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Abstract	<p>We evaluated the background and reasons why certain drugs were eliminated from prescriptions as a result of inquiries made to physicians by pharmacists in order to clarify the role that pharmacists play in separating drug dispensing from doctors (bungyo practice). From 750 prescriptions which were inquired about in the two-year period between April 2003 and March 2005, we selected those from which at least one drug was eliminated and retrospectively investigated inquiry records, the registry of medication histories, and computer data for medical coding.</p> <p>The results of the analysis revealed 7 reasons for the elimination of drugs from prescriptions: 1) leftover, 2) duplication with other institutions, 3) no symptoms, 4) difficult to use, 5) discovery of contraindications, 6) poor communication with doctors, and 7) history of adverse reactions. This study showed that pharmacists notice inappropriate prescriptions mainly while checking the medication history and giving medication guidance to patients.</p> <p>Our findings suggested that pharmacists can more effectively contribute to the proper use of drugs, the management of drugs, and reduction in patients' financial burden by skillfully obtaining information from patients while giving medication guidance and by transmitting the obtained information to doctors.</p>
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Elimination of prescribed drugs as a result of inquiries made by pharmacists

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We evaluated the background and reasons why certain drugs were eliminated from prescriptions as a result of inquiries made to physicians by pharmacists in order to clarify the role that pharmacists play in separating drug dispensing from doctors (*bungyo* practice). From 750 prescriptions which were inquired about in the two-year period between April 2003 and March 2005, we selected those from which at least one drug was eliminated and retrospectively investigated inquiry records, the registry of medication histories, and computer data for medical coding.

The results of the analysis revealed 7 reasons for the elimination of drugs from prescriptions: 1) leftover, 2) duplication with other institutions, 3) no symptoms, 4) difficult to use, 5) discovery of contraindications, 6) poor communication with doctors, and 7) history of adverse reactions.

This study showed that pharmacists notice inappropriate prescriptions mainly while checking the medication history and giving medication guidance to patients.

Our findings suggested that pharmacists can more effectively contribute to the proper use of drugs, the management of drugs, and reduction in patients' financial burden by skillfully obtaining information from patients while giving medication guidance and by transmitting the obtained information to doctors.

Keywords: inquiries to physicians, medical expenditures, *bungyo* (separating drug dispensing from doctors), medication guidance

1. Introduction

The Japanese government is promoting separating drug dispensing from doctors (*bungyo* practice) and the use of "family pharmacies" in order to ensure that pharmacists give full medication guidance to patients and protect them from duplicated medication and drug interactions. The *bungyo* rate, or the number of legal prescriptions as a percentage of the total number of prescriptions issued, increased to 54.1% in FY2005. The number of prescriptions filled by dispensing pharmacies increased to 645,075,260, a 6-fold increase over 20 years [1]. The number of pharmacists hired by pharmacies has also been increasing each year, and these pharmacists are playing an increasingly important role. Asking

doctors about prescriptions they fill is one of the duties of pharmacists under the Pharmacists Law (Article 24). Pharmacists raise inquiries with respect to an increasing number of prescriptions as the *bungyo* rate increases.

A number of studies have been published on the nature of the inquiries [2-8], showing that a high percentage of prescriptions are changed as a result of inquiries by pharmacists and indicating the usefulness of patients' care and medication management by pharmacists. However, there has been no detailed report on the elimination of prescribed drugs as a result of inquiries by pharmacists. Leftover drugs is a major problem in home care [9-10]. Minimizing prescription of

unnecessary drugs is one of the important roles of pharmacists.

In the present study, we compiled and analyzed prescriptions filled in our pharmacy and determined why and how certain prescribed drugs were eliminated as a result of inquiries by pharmacists in an effort to clarify the role of pharmacists under the bungyo system and to assess their contribution to the better management of drugs at home and the reduction in patients' financial burden.

2. Methods

A total of 11,653 prescriptions filled in our pharmacy for the two-year period between April 2003 and March 2005 were analyzed. Prescriptions on which inquiries were made were selected, and the details of the inquiries were determined and analyzed based on medication histories and records in the prescriptions. Eliminated drugs were classified using standard commodity classification of Japan (therapeutic effects category).

To determine the amount saved on drugs, the names and the numbers of drugs eliminated were determined by checking prescriptions, and the National Health Insurance (NHI) price of the eliminated drugs was multiplied by the number of drugs eliminated. Healthcare administration computer software was used to determine the patients' economic burden reduced as a result of inquiries.

3. Results

1) Analysis of inquiries to physicians

During the 2-year period, inquiries were made with respect to 750 prescriptions, or 6.4% of the total number of prescriptions filled at our pharmacy. The number of inquiries was 934, or 1.25 per prescription. We analyzed these 934 inquiries.

Inquiries were classified into "formal" and "pharmaceutical" inquiries. Formal inquiries included those related to missing insurance numbers, copayment rates and issue dates, requests of validity prolongation for expired prescriptions, inquiries regarding the name of the medical institution or prescribing doctor, and requests for complete information on the name, specification, and dose of the prescribed drug. Pharmaceutical inquiries included questions about duplicated medications, possible interactions with concurrent drugs,

contraindications noted in the medical history, inappropriate treatment regimens, drugs that caused adverse reactions in previous treatment, and drugs prescribed in the absence of symptoms or drugs that the patient experiences difficulty taking. Of the 934 inquiries, formal inquiries (383) accounted for 41.0% and pharmaceutical inquiries (551) for 59.0%. Of the 551 pharmaceutical inquiries, 509 (92.0%) resulted in changes in prescriptions and 102 (18.5%) in the elimination of certain drugs prescribed. The most common reason for the exclusion of drugs was "leftover" (42 inquiries), followed by "duplication with other institutions" (21), "no symptoms" (12), "difficult to use" (11), "discovery of contraindications" (8), "poor communication with doctor" (6), and "history of adverse reactions" (2) (Fig.1). "Leftover" accounted for nearly 50% of drug exclusion cases. In most cases, patients still had leftovers of gargles, troches, and antipyretic/analgesic agents (taken as necessary) from previous prescriptions. "Duplication with other medical institutions" included anti-allergy drugs, antibiotics, antipyretic/analgesic agents, gastrointestinal (GI) drugs, and anti-inflammatory agents. Problems reported in relation to "difficult to use" included "discomfort experienced while taking Isodine Gargle," "hate of the taste of gargling agents (Isodine Gargles and Azunol Gargle)," "hate of the taste of SP Troche," and "impossible to remove contact lenses to put eye drops in the daytime (for pollinosis four times a day)," and "GI drugs prescribed to prevent adverse reactions are unnecessary since no adverse reactions have been experienced without such drugs." Drugs excluded because of the "discovery of contraindications" included loxoprofen prescribed for one patient with gastric ulcer, Cor-tyzine (tetrahydrozoline hydrochloride + prednisolone) prescribed in two children younger than two, PL Granules (non-pyrazolone cold medicine) prescribed in three patients with prostatic hypertrophy and one patient with glaucoma, Celestamine (betamethasone + d-chlorpheniramine maleate) prescribed in one patient with glaucoma, and Medrol (methylprednisolone) prescribed in one patient with peptic ulcer. Drugs excluded because of the "history of adverse reactions" included an antibiotic from the same family which had caused adverse

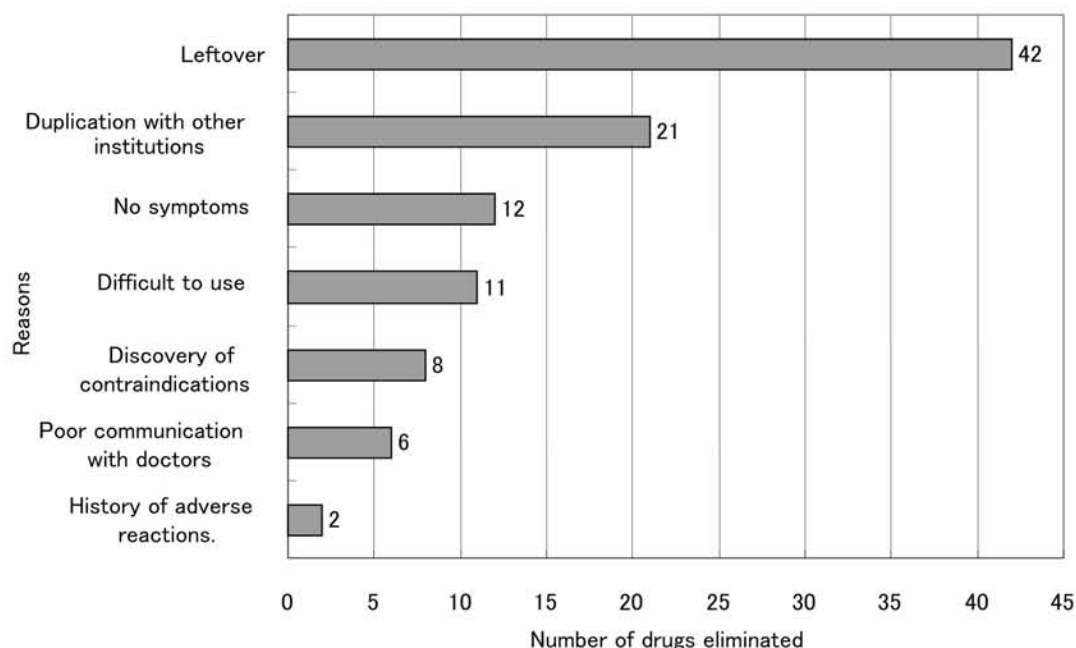


Fig.1 Reasons for eliminating drugs

The most common reason for the exclusion of drugs was “leftover” (42 inquiries), followed by “duplication with other institutions”, “no symptoms”, “difficult to use”, “discovery of contraindications”, “poor communication with doctor”, and “history of adverse reactions”. Problems related to “leftover,” “no symptoms,” and “difficult to use” accounted for 64% of the total inquiries

reactions in the past in one patient and an anti-inflammatory enzyme in one patient with a history of urticaria due to a similar anti-inflammatory analgesic agent. Problems related to “leftover,” “no symptoms,” and “difficult to use,” which accounted for 64% of the total inquiries, can be avoided if doctors communicate better with patients. Thus, our results showed that inquiries were needed because of poor doctor-patient communication in many cases. Inquiries due to “duplication with other medical institutions,” “discovery of contraindications,” and “history of adverse reactions” were necessary to avoid adverse reactions and drug interactions. These inquiries, which accounted for 30% of the total inquiries, were prompted as a result of the review of medication histories and interviews with patients through medication guidance. Drugs excluded from prescriptions were classified by therapeutic effect category (Table 1). Gargles were the most common drug, and external use such as drugs for the oral cavity and sensory organs accounted for about 50% of the whole. Among drugs for internal use, many drugs affecting the central nervous system, such as antipyretic/analgesic agents, were cited.

Table 1 Classification of excluded drugs by therapeutic effect

Therapeutic effects category	Drugs excluded (n=102)
Gargles	24*
Drugs affecting the central nervous system	17
Respiratory organ drugs (excluding gargles)	8
Drugs for the oral cavity	11*
Sensory organ drugs	9*
Gastrointestinal drugs (excluding agents for the oral cavity)	6
Cardiovascular drugs	6
Antibiotics	5
Metabolic drugs	4
Anti-allergic agents	4
Hormones	2
Dermatological drugs	2*
Blood and body fluid products	2
Others	2

* external use

2) Reduction in patients' financial burden

Costs incurred at the pharmacy (dispensing fees) and patients' copayment before and after the elimination of drugs from the 74 prescriptions are compared in Table 2. This table also shows the cost of 102 eliminated drugs calculated based on their NHI prices.

The dispensing fee for the 74 prescriptions totaled ¥471,170, with a reduction of ¥114,550. The reduction per prescription ranged between ¥80 and ¥19,850 with an average of ¥1,548. The reduction in patients' copayment per prescription ranged

Table 2 Changes in dispensing fees and patients' copayment as a result of elimination of prescribed drugs (74 prescriptions)

	(yen)						
	Dispensing fees before elimination	Dispensing fees after elimination	Reduction in dispensing fees	Patients' copayment before elimination	Patients' copayment after elimination	Reduction in Patients' copayment	Reduction in drug costs (102 drugs eliminated)
Total	471,170	356,620	114,550	134,620	102,400	32,220	92,912.0
Max.	45,220	25,370	19,850	13,570	7,610	5,960	18,288.0
Min.	1,660	1,270	80	230	130	10	31.2
Mean	6,367.2	4,819.2	1,548.0	1,819.2	1,383.8	435.4	1,255.6
Standard deviation	6,248.1	4,040.1	3,590.5	1,852.0	1,150.2	1,057.9	2,237.7

between ¥10 and ¥5,960 with a average of ¥435.4. The cost reduction achieved for the 102 drugs is shown on the right edge of Table 2. The total amount of drug cost reduction, calculated as the NHI price of drugs eliminated multiplied by the number of tablets, was ¥92,912.0. The cost reduction ranged between ¥31.2 and ¥18,288 with an average of ¥1,255.6 per prescription.

4. Discussion

The present study showed that pharmacists can contribute to the proper use of drugs and the prevention of adverse reactions by collecting information on individual patients by checking their medication histories and making inquiries to prescribing doctors, if necessary.

The present study also showed that patients sometimes forget to give important information to doctors and recall it while talking with pharmacists. They also complain of the difficulty of taking particular drugs while receiving medication guidance from pharmacists.

The problem of leftover drugs was pointed out in discussions by members of the government's Fiscal System Council [11], and the need for effective counter-measures has been emphasized. It is necessary for pharmacists to actively make inquiries and continue their efforts to contribute to the proper use of drugs and prevention of adverse drug reactions.

Our findings suggested that pharmacists can contribute to the reduction in leftover drugs by making inquiries. It is recommended that pharmacists check leftovers when oral drugs and topical drugs for the ear and nose are prescribed over a long period of time.

Average patients' copayment and drug cost per prescription were reduced by ¥435 and ¥1,260,

respectively. Although the amount saved varied greatly from one prescription to another, elimination of drug wastage leads to proper management of drugs in the patient's home and is pharmacologically meaningful.

Conclusion

At present, over 600 million prescriptions are filled by pharmacies as a result of the progression of bungyo. In the treatment of patients admitted to hospitals, safety of medication can be ensured by hospital healthcare staff members. However, outpatients and patients treated at home are generally required to manage their own drugs by themselves. For this reason, pharmacists should actively play an important role in helping them take drugs safely by reviewing their prescriptions and making inquiries to the prescribing doctors, if necessary. Inquiries by pharmacists are meaningful both pharmacologically and economically and are expected to contribute to the reduction in the cost burden on both patients and the government.

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