

Research article

Diet Cost of Patients in Teaching Hospital Kalubowila

Rathnayake Mudiyansele Syamalee Sujeewa Rathnayake¹  , Dileep De Silva²¹ The Postgraduate Institute of Medicine, Colombo, Sri Lanka.² Family Health Bureau, Ministry of Health and Indigenous Medicine, Sri Lanka.**Background**

Admissions to Tertiary care hospitals are on the rise while cost of patient care continues to increase. It has become a challenge for the sustainability of continuing free health care in developing countries like Sri Lanka. The need of costing studies is valuable in this scenario. This study analyzes diet cost for patients admitted to the Teaching Hospital Kalubowila (THK) which is a Tertiary care hospital in Colombo District, Sri Lanka.

Methods

This is a descriptive cross sectional study conducted retrospectively. The analysis was done using secondary data, during the period of 01.02.2014 to 28.02.2014. The cost analysis was done according to step-down method.

Results

Total admissions were considered and cost for the kitchen cost center (without raw material) was Rs 677,042/=. The unit cost per patient per meal was Rs.119/=.

Discussion

THK spends a high percentage of the operating expenses for diet. Further, out of the total hospital operating cost, two thirds were spent for salaries and wages. Suggest to introduce an awareness programme to relevant hospital staff, to highlight cost per diet per patient. This will help the staff to work with cost consciousness and consequently to improve efficiency.

Keywords: Tertiary care hospitals; Diet cost; Sri Lanka; Teaching hospital Kalubowila; Step-down method

Copyright: © 2016 Rathnayake RMSS *et al.* This is an open access article distributed under the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Funding: None

Competing interests: None

Received: 24 November 2015 **Accepted revised version:** 16 May 2016 **Published:** 01 September 2016

 **Correspondence:** rathnayakesujeewa077@gmail.com

Cite this article as: Rathnayake RMSS, De Silva D. Diet cost of patients in teaching hospital Kalubowila.

Anuradhapura Medical Journal 2016; **10**: 1-5.

DOI: <http://dx.doi.org/10.4038/amj.v10i1.7596>

Introduction

Sri Lanka has achieved a tremendous progress in curative and preventive health care aspects, compared to other South Asian countries. After becoming an independent nation, Sri Lanka shows competitive rates in its health indices as a result of free education and free healthcare provided by successive governments. Providing basic healthcare, free of charge to all individuals in an equitable manner at the point of delivery, in state sector healthcare institutions is one of the main strategies of health sector development plan (1). To provide free health care at the point of delivery, the government needs to increase its budget allocations on various aspects of health in curative and preventive sectors annually. With the increasing population and increasing demand of health care services, with new technologies which changes rapidly with time, the sustainability of free health care will be a major challenge. Therefore cost effectiveness of appropriate healthcare services is a very important domain that needs to be addressed.

Newbrander and Lewis pointed out that many countries have started to implement different methods to generate additional revenue resources to their hospitals and health care systems to minimize the growing gap of health requirements between available and required needs and resources (2). This gap may be due to deviated social, demographic and epidemiological changes in developing countries.

This difficulty could be effectively overcome by handling current available resources more effectively through upgraded allocation patterns and maximized efficiency in management of hospitals.

Further, various studies in hospital cost analysis have been done in developing countries with the aim of identifying cost effectiveness. Cost analysis is of utmost importance especially in health systems which manage with scarce resources, but there is a paucity of costing studies in Sri Lanka as well as in other developing countries. Furthermore, diet cost is one of the cost items that have not been analyzed frequently.

A study in Malawi, which estimated the simple management correction of inefficiency practices, resulted in a saving of 44% of the nation's major non personnel recurrent cost (2).

Therefore, to improve efficiency and effectiveness, accurate and appropriate cost information is important, because the monetary value can impress the people, mainly the staff. While the staff tends to work with cost consciousness, policy makers and managers use cost information to improve the efficiency and quality of work and effectiveness of financial management in their organizations. Cost information is used by regional, provincial and national level managers and policy makers to compare the performance of similar types of units in other hospitals. They may also use such information for resource allocations, guideline preparation, setting priorities, identifying necessary infrastructure facilities and for new innovations to improve the performance of the hospitals.

Although Sri Lanka is a developing country, its health indices are more comparable to the developed countries. While Korea spends 7.5%, Sudan 7.2% and USA 17.9% of GDP (Gross Domestic Product) for health services, Sri Lanka allocates only 3.1% (2). For the sustainability of this admirable and unique position in healthcare, comprehensive costing studies which lead to evidence based decisions in resource allocations are absolutely necessary.

New golden steps in introducing modified data oriented healthcare models for the developing world can be achieved by facilitating the ground work for more comprehensive studies from the initial details obtained from costing studies. Further, the information taken from costing studies help in cost savings in hospitals (3).

The three main methods of cost analysis are the direct method, step-down method and the reciprocal method. Most of the costing studies in the world have been done by applying either direct method or step-down method. Comparing with other methods the step-down method which is applied in this study also, is accurate, less costly and less time consuming.

Government hospitals provide all the services free of charge at the point of delivery. People by-pass nearby hospitals to attend tertiary care hospitals and there is no proper referral system in operation. As a result, tertiary care hospitals become overcrowded, but these hospitals render an amicable service. The dietary service is one of the important supportive services in a hospital. The objective of the dietary service is providing clean, hygienic and nutritious diets for the indoor patients according to calorie and nutritious requirement. All the necessary diets are provided free of charge to the patients. Since the hospital admissions tend to increase day by day hospital dietary cost also tend to increase rapidly.

Table 1 illustrates the background data of T.H. Kalubowila (during the study period)

Table 1 Background data of TH Kalubowila in February 2014

Characteristic	TH Kalubowila
Beds	1098
Outpatients	54949
Total admissions	9558
Total deaths	170
In patient days	26958
Bed occupancy rate	87%
Average length of stay	2.8 days
Number of doctors	435
Number of nurses	829
Number of supporting staff	1048

TH = Teaching hospital

Objective

To Analyze the diet cost per meal per patient admitted to TH Kalubowila.

Methods

Study design

This study was a descriptive cross sectional study conducted retrospectively with an analytical component.

Study setting

TH Kalubowila which is a tertiary care hospital situated in the south of Colombo was selected for the study. The selected hospital consists of 1098 beds with a total staff strength of 2312. It is a large tertiary care hospital and it was established in 1960 as a Base Hospital in a 12.5 acre land.

Data Collection

Data were collected from the following sources: verified validated data collection sheets, check lists, hospital records, accounting reports, vouchers and diet records. Moreover, interviews with relevant officials (e.g. Diet clerk, Overseer) were conducted by the principle author.

Method of cost calculation

The main objective of this research was to analyze the diet cost of patients.

As the first step, organization's overhead, intermediate and final cost centers were identified.

Considering cost centers separately, all direct costs (salaries, capital costs, stationary and other consumables) were added (sum of the value calculated).

The administrative cost center was apportioned according to the number of staff working in different units. Then the overhead costs were apportioned appropriately to the intermediate and final cost centers.

- *Overhead cost centers* : Cost centers responsible for the smooth functioning of intermediate and final cost centers.
- *Intermediate cost centers* : Cost centers which were not directly involved in the patient care delivery but supported their treatment.
- *Final cost centers* : Cost centers which were directly involved with patient care delivery.

Cost Centers TH Kalubowila shown in table 2.

Table 2 Identified cost centers TH Kalubowila

Overhead	Final
Director's office	Kitchen
Accountant's office	
Hospital secretary's office	
Matron,s office	
Overseer's office	
Administration branches	
Water	
Electricity	
Telephone	
Security	
Cleaning	

Intermediate cost centers were not considered in this analysis as there were no intermediate cost centers for kitchen cost center.

Overhead costs

Indirect costs were added to each cost center after apportioning appropriately as described below.

Cost incurred for the electricity was apportioned according to the square feet area of the unit.

All telephone charges of direct lines were directly added to particular cost centers. In the case of telephone charges of extensions (intercoms), the salaries and wages of telephone operators were considered according to the number of extensions available in cost centers. The reason was that these extensions were used to take and receive out-side calls through the operator assistance.

Water bills were apportioned according to the number of taps available in a unit. Security and cleaning charges were apportioned according to the number of security officers and cleaning personnel.

Ethical and administrative considerations

Ethical clearance was obtained from Ethical Review Committee of the National hospital of Sri Lanka. Written authorization was obtained from the Director TH Kalubowila to conduct the study. Confidentiality of the information was assured.

Results

For the calculation of total cost for kitchen cost center, total salary of the kitchen staff (Table 3), consumables and stationary used in the unit were separately calculated.

Table 3 Total salary of the kitchen staff in February 2014

Category	Number	Salary	Total cost Rs
Cook	8	37450	299601
Ordinary SKS	1	44715	44715
Junior SKS	3	28667	86001
Casual SKS	-		
Diet steward	4	28347	113388
Total			54370

SKS = Saukya Karya Sahayake (casual and ordinary labourer)

Further, apportioned costs to the kitchen cost center were taken from telephone, water, security, cleaning, electricity and administration total costs to the hospital. (Table 4)

Table 4 Apportionment of security and cleaning cost to kitchen cost center

	Security		Cleaning	
	No. of officers	Cost Rs	No. of workers	Cost Rs
Total	47	2,284,000	106	6,550,000
Kitchen	0.25	12,147	0.25	15,408

Total floor area of the hospital buildings was 286,000 sqft and the sqft of the kitchen is 4774 sqft. It is only 1.66% of the total sqft. Accordingly, from the total electricity bill Rs 4,700,000 was apportioned to the kitchen. For the security and cleaning costs the total cost was apportioned on the basis of number of people deployed to render their services to the kitchen. Number of officers and workers were taken as a decimal point on the basis of their contribution to the kitchen.

Water was apportioned according to the number of taps available and the telephones by available extensions. Water and telephone costs to the kitchen cost center were Rs 8,130 and Rs 612 respectively. From the total overhead administration cost to kitchen cost center was taken according to the number of staff available. It was Rs 17,196 (Table 5).

Table 5 Total cost of kitchen cost center

Overhead	Final
Total salary	543,705
Consumables (used in the unit)	1,987
Stationary (used in the unit)	235
Telephone	612
Water	8,130
Security	12,147
Cleaning	15,408
Electricity	78,020
Administration	17,196
Total	677,042

Diet cost calculation (Rs.)

Total Number of meals (staff + patients)	= 7,679 + 13,330 = 21,009
Liquid paraffin gas total	= 192,434
Cost for raw materials	= 1,629,216
Cost center allocations	= 677,042
Total diet cost	= 2,498,692
Diet cost per head	= 2,498,692 / 21,009 = 119.00

Discussion

Healthcare cost is increasing daily due to improving technology, increasing people expectations and advancement of information technology. Further, epidemiological and demographic transition in the world has posed a big challenge in health services. The trend of rising non communicable diseases among citizens and continuously increasing proportion of elderly population make the health care expenditure unbearable to a developing country like Sri Lanka. The government expenditure on health care is more or less constant ranging between 3 - 3.1% of GDP during the last few decades.

As the capital cost and the salary are constant, operating cost will be affected to a greater extent by the bed occupancy rate. Bed occupancy rate indicates the

hospital's efficiency. WHO recommended 80% occupancy rate was considered efficient. Therefore, the bed occupancy rate of 87% at TH Kalubowila could be considered efficient.

The Administrative cost apportionment was done according to the number of admissions.

Health sector is a labour intensive field. This study revealed that TH Kalubowila spends 74.5% from the total operating cost for salaries and wages. In a study done in Bangladesh the corresponding value was 62% (4).

This study revealed that diet cost per head at TH Kalubowila is Rs.119. There is only one kitchen for both staff and patients at TH Kalubowila. Therefore, diet cost per head was calculated for both staff as well as patients.

Telephone charges were apportioned in Ghamuria hospital survey (5) and the study of three hospitals in India (6) on the basis of the number of personnel in each center. However, this was done according to the number of intercoms available in each cost center. Telephone charges for direct lines were dealt at respective cost centers.

Electricity and water consumed were apportioned in most studies according to the floor area (6,7). In the study of Ghamuria General Hospital the consumption of electricity was measured by using an avometer (5).

However it is the expert opinion (5) that in large hospital set-ups, a better method of measuring electricity consumption is by measuring consumption for each unit, because in some units the consumption of electricity is maximum eg: ICU and OT while in some units it is minimum eg: Health education unit.

Due to many constraints and feasibility in this study, electricity consumed was apportioned from the total electricity bill of the hospital, according to the floor area assuming equal consumptions in each unit.

The accounting system in the Sri Lankan public sector is maintained on a cash basis this is a rudimentary system when compared to advanced accounting systems which are based on accrual basis. Health ministry also follows its accounting on cash basis.

Minimum records were available pertaining to the capital items such as lands, buildings, major equipment etc. In some instances only the purchase price and date of the equipment were available. This hindered taking capital values of the equipment for diet cost calculation.

Conclusion and Limitations

As shown in this study, the diet cost per patient per meal at TH Kalubowila is Rs 119. There are no published studies in the domain of diet costing in Sri Lanka, to compare with the above results. Studies done abroad cannot be compared to a greater extent with Sri Lankan surveys, due to the unique nature of our accounting system (cash basis as against accrual basis) and hospital set-ups in our health system.

To reduce the complexity of calculations some overhead cost centers like infection control unit, quality control unit and health education unit were not considered in cost computation. Further, postal costs, transport costs,

maintenance costs, expenses for staff quarters and costs for training were not considered in the present analysis. However, as per expert opinion, there is only a minimum impact of not considering these cost centers and taking costs into the final analysis. Equipment costs in the kitchen after depreciation was not considered due to its complexity, paucity of data, long years of service (more than 10 years) hence, minimum impact into this cost analysis.

There are several electricity meters at TH Kalubowila and no records could indicate which meter supplies which area/s specifically. Further, the total floor area of the buildings of the TH Kalubowila was not available. Therefore, it was an extremely tedious task to apportion the total electricity bills to the total square area.

Water apportion was done according to the number of taps available. But in some units taps were shared with other units. Difficulties were encountered during the identification of water meters, similar to electricity meters.

Recommendations

We recommend to introduce an awareness programme to the hospital staff, to highlight how much it costs per meal per patient to the government.

It is advisable to maintain a proper stock register of equipment and instruments, with depreciated values to replace the items on time.

References

1. Ministry of Health Sri Lanka. Health development plan (2013-2017). Ministry of Health Sri Lanka: Colombo.
2. Newbrander W, Lewis E. Hospital costing model manual. Report for USAID Health Reform and Financing Program & APHIA Financing and Sustainability Project. Management Sciences for Health, 1999.
3. Buki A. New studies calculate cost of medical services in Indian hospitals. The Center for Disease Dynamics, Economics & Policy 2013. Center for Disease Dynamics, Economics & Policy: Washington, DC. Available from : http://www.cddep.org/media-press/press-releases/new_studies_calculate_costs_medical_services_indian_hospitals#sthash.99k7T2KV.dpbs
4. Hussain AMZ. Cost analysis of a primary health care center in Bangladesh. *Bulletin of the World Health Organization* 1983; **61**: 477-483.
5. Ministry of Health and Population, University of California, Berkeley, school of public health cost analysis and efficiency indicators for health care: Report Number 3 (1997) Summary Output for El Gamhuria General Hospital, 1993-1994
6. Susmita C, Carol L, Ramanan L. Unit cost of medical services at different hospitals in India. *PLoS One* 2013; **8**: e69728. DOI: <http://dx.doi.org/10.1371/journal.pone.0069728>
7. Aboagye AQ, Degboe AN, Obuobi AA. Estimating the cost of healthcare delivery in three hospitals in Southern Ghana. *Ghana Medical Journal* 2010; **44**: 83-92.

Submit your next manuscript to



**Anuradhapura
Medical Journal**

Submit your manuscript at
<http://amj.sljol.info/>