accountability to provide health care services at an acceptable level of quality and at the least possible cost to the patients served by them. The hospital has many core and noncore service areas. The core areas are the areas related to the direct patient care eg. Operation theatres, ICU's etc. and the non core areas are the different support and ancillary services. Hospital dietetics department is one of the important support services of a hospital. Hospital dietary services play a significant role in patient healing and well-being. Dietary service quality can also influence patients' satisfaction with their overall hospital experience¹. Satisfactory diet intake is a main part of curing the hospital patient. Promoting best possible dietary status through eminent hospital dietary services can lead to a sooner improvement and decreased length of hospital stay which in turn have a big impact on hospital expenditure²⁻³. As a result, many hospital dietary service organizations are paying more attention on patient care in an attempt to enhance patient satisfaction and control hospital costs⁴⁻⁶.

The new epoch of health care consumerism combined with rising fiscal demands presents immense challenges for hospital Managers. The cut throat competition has forced hospital Managers to place larger importance on customer-oriented service and cost-effective quality enhancement⁷⁻⁸. The cost finding and analysis can help hospital managers to determine how well their institutions meet these public needs. As financial management techniques, cost finding and analysis help to furnish the necessary data for making more informed decisions concerning operations and infrastructure investments. In order to control costs while also enhancing the quality of dietary service, it is important to separate out scope of dietary service that are in most urgent need of improved satisfaction and to identify accurately which effort will reap the greatest benefits⁹⁻¹¹. Hospital dietary service can present especially complex features and is often considered to be the most complicated process in the hospitality sector with many interrelated factors impinging upon the whole¹². The number of undernourished hospital patients is unacceptable and leads to extended hospital stays, prolonged rehabilitation and unnecessary costs to health care¹³.

Therefore a study was planned at PT. B. D. Sharma, PGIMS, Rohtak for doing the cost analysis of dietary services. The hospital has in house dietary department and is providing the services to all the indoor patients. The understanding of costs (both unit and total) can assist in forecast for upcoming budgets and to ascertain a schedule of hospital charges for patient food services. In conclusion, cost finding and analysis are also of value to hospital management in ensuring that costs do not surpass available revenues and subsidies. Analysis of unit costs also allows hospital managers to examine the economic advantages of outsourcing services versus using in-house staff. Further by doing the cost analysis we can compare the performance of dietetic departments across different hospitals. For hospitals of comparable sophistication and quality, a low cost per patient-day is an indication of good efficiency, while a high cost per patient-day may suggest poor efficiency. This study will also help the hospital managers to examine the dietary charges of private patients admitted in the private wards.

AIM:-

- To undertake the cost analysis of Kitchen Department of Pt. B D Sharma PGIMS Rohtak

OBJECTIVE:-

- To study the six month expenditure of Kitchen Department of Pt. B D Sharma PGIMS Rohtak.

RESEARCH METHODOLOGY:-

Keeping in view the above aim and objective the following methodology was adopted

STUDY AREA:

Dietetics department of PT. B. D. Sharma, PGIMS, Rohtak

STUDY PERIOD:

July 2014 to December 2014 (six month)

RESEARCH DESIGN: -

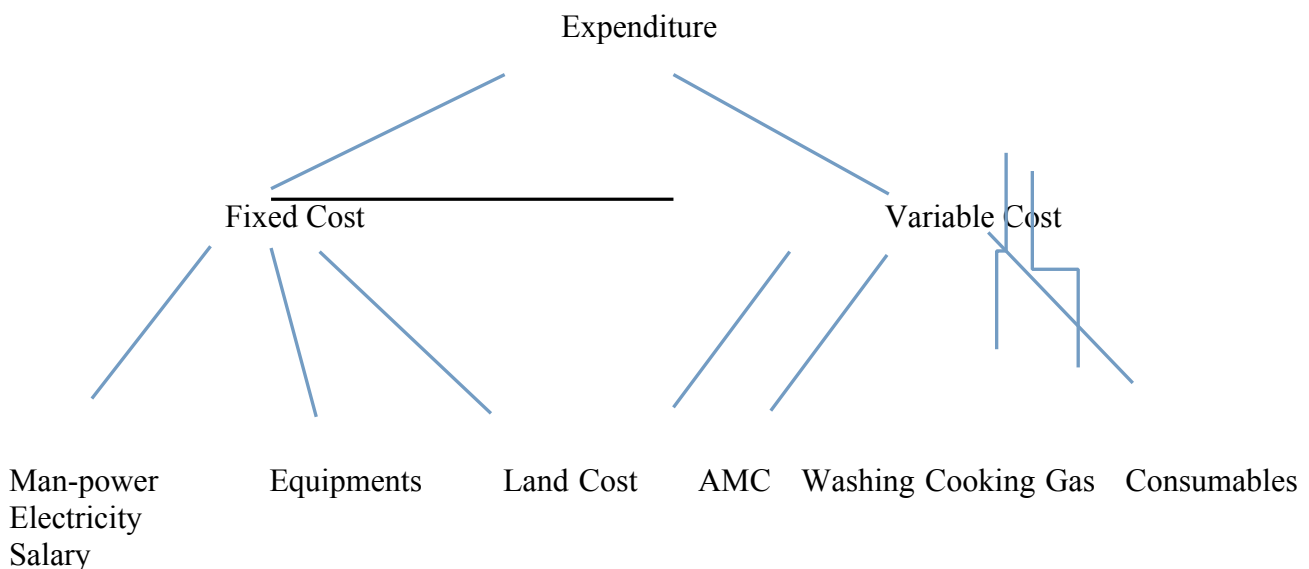
- i) This is primarily a record based retrospective study. The records of dietetic department for the period of July 2014 to December 2014 were extensively scrutinized and the expenditure incurred on different heads in the kitchen was calculated.
- ii) An observational study and detailed discussion was held with kitchen staff to assess the different cost centers (viz. salary of staff etc.) and study of existing Equipments and items involved in the functioning of Kitchen department.

STATISTICAL ANALYSIS:-

The data was entered in excel sheet and a data base was created. The data was analyzed and different tables and graphs were prepared.

RESULT SECTION

The expenditure incurred on different heads of kitchen department is grossly divided into following sub heads.



I) DETAILS OF EXPENDITURE INCURRED ON SALARY OF STAFF POSTED IN DIETETIC DEPARTMENT

The dietetic department is functionally divided into two sections. One section is looking after the food services of private wards and the other section is looking after the food services of general wards. The manpower is divided into these two sections. Therefore their salary is calculated against each section. It was found that the total expenditure incurred on salary of staff posted for general kitchen is Rs 13,02,000/-and total expenditure incurred on private kitchen is Rs 23,04,000/- (Table No 1)

TABLE NO. 1:- DETAILS OF EXPENDITURE INCURRED ON SALARY OF STAFF POSTED IN DIETETIC DEPARTMENT

Sr. No.	Category of Staff & Numbers	No. in Pvt ward Kitchen	No. in General Kitchen	Salary per month	Total amount per month in Special Kitchen	Total amount per month in General Kitchen	Total amount
1	Dietician(2)	1	1	42000	42000	42000	
2	Store keeper (2)	1	1	20000	20,000	20000	
3	Head cook (1)	1		20000	10000	10000	
4	Cook (19)	4	15	17000	68000	255000	
5	Masalchi(5)	2	3	16000	32000	48000	
6	Sweeper(2)	1	1	9000	9000	9000	
7	Bearer (4)	4	-	9000	36000	0	
Total							

Note: The fringe benefit of employees i.e. earned leave, medical leave, LTC etc. are not calculated

II) DETAILS OF EXPENDITURE INCURRED ON EQUIPMENTS AND UTENSILS USED IN DIETETIC DEPARTMENT

As discussed earlier the dietetics department is functionally divided in two sections i.e. private ward kitchen and general ward kitchen. There are equipments which are used in both the sections and there are few other types of equipments used exclusively in private ward section or general ward

kitchen section. Therefore, these are compiled separately. The capital investment on the purchase of these items was verified from the stock registers. The total life of the equipments or utensils was calculated and the depreciation cost for the study duration (i.e. six months) was calculated. There is no high cost equipment purchased in the kitchen department therefore the depreciation cost was not calculated keeping in mind the current inflation rate, Thus the cost may vary to some extent.

a) **DETAILS OF EXPENDITURE INCURRED ON EQUIPMENTS / UTENSILS COMMON IN BOTH THE SECTIONS OF DIETETIC DEPARTMENT**

It was revealed that the total deprecation cost for the study period of the common equipment was Rs. 7857.4/- (Table II)

TABLE NO. II:- DETAIL OF TOTAL DEPRICIATION COST OF COMMON EQUIPMENTS/ UTENSILS USED IN DIETARY DEPARTMENT FOR THE STUDY PERIOD

Sr. No.	Equipments and utensils	No.	Unit Price (in Rs.)	Total price (In Rs)	Average life (In Years)	Price of equipments for 6 months (In Rs)
1	Knife (Stainless Steel)	26	10	260/-	3	43.33
2	Dusting trolley	1	5758	5758/-	5	575.8
3	Dustbin	4	180	720/-	3	120
4	Weighing machine	1	125	125/-	15	4.16
5	Ration storage bin	37	130	4810/-	25	96.2
6	Aluminum table	12	420	5040/-	25	100.8
7	Fridge	3	20200	60600/-	12	2525
8	Trolley heavy duty	2	185	370/-	20	9.25
9	Luggage trolley	3	180	540/-	20	13.5
10	Dustbin large	1	3250	3250/-	3	541.67
11	Patila cover	3	97	291/-	20	7.27
12	Desert cooler	3	3672	11016/-	5	1101.6
13	Kadai aluminum	1	1998	1998/-	3	333
14	Cooker (22 ltr.)	1	1490	1490/-	12	62.08

15	Voltage stabilizer	3	1276	3828/-	10	191.4
16	Canteen burner	2	490	980/-	15	32.67
17	Regulator	2	630	1260/-	5	126
18	Weighing scale electric	1	5090	5090/-	10	254.5
19	Patila	5	2063	10315/-	3	1719.17
Total						Rs. 7857.4/-

b) DETAILS OF EXPENDITURE INCURRED ON EQUIPMENTS AND UTENSILS USED EXTENSIVELY IN GENERAL KITCHEN

It was observed that the total depreciation cost on the utensils used in general kitchen for the study period was Rs. 8700.00/- and the grand total cost is Rs 12628.7/-. The detail is as follows. (Table III)

TABLE NO. III:- DETAIL OF TOTAL DEPRICIATION COST OF UTENSILS USED IN GENERAL KITCHEN FOR THE STUDY PERIOD

Sr. No.	Equipments and utensils	No.	Price per unit (In Rs)	Total price (In Rs.)	Avg. life (In Years)	Price of equipments for 6 months (In Rs)
1	Chapati Bhatti	2	650/-	1300/-	25	26
2	Topia	64	70/-	4480/-	10	224
3	Bulk Cooker	4	83000/-	332000/-	20	8300
4	Paraat aluminium	4	420/-	1680/-	20	42
5	Dorhi	1	22/-	22/-	2	5.5
6	Pigeon almira	1	4100/-	4100/-	20	102.5
Total						8700.00/-
Proportionate Cost of common equipment being used in General Kitchen						3928.7/-
Gross Total						12628.7/-

c) DETAILS OF EXPENDITURE INCURRED ON EQUIPMENTS AND UTENSILS USED EXCLUSIVELY IN PRIVATE KITCHEN DURING THE STUDY PERIOD

It was revealed that the total depreciation cost of the utensils used in private kitchen for the study period was Rs. 6783.89/- and the grand total cost is **Rs 10712.59/-**The detail is as follows. (Table IV)

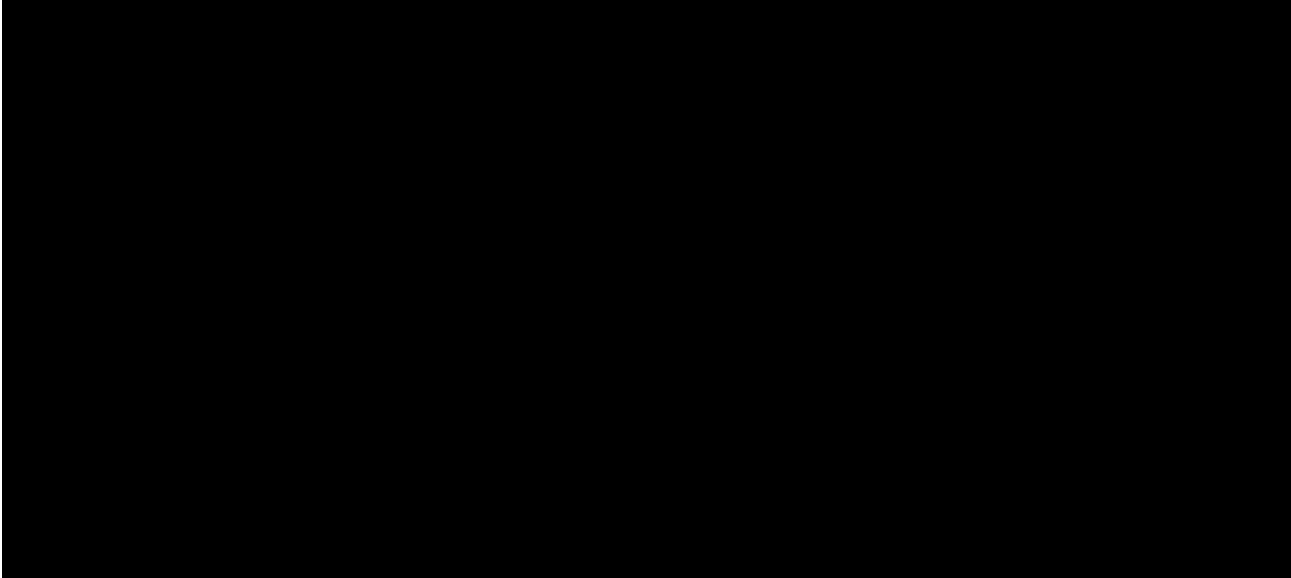
TABLE NO. IV:- DETAIL OF TOTAL DEPRICIATION COST OF EQUIPMENTS AND UTENSILS USED EXCLUSIVELY IN PRIVATE KITCHEN DURING THE STUDY PERIOD

Sr. No.	Equipments and utensils	No.	Price per unit (In Rs.)	Total Price (In Rs.)	Average life (In years)	Price of equipment for 6 months (In Rs.)
1	Parat SS	4	100/-	400/-	5	40/-
2	Karchi SS	25	5/-	125/-	3	20.8/-
3	Cooking range	2	1740/-	3480/-	25	69.6/-
4	Cooker 10 ltr	2	65/-	130/-	10	6.5/-
5	Soup strainer	4	25/-	100/-	5	10/-
6	Food trolley electric	4	425/-	1700/-	20	42/-
7	Sink sterilizer	1	450/-	450/-	22	10.2/-
8	Tiffin large	58	586/-	33988/-	6	2832.33/-
9	Tiffin small	59	250/-	14750/-	6	1229.16/-
10	Chapati box	1	150/-	150/-	3	25/-
11	Quarter plate	79	7.35/-	580/-	6	48.38/-
12	Thermos	86	116/-	9976/-	3	1662.67/-
13	Casserole	2	210/-	420/-	3	70/-
14	Food trolley ss	1	8607/-	8607/-	6	717.25/-
Total						6783.89/-
Proportionate Cost of common equipment being used in General Kitchen						3928.7/-
Grand Total Cost						10712.59/-

III) DETAILS OF EXPENDITURE INCURRED ON THE ITEMS USED IN OFFICE OF THE DIETETIC DEPARTMENT

Based on the total number of office items and their unit price at the time of purchase and the average life, the depreciation cost of the various items was calculated for the study duration. It was found that the total cost was Rs 8795.47/- The details are as follows (**Table V**)

TABLE V: DETAILS OF EXPENDITURE INCURRED ON THE ITEMS USED IN OFFICE OF THE DIETETIC DEPARTMENT DURING THE STUDY PERIOD



IV) DETAILS OF COST INCURRED ON LAND AND BUILDING OF DIETITCS DEPARTMENTS DURING THE STUDY PERIOD

Initially the land was donated to the PGIMS, Rohtak free of cost. However for doing the costing, the cost of land and building was calculated based on the current prevailing rates. The depreciation or replacement cost for the study period was found to be Rs 303085.875/-. The details are as follows (Table No VI)

TABLE NO VI: DETAILS OF COST INCURRED ON LAND AND BUILDING OF DIETITCS DEPARTMENT DURING THE STUDY PERIOD

Sr. No.	Cost of Land (In Rs)	Cost of building (In Rs)	Total Cost (In Rs)	Average life of a building	Depreciation/ replacement cost of one	Depreciation/ replacement cost of six month (In
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1	Milk	696222	686143	657378	612153	681896	663361	3997153
2	Hafed	24000	25900	66180	66180	66150	55350	303760
3	Co-operative	278555	265310	219925	216070	222730	201635	1404225
4	Vegetables	52851	53626	50847	50388	49673	49943	305149
TOTAL								6010287

b) COST INCURRED ON PURCHASE OF DIFFERENT FOOD (CONSUMABLE) ITEMS FOR PRIVATE WARD KITCHEN DURING THE STUDY PERIOD

It was found that Rs 446249/- was spent on the procurement of consumable items for the private ward kitchen. 34% of the total cost was attributable to the products purchased from the cooperative store. The detail is as follows (**Table No VIII**)

TABLE NO VIII: DETAILS OF COST INCURRED ON PURCHASE OF DIFFERENT FOOD (CONSUMABLE) ITEMS FOR PRIVATE WARD KITCHEN DURING THE STUDY PERIOD

Sr. No.	Product	Jul	Aug	Sep	Oct	Nov	Dec	Total Cost (In Rs)
1	Milk	28803	23744	23807	21932	23177	24800	146263
2	Co-Operative	10367	9074	8640	11123	6563	6648	52415
3	Bread,Cheese, Fruit,Vegetable	28704	23676	23512	21676	23512	24036	144012
Total								342690

c) COST INCURRED ON PURCHASE OF DIFFERENT CONSUMABLE ITEMS FOR PATIENTS COVERED UNDER JSSK SCHEME DURING THE STUDY PERIOD

It was found that total Rs 1301271/- were spent on the purchase of items for patients covered under JSSK scheme. The details are as follows (**Table No IX**)

TABLE NO IX: DETAILS OF COST INCURRED ON PURCHASE OF DIFFERENT CONSUMABLE ITEMS FOR PATIENTS COVERED UNDER JSSK SCHEME DURING THE STUDY PERIOD

Sr. No.	Product	Jul	Aug	Sep	Oct	Nov	Dec	Total (In Rs)
1	Sugar, Suji	15125	12260	12100	12200	14950	14800	81435
2	Ghee	92022	73618	73618	73618	92022	92022	496920
3	Milk	125343	125773	111781	134893	145584	135513	778892
Total								1357247

VI) DETAILS OF THE COST INCURRED ON THE OTHER MISCELLANEOUS HEADS

In the study some miscellaneous recurrent costs were also calculated. The details are as given below

(Table No X)

TABLE NO X: DETAILS OF MISCELLANEOUS RECURRENT COST

Sr. No.	Tentative Expenditure incurred on Electricity in six months (In Rs)	Tentative Expenditure incurred on Annual Maintenance Contract in six months (In Rs)	Tentative Expenditure incurred on washing utensils in six months (In Rs)
1	7,50,000 /-	2270 /-	3000/-

VII) DETAIL OF TOTAL WORLOAD OF KITCHEN DEPARTMENT

It was found that total 22179 numbers of diets were prepared in the dietetics department in the month of December 2014. The distribution of diets in different categories of patients is as given below (Table No XI).

TABLE NO XI: DETAILS OF TOTAL WORK LOAD OF THE KITCHEN DEPARTMENT

Sr. No.	Total No. of General ward diets	Total No. of Pvt. Ward Diets	Total No. of diets to JSSK Beneficiaries	Remarks
1	18574	767	2838	The diets were calculated for the full month of December 2014
2	% of diet for private ward patients = $767/22179*100 = 3.46\%$			
3	% of diet for general ward patients = $18574/22179*100 = 83.75\%$			
4	% of diet for JSSK patients = $2838/22179*100 = 12.80\%$			

VIII) CUMMULATIVE EXPENDITURE OF SIX MONTHS ON THE SERVICES PROVIDED IN GENERAL AND PRIVATE WARD KITCHEN

The cumulative expenditure incurred on general kitchen and private ward kitchen is Rs 15239989/- and Rs 1797823/- respectively. The details are as given below (Table No XII)

TABLE NO XII: TOTAL EXPENDITURE ON THE SERVICES PROVIDED IN GENERAL WARD AND PRIVATE WARD KITCHEN DURING THE STUDY PERIOD

Sr. No.	Particulars	Expenditure incurred in General Kitchen (In Rs)	Expenditure incurred in Private Kitchen (In Rs)
1.	Purchase of Consumable Items	6010287	342690
2.	Direct Labour		
i	Head Cook	60000	60000
ii	Cook	1530000	408000
iii	Masalchi	288000	192000
iv	Sweeper	54000	54000
	Total Cost	1932000	714000
3	Direct Expenses		
i	Electricity	628125	25950
ii	Utensils/ Equipments	12629	4271
iii	Cooking Gas	46900	1938
	Total Cost	687654	32159
4	Prime Cost (1+2+3)	8629941	1088849
5	Kitchen Overhead		
i	Land & Building Cost	253835	10487
ii	Washing of Utensils	2513	104
iii	Wages of Bearer	-	216000
	Total	256348	226591
6	Kitchen Cost (4+5)	8886289	1315440
7	Office & Administrative Over Head		
i	Dietician	252000	252000
ii	Store Keeper	120000	120000
iii	Office Cost	7366	304
iv	AMC Charges	1901	79
v	Total	381267	372383
8	Office Cost (6+7)	9267556	1687823
9	Distribution Cost		
i	Cost of Food Trolley, Thermos, Tiffin Large & Small	-	6441
10	Total Cost (8+9)	9267556	1694264

IX) DIETARY COST CALCULATIONS

The cost per diet in general ward patients was found be Rs 137/- and in case of the private wards the diet cost per patient was Rs 391/-. The details are as given below. (Table No XIII)

TABLE NO XIII: DIETARY COST CALCULATIONS

Sr. No.	Head	Total No. of diet in six Months (In Rs)	Total cost in six months (In Rs)	Cost per Diet per day (In Rs)
1	General ward	111444	9267556	83.16
2	Private ward	4602	1694264	368.16

DISCUSSION:

Dietary services are important support service in any hospital set up. It becomes more important in tertiary care higher referral centers where patients suffering from different critical illnesses and facing various complications are undergoing treatment. It is well understood fact that nourishment provides an important role in the healing of the patients. In hospitals different therapeutic diets are also provided to the patients in addition to the normal diet. According to a major World Bank study of public hospitals (Barnum and Kutzin, 1993), the share of public sector health assets in developing countries consumed by hospitals ranges from 50 to 80 percent. Therefore the costing of different ancillary and support services in a hospital is important for better understanding of costs of various activities and improvement of efficiency of the departments and the hospital. Cost finding and analysis can help hospital managers and policymakers to determine how well their institutions meet the public needs. As financial management techniques, cost finding and analysis help to furnish the necessary data for making more informed decisions relating to operations and infrastructure investments. In our study it was found that in a month total 767 number of diets were prepared for the private ward patients and 18574 numbers of diets were prepared for general ward patients in a month of December 2014. Various indirect and direct costs were calculated for the study period and it was found that the total expenditure incurred on dietary services in six month duration on general ward patients was Rs **9267556/-** and the total amount spent on private ward patient's diet was Rs **1694264/-**. Further the cost incurred on diet per day on general ward patient was found to be Rs

83.16/- and the cost incurred on diet per day on private ward patient was found to be Rs 368.16/-. Considering three main meals in a day, the per diet cost for general ward patient was found to be Rs 27.72/- and for private ward patient was found to be Rs 122.72/-. In a study¹⁴ conducted at Chandigarh it was found that per diet cost incurred in their hospital was Rs 70.49/-. Similarly, a study¹⁵ was carried out at premier tertiary care hospital at New Delhi and it was concluded that the per day cost of food in private type A room is Rs 276/-. When we compare the cost of dietary services with the different hospitals of similar complexity, it was found that the per diet cost is lower in our institution as compared to the Chandigarh hospital, but keeping in view the cost difference it seems that in Chandigarh study they had calculated per day cost instead of per diet cost and in that case the cost in both the institutes are comparable for our general ward patients. Similarly, the cost of private ward patient calculated in Delhi study is around 25-26% lesser than the current study. It is difficult to explain this difference because the details of cost calculation in these studies are not available with us. These studies were carried in different time periods. In general, the primary reason for a cost change between two time periods is a function of three factors i.e. Changes in input prices, Changes in input productivity (efficiency), Changes in departmental volume. The following variances can be calculated to figure the effects of these three factors:

i) Input Prices: Price variance = (Present price - Old price) X Present quantity

ii) Input Productivity: Efficiency variance = (Present quantity - Expected quantity at old productivity) X Old price

iii) Volume Changes: Volume variance = (Present volume - Old volume) X Old cost per unit

Thus the difference in cost may be attributed to any of the above factors and it need more study for doing the comparative analysis.

Therefore, in a government hospital where majority of the patients are provided free of cost food services; a good proportion of total hospital budget is allocated to the dietary department. Hence it becomes important for the hospital managers to give priority on the financial management of dietary services. In our hospital the general ward patients are provided free of cost food services and the patients admitted in the private ward are also getting concessional meal services as the hospital is charging Rs 180/-per day towards meal services and our study has pointed out that the per diet cost for private ward patient is Rs 368/-.

CONCLUSION

Various indirect and direct costs were calculated for the study period and it was found that the total expenditure incurred on dietary services in six month duration on general ward patients was Rs 9267556/- and the total amount spent on private ward patient's diet was Rs 1694264/-. Further the per day cost incurred on general ward patient diet was found to be Rs 83/- and the per day cost incurred on private ward patient was found to be Rs 368/-.

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