SHORT REPORT

Operational cost for management of leprosy-related complicated ulcer in charitable hospitals

SRINIVAS GOVINDARAJULU*, VIVEK LAL*, SAMUEL THOMSON SUGUMARAN DAVIDSON*, THIRUMUGAM MUTHUVEL*, SHIBU GEORGE* & KANAGASABAPATHY VAIKUNDANATHAN*
*German Leprosy and TB Relief Association, Chennai, India

Accepted for publication 22 June 2015

Introduction

Leprosy causes skin lesion and nerve damage which can ultimately progress to secondary impairments of the eyes, hands and feet. The most important aspect of nerve damage is the sensory dysfunction which can lead to insensitivity and a predisposition to the development of ulcers. Plantar ulceration is the single most common cause of morbidity among leprosy-affected people. Ulcers also pose a significant problem to health services as the treatment and rehabilitation of patients with ulcers is extremely demanding on the health care budget. Standard wound therapy for complicated ulcers extends, on average, through 30 days of conventional treatment. Within that time most will heal given adequate treatment.

The paucity of data on the operating costs of ulcer management in in-patient settings also applies to the unit costs of various services provided in ulcer management for leprosy patients.

Charitable hospitals have played a vital role all through the history of leprosy control in India. One of the major tasks undertaken by them is running referral care centres to manage simple and complicated ulcers. Even in the post-integration phase, specialised services offered by such hospitals remain relevant. Given the prevailing fund constraints, therefore, obtaining financial estimates for ulcer care management would be useful. Such estimates would yield more precise information for decision-makers who could then allocate financial resources efficiently.

The main objective of our study was to estimate the operational costs involved in the in-patient treatment of leprosy-related complicated ulcers.
Materials and Methods

The study was conducted during 2011–2012. Data was collected from the in-patient departments of three charitable hospitals supported by the German Leprosy and TB Relief Association (GLRA) in Southern India, viz. Sagayamatha Hospital in a rural area of Tamil Nadu, Damien Leprosy Centre in a semi-urban area and Sivananda Rehabilitation home in an urban area of Andhra Pradesh. These institutions were chosen because we could access comprehensive hospital data from them, including expenditure details.

Data from the selected hospitals was used to derive costs per in-patient stay of 30 days for complicated ulcer management. The unit costs for the following basic services were included: drugs and dressing materials, personnel costs (including salary), support services (food, linen, sanitary items) and logistics (water and electricity). Providers’ costs were estimated from the view point of: ‘what is’, that is the current practice. The unit cost analysis was carried out using the technique of average costing with an activity based bottom-up approach in estimating the costs incurred by the hospital to provide services. Information relating to costs of hospitalisation was calculated from reviews of patient medical bills and the hospital maintenance costs during the patient’s stay. The cost of the management of complicated ulcer care due to leprosy was estimated (for each patient individually) by multiplying the number of resources utilised by their specific unit cost and then summing all costs per patient. Then an average cost for ulcer care across the facility during this study period was calculated.

Information on time spent by health staff on ulcer-related activities was generated by time and motion study. Human resource costs were determined on the basis of proportion of time spent on the management of leprosy patients. Variable costs were calculated using proportional time allocation (apportioned based staff time). Capital costs, admin costs and contingency costs were not included in this study.

Results

The major operational cost components of in-patient ulcer care was the cost of drugs and dressing materials (37%), salaries for medical and para medical staff (30%) and patient support care (24%) – Please see Figure 1.

The average unit cost per patient for managing a complicated ulcer for 30 days is presented in Table 1. The cost for drugs constituted 13 € and the cost for dressing materials was 14 € (drug and dressing materials together accounted for 37%) respectively of the total cost.

The most significant human resource cost component of treatment was that for a medical service provider. This was followed by the cost of paramedical service provision, i.e. nursing staff. The time spent to care for a leprosy-affected patient, however, fell significantly on nurses. Nurse time spent caring for leprosy-affected patients accounted for almost 73% of nursing time. In a time motion study of a ward nurse attending about 20 beds/day, the major activities carried out in a day included: Dressing for in-patients - 2.5 hours; Medicine distribution to in-patients - 1 hour; Injection - 1 hour and Record work - 2 hours.

Discussion

Our study revealed that the unit cost involved in managing complicated ulcers in an in-patient setting was 75 € for a 30-day ulcer care. We found that the major proportion of the costs
incurred was spent on drugs and dressing materials rather than on salaries or supportive care services. The cost of drugs will be the major expense to be borne by patients when availability and affordability is an issue.\textsuperscript{5}

A cost analysis study of in-patient services conducted at a premier teaching hospital in India estimated expenditure on manpower to be 40\% of the total cost.\textsuperscript{6} The difference from our findings (73\%) may be due to the fact that the human resources cost is comparatively less at charitable and private hospitals where salary structures at such instututions are generally lower than prevailing rates.\textsuperscript{7}

Nurses (or nursing auxiliaries) are required for dressing wounds, administering prescribed drugs and for the regular monitoring of patients. A recent study reported that nurse or auxiliary staff time accounted for almost 90\% of the overall cost and for 96\% of the cost in the case of ulcers. The cost of other resources such as dressings, antibiotics and pressure-relieving equipment was reported to be lower (3.3\% of the overall cost).\textsuperscript{8}

<table>
<thead>
<tr>
<th>Cost Head</th>
<th>Components</th>
<th>Unit Euro €</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressing materials</td>
<td>Cost for cotton, gauze, betadine, saline, etc.</td>
<td>14</td>
</tr>
<tr>
<td>Drugs</td>
<td>Cost for antibiotics, anti-inflammatory drugs, vitamin, syringe, needles and others</td>
<td>13</td>
</tr>
<tr>
<td>Personnel</td>
<td>Cost for medical, para-medical staff, cook</td>
<td>22</td>
</tr>
<tr>
<td>Support care</td>
<td>Cost for food, linen, sanitary items and others</td>
<td>18</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>Cost for routine laboratory investigations, including X-Ray</td>
<td>4</td>
</tr>
<tr>
<td>Logistics</td>
<td>Water, Electricity</td>
<td>4</td>
</tr>
<tr>
<td><strong>Cost for Ulcer management in an In-patient setup for 30 days</strong></td>
<td></td>
<td><strong>75 €</strong></td>
</tr>
</tbody>
</table>

*Figure 1. Various components of operational cost in management of complicated ulcer in charitable hospitals.*
Limitations

Cost differences across study hospitals do exist and hospital selection for unit cost estimates are likely to have an impact on results and conclusions. It is likely that the hospitals included in our study were implementing best practices in providing efficient care and therefore the costing estimates obtained would be considered an efficient cost and hence may not be generalised.

Conclusions

Information on the cost of providing health services is essential for good planning and management as it will secure an efficient use of limited resources. Awareness of possible healthcare-related costs in managing ulcers presented by people affected by leprosy is necessary if already high healthcare costs are to be reduced. The presented results could contribute to efforts to forecast the economic burden of leprosy care in India.

Acknowledgements

We would like to express our sincere thanks to the management and staff of Sagayamatha Hospital - Pullambady, Tamil Nadu; Damien Leprosy Centre, Eluru - West Godavari, Andhra Pradesh and Sivananda Rehabilitation home, Kukatpally, Hyderabad, Telangana for their support to the study.

Authors’ contribution

Srinivas Govindarajulu: Conception and designing the study, Interpretation of data, drafting the article, critical revision.
Vivek Lal: Drafting the article, critical revision.
Samuel Thomson Sugumaran Davidson: Acquisition of data, analysis of data, critical revision.
Thirumugam Muthuvel: Literature review, interpretation of data, editing the article.
Shibu George: Data collection, literature review, interpretation of data, editing
Kanagasabapathy Vaikundanathan: Interpretation of data, editing the article.

References


