

The realities and Medical Expense of Hospitalization that Originates in Outpatient Medicine Treatment

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Problems associated with outpatient pharmacotherapy may require hospitalization. However, such hospitalization may be prevented if pharmacist's pharmaceutical care (PC) is given. We investigated the reasons for hospitalization in medical institutions and medical expenses were calculated. Inpatient diagnoses, treatment, etc. in the previous year in the past were examined, and cases of hospitalization due to drug therapy were extracted. Next, the possibility of preventing hospitalization with PC practice was examined. Among 1552 cases, outpatient pharmacotherapy was the reason for hospitalization in 27 cases. Noncompliance was the underlying cause in about 40% of hospitalizations. It was thought that in 22 cases hospitalization could have been prevented by pharmacist's PC. The average hospitalization medical expense was ¥295,805 per patient. It is necessary to perform regular consultation recommendations, interventions with the family, home care, etc. for proactive PC.

Key words—pharmaceutical care; noncompliance; medical expense; reason for hospitalization

INTRODUCTION

According to the 2003 Hospital Report published by the Ministry of Health, Labor and Welfare, 14 million people were hospitalized that year.¹⁾ In some cases, incidents related to outpatient medication, e.g., adverse drug reactions and patient lack of compliance with drug administration, possibly led to hospitalization. Beard reported that approximately 3 to 11% of hospitalizations were attributed to drug treatment.²⁾ Furthermore, of 62216 patients who were enrolled in health maintenance organizations and made an emergency visit, 1074 patients (1.7%) did so due to their lack of compliance and inappropriate drug use, according to Schneitman–McIntire et al.³⁾ A systematic review was also conducted, and the meta-analysis performed by Roughead et al. suggested that the reason for hospitalization in 2.4 to 3.6% of all inpatients was related to outpatient drug treatment, and that 32 to 69% of those admissions could have been avoided.⁴⁾ Sullivan et al. estimated that 5.5% of inpatients were admitted due to their lack of compliance with drug administration, and in 1986, an additional US\$ 8.5 billion was spent for inpatient care of approximately 1,940,000 patients who were hospitalized due to lack of compliance.⁵⁾

Often hospitalization attributable to drug treatment could have been prevented if pharmacists had provided patients with appropriate pharmaceutical care (PC) during outpatient treatment. Furthermore, if hospitalization had been avoided *via* PC, the medical expenses incurred could also have been avoided.

This research was conducted as an exploratory study to investigate the actual conditions of hospitalization attributable to outpatient medication in a medical institution and medical expenses incurred for such hospitalizations.

METHOD

Patients This research was conducted among all patients newly hospitalized from August 1, 2002, to July 31, 2003, at the Hakuyo-kai Kashiwado Hospital (Kashiwado Hospital), a medical institution with 10 clinical departments, 150 general beds, and 21 long-term care beds, located in Chuo-ku, Chiba City, Chiba Prefecture.

Research Procedures The initial screening of patients was performed by pharmacists of Kashiwado Hospital, mainly based on records on drug investigations conducted during patient hospitalization, etc., to identify hospitalizations suspected to be related to drug treatment. The second screening was conducted by physicians responsible for the hospitalized patients. The physicians judged whether the hospitali-

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zation of their patients was attributable to drug treatment, using the following grading system: 1) the hospitalization was highly likely related to drug treatment, 2) the hospitalization was likely related to drug treatment, 3) the hospitalization was less likely related to drug treatment, and 4) the hospitalization was not likely related to drug treatment. Subsequently, a panel was established to review whether the hospitalization judged by the physicians as 1), 2), or 3) could have been avoided if pharmacists had provided appropriate PC during outpatient treatment. The panel was comprised of four outside pharmacists (one with 32 years' experience at a pharmacy, one with 10 years' at a hospital and 32 years at a pharmacy, one with three years' at a hospital and one year at a pharmacy and one with 41 years' at a hospital). Furthermore, the physicians also judged whether the hospitalization "could possibly have been avoided if a pharmacist had been actively involved," or "could not possibly have been avoided even if a pharmacist had been actively involved." Moreover, the medical expenses for hospitalization were evaluated as "could possibly have been avoided if a pharmacist had been actively involved" were calculated based on medical service fee claims to identify how much medical expenses could have been reduced if the hospitalization had been avoided. This research was conducted with the approval of the Institutional Review Board of Kashiwado Hospital.

RESULTS

Screening and Evaluation of Patients Of 1551 patients newly admitted to Kashiwado Hospital during the research period, the hospitalization of 45 (2.9%) was judged by the hospital's pharmacists as being suspected to be related to outpatient medication. Among the 45 patients, 27 were evaluated by their physicians as attributable to drug treatment (i.e., "highly likely," "likely" or "less likely," related to drug treatment). These 27 were designated as the analysis group. Of the 45 patients, 7 were not analyzed due to difficulty in making contact with the physicians responsible for the hospitalization in the research period or other reasons. After the 27 patients were reviewed by the panel consisting of four pharmacists, 22 were judged as those that "could possibly have been avoided if a pharmacist had been actively involved" (Fig. 1).

These 22 were designated as the hospitalization-

avoidable group. However, 15 patients were judged by the physicians as those that "could possibly have been avoided if a pharmacist had been actively involved."

Background of Analysis Group The analysis group was comprised of 11 men and 16 women, including 8 patients in their 70s, the largest age-group, followed by 5 patients in their 80s. Those aged 60 and older comprised, 18 patients, who accounted for two-thirds of the analysis group (Fig. 2).

Causal Disease Groups and Causal Drug Efficacy Group Figure 3 illustrates a breakdown of disease groups causing hospitalization in the analysis group. Mental disease and cardiovascular disease were ranked first at 4 patients, followed by neurologic/muscular diseases, alimentary disease, and respiratory disease in 3 patients, respectively. Figure 4 shows a breakdown of the type of drugs causing the hospitalization of the analysis group. Central nervous system drugs, including antipyretic-antiphlogistic analgesics, were ranked first at 7 patients, followed by cardiovascular drugs at 5 and other metabolic drugs at 3. An over-the-counter medication was also included in the breakdown (1 patient).

Issues in Drug Treatment The reasons for hospitalization in the avoidable and unavoidable groups were categorized into the "noncompliance group (NC)" and "excluding-noncompliance group (E-NC)." The NC group in the avoidable group comprised 11 patients with 8 treatment discontinuation and 3 overdose patients. The E-NC group in the avoidable group also consisted of 11 patients, with 2 excessive reactions, 1 intoxication, 5 other specific adverse reactions, 2 interactions, and 1 unidentified. All the reasons for hospitalization in the unavoidable group were categorized as E-NC, with 2 intoxications, 1 allergy, and 2 other specific adverse reaction patients (Fig. 5). Figure 6 illustrates the relationship between the issues of drug treatment and analysis group age. Among the 27 patients analyzed, 2 NC and no E-NC were in the age-group of less than 40 years, no NC and 6 E-NC in the group of 40 to 59 years, and 9 NC and 10 E-NC in the group aged 60 and older.

Average Length of Stay and Expenses Expenses incurred due to hospitalization were calculated based on expenses specified on medical service fee claims, such as those required for admission, meals, examinations, and surgery. In the analysis group, a medical service fee claim was obtained for 22

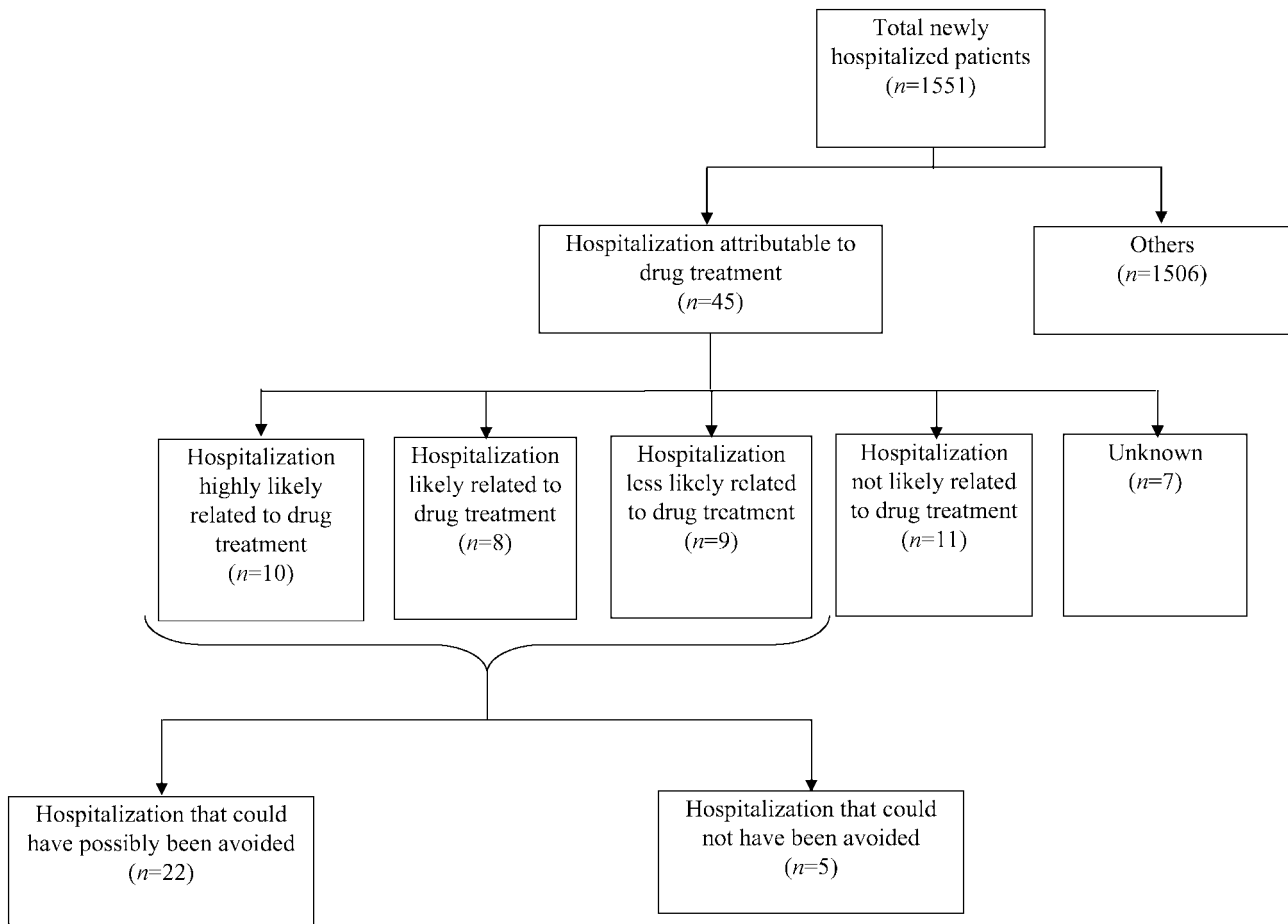


Fig. 1. Pharmacists' Screening and Judgment of Analysis Group

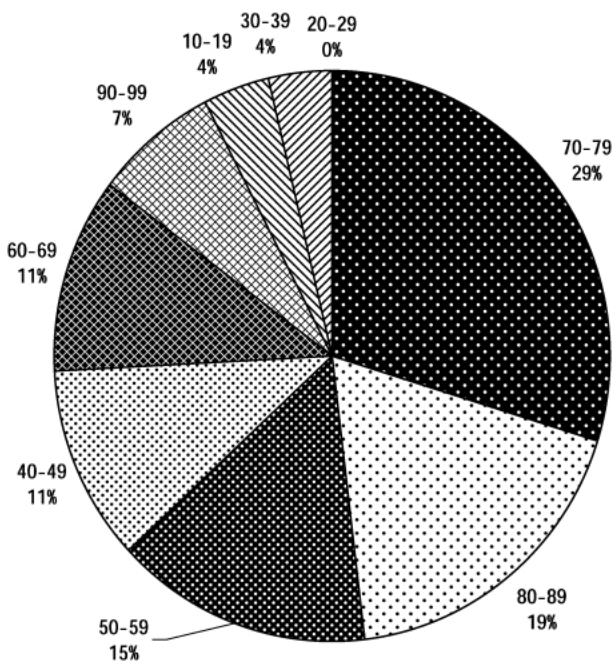


Fig. 2. Age-groups in Analysis Group

patients. The average expense of the 22 was ¥311,986 (¥18,100—¥1,038,100) with an average length of stay of 17 days (1—57 days).

From the avoidable group, a fee claim was obtained for 19 patients, with the average expense of ¥295,805 (¥18,100—¥1,038,100) and an average length of stay of 16 days (1—57 days). In the most expensive case (¥1,038,100), the length of stay was 57 days, and the patient who had splanchnemphraxis did not follow the directions for the medicine.

Discrepancy between Physician Evaluation Of the 12 patients judged by the physicians as those whose hospitalization “could not possibly have been avoided even if a pharmacist had been actively involved,” 7 were judged by the panel as those whose hospitalization “could possibly have been avoided if a pharmacist had been actively involved.”

DISCUSSION

This research examined whether hospitalization suspected to be attributable to outpatient drug treat-

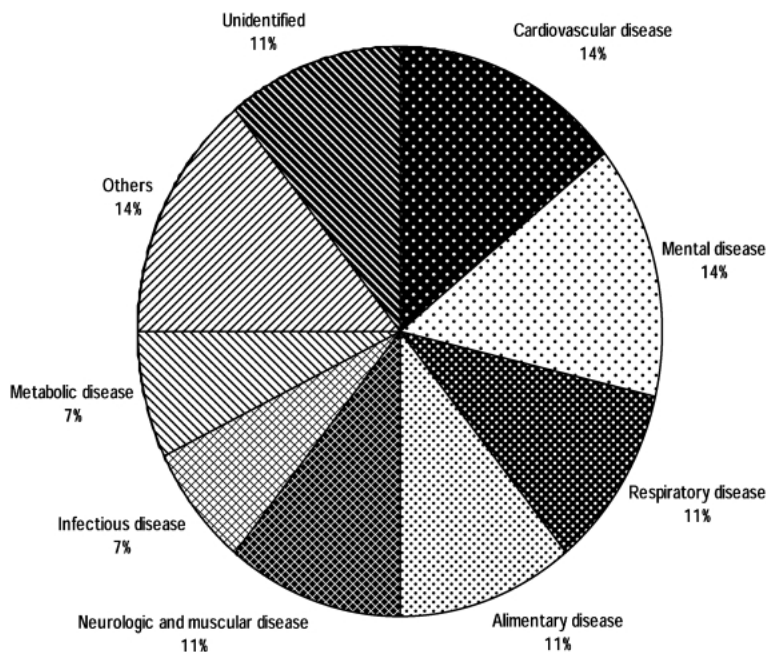


Fig. 3. Analysis Group's Hospitalization Causal Disease Category

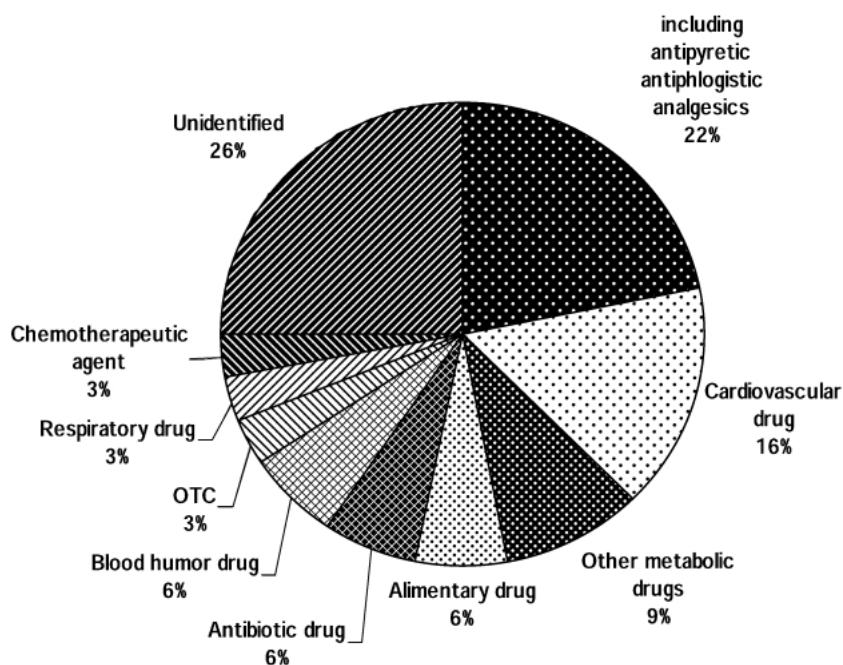
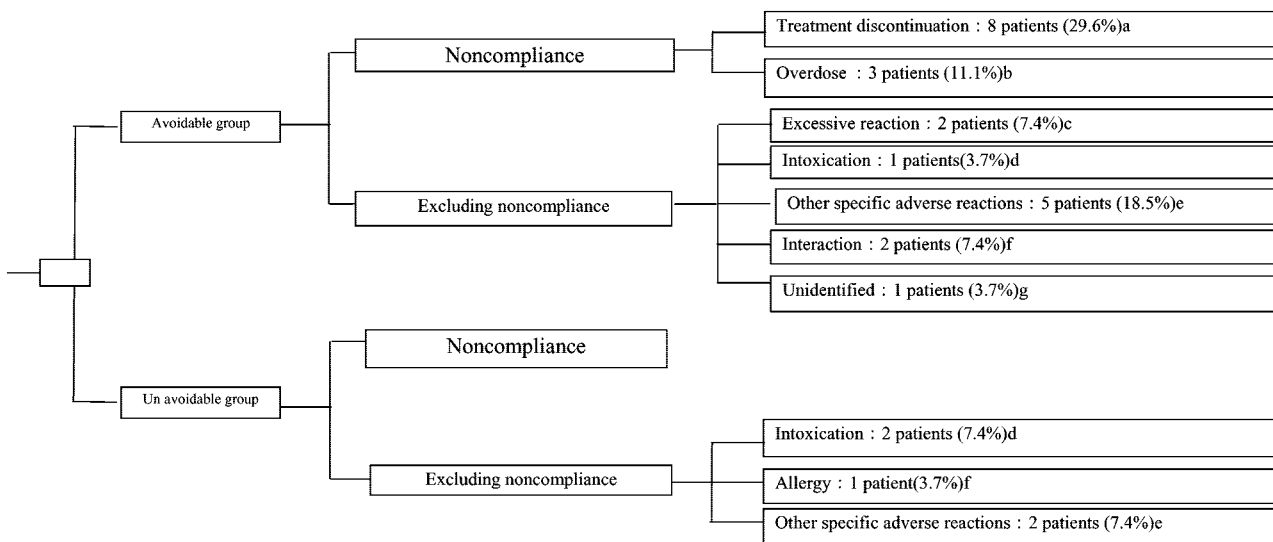


Fig. 4. Analysis Group's Hospitalization Causal Drug Category

ment could have been avoided if appropriate PC had been provided during outpatient treatment. Of all patients newly admitted to the Kashiwado Hospital during the research period, 27 hospitalizations (1.7%) were judged as those attributable to outpatient drug treatment based on patient compliance problems. Moreover, 81% of them (22 patients), or

approximately 1.4% of all new inpatients, were judged as those that could have been avoided if appropriate PC had been provided during outpatient treatment. These results closely correspond with those of studies previously conducted outside Japan. Based on the extrapolation of our research results to all inpatients in Japan, it is estimated that 240000 patients



- a Discontinuing treatment at patient’s own discretion for unknown reason.
- b Taking more than prescribed dose.
- c Excessive drug reaction despite taking prescribed dose.
- d Intoxication via excessive drug reaction despite taking prescribed dose.
- e Drug-related adverse reactions, such as NSAID ulcer and Lamisil hepatopathy.
- f Interaction such as that of β -blocker and asthma, and warfarin and alcohol.
- g Symptoms suspected to be attributable to Primperan.

Fig. 5. Reasons for 27 Hospitalizations Related to Drug Treatment

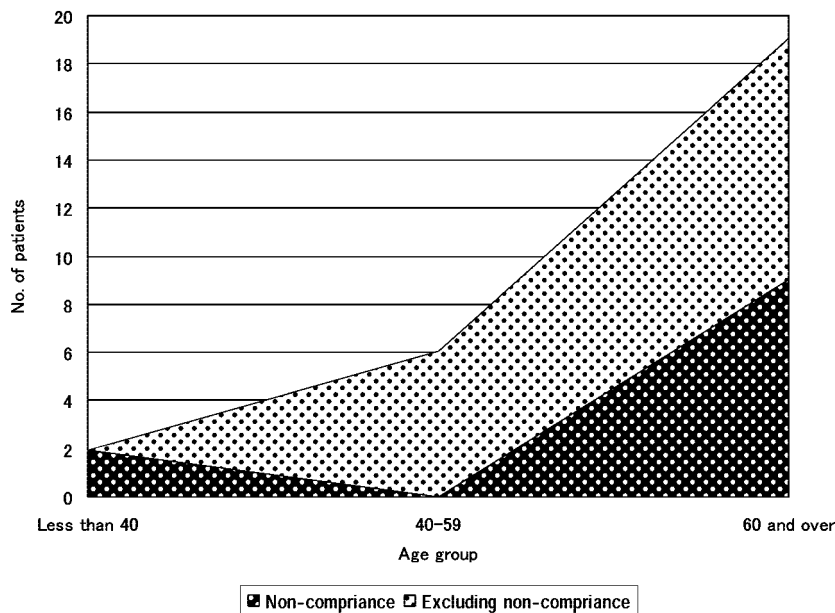


Fig. 6. Relationship between Compliance and Age-group

are annually hospitalized due to outpatient drug treatment and that 200000 hospitalizations could be avoided through appropriate PC.

This study revealed that 41% of hospitalizations were attributed to patient lack of compliance with

drug administration, such as treatment discontinuation at the patients’ own discretion and overdosing. As for noncompliance with drug administration, Brian et al. reported⁶⁾ that, in many cases of drug treatment, the typical rate of patients who adhere to

prescribed medical regimens throughout their treatment process without missing a dose or not taking all of their prescription drugs was approximately 50%. It was also reported that the compliance rate would be improved by close communication with patients, such as direct discussion of missing dose and clear instructions. To avoid noncompliance seen in our 27 hospitalizations judged as being related to drug treatment, it would have been necessary for a pharmacist to encourage patients to undergo regular medical examinations and have their parents and caregivers recognize the disease and understand its treatment to secure their support. Moreover, these hospitalizations could have possibly been avoided if a pharmacist had recognized not only the patient's disease but also his/her general condition in detail, including background and personality.

Of hospitalizations judged by the physicians as those that "could not possibly have been avoided even if a pharmacist had been actively involved," more than half were judged by the panel of four experienced pharmacists as those that could possibly have been avoided with a pharmacist's active involvement in outpatient treatment, such as close communication with the patient. These results suggest that it is necessary to improve further pharmacists' communication skills and drug administration instruction techniques. In this regard, pharmacist education at universities must be reviewed to improve the curriculum regarding communication skills.

Although hospitalization was more often attributed to E-NC rather than NC, hospitalization related to E-NC could also be avoided by providing patients with drug administration instructions based on their personality, disease, condition, and drug treatment. Two-thirds of patients who were hospitalized due to drug treatment were aged 60 years and older. In the middle-aged and elderly groups, the NC rate increased with age, which suggests the necessity of a pharmacist's active involvement in the pharmaceutical treatment of the elderly.

Medical expenses were calculated based on medical service fee claims, and these expenses can be construed as the maximum expenses that could have been

avoided if a pharmacist had been actively involved in outpatient treatment. Based on our calculations, it was estimated that ¥59 billion could be saved annually in Japan. To identify the actual costs that could have been reduced *via* PC, it is necessary to deduct from the estimated figure expenses that would have been required even if hospitalization had not occurred. However, that deduction was not performed in this study because it was impossible to determine outpatient treatment expenses.

This study was conducted based on one hospital's data and it is not certain whether the results reflect the overall Japanese situation. However, we believe that the results show the importance of the PC activities.

It appears necessary to identify issues related to outpatient drug treatment in Japan based on problems clarified in this research, examine what constitutes the ideal pharmacist involvement in outpatient medication, and evaluate the economic effects of such involvement.

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