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Carrying out a bed census at a district hospital in Zambia

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Introduction

Many hospitals in developing countries are faced with high and still increasing rates of bed occupancy, to the extent that concerns are being raised about the quality of care. Resources available for health care are shrinking due to declining economies, but at the same time population growth alone produces increases in the demand for care. In some of the poorest regions in the world, these problems are compounded by the HIV/AIDS epidemic with its resultant increase in demand for care made by HIV-infected patients.

In most of these hospitals the information that can be extracted from routine statistics is limited, the most commonly available data being average length of stay in hospital, bed occupancy rates, hospital mortality rates and discharge diagnoses. Comparisons over time and between hospitals can give indications about the existence of problems, but a more refined analysis for the elaboration of solutions requires a more sophisticated assessment of the use of hospital beds.

We report here on our experiences with a bed census in a district hospital in Zambia. The bed census was carried out as part of a larger study of the impact of HIV and AIDS on Monze District, southern Zambia. The study was based at Monze District Hospital, a 250-bed mission hospital which is also the official district hospital. One of the objectives of the larger study was to find ways to improve use of hospital resources in coping with the epidemic of HIV. We therefore wanted to know who was in the hospital, how the beds were being used, what bed occupancy rates were, whether any of the patients in beds could have been treated elsewhere (especially at health centres or through the outpatient department (OPD)), or whether they were in hospital primarily for non-medical reasons. We also suspected that delays, especially in the processing and reporting of lab results, might be responsible for a significant proportion of bed use. We wanted to have an approximate idea of how much HIV related disease was felt to be on the wards; subsequent to the bed census, the study found that at this hospital about 42% of medical and surgical inpatients, and 70% of TB patients, were HIV seropositive; 30% of bed days were used for the care of patients with HIV disease.[1] The bed census was also used as an exercise in data collection and organization as part of the training programme we provided for our research staff.

Methodology

In essence a bed census is a cross-sectional 'snapshot' of the utilization of hospital beds on one particular day. In the type of bed census described here, for each patient occupying a hospital bed the reason(s) for him/her being in hospital on that particular day is noted. Using a pre-set list of criteria of appropriateness of bed utilization, for each patient an assessment is made of whether the reason(s) for his/her presence in hospital on that day is appropriate. The outcomes of this exercise include 1) the proportion

of hospital beds occupied; 2) the proportion of beds that are inappropriately occupied; 3) the reasons for inappropriate bed occupation. In the literature there are several reports of such censuses carried out in the US,[2,3] the UK[4] and South Africa.[5] However, to our knowledge no such exercise has been reported from a developing country setting.

The first step in the exercise was to make a list of reasons why patients may be in hospital. We used as a guide the lists of criteria for appropriateness of hospital days and reasons for not being home, which were used in a study conducted in Oxford in 1986.[4] These lists were adapted to suit better the realities of a district hospital in Zambia. The reasons for being in hospital were grouped in three categories: 1) clinical reasons for being in hospital; 2) non-clinical reasons for being in hospital; 3) 'waiting for . . .' reasons. In addition to this an open-ended question was added to the form asking for any other reason for being in hospital on that day. More than one reason for being in hospital could be ticked. The doctors filling out the questionnaire were also asked whether they were of the opinion that the patient could have been managed at a more peripheral level of health service, i.e. a health centre or an outpatient department. A question relating to blood transfusion policy was included to see whether a large proportion of patients were waiting for a unit of blood to be procured; due to the HIV epidemic it had become very difficult to secure safe units of blood. In order to increase compliance with the exercise, we made an effort to keep the form to one page (Annex 1).

The doctors were asked to fill out the forms, each for his/her own ward. One day in the week was chosen to carry out the bed census. This day was not randomly chosen, but took account of theatre days and of the doctor's availability to fill out the forms. The data were entered into a computer and analyzed using Epi-Info v. 5.01.

Results

On the day of the bed census 246 of the 250 beds were occupied (98.4% occupancy). The distribution of the broad categories of reasons for being in hospital on that day was as follows: 87% of the patients had one or more clinical reasons for being in hospital; 12% of patients had a non-clinical reason; and 24% of patients were waiting for a lab test result or another opinion, visit of a consultant, etc. Some patients had more than one reason for being in hospital that day. Interestingly, although 87% of patients were in hospital because of one or more clinical reasons, in 24% of cases it was felt by the doctor filling out the form that the patient could have been treated at a lower level, including approximately 70% of TB patients. Conversely, of all the patients who - according to the doctors - could have been treated at a lower level health facility, 82.5% were in hospital because of clinical reasons. Paradoxically although they *could* in theory have been treated at a lower level facility, those facilities in Monze District are for the most part not geared up to provide inpatient treatment, so such patients have to be admitted to hospital.

Discussion

Though we did not label reasons for being in hospital as appropriate or not appropriate, we implicitly assumed that the clinical reasons were appropriate, whereas the other reasons were not. We had only briefly discussed the list of reasons with the doctors working in the hospital, but by and large this list was made up by researchers coming from outside the health services of Monze hospital. Judgments about the appropriateness of hospital bed utilization will vary from one situation to another, and from one doctor to another. In fact, whether a hospital bed is used appropriately will depend on the perceived role of the hospital in the area. This in turn will depend on the services it can offer, i.e. its technical level, and on the availability of alternative services. As such it is impossible to develop widely applicable gold-standard criteria against which appropriateness of hospital bed utilization can be judged.

This disadvantage of the method can be turned into an advantage: hospital staff wishing to embark on a bed census ought to start by reflecting on the role of their hospital in order to set out criteria for judging the appropriateness of bed utilization. A consensus has to be reached on which reasons for bed occupation are appropriate. The development of this consensus ideally should also involve staff from services outside the hospital, e.g. health centres in the

catchment area of the hospital. The lack of such consensus is probably responsible for our seemingly contradictory finding that the majority of patients whom the doctors thought could have been managed at a lower level of health facility were in hospital for 'clinical reasons'. This exercise in consensus building would then be a first step towards solving a problem of high bed occupancy.

A second problem relates to the day chosen for the bed census. Patient flows differ markedly from one day to the next. On Mondays the hospital would be crowded, and on Fridays there would be an extra effort made to discharge patients. Moreover, there can be marked seasonal variations in bed occupancy. In Zambia it is well known that during the rainy season hospitals are more crowded than during the dry season, due – amongst other reasons – to higher transmission of malaria.

This need not be a problem if the bed census is seen as an exercise to identify problems and to evaluate interventions to solve these problems. In the South African study the bed census revealed that 98% of admissions were appropriate, but that the level of care was appropriate for only 49%; and that 62% of the reasons for delay were related to the hospital's own procedures vs. 20% family-related and 18% related to inadequate lower level facilities. One conclusion was that there was a need for greater provision of adequate community-based care.[5] In Oxford, the study found that 38% of days were appropriate, but this varied by ward and by age of the patients, with 50% of days being deemed appropriate for patients of 16–64 years, but only 19% for patients over 84; 'appropriateness' declined from 74% on the first day after admission to only 22% on the eighth day, and was related to the patterns of consultants' ward rounds; a suggestion was to delegate the discharge decision to other staff, and to involve GPs more in discharge planning.[4]

Conclusion

There are major advantages to conducting such a bed census. Once the list of criteria is drawn up, the exercise itself is fairly straightforward and can be completed, including data entry and writing of a report, in a few days. We were concerned about the extra burden it would put on already overburdened hospital staff, but in fact most of the doctors were quite happy to do it, and depending on the complexity of the form to be filled in, it could be combined with a regular ward round. The survey could thus easily be repeated at a later date, for instance to evaluate the implementation of an intervention.

The bed census proved useful on several counts. First of all, it gave the staff an opportunity to reflect on their practice and on the reasons for variations between wards. We were able to verify the impression that the hospital was working to full capacity, and that most of the beds were being used appropriately. On the other hand, the bed census gave an indication, later verified by other work, that there was much to be gained by strengthening the health centres in the district, all of which have an inpatient capacity which is for the most part under- or unutilized, and which would be especially useful in treating patients with HIV disease. Our finding that approximately 70% of TB patients could be treated at a lower level of the health service was reassuring to the Ministry of Health, which was contemplating a change of TB treatment policy in Zambia in favour of outpatient treatment; but that finding has also been useful in estimating the percentage of TB patients who are too ill to be treated on an outpatient basis because of advanced or concurrent disease and in planning for their care.[6]

In conclusion we feel the bed census is a useful method, worth further exploration in developing country settings, to be used at district level to judge the appropriateness of bed use. Its interest resides not only in the actual data that are collected, but also in the process of reflection and consensus building at district level that is needed to draw up the list of criteria against which the appropriateness of use of hospital beds will be judged.

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Biographies

Anne Buvé was a District Medical Officer in Zambia and Sierra Leone. She has an MSc in Epidemiology from the London School of Hygiene and Tropical Medicine and was involved in the Study of Adult Diseases in Monze, Zambia, funded by the Overseas Development Administration (UK). She is co-founder of Health Research for Action (HERA) in Belgium and currently she is an epidemiologist at the Institute for Tropical Medicine in Antwerp.

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Annex 1.

ADZAM Bed Census Form — Use BLOCK CAPITALS please

WARD: FS Female Surgical FM Female Medical |_|_|
MS Male Surgical MM Male Medical
PD Paediatrics TB TB
MA Maternity

Bed Number: |_|_|_| Date of Admission (DD/MM): |_|_|_|_|

Is the patient a resident in Monze District? YES NO

Filled in by (initials): |_|_|_|

Patient was admitted: Direct to ward |_| Via OPD |_|

Clinical reasons for being in hospital on Friday:

|_| invasive procedure Wednesday/Thursday/Friday
|_| treatment requiring frequent monitoring and close adjustments (including IV-therapy)
|_| requiring close monitoring (at least once a day by a doctor)
|_| care of major wound or drainage
|_| other nursing care
|_| requiring daily injection(s)
|_| requiring physiotherapy/orthopaedic traction

Non-clinical reasons for being in hospital on Friday:

|_| waiting for transfer to another hospital
|_| waiting to be taken home
|_| uncertainty over medical aftercare/nursing care
|_| uncertainty over compliance
|_| inadequate social support at home
|_| uncertainty over ability to return in case of complication

Waiting?	waiting this day	delay in the past
laboratory	|_|	|_|
radiology	|_|	|_|
other investigation	|_|	|_|
drugs/supplies	|_|	|_|
other opinion	|_|	|_|
blood transfusion	|_|	|_|
consent of relatives	|_|	|_|

Other reason(s) for being in hospital this day:

In hospital this day because of blood transfusion policy? YES NO

Could the patient have been treated at a lower level facility? YES NO

Serological Status: POS |_| NEG |_| WAITING |_| N/A |_|

Thank you for your co-operation