

Acute mental health care according to recent mental health legislation

Part II. Activity-based costing

ABR Janse van Rensburg¹, W Jassat²

¹Division of Psychiatry, University of the Witwatersrand, Johannesburg, South Africa

²School of Public Health, University of the Witwatersrand, Johannesburg, South Africa

Abstract

Objective: This is the second of three reports on the follow-up review of mental health care at Helen Joseph Hospital (HJH). Objectives for the review were to provide realistic estimates of cost for unit activities and to establish a quality assurance cycle that may facilitate cost centre management. **Method:** The study described and used activity-based costing (ABC) as an approach to analyse the recurrent cost of acute in-patient care for the financial year 2007-08. Fixed (e.g. goods and services, staff salaries) and variable recurrent costs (including laboratory, 'pharmacy') were calculated. Cost per day, per user and per diagnostic group was calculated. **Results:** While the unit accounted for 4.6% of the hospital's total clinical activity (patient days), the cost of R8.12 million incurred represented only 2.4% of the total hospital expenditure (R341.36 million). Fixed costs constituted 90% of the total cost. For the total number of 520 users that stayed on average 15.4 days, the average cost was R1,023.00 per day and R15748.00 per user. Users with schizophrenia accounted for the most (35%) of the cost, while the care of users with dementia was the most expensive (R23,360.68 per user). Costing of the application of World Health Organization norms for acute care staffing for the unit, projected an average increase of 103% in recurrent costs (R5.1 million), with the bulk (a 267% increase) for nursing. **Conclusion:** In the absence of other guidelines, aligning clinical activity with the proportion of the hospital's total budget may be an approach to determine what amount should be afforded to acute mental health in-patient care activities in a general regional hospital such as HJH. Despite the potential benefits of ABC, its continued application will require time, infrastructure and staff investment to establish the capacity to maintain routine annual cost analyses for different cost centres.

Key words: Cost analysis; Activity-based costing; Acute mental health care; Recurrent cost; Fixed and variable cost; Cost centre management; Hospital expenditure

Received: 13-02-2009

Accepted: 30-09-2009

Introduction

Cost is increasingly being recognised as an important dimension in providing clinical care. In the current climate requiring fiscal restraint, it is becoming more important for hospital managers to assess the costs of services and clinical procedures provided.¹ In developing countries, there is a lack of data on the unit costs and total costs of running inpatient services, and the various services in public hospitals.² This article is the second of three that reports on a review of a local

acute mental health care unit in a general specialist hospital in Johannesburg, South Africa.

Helen Joseph Hospital (HJH) in Johannesburg is a 480-bed facility and one of three general referral hospitals with an acute psychiatric unit on the local specialist service and teaching circuit. Since 2005, Ward 2 at HJH operated as a designated 30-bed acute 72-hour psychiatric and mental health assessment unit for adults according to the Mental Health Care Act, No. 17 of 2002 (MHCA). The main objective of the unit is to provide efficient and cost effective acute care, treatment and rehabilitation as a 72-hour assessment unit in a "lesser restrictive environment" compared to a psychiatric hospital. This is generally translated to mean the completion of users' assessment as soon as possible and an attempt to optimize their initial stabilization in the short term, often under

Correspondence

Dr. B van Rensburg
PO Box 1247, Pinegowrie, 2123, South Africa
email: bernardj@gpg.gov.za

the pressure of a high turnover of users in need of routine acute admission and treatment.

In South Africa currently, public hospital accounting systems do not routinely provide the information needed to determine the cost of specific clinical services such as mental health care in general hospitals. The fundamental problem with traditional cost accounting systems in public hospitals is that they provide a cost number that, standing alone, does not provide any guidance on how to improve performance by lowering cost or enhancing throughput. A hospital's finance department is currently only able to calculate a cost per 'patient day equivalent' (PDE) for a given period by dividing the total hospital expenditure by a measure of the number of patient days. This general calculation is able to provide an estimate of the average daily cost incurred across the entire institution, but gives no reflection of the complexity of activities and the actual costs of different clinical departments or patient categories. The calculation of the cost of a particular clinical department or service in a general hospital has therefore not been possible routinely, unless a particular analysis of identified cost items is undertaken. A particular obstacle for example, to overcome in these efforts is how to account for indirect costs such as electricity, water, municipal rates and taxes, etc. The policy – albeit intended to address stigma – that mental health should be integrated into general health programs and services, has therefore in this regard contributed to the difficulty to identify what amount is actually spent, or should be spent on psychiatric services and other mental health activities in a particular facility, region or nationally.

Activity-based costing (ABC) was proposed as the approach through which to cost different unit specific activities of mental health care at HJH. Motivation for this was that the (ABC) method is able to provide cost estimation that more accurately estimates full unit costs. ABC has been applied successfully in many manufacturing and service organizations and was introduced to the health care sector in the 1990's, where in the United States and elsewhere it was implemented largely in response to the increased need of this type of information following the use of prospective payment systems. ABC methods have been successfully utilised in financial audits for clinical services and hospital departments.³⁻⁵ Kukow in an earlier financial audit of a Urology unit in a public hospital in the United Kingdom showed that clinicians can be engaged to produce a financial analysis of their work and to cost their treatment activities.³ Kaplan suggested a revised model where managers are responsible for estimating the resource demands imposed by each transaction, product or customer rather than relying on time-consuming and costly employee surveys.⁴ An evaluation of the implementation of ABC in a Peruvian non-governmental health care organisation provided evidence that ABC is feasible in a developing country setting.⁵ A South African example of the application of ABC is described and assessed by Taba in the local post office service.⁶ The approach taken in ABC assumes that cost objects generate activities that in turn consume costly resources.⁷ It is able to more accurately assign direct (variable) cost, which are those costs that can be easily traced to patient care, e.g. laboratory or pharmacy usage. But where this cost methodology is particularly useful is in its dealing with fixed (including overhead or indirect) cost. The ABC

model attempts to delineate these "aggregated" fixed costs and to assign it more accurately per cost centre and to identify the actual "cost driving" activities that are consuming the most resources.⁸ ABC is considered to be a highly effective approach to provide management with accurate and relevant information about the cost of particular products and services in a facility or organization. ABC is however also noted to be a time consuming and complicated approach to implement, requiring a "bedside" system with which costs are recalculated annually.

A pilot clinical audit study that included the costing of mental health care at Helen Joseph Hospital (HJH) was undertaken during 2003/04, prior to the implementation of the MHCA. It attempted amongst others to provide a baseline for future cost centre management. It was found by this pilot study that the expenditure on mental health at HJH for a 12-month period amounted to roughly 2% of hospital's total expenditure for 2003/04. The major expense (80%) was staff remuneration.⁹ To establish whether this 2% of the hospital budget allocation was supposed to be adequate could not be verified. However, judged by ongoing day-to-day constraints and deficits such as critical staff-patient ratios, neglected maintenance, etc., it could be empirically deducted that mental health activities at HJH were severely underfunded. The pilot study had several limitations, such as: - the general non-availability of routine financial information for separate cost centres as mentioned above; - indirect costs (e.g. municipal services) were not fully accounted for; and - the study period did not correspond with a financial year. It could therefore at the time only offer provisional and proportional estimates of the running cost of the mental health care program at HJH. The methodology of the pilot study was reviewed and it was suggested that a more standardised approach should be adopted for this follow-up study.¹⁰

The objectives of this cost review in parallel with the original pilot study were therefore to: - establish a continuous quality assurance cycle in order to facilitate cost centre management; and - provide realistic estimates of cost to align the current facilities and program with requirements and acceptable standards according to the unit's designated function.

Method

Original methods for the planned 4-year review of mental health care at HJH of which this report forms a part, were set out in Part I¹¹ of the three reports as 4 steps: Step 1 - Program of care; Step 2 - Clinical profile; Step 3 - Running cost; and Step 4: Design and capital cost. Methods for this second report (Step 3) were subdivided into:

- Step 3(e): "to calculate current cost of each activity to establish resources necessary to continue the status quo program"; and
- Step 3(f): "to estimate projected recurrent cost if appropriate norms and standards were to be implemented to align the quality and scope of care for each functional area".

Principles of ABC were adopted to execute Step "3(e)", while in Step "3(f)" a World Health Organization model's service norms and standards for acute mental health care were used to ascertain adequate staff ratios and the projected cost.^{12,13}

The scenario to extend the unit's capacity from its current 30 beds to forty was also taken into consideration in this phase of the study.

Data used for the cost analysis and for the estimation of projected cost included: (1) the routine clinical discharge summaries of users admitted to the unit at HJH; and (2) routine financial and management data on the hospital's annual expenditure on fixed and variable cost for the financial year 1 April 2007 to 31 March 2008. The operational areas of the mental health care unit at HJH as a distinct cost centre were identified in the first (Part I)¹¹ of the three reports on acute mental health care to be service delivery, teaching, and research. Activities within each area were identified as: in-patient care, out-patient care and consultation/liaison; under- and postgraduate teaching; and self initiated and contract research. This cost review however only focused on acute in-patient mental health care and did not include the costing of out-patient and consultation services or academic activities.

Fixed cost was considered to imply cost that did not change with a change of activity in the unit Table I. Information on fixed (overhead) cost incurred in running the inpatient mental health care unit, was obtained from additionally requested facility, administrative and human resource data. Fixed cost in this calculation included staff salaries, as it did not represent a change in the activities of the unit. Staff expenditure stayed "fixed" even with a change in the number of admissions. Cost was then allocated to inpatient mental health care on a proportional basis, using an allocation formula according to ABC methodology.

Fixed cost activities (overhead/indirect)	Allocated items
	- goods and services: municipal services, agency nursing, medical stores, domestic services (meals, cleaning, laundry), security, telephone, unit management, transport
	- maintenance and repairs
	Staff salaries
	Patient days
	Floor space
Variable cost activities (direct)	Pharmacy
	Laboratory
	Radiology
	EEG

The following information was required to allocate these proportional fixed costs:

- allocated items: goods and services (municipal services, agency nursing, medical stores, domestic services, security, telephone, unit management, transport); maintenance and repairs
- proportional floor space as per floor plans from the Gauteng Department of Public Works;
- proportion of the number of patient days for inpatient mental health care relative to the total patient days for the hospital; and
- proportion of salary cost for mental health care staff relative to the cost of total salaries for the hospital.

Variable cost was considered to imply cost changes with a change of activity, for example through increased admissions (Table I). Variable costs therefore included the cost of drugs ("Pharmacy"), laboratory tests ("Laboratory"), radiological ("Radiology") and other procedures ("EEG"). This was captured from various records and cost was assigned in the following way:

- Pharmacy: from a clinical record review of discharge summaries that yielded information on in-patient treatment; unit cost for medication were applied according to current hospital tender prices;
- Laboratory: from the National Health Laboratory Services (NHLS) database that contained actual laboratory tests and cost for individual patients;
- Radiology: from the routine register reflecting actual X-rays and Computer Tomography (CT) scans done for individual patients; costs were derived from the Uniform Patient Fee Structure (UPFS).
- Electro-encephalogram (EEG): from attendance registers reflecting actual EEG's done and cost from the UPFS.

Individual user cost per admission was calculated as a composite of the variable cost (drugs, laboratory tests, radiological and other procedures) and the allocated portion of the fixed cost, which equated to the "bed cost". The calculation of the total cost per user or "bed cost" was done in the following way:

cost per day = total cost/total patient days; and
cost per user = cost per day x length of stay (LOS)

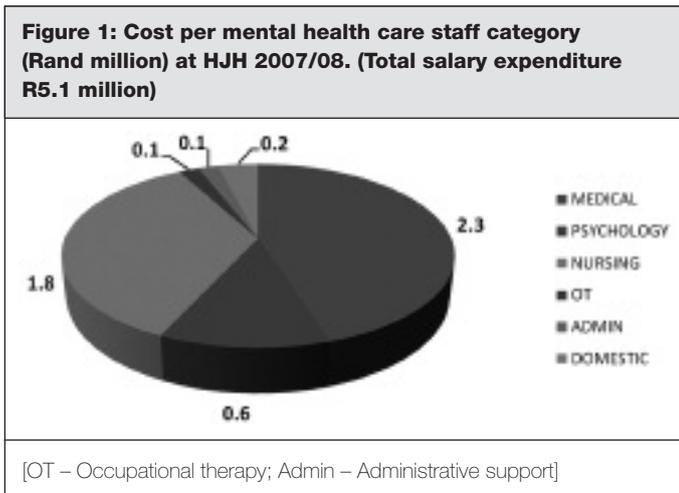
Finally, a differentiation of cost was made per specific diagnostic groups (e.g. schizophrenia, bipolar mood disorder, etc), for the re-admission of the same users and for users admitted for an extended period (more than 25 days).

Results

Part I of the review of acute mental health care at HJH according to recent legislation, reported in detail on the demographic, clinical and outcome profile of in-patient users.¹¹ In summary, a total of 520 users were admitted for in-patient mental health care during the financial year 2007/08. Users were admitted from all over Johannesburg – mainly from the "Metro" region – but also from the Ekurhuleni and West Rand regions, as there was no clear delineation of the catchment area for the hospital. There was an even distribution of males and females. The mean age was 37 years and ranged from 13 to 75 years. The mean average length of stay (ALOS) was 15.4 days and ranged from 1 to 85 days. Ninety users (17.3%) had an extended period of stay - 25 days and more, while 39 users had multiple admissions during the 12 month period: twice (n=35) and thrice (n=4). The most common Axis I diagnoses made were schizophrenia n=138 (29%), substance-related conditions n=99 (21%), bipolar mood disorder n=69 (14%) and disorders related to a general medical condition n=49 (10%). After discharge users were referred to Sterkfontein Hospital n=65 (13%), Tara the H Moross Center n=49 (9%), psychiatric community services n=157 (30%), HJH out-patient department n=139 (27%) and Life Health Esidimeni facilities n=8 (1%).

Recurrent cost of acute in-patient mental health care (2007/08)

Overview - The proportional floor space for acute in-patient mental health care activities at HJH was 835 m², 4.4% of the total (18,825m²). A total of 8005 patient days were calculated for acute mental health care users, 4.6% of the total (164 258 days). The total expenditure of the hospital for the financial year 1 April 2007 to 31 March 2008 was R341,361,015.28. The total cost of acute inpatient mental health care was R8,188,671.00, amounting to 2.4% of the total hospital expenditure. This finding is concurrent with the provisional proportional estimate of 2% that the earlier pilot review was able to establish for 2003/04. The total expenditure on staff by the hospital was R184.4 million of which R5.1 million (2.8%) was for mental health care staff (Figure 1).



Fixed and variable cost – (Table II.) The bulk of the current running cost of acute in-patient mental health care for 2007/08 was made up of the fixed (overhead) cost for the unit (91%). Apart from the “allocated items” (supplies, domestic services - meals, cleaning and laundry, maintenance, security, telephone, unit management, and transport), fixed overhead cost also included the expenditure on staff. Variable cost items made up the remaining small proportion of 9% (R0.72 million) of the total

Table II: Cost of in-patient mental health care at HJH, 2007/08

Cost Component	Cost (Rand; % tot cost)
FIXED COSTS	7,464,175 (91% of ²)
Goods and services	1,966,390
Maintenance and repairs	354,653
Staff salaries	5,143,132
VARIABLE COSTS	724,496 (9% of ²)
Pharmacy	133,430
Laboratory	432,860
Radiology	142,456
EEG	15,750
TOTAL COST ²	8,188,671 (2.4% of ¹)
TOTAL HOSPITAL EXP ¹	341,361,015

cost. The proportion of the total variable cost was 60% for “Laboratory”, 20% “Radiology”, 18% Pharmacy” and 2% for “EEG”.

Cost per user - The average cost per patient day for acute mental health care during the study period was R1,023.00. The average cost per user was R15,748.00 and ranged from R933.00 to R87,410.00 (Table III). The average “Pharmacy” cost per user for the 478 users who received medication during the period was R279.00 and ranged from R0.30 to R3,352.00. The average “Laboratory” cost per user for the 456 users who had laboratory investigations was R949 and ranged from R35.00 to R4,041.00 per user. The average “Radiology” cost per user for the 69 users who had radiological procedures was R2,065.00 and ranged from R196.00 to R3,007.00. The six main cost drivers during this period were: - full time staff (63%); - municipal services (5.4%); - laboratory (5.3%); - maintenance and repairs (4.3%); - agency nursing (3.5%); and - security (2.3%) - Table IV.

Table III: Average costs of in-patient mental health care at HJH, 2007/08

Indicator	Total Cost (Rand)	(n=)	Cost per patient and day (Rand)
Average per patient	8,188,671	520	15,748
Average per day	8,188,671	8005 (days)	1,023
Average Pharmacy cost	133,430	478*; 520	279; 256
Average Laboratory cost	432,860	456*; 520	949; 832
Average Radiology cost	142,456	69*; 520	2,065; 274

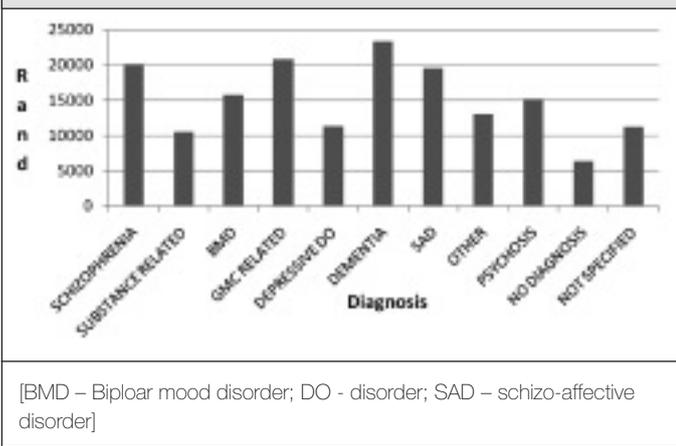
*Number of users documented to have received medication or a procedure during their in-patient stay

Table IV: Cost drivers of in-patient mental health care at HJH, 2007/08

Items	Expenditure (Rand)	Proportion of total (R8.19 million)
Staff salaries	5,143,132	62.8%
Municipal services	443,534	5.4%
Laboratory	432,860	5.3%
Maintenance and repair	354,654	4.3%
Agency nursing	284,714	3.5%
Security	186,904	2.3%
Meals	144,019	1.8%
Radiology	142,456	1.7%
Pharmacy	133,431	1.6%
Medical stores	128,908	1.6%
Cleaning	110,900	1.4%

Differentiated cost – The cost of acute mental health care for users with schizophrenia (n=138, 26.5% of total) at 34% (R2.8 million) of the total cost was the highest for a particular diagnostic category, with an average cost per user of R20,178.30 (Table V; Figure 2). Although users with dementia only comprised 4.8% (n=25) of the total admissions, their average cost per user was the highest (R23,360.68) and accounted for 7.1% of the total cost, due to

Figure 2: Average cost per diagnostic group at HJH, 2007/08



their relatively longer average periods of admission. One user with dementia stayed for 85 days at a total cost of R86,955.00. The average cost per user with a diagnosis related to a general medical condition (n=49; 9.4% of total) was R20,814.92, 12.5% of total cost. Of the differentiated variable cost, expenses on "Laboratory" were the highest in all diagnostic groups. The total cost of pharmaceuticals ("Pharmacy") was the highest for users with schizophrenia, compared with other diagnostic groups. The cost of re-admissions (n=39; 8%) to the ward was 14% of the total cost for this financial year. Users with an extended stay of 25 days and more (n=90) were 17% of the total admissions, with an average cost per user of R36,692.00 and a total cost of R3.3 million. This formed a disproportionate 40% of the total cost and probably reflected a longer time to stabilize and the extended periods of time that users often waited for placement in medium and long-term facilities.

Estimated projected recurrent cost towards alignment with WHO staff norms

Additional funding will be required: - to normalize the current particularly compromised nurse to bed ratios; - to take rising user numbers (35% from 2004 to 2006) and the extended scope of services (voluntary, assisted and involuntary) into account; and - to anticipate the possible addition of another 10

beds to the current 30 in the unit, according to Gauteng provincial health department's objective for acute units.

It was established in the first report (Part I) that if the WHO model's nurse to bed ratio of 0.5:1 was applied to the 30 acute beds at HJH, the current available 5-6 nurses per shift (at a ratio of 0.2 to 1) would have to be more than doubled to be brought on par with this norm. To also anticipate the additional 10 beds that have to be aimed at, the total projected number of nurses needed according to this norm will be:

$$6 \text{ nurses} \times 2.5 + 1 \text{ nurse per } 2 \text{ additional (10) beds} = 15 + 5; \text{ i.e. } 20 \text{ per nurses } 40 \text{ acute beds}$$

While the medical staff ratio per acute bed was much better in comparison with that of nurses, constraints still existed if 30% academic time was fully applied and if the unit would be extended to 40 beds. An additional (third) specialist and another (fifth) registrar/medical officer would therefore be needed.

Allowing for 14 additional nurses, an additional specialist and registrar/medical officer, as well as for a third psychologist, a full time occupational therapist (OT) and assistants, a social worker and an additional administrative assistant, the total projected cost based on current (2007/08) figures for these projected staff members, will be about R10.4 million per annum. This represents an additional amount of R5.3 million per annum, an increase of 103.2% in the current R5.1 million per annum (Table VI).

Table VI: Projected cost of increased staffing at HJH towards alignment with norms and standards

Staff Category	Additional cost (Rand)	% Increase
Medical	843,180	37%
Psychology	290,519	48%
Nursing and GA	3,950,457	267%
Administration	48,675	52%
Occupational Therapy	106,096	69%
Social Work	72,630	100%
TOTAL	5,311,557	103%

Table V. Fixed and variable cost per diagnostic group, inpatient mental health care HJH, 2007/08

	Number	%	Total LOS days	Total cost (Rand million)	Cost/user	Proportion of total (R8.19 million)
Schizophrenia	138	26.5	2722	2.8	R 20,178.30	34.0%
Substance related	100	19.2	1029	1.05	R 10,526.67	13.0%
BMD	69	13.3	1062	1.1	R 15,745.30	13.3%
GMC related	49	9.4	997	1.07	R 20,814.92	12.5%
Depressive do	38	7.3	422	0.43	R 11,360.68	5.3%
Dementia	25	4.8	572	0.58	R 23,360.68	7.1%
SAD	18	3.5	344	0.35	R 19,550.67	4.3%
Other diagnoses	12	2.1	154	0.16	R 13,128.50	1.9%
Other psychosis	11	2.3	163	0.17	R 15,772.71	2.0%
No diagnosis	24	4.6	148	0.15	R 6,308.50	1.9%
Not specified	36	6.9	393	0.4	R 11,167.75	4.9%
TOTAL	520	100.0	8005	8.19	R 15,748.30	100.0%

Discussion

Specific limitations of this study should be noted, for example that this review only calculated the cost of inpatient care, therefore excluding the other two operational areas of teaching and research, as well as the other activities (out-patients and consultation liaison) within the service delivery area. Costing of these other mental health care activities should also be included in future costing of mental health care at HJH. Another limitation was that as a retrospective review, this study relied on existing clinical and financial data sources and was therefore subject to and limited by incomplete and sometimes incorrect data. Clinical data was for example retrieved from the discharge summary documents completed by the doctors on discharge. Every effort was however made to find missing information, for example for laboratory tests, but this was often not possible to do. A certain discrepancy (about 5% of total admissions) continued to occur and was accounted for as the "not specified" category in Table V. However, these omissions would not have impacted significantly on the overall results. A significant difficulty in this cost analysis was the assigning of unit prices to some of the variable cost items (radiology and EEG). In the absence of readily available unit cost information, cost for items was charged according to the UPFS. While this private sector cost units would have been an overestimate it remained the best estimate of these costs for the purpose of this study. Lastly - due to the undetermined catchment area for HJH - the calculation of incidence or prevalence rates of different diagnoses for the regional population that the hospital serves, were not possible.

Recurrent cost of acute in-patient mental health care (2007/08)

Although the ABC methodology used in this cost analysis remained subject to various assumptions, as well as to its inherent complexities, it resulted however in a more realistic estimate of the recurring cost incurred by the acute mental health care unit at HJH, that can be used to align the facility and program towards acceptable standards of care. The method allowed for not only allocating cost on a service volume basis - thus overestimating it to some extent - but allocating cost by considering the level of activities that generate those costs.

Total expenditure

The results revealed that acute mental health care consumed only 2.4% of the total hospital budget and salaries of mental health care staff were only 2.8% of the total, when in fact the unit provided 4.6% of the services at the institution (patient days). Although mental health care involves relatively low technology and does not require high capital cost inputs, it does involve service provision that is labour intensive - requiring recurrent cost inputs to afford the salaries of permanent staff. An adequate annual budget should therefore be prioritized and allocated for the recruitment and retention of employees at acceptable staff ratios in order to maintain standards of care.

No information or formal guidelines currently exist on what proportion of resources should actually be allocated to a designated 72-hour assessment unit in South Africa,

considering the range of services that are expected from these units. In the absence of another approach, it can be suggested that using a method such as ABC that - to a much larger extent - can allocate cost more specifically to particular clinical services in a general hospital, may contribute to a solution of the problem of how to determine what proportion of the total expenditure of a general hospital should be afforded to psychiatric and mental health care. Allocation can therefore be based on the principle that the proportion of the hospital budget to be allocated to a particular clinical component should be aligned towards the proportion of the component's staff salaries (percentage of total staff budget) as well as towards the proportion of services rendered (as measured in patient days). Provided however, that staff ratios were calculated and appointments were made according to appropriate norms for a particular output in the first place and also, that adequate quality and productivity control and effective performance evaluation measures have been incorporated at the same time. In other words, to essentially establish the capacity and information support to implement a cost centre management approach. This cost analysis of acute mental health care activities at HJH - albeit limited - may therefore be useful as an initial local case study in this regard.

Fixed cost

It was shown that fixed cost per patient day was by far the largest component of the cost per day as the variable cost contribution was much lower. It stands to reason therefore, that the biggest determinant of cost is length of stay (LOS). In practice, this becomes a matter of concern when considering the issue of extended admissions. In-patients who remained in the hospital for a protracted time consumed a large proportion of the mental health unit's budget.

Variable cost

In terms of variable costs, a financial review such as this one can in fact identify unnecessary cost and highlight potential areas for targeting cost containment measures. An interrogation of pharmaceutical prescription practices and the cost involved is necessary and will have to be conducted as part of routine monitoring measures in the future. With regards to laboratory usage, data collection did reveal wasteful repetition of investigations. This occurred particularly when blood tests were ordered on admission in the emergency or medicine departments, and then repeated in the mental health care unit a day later without checking for results. One particularly costly test that was noted to be repeated often was the thyroid function profile at a cost of around R250.00 per test. This should be an area for further analysis.

Differentiated cost

The factors that influenced the cost for users with different diagnoses - as mentioned - were the LOS and the determinants thereof. If users stayed longer than the average 15.4 days, it added to the cost per user at a rate of R1023.00 per day. For example the average LOS per user with schizophrenia was 19.5 days and ranged from 1 to 70 days, thus increasing the cost of schizophrenia above the

average.¹² In the same sense, it was also clearly shown that the cost of the acute management of dementia was the most expensive compared to all other diagnoses due to the longer time that was usually required to find a suitable placement prior to discharge.

Estimated projected recurrent cost towards alignment with WHO staff norms Although this section implies that a projection was made of all recurrent cost, only the proposed increase in staff was considered, in order to give some perspective on the proportion of the increase in the different staff categories needed to operate according to more acceptable norms and standards. Applying the WHO norm for acute mental health care identified nursing is particularly at stake, needing a projected increase of almost 270%.

To motivate an increase in the allocation of recurrent funds to accommodate the additional staff, one can return to the argument that the proportion of the hospital budget to be allocated to a particular clinical component should be aligned towards the proportion of the component's staff salaries as well as towards the proportion of services rendered. Adjusting the proportion of the budget for acute mental health care from 2.4% towards 4.6%, will easily cover the additional funding required to afford the projected staff increase. An increase in the number of beds and thus the number of users and activities performed in the unit will therefore also increase the variable cost (laboratory, pharmacy, radiology and EEG). It would however be the relatively smaller proportion of the total anticipated cost, if the proportions of this analysis will apply.

Conclusion

This study demonstrated that a cost analysis using an ABC approach can be done successfully in a South African acute public mental health care setting. It provided more detailed estimates of cost for in-patient mental health care at HJH, with the aim to where possible assist hospital managers to make evidence-based decisions regarding resource allocation. It can be recommended that facility and regional health care management should support efforts by clinicians involved in a bottom-up approach to produce costs for their different departments. This will however require: - a system of electronic medical record keeping for bottom-up costing; - appropriate computing equipment with administrative and

technical support; - the availability and training of staff. Subsequent annual cost analyses as part of a continuous quality assurance cycle would be required to successfully implement a cost centred management approach.

References

1. *Draft report: Cost Analysis Tool. Simplifying cost analysis for managers and staff of healthcare services. New York. 2000; EngenderHealth*
2. Olukoga A. Unit costs of inpatient days in district hospitals in South Africa. *Singapore Med J* 2007; 48 (2): pp143
3. Kuckow PM. Cost of urology: financial audit in a clinical department. *British Medical Journal* 1992; 305: pp743-746
4. Kaplan RS. Time-driven activity-based costing. *Harv Bus Rev* 2004; 82(11): pp131-138
5. Waters HE, et al. Application of activity-based costing (ABC) in a Peruvian NGO healthcare system. *Operations Research Results 1* (3, Revised). Bethesda, Maryland. 2003; Published for the U.S. Agency for International Development (USAID) by the Quality Assurance Project (QAP)
6. Taba LM. Measuring the successful implementation of activity-based costing (ABC) in the South African Post Office. 2005; Dissertation submitted for MTech degree (UNISA)
7. Garrison RH. *Managerial accounting. Ninth Edition. 2000; McGraw-Hill Higher Education, Boston*
8. Krub B, et al. Is a methodology available that accurately measures the cost of an FDG-PET study? *Eur J Nucl Med Mol Imaging* 2007; 34: pp625-627
9. Janse van Rensburg ABR. *Clinical Audit Of Mental Health Care At Helen Joseph Hospital. Sep 2003 to Aug 2004; Internal report submitted 31 January 2005*
10. Jassat W. *Cost of Psychiatry at Helen Joseph Hospital, a regional referral facility. Internal research report. School of Public Health, WITS. Dec 2007*
11. Janse van Rensburg ABR. *Acute mental health care and South African mental health legislation. Part 1 - morbidity, treatment and outcome. African Journal of Psychiatry* 2010; 13(5): 382-389.
12. Gauteng Department of Health. *Annual Performance Plan 2008-2011; pp35-38*
13. Janse van Rensburg ABR, Olorunju SAS. *Diagnosis and treatment of schizophrenia in an acute 72-hour assessment unit. African Journal of Psychiatry* 2010 ;13(3):204-10.