

Costs and Length of Stay of Drug-Related Hospital Admissions in Cancer Patients

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ABSTRACT

Background: Most previous studies of the incidence and economic impact of drug-related hospital admissions were not cancer specific, despite the fact that drug-related problems (DRPs) are of particular concern in oncology.

Objective: The goals of this study were to assess the economic impact, particularly the length of stay (LOS) and direct medical costs (DMC), of drug-related hospital admissions and the associated factors in cancer patients in Singapore.

Methods: A prospective study was conducted over a 5-month period in 2 oncology wards at the largest acute tertiary hospital in Singapore. Drug-related admissions were identified from all oncology admissions to these wards, and the demographic, clinical, and cost data of these drug-related admissions were collected. The association between LOS and DMC as well as their associations with age, severity, and preventability of DRPs were examined. A nationwide estimation was made to determine the overall DMC of drug-related hospital admissions among cancer patients.

Results: A total of 151 drug-related admissions that occurred among 137 cancer patients were identified. The mean DMC (in Singapore dollars [SGD]) and LOS per drug-related admission were SGD \$4747 and 6.1 days, respectively. A nationwide extrapolation estimated an annual total DMC of SGD \$16.2 million. Longer LOS was found to be correlated with higher DMC ($r_s = 0.86$, $P < 0.001$) and preventable DRPs ($P = 0.02$).

Conclusions: Drug-related hospitalization among cancer patients is costly; therefore, more attention is warranted to develop and improve strategies for preventing drug-related morbidity and mortality in cancer patients. (*Clin Ther.* 2014;36:588–592) © 2014 Elsevier HS Journals, Inc. All rights reserved.

Key words: cancer, costs, drug-related hospital admissions, length of stay.

INTRODUCTION

Medication is a 2-edged sword, potentially lifesaving, but able to harm or even kill when used inappropriately. Drug-related problems (DRPs) are complications of drug therapy that actually or potentially interfere with desired health outcomes.¹ The impact of DRPs can range from slight nuisances to fatalities. Most previous studies of the incidence and economic impact of drug-related hospital admissions were not cancer specific,^{2–4} despite the fact that DRPs are of particular concern in oncology.

The risk of cancer patients being hospitalized due to DRPs can be significant, and those hospitalizations add to the already considerable and increasing costs of treating cancer. Unfortunately, the dearth of research on the incidence and economic impact of drug-related hospital admissions in cancer patients makes health care providers unable to fully understand the extent of the problem. Indeed, the few existing cancer-specific studies^{5–10} involved only certain types of cancer or certain DRPs. Therefore, the goal of the present study was to assess the length of stay (LOS) and direct medical costs (DMC) of drug-related hospital admissions in cancer patients in Singapore.

PATIENTS AND METHODS

This prospective study was conducted at the 2 main oncology wards at the largest acute tertiary hospital in Singapore between July and December 2012.

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Admitted cancer patients were jointly managed by health care providers from the study hospital and the National Cancer Centre Singapore, which treats ~70% of cancer patients in Singapore.

All patients with a cancer diagnosis who were admitted to the 2 oncology wards during the 5-month study period were screened for DRPs that caused hospitalization; screening was conducted via evaluation of the patients' case notes and medical records. Information necessary for the screening included sex, age, cancer type and staging, chief complaints, primary and secondary diagnoses, comorbidities, and relevant notes. DRP-related admissions were identified with references from Micromedex DRUG-REAX and the Lexi-Comp Drug Information Handbook (20th edition). After screening, the patients were classified into 4 categories: DRP, non-DRP, unclear, and exclusion. Examples of non-DRP cases include accident, non-drug-related infection, and progression of cancer or other diseases. Unclear cases were those without sufficient information for definitive classification as a DRP or non-DRP. Patients who were receiving trial drugs, aged <21 years, or not diagnosed with cancer were excluded from this study. DRP cases who were not discharged or whose final bills were unavailable 3 weeks after the study terminated were excluded from the analysis.

The severity of DRP cases was assessed as minor, moderate, or severe according to the classification scheme of McDonnell and Jacobs.¹¹ Using a series of

modified questions from the criteria of Schumock and Thornton,¹² the preventability of DRP cases was determined to be not preventable, probably preventable, or definitely preventable.

Information about the LOS and DMC of the identified DRP cases was obtained from the Finance Department of the study hospital, with the aid of Integrated Health Information Systems Pte Ltd. LOS was defined as the number of days in the hospital from the date of admission to the date of discharge. Patients who were admitted and discharged on the same date were considered to have a 1-day LOS. DMC data were obtained from the gross bill and calculated in 2012 Singapore dollars (SGD). The gross bill was a summation of various components, namely consultation, laboratory, examination, pharmacy, and others, as well as subsidies rendered to eligible patients. A nationwide extrapolation of annual total DMC of drug-related admissions among cancer patients in Singapore was calculated as follows: total number of hospital admissions among patients with cancer in 2012¹³ × incidence of drug-related admission among patients with cancer × mean DMC per drug-related admission.

Descriptive statistics were used to summarize demographic and clinical characteristics of the study sample. Spearman's correlation and the Wilcoxon rank sum test were performed when appropriate to assess the relationship between LOS and DMC, as well as their associations with the severity (severe or nonsevere) and preventability (nonpreventable or

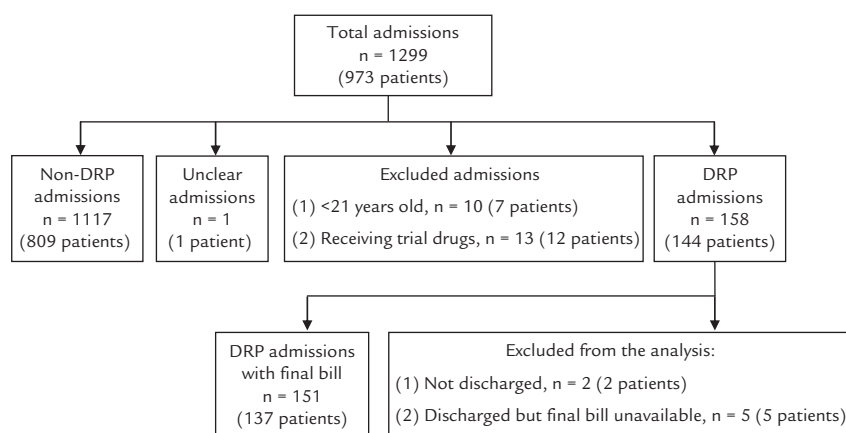


Figure. Flowchart of preliminary screening of patients with cancer admitted to 2 oncology wards in Singapore General Hospital from July 17, 2012, to December 13, 2012. DRP = drug-related problem.

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