

RESEARCH ARTICLE

The study of the economic burden of infectious diseases in medicine department of tertiary care hospital

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ABSTRACT

Background: The common perception of the general population is that a visit to a hospital is an expensive issue and infectious diseases are the most common reason for the visit. **Aims and Objective:** The aim of the study was to evaluate the economic burden of infectious diseases in patients admitted to the medicine department. **Materials and Methods:** It was a prospective observational study conducted on patients admitted to medicine ward with any infectious conditions. The study period was for 3 months. The data were collected in specially designed case record forms. The following analysis was performed; the WHO core indicators, cost of drugs, cost of consultation, and cost of illness (COI) were determined. **Results:** Out of 87 subjects considered for final analysis, 56% were male and 68 were from the urban locality. The respiratory system was most commonly involved, and lower respiratory tract infection emerged as the most common infectious disease with 28 cases. The average drug per prescription was 4.2. The average cost of drugs was Rs. 5867 out of which Rs. 2039 was the cost of antibiotic used. The average consultation charges were Rs. 2289. COI per patient was Rs. 8156. **Conclusion:** By determining the COI of infectious disease, which was Rs. 709,572 the value of prevention and treatment strategies can be measured. The cost of preventive strategy could be subtracted from this to yield the benefit of implementing the preventive strategy nationwide and on a personal level.

KEY WORDS: Cost of illness; Antibiotic; Infectious Diseases; Cost of Drugs; Cost of Consultation


INTRODUCTION

The major economic burden that any individual fears is the cost of visiting a hospital. Diseases that an individual suffers from, during his lifetime are the major factors that destabilize the family's economic condition. Patient compliance or adherence to drugs depends mainly on the cost of treatment followed by adverse events and duration of illness. Controlling the cost of

treatment is a key part of the management protocol so as to promote the patient to complete the course of treatment.

Clinicians often face a dilemma while treating the patient, whether to start, stop, or continue the treatment. Every patient is unique and needs a particular way of treatment management. Physician's decisions online of treatment are usually based on the clinical scenario, efficacy data of the drug, and the economic affordability of the patient.

The most common disease that any person suffers in his lifetime is infectious diseases. It is the major cause of doctor consultation. According to the WHO, there are four communicable diseases among the top 10 causes of deaths worldwide, namely, lower respiratory diseases, diarrheal diseases, tuberculosis (TB), and HIV.^[1]

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Pharmacoeconomics is a study of the costs of drug therapy to health-care systems and society. It identifies, measures, and compares the costs and outcomes of the treatment measures may it be in the form of drug or interventions. It measures if the added benefit of one intervention is worth the added cost of that intervention. Basic components of pharmacoeconomics are the drug or interventions, costs, and outcomes.^[2]

In different types of economic models, costs most commonly measured in monetary terms are compared with a variety of outcomes such as benefit as in cost-benefit analysis, effectiveness as in cost-effectiveness analysis, or utility as in cost-utility analysis. Cost of illness (COI) also known as the burden of disease (BOD), encompasses various aspects of the disease impact on the health outcomes in a country or individuals.

The aim of COI studies is descriptive: To itemize, value, and sum the costs of a particular problem with the aim of giving an idea of its economic burden.^[3] COI is essential and helps to formulate and prioritize health-care policies and interventions and facilitates resources allocation in accordance with budget sanctioned to achieve policy goals efficiently.^[4] COI studies give the economic BOD that the patient has to bear. This cost gives the individual or the policymakers the basis to plan preventive strategies effectively. Hence, the current was undertaken to estimate the COI or economic burden of infectious diseases in medicine general ward.

MATERIALS AND METHODS

Study Design

The present study was a prospective, cross-sectional, and observational study.

Source of Data

The present study was with the Department of Medicine on the patients admitted in the medicine ward in Basaveshwara Teaching and General Hospital attached to M. R. Medical College, Kalaburagi. The study period was for 3 months from January 2018 to March 2018.

Study Population

The sample size was calculated to be 100. The study was conducted after obtaining approval from the Institutional Ethics Committee (IEC).

Inclusion criteria

The following criteria were included in the study:

- Patient of either gender aged 20–50 years
- Diagnosed with infective conditions and on antimicrobial drugs
- Admitted in medicine general ward.

Exclusion criteria

The following criteria were excluded from the study:

- Patient suffering from HIV, TB, and other chronic infective condition
- Pregnant and lactating women.

Method of Collection

After obtaining approval from IEC, patient with the above criteria was enrolled in the study after taking written informed consent. Demographic details of patients, diagnosis of disease, and data about intake of antibiotic agents and other drugs were collected from the in-patient case sheet of general medicine ward.

Prescriptions or bills were collected from the patient and were analyzed prospectively. In the case where there were no bills with the patient, the cost was enquired from the hospital pharmacy. Cost of medication was calculated as.

Total medication cost = cost of medication per dose × frequency per day × no. of days the drug was prescribed

The WHO core indicators, cost of consultation and total COI were also calculated.

Statistical Analysis

The data collected were analyzed statistically using descriptive statistics. The result is expressed in the form of the mean. Wherever necessary, the results will be depicted in the form of percentage and graphs. Microsoft Excel was used for tabulation and statistical analysis.

RESULTS

Out of 100 cases selected, 87 were considered for further analysis as rest had insufficient data. Among 87 cases, 49 were male and 38 were female [Figure 1], and 68 were from the urban locality and rest 19 from rural areas. Majority of the patient were from age group 20 to 30 years, Figure 2 gives age distribution.

The patients were mainly diagnosed with lower respiratory tract infection (LRTI) (32%), upper respiratory tract infection (13%), gastrointestinal infections (18%), zoonotic infection (13%), urinary tract infection (7%), and viral infection (17%) [Figure 3].

Physicians prescribed antimicrobials in all cases, including patients with symptoms of viral infections. Apart from antimicrobials; nonsteroidal anti-inflammatory drugs (95%) were the most prescribed drug. Other drugs prescribed were bronchodilators, rehydration fluids, antispasmodics, and probiotics [Table 1]. Among the combination of the

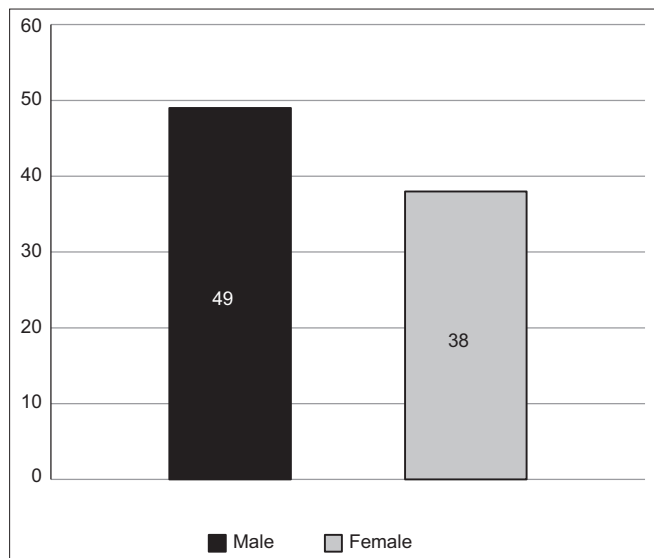


Figure 1: Gender distribution

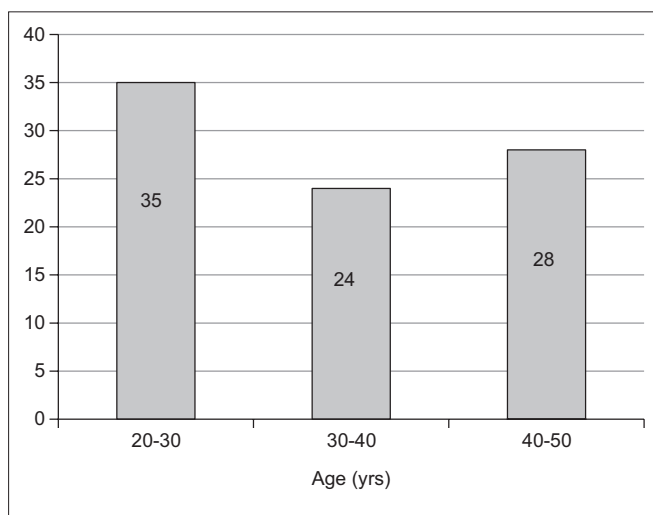


Figure 2: Age distribution

antimicrobial of piperacillin and tazobactam (35%) was most commonly prescribed followed by ceftriaxone (34%). Other antimicrobials prescribed are shown in Table 2.

The total COI for all 87 patients was Rs. 709,572 [Table 3]. Out of this Rs. 177,409 was spent on antibiotics alone and ranged from Rs. 160 to Rs. 4529. The total amount of money spent on all drugs was Rs. 510,429. The average cost of drugs was Rs. 5867 and cost of the consultation was Rs. 2289 [Figure 4]. The average COI per patient was Rs. 8156. The average duration of stay of the patients was 4.9 days. Average drugs per prescription were 4.2. Majority (86%) of prescription used brand names of the drugs. About 87% prescriptions had injectable.

DISCUSSION

COI for infectious diseases was found to be Rs. 709,572 in our study. The average cost of drugs was Rs. 5867 out

Table 1: Class of drugs prescribed

Class of drugs prescribed	Percentage
Antimicrobials	100
Nonsteroidal anti-inflammatory drugs	95
Bronchodilator	48
Rehydration fluids	89
Antispasmodics	10
Probiotics	15

Table 2: Antimicrobials prescribed

Antimicrobials	Percentage
Piperacillin and tazobactam	35
Ceftriaxone	34
Cefoperazone and sulbactam	17
Cefuroxime and clavulanate	3
Azithromycin	10
Clarithromycin	17
Doxycycline	11
Lariago	6

Table 3: Cost of illness

Total cost of illness	
Rs. 709,572/-	
Average cost of illness	
Rs. 8156	

of which Rs. 2039 was the cost of antibiotic used. The average consultation charges were Rs. 2289. The higher cost of the therapy was found in our study; this was due to the predominant prescription of the newer generation of antimicrobial agents. The respiratory system was most commonly involved and LRTI emerged as the most common infectious disease with 28 cases.

In our study, there was 56% male which is similar to study done by Pathak *et al.* in central India where there was male preponderance with 58% might be because they have more social interactions and exposure to external environment than females.^[5] Majority of the patient were of age group 20–30 years, i.e. 40%. This is similar to a study done by Randad *et al.* where there were 37% from the age group of 20–30 years.^[6] A large group of the patient (78%) was from an urban area in our study, unlike the data found in the study done by Ahmed *et al* with 62% from a rural area.^[7]

All the prescriptions in our study had antimicrobials. Most commonly, beta-lactams were prescribed followed by macrolides. The most common antimicrobials used without combining with other antimicrobials were ceftriaxone 34%, which is in accordance with many other studies.^[8,9] The most common combination used was piperacillin and tazobactam

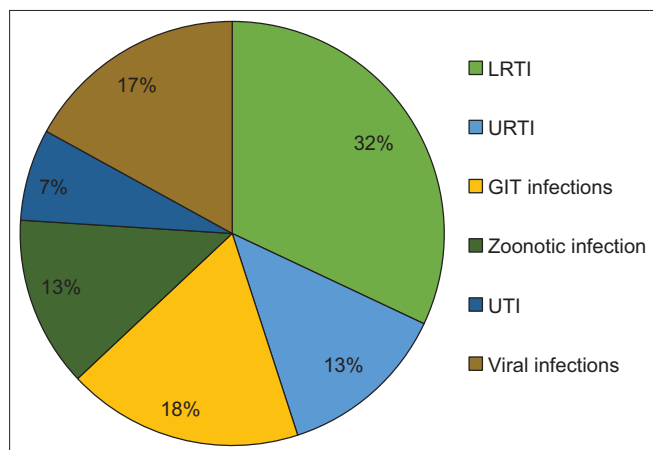


Figure 3: Distribution according to diagnosis

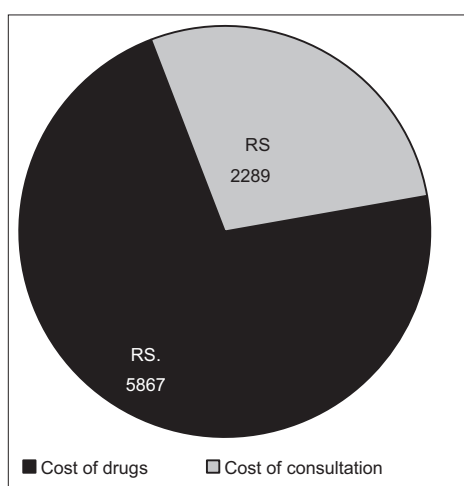


Figure 4: Cost of illness

35% which is in accordance with study done by Beg *et al.*^[10] The class of antimicrobial agent that was prescribed most commonly to the extent of 54% was cephalosporins, this study finding was in accordance to study done by Shaji *et al.* where cephalosporins were prescribed in 59% of cases.^[11]

The average COI incurred by the patient was Rs. 8156, out of which majority of the cost was toward purchasing of the drugs, i.e., Rs. 5867. About 25% of the total expenditure incurred by the patient was toward antibiotics. The highest variability of the cost was also found in antibiotics, with cost ranging from as low as Rs. 160 to as high as Rs. 4529. The cost of antibiotics was higher as newer antibiotics such as piperacillin and tazobactam or cefoperazone were highly prescribed.

Antibiotics were mostly prescribed by their brand names, which corroborates with the finding of Meher *et al.* where only 16% prescription was prescribed with a generic drug. Similarly, the average duration of stay of the patients was 4.9 days, which closely matches with a study done by Meher *et al.* where it was 4.2 days.^[12] The average number of drugs per prescription in the present study was 4.2, which is higher than the ideal WHO standard of <2 (1.6–1.8).^[13]

Strengths and Limitations

The COI definition includes two types of costs – direct and indirect. Direct costs are the amount spent to prevent, detect, and treat diseases. Indirect costs measure cost that patient has to bear due to loss of productive output caused by mortality, absenteeism, or sometimes early retirement from his work. For feasibility purpose, only direct cost such as cost of drug and consultation was calculated. The cost of the investigation was not considered as there was no uniformity. Some cases did investigation elsewhere, and in some cases, it was not done. Another limitation of the study was an indirect cost, which was not calculated. Sample size considered for the study was small.

The COI studies are considered to be an important and essential measurement technique in health and medical sciences. They put a price tag on prevention and treatment strategies as they extrapolate the benefit of implementing the preventive strategy nationwide. It helps the health-care decision-makers in setting up and prioritizing health-care policies and interventions that they are supposed to be implemented. This study would throw light over this aspect of infectious diseases and would inspire physicians to prescribe more generic drugs.

CONCLUSION

Effective control of infectious diseases in need of new millennium, to achieve this vast public health infrastructures that will rapidly recognize and respond to emerging problems need to be built up. Our study tries to give insight into the benefits of such large ventures. Apart from this, proper antibiotic policies should be adopted and implemented to be able to provide a higher level of health care. Finally, as the saying goes – “Self-help is the best help” on personal grounds certain level of health hygiene such as hand washing, food safety, and immunizations have to be followed to guard ourselves against the infectious diseases.

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