Original Article

Transitional care for high-risk elderly patients pre/post discharge by collaboration between general hospital and community pharmacy: a pilot study

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ABSTRACT

Background: Medication-related problems (MRPs) frequently occur during the discharge period. Elderly patients, particularly, are at high risk for these problems due to polypharmacy and the use of potentially inappropriate medications. The purpose of this study was to build and implement collaboration between general hospital and community pharmacies to address MRPs among high-risk elderly patients before/after discharge. **Methods:** This retrospective study was conducted between June and December of 2020. The inclusion criteria were patients with aged ≥65 years; residents of Jeonju; discharged from Jeonbuk National University hospital; either on medication of exceeding 10 medications (or high-risk medications) after hospitalization through the emergency room, or having severe illness. Patients received medication reconciliation and counselling by hospital pharmacists before discharge and home-visit pharmaceutical care as follow-up by community pharmacists after discharge. **Results:** Twenty-two patients agreed to home-visit pharmaceutical services. Fifteen and 11 patients completed the first and second home-visit pharmaceutical care service, respectively. Forty-two MRPs were identified in 15 patients. The types of high-frequency MRPs were incorrect administration of drug, adverse drug reactions, medication non-compliance, drug-drug interactions, lifestyle modifications, and expired medication disposal. After consultation with the pharmacist, 34 out of 42 MRPs were resolved. **Conclusions:** Transitional care for high-risk elderly patients before and after discharge was successfully built and implemented through a collaboration between general hospital and community pharmacies. This study suggests that home-visit pharmaceutical services may have positive effects on the safe use of drugs during the transition period; however, additional research is needed to expand on these findings.

KEYWORDS: Collaboration, transition care, discharge, home-visit pharmaceutical service, high-risk elderly patients, medication-related problems (MRPs)

With population ageing, polypharmacy has increased due to the increasing incidence of complex chronic diseases. In elderly patients, polypharmacy and the use of potentially inappropriate medications (PIMs) are risk factors for medication-related problems (MRPs).[1-4] The incidence of MRPs is high during the transition period, and the risk of developing MRPs may be higher, especially during discharge, due to medication changes and lack of communication between patients and medical staff.[5] MRPs increase unintentional readmissions, which can lead to socioeconomic and physical burdens on patients and caregivers. MRP-associated readmissions accounted for 20% of all hospitalizations, of which 70% were preventable.[6] In the United States, the medical costs resulting from unintentional readmissions have been estimated to be approximately USD 17 billion annually.[5,7] Therefore, studies on reducing unintentional readmissions are being actively conducted. In several foreign studies, pharmacists could resolve MRPs and reduce readmissions by providing medication reconciliation and counselling in hospital, and post-discharge visits or telephone counselling.[1,5,8-15]

According to the polypharmacy status and PIM prescription among elderly patients in Korea, the proportion of polypharmacy (use of ≥5 drugs) was 44-86%, higher than that in countries such as the United States (39%) and Japan (28%),[16] and approximately 80% of elderly patients were prescribed ≥1

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PIMs.[17] In a study in which 3 million elderly people were followed up for 5 years, the polypharmacy proportion was 46.6%. Furthermore, hospitalization and death risks were 18% and 25% higher, respectively, in the polypharmacy group than in the control group.[18] In countries such as Korea where the systems of primary medical care services are underdeveloped and medications are prescribed from several different medical institutions, the risk of MRPs may increase due to drug duplications or drug-drug interactions (DDIs).[19] In a previous study, 84.5% of the elderly reported taking non-prescription drugs, such as over-the-counter drugs (OTCs), functional foods, and herbal medicines, in addition to prescription drugs.[20] Considering the drugs that are difficult to confirm through insurance claim data, the polypharmacy risk in elderly Korean patients is expected to be higher. In addition, according to the health care service implementation for discharged elderly patients, impaired mobility (35.6%) and polypharmacy (22.2%) were reported as the biggest difficulties.[21]

Studies on safe drug use for high-risk elderly patients in the transition period are underway in Korea. Park et al. reported that pharmacists reduced the number of drugs from 10.5 before hospitalization to 6.5 upon discharge by readjusting drugs for elderly patients and significantly decreased the PIM prescription rate and drug duplication.[22] Recently, hospital pharmacists introduced a pilot pharmaceutical care service including medication reconciliation, education, and post-discharge phone consultation for discharged elderly patients. However, despite the positive effects of transition care by pharmacists reported in previous studies, there is still a very limited number of hospitals where pharmacists perform medication reconciliation and counselling for patients in the transition period in Korea. Moreover, after discharge, community pharmacy-linked pharmaceutical care services are not maintained.

Aim

This study was aimed at determining the effects and limitations of a transitional care service introduced via collaborations between hospital and community pharmacies for elderly patients at high readmission risk due to polypharmacy, use of high-risk medications, and severe illness.

Ethics Approval

The Institutional Review Board (IRB) of Jeonbuk National University Hospital (JBUH) granted ethical approval for this study (CUH 2021-05-036). The IRB waived the requirement for informed consent from the study participants since their data were de-identified and encoded anonymously before starting analysis.

Methods

This study was conducted by JBUH and the Jeonju Pharmaceutical Association (JPA), which retrospectively analysed the electronic medical records (EMRs) of patients discharged from JBUH who received at least 1 home-visit pharmaceutical service by a community pharmacist. Three pharmacists from JBUH, 12 community pharmacists from the JPA, and 5 community pharmacy college students participated in the study, and 2 offline training sessions were conducted before the transitional care service.

Study population

The study was conducted from June to December 2020. The inclusion criteria were patients with aged ≥65 years; residents of Jeonju; discharged from JBUH; either on medication of exceeding 10 medications (or high-risk medications) after hospitalization through the emergency room, or having severe illness (Fig. 1). Among the eligible patients, those who were discharged home (excluding those transferred to other hospitals or nursing facilities) were selected. The service was provided when the patient or guardian agreed to post-discharge home visit pharmaceutical services.

Medication reconciliation and counselling at discharge in hospital

Hospital pharmacists screened for eligible patients and performed medication reconciliation through EMR reviews. Subsequently, medication education and counselling were provided. Any MRPs identified during the prescription review and counselling were recorded; the medical staff was notified of MRPs requiring prescription intervention and the results were also recorded (Fig. 2). After counselling, a pharmaceutical care patient record, containing the discharge medication list and medication counselling history, was prepared and sent to the JPA.

Post-discharge home visits by community pharmacists

After discharge, 2 home visits were planned and conducted by a community pharmacist. The JPA, which received the pharmaceutical care patient records, attempted to reach the patient by phone as soon as possible, checked the consultation
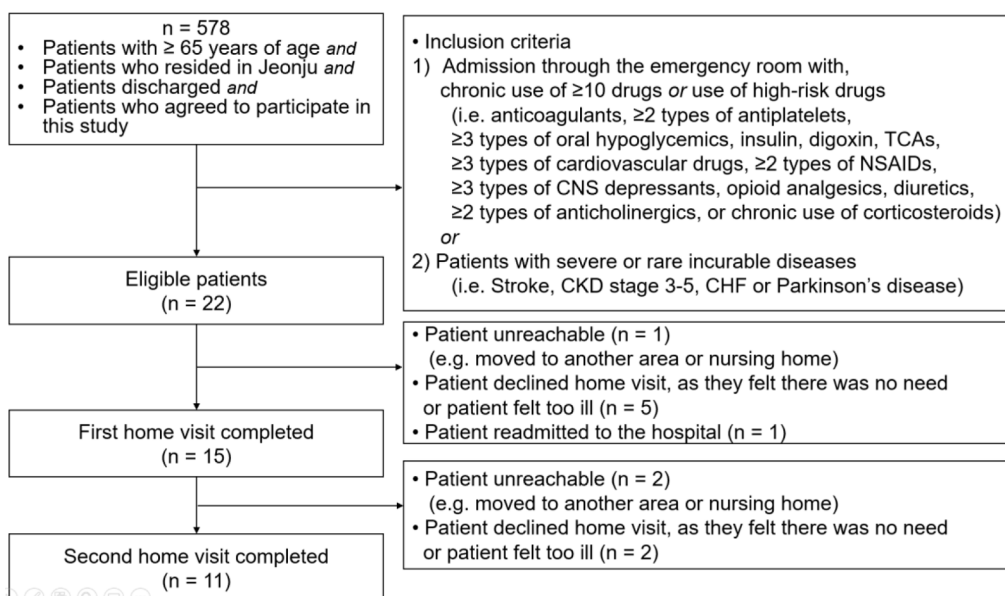
Fig. 1. Study flow chart indicating criteria for patient selection, inclusion, and exclusion. CHF, chronic heart failure; CKD, chronic kidney disease; CNS, central nervous system; NSAIDs, nonsteroidal anti-inflammatory drugs; TCAs, tricyclic antidepressants

Fig. 2. Overview of clinical pharmacists' services in transition care program. EMR, electronic medical record; JBUH, Jeonbuk National University Hospital; MRPs, medication-related problems; OTC, over-the-counter

schedule with the patient, and assigned 1 community pharmacist and 1 pharmacy student. The home-visit service was not provided if the patient was unintentionally admitted to a nursing hospital, moved to another area after discharge, or refused the home-visit service.

For the first visit, the community pharmacist prepared a consultation based on the pharmaceutical care patient's records. At the patient's home, the pharmacist checked all the medications (including prescription drugs, OTCs, functional foods, and herbal medicines) and queried the patient's lifestyle.

Also, the pharmacist provided medication reconciliation and consultation. Pharmacy students assisted with drug identification and survey (Fig. 2). The second visit was planned 1 month after the first. After the first consultation, the pharmacist coordinated with the patient over the phone about the schedule. The second consultation was conducted in the same way as the first visit. If MRPs were identified, the community pharmacist attempted to resolve the MRPs through communication with the hospital pharmacist who had access to the patient's EMR, which included information such as clinical results and drug adjustments. If it was necessary to notify the medical staff, the pharmacist informed the patient about the MRPs and instructed them to pass on the information directly to the doctor (Fig. 2).

Data collection and outcomes

From June to December 2020, data were collected retrospectively through EMRs and medication counselling records. The status of polypharmacy, MRP types, and whether MRPs were resolved were evaluated and determined to assess whether the home-visit pharmaceutical service was successfully implemented.[5,8,10,12,23]

The hospital pharmacist collected information such as patients' baseline demographic characteristics, medication histories, and baseline disease features by using EMRs. The time required for each process and the MRPs identified during consultations were recorded. The community pharmacist also recorded the time required for each process and the MRPs identified during the consultation. Additionally, if the first or second consultation failed, the reason was recorded. To evaluate polypharmacy status, drug use was checked at the time of discharge and at the first and second consultations. Furthermore, the prescription complexity of all medications used was evaluated using the modified medication regimen complexity index (MRCI).[24,25] Medication compliance was evaluated by administering a questionnaire and using the 6-item modified Morisky Medication Adherence Scale (MMAS-6).[19,26]

Results

Patients and baseline characteristics

During the study period, there were 578 patients aged ≥65 years who met the inclusion criteria. Of these, 22 who lived in Jeonju and were discharged home consented to the home-visit

Table 1. Baseline demographic characteristics of selected patients

Characteristic	Value (n=15)
Age in years, median (range)	78 (69-93)
Sex, n (%)	
Male	9 (60.0)
Female	6 (40.0)
Current Smoking, n (%)	2 (13.3)
Living situation, n (%)	
Living alone	2 (13.3)
Reason for hospitalization, n (%)	
Stroke	4 (26.7)
Acute coronary syndrome	7 (46.7)
Others	4 (26.7)
Co-morbidity, n (%)	
Diabetes	6 (40.0)
Hypertension	5 (33.3)
Dyslipidaemia	5 (33.3)
Thyroid dysfunction	2 (13.3)
Arrhythmia	2 (13.3)
Chronic kidney disease	1 (6.7)
LACE[a] index (out of 30), median (range)	12 (9-16)
Medications at discharge, median (range)	8 (3-17)

[a]Patient readmission risk was evaluated using the LACE index. 'LACE' includes length of stay ('L'); acuity of the admission ('A'); comorbidity of the patient (measured with the Charlson comorbidity index; 'C'); and emergency department use (determined as the number of visits in the 6 months before admission; 'E').[27]

pharmaceutical service. Among them, 15 patients completed their first visit, and 11 (50%) completed the second. Among the 7 patients who did not complete the first visit, 1 was admitted to a nursing hospital and another was readmitted due to worsening of the underlying disease. The remaining 5 patients did not receive consultation due to worsening of their existing condition, lack of a need for additional medication counselling, refusal to receive counselling, or failure to adjust the counselling schedule. Of the 4 patients who completed the first visit but not the second, 2 moved to another area and 2 did not want the second consultation because they had good understanding of their medication and compliance after the first visit (Fig. 1). We analysed data from 15 patients who had completed at least 1 visit. The median age of these patients was 78 years (range: 69-93 years), 9 patients (60%) were male, and 2 patients (13.3%) lived alone (Table 1).

Table 2. Time required for each transitional care program per patient

Variable	Value[a]
Hospital pharmacist	
Total, min	65 (55-90)
Screening of eligible patients and preparation time before consultation, min	15 (10-20)
Preparation of the consent form and consultation time for discharge medication, min	21 (10-30)
Time to the preparation of the 'Pharmaceutical care patient record', min	20 (11-25)
Time required for administrative support (e.g. preparation of an official letter), min	15 (7-20)
Community pharmacist	
Time from hospital discharge to the follow-up call, days	2 (1-17)
Time from hospital discharge to the first home visit, days	7 (3-20)
Time from the first home visit to the second home visit, days	34 (21-48)
Total time required to complete the first home visit, min[b]	144 (118-172)
Schedule adjustment including communication over the phone and consultation preparation time, min	25 (20-40)
Time taken to reach the patient's home (round trip), min	40 (26-60)
Time required for the first consultation, min	40 (20-60)
Feedback time, such as that for the writing of a reply and reporting of adverse drug reactions, min	20 (15-30)
Total time required to complete the second home visit, min[c]	105 (70-150)
Schedule adjustment including communication over the phone and consultation preparation time, min	15 (10-30)
Time taken to reach the patient's home (round trip), min	40 (20-55)
Time required for the second consultation, min	20 (20-55)
Feedback time, such as that for the writing of a reply and reporting of adverse drug reactions, min	20 (10-30)

[a]Values are medians (range) unless stated otherwise.
[b]The first home visit time was analysed for 15 patients.
[c]The second home visit time was analysed for 11 patients.

Outcomes

For home-visit pharmaceutical services aimed at elderly patients in transition period, hospital pharmacists screened the target patients; prepared the consent form; provided medication reconciliation and adjustment, and guidance on taking discharge medication; conducted medication counselling and prescription intervention; and provided pharmaceutical care patient records and sent official notices to the local pharmacist association. The median time spent performing the aforementioned tasks per patient was 65 min (range: 55-90) (Table 2). The community pharmacists performed feedback tasks over the phone, such as coordinating the consultation schedule, preparing for the consultation, travelling (round trip) to the consultation location, medication counselling, and drafting a reply after the consultation. The median time spent per patient at the first consultation was 144 min (range: 118-172); this time decreased to 105 min (range: 70-150) at the second consultation (Table 2).

Examination of polypharmacy revealed that the median numbers of daily medications used by the patients were 8 (range: 3-17) at discharge, 12 (range: 6-20) at the first visit, and 11 (range: 6-20) at the second visit. Regarding these drugs, the median numbers of drugs prescribed from JBUH were 7 (range: 3-17) at discharge, 8 (range: 3-17) at the first visit, and 7 (range: 3-13) at the second visit. However, the total number of drugs increased post-discharge due to prescription drugs from other medical institutions, OTCs, and functional foods. The median modified MRCI score was 29 (range: 11-43) at discharge, 38 (range: 19-76) at the first visit, and 30 (range: 19-76) at the second visit (Table 3). The median MMAS-6 points at the time of the first visit was 6 (range: 4-6). Examination of the responses for each item revealed high scores for most of the items related to medication motivation and knowledge. However, the percentage of respondents who answered 'I know the long-term benefits of taking the medicine as told by my doctor or

Table 3. Number of medications and medication regimen complexity index

Variable	Value		
	At discharge (n=15)	First home visit (n=15)	Second home visit (n=11)
Number of medications, median (range)			
Total	8 (3-17)	12 (6-20)	11 (6-20)
Prescription at JBUH	7 (3-17)	8 (3-17)	7 (3-13)
Non-JBUH prescription	0 (0-8)	1 (0-11)	1 (0-11)
Over-the-counter drug	-	0 (0-2)	0 (0-1)
Functional food or herbal medicine	-	0 (0-6)	0 (0-6)
MRCI, median (range)	29 (11-43)	38 (19-76)	30 (19-76)

JBUH, Jeonbuk National University Hospital; MRCI, medication regimen complexity index.

Table 4. Self-reported medication adherence behaviour at the first home visit evaluated using the 6-item modified Morisky Medication Adherence Scale (MMAS-6)

	Item	No. (%) patients who answered as 'No' (n=15)
Motivation	1. Do you ever forget to take your medicine?	14 (93.3)
	2. Are you careless at times about taking your medicine?	15 (100.0)
Knowledge	3. When you feel better, do you sometimes not take your medicine?	14 (93.3)
	4. If you feel worse when you take your medicine, do you stop taking it?	13 (86.7)
	5. Do you know the long-term benefits of taking your medicine as told to you by your doctor or pharmacist?	6 (40.0)
Motivation	6. Do you forget to refill your prescription medicine on time?	15 (100.0)

pharmacist' was relatively low (60%, 9 patients) compared to those for other items (Table 4).

Forty-two MRPs were identified in 15 patients at the time of discharge and at the post-discharge home visit. At least 1 MRP was found in all patients. Two patients (13.3%) had 1 confirmed MRP, 7 patients (46.7%) had 2 MRPs, and 6 patients (40.0%) had ≥4 MRPs. Considering the types of MRPs that occurred frequently, incorrect administration of drug and adverse events (AEs) were the most common (21.4%, 9 patients each), and poor medication compliance and DDIs each accounted for 11.9% (5 patients) of these MRPs (Table 5). Of the 42 MRPs, 34 (81.0%) were resolved after consultation with a pharmacist. Although MRPs that could be resolved with the intervention of a pharmacist alone, such as poor medication adherence and expiration date management, accounted for most of the MRPs, the resolution rates were relatively low for MRPs that required intervention by medical staff, such as AEs or DDIs.

Discussion

This preliminary study was aimed at introducing a home-visit pharmaceutical service through collaboration between a general hospital and a local pharmacist association for the first time in Korea to ensure the safe and effective use of drugs before and after discharge among high-risk elderly patients. The lack of medical information about patients is one of the difficulties faced by community pharmacists conducting counselling.[14] However, in this study, through a collaboration between hospital and community pharmacies, patient information was identified in advance, which made counselling much easier and more accurate. During the study period, 15 patients received pharmaceutical service visits and 42 MRPs were identified during the consultation process, of which 34 were resolved (81.0%), suggesting that the home-visit pharmaceutical service was conducted successfully.

Examination of polypharmacy at discharge revealed that the

Table 5. Identification and intervention of medication-related problems conducted by pharmacists

Variable	Value, n (%)
MRPs per patient (n=15)	
0	0 (0.0)
1	2 (13.3)
2	7 (46.7)
3	0 (0.0)
≥4	6 (40.0)
MRPs[a] identification and intervention conducted by pharmacists (n= 42)	
At discharge	9 (21.4)
First home visit	24 (57.1)
Second home visit	9 (21.4)

Types of MRPs[a] (n=42)	n (%)	Resolved, n (%)	Case
Incorrect administration of drugs	9 (21.4)	9 (100.0)	A 78-year-old man who used various ointments/creams to treat dermatitis was hospitalized for STEMI treatment. During the patient's consultation, a local pharmacist trained the patient in the use of Isoket® spray because the patient mistook it to be a skin ointment.
ADR review and advice on how to reduce ADRs	9 (21.4)	6 (66.7)	A 72-year-old man received antidiabetic drugs at discharge for newly detected diabetes. After discharge, he drastically reduced his meals along with taking antidiabetic medication and complained of symptoms of hypoglycaemia. A Community pharmacist recommended a regular diabetic diet and provided information on how to manage hypoglycaemia. The patient's symptoms improved thereafter.
Medication compliance advice	5 (11.9)	5 (100.0)	A 77-year-old woman had been taking levothyroxine after thyroidectomy before hospitalization but was found not to have taken it due to a change in the drug packaging during the pharmacist's visit.
Drug-drug interaction	5 (11.9)	2 (40.0)	An 82-year-old man was taking nicorandil prescribed as a discharge medicine and tadalafil prescribed at a local clinic. The local pharmacist informed the patient about an interaction between the 2 drugs and recommended not to use them together.
Lifestyle modification	3 (7.1)	2 (66.7)	An 83-year-old man was discharged from the hospital after a stroke; however, he continued smoking after discharge. Furthermore, he quit the job after discharge, and later complained of a reduced appetite and depression. Community pharmacists informed the patient about the importance of quitting smoking to prevent stroke recurrence and recommended regular diet and exercise.
Disposal of expired/unused medication	3 (7.1)	3 (100.0)	A 93-year-old woman was taking insulin aspart for diabetes control. A local pharmacist found that it was being used for more than 2 months as the insulin dose had decreased. The insulin aspart had expired and was discarded.
Resolution of discrepancies between physician's instructions and actual prescription	3 (7.1)	3 (100.0)	A 69-year-old woman was expected to taper her prednisolone use. During the discharge drug consultation, the hospital pharmacist made corrections after confirming that the doctor's tapering plan and the actual prescription were different.
Additional medication included	2 (4.8)	2 (100.0)	A 73-year-old man with diabetes was discharged from the hospital after stroke treatment. A community pharmacist found that the dose of metformin was reduced compared to that before hospitalization. Hence, the pharmacist informed the patient and recommended self-monitoring of blood sugar. Self-testing showed persistent hyperglycaemia. Thus, the patient visited the hospital for glucose control treatment, wherein his metformin dose was increased, and eventually, his blood sugar levels normalized.

Table 5. Continued

Types of MRPs[a] (n=42)	n (%)	Resolved, n (%)	Case
Medication duplication	2 (4.8)	2 (100.0)	A 90-year-old woman was hospitalized for myocardial infarction and was discharged from the hospital with a dual antiplatelet agent prescription. During the patient's visit consultation, the local pharmacist confirmed that the patient was prescribed NSAIDs repeatedly by various local clinics to treat arthritis and explained to the patient the precautions necessary to prevent duplicate NSAID use.
Need for assessment or monitoring	1 (2.4)	0 (0.0)	A 77-year-old woman was taking levothyroxine 75 mcg after thyroidectomy; however, the dose was reduced to 50 mcg after hospitalization for angina. A community pharmacist communicated with the hospital pharmacist to confirm that the patient had reduced the dose of levothyroxine without laboratory assessment of thyroid function, and then recommended symptom monitoring and a thyroid function test.

[a]More than 1 intervention could have been conducted for each patient.
ADR, adverse drug reaction; MRPs, medication-related problems, NSAIDs, nonsteroidal anti-inflammatory drugs.

median number of daily medications was 8, with 87% of the patients on polypharmacy. However, at the first consultation, the number of drugs increased to 12 in all patients on polypharmacy. The polypharmacy rate was higher in this study than in previous domestic studies (44-86%).[16] This may have been because the study targeted patients with chronic diseases and receiving polypharmacy and the pharmacist personally checked all medications during the visit, allowing a precise evaluation of polypharmacy. In particular, the use of herbal medicines in Korea has traditionally been high[28,29] and recently, the use of functional foods in addition to OTCs and prescription drugs is increasing, elevating polypharmacy risk.[30] Many patients did not recognize the need for medication guidance for non-prescription drugs and did not report to medical staff based on their own judgment.[31] In this study, as the pharmacist identified all drugs through direct visits, it was possible to identify all MRPs, including medication duplication, possible DDIs, and AEs, and perform interventions. The MRCI at discharge was 29 points, similar to the results of other domestic studies (28 points).[32] However, at the time of the first consultation, along with an increase in the number of drugs, the MRCI increased to 38 points. In fact, during consultation, patients complained of difficulties due to complicated administration instructions, which led to MRPs such as incorrect administration of drug and poor adherence. However, this study did not significantly reduce the polypharmacy rate. A follow-up study is needed to decrease the rate of polypharmacy, which is a fundamental problem.

Most MRPs (81%) in this study were resolved only with pharmacist consultation. MRPs due to non-adherence, such as incorrect drug use or poor compliance, were also frequent in other post-discharge studies and could be resolved immediately by consulting a pharmacist.[8,12,33] Non-adherence may occur because the patient is unaware of post-discharge medication changes or misunderstands the instructions. In this study as well, in the evaluation of medication knowledge after discharge, 60% of patients answered that they did not know about the effects or benefits of the changed medication. Because the patients were exposed to much information at once at discharge and had decreased awareness due to ageing, their medication knowledge scores were relatively low despite receiving medication education. To solve this problem, Daliri et al. gauged patients' understanding of drugs by using the 'teach-back' method, wherein patients are asked about important educational information.[8] Alternatives such as the 'teach-back' method should be devised in future research to resolve MRPs related to non-adherence that occur frequently. On the other hand, MRPs such as DDIs and AEs are difficult to resolve only through consultation with a pharmacist. When MRPs were identified before discharge, the hospital pharmacist can directly work with the medical staff to resolve the issue. However, after discharge, there is no information delivery system that can relay the MRPs to the medical staff, forcing the patient to relay this information to the physician directly. Multidisciplinary efforts are required along with the establishment of an information delivery system to solve these MRPs in future studies.

This is a preliminary study with voluntary participation of pharmacists without the addition of dedicated personnel to perform the home-visit service. Considering the time taken to complete the consultation in this study, hospital pharmacists spent 65 min per patient, and community pharmacists spent

approximately 140 min during the first consultation. In a study by Kelling et al., consultation was conducted for approximately 44 min by direct patient visits to the pharmacy.[34] In another study by Monte et al., the average consultation time was 2 h, including pharmacists' travel time.[35] In this study, the consultation time during the visit was similar (40 min). However, the time required for travel, besides that for consultation preparation and counselling record preparation, was 100 min. In the future, when expanding the number of pharmacists, it is necessary to reduce travel time by assigning pharmacists available close to the patient's residence. Furthermore, it is important to reduce the time required for other activities, such as counselling record preparation, by developing a computerized system. Payment of consultation fees to pharmacists is an important factor in expanding home-visit services provided by community pharmacies. Because this was a small-scale preliminary study to introduce transitional care pharmaceutical service, economic evaluations such as drug cost reduction by preventing drug duplication, prescription of excess drugs, and medical cost reduction through prevention of MRP-related readmissions were not conducted. An economic evaluation should be conducted in many patients in the future to determine the appropriate cost of home-visit pharmaceutical services.

This study had several limitations. First, due to the single-centre nature and short duration of this preliminary study, the results may not be generalizable to other clinical settings. However, the main goal of this study was the implementation of transitional care during discharge by general hospital and community pharmacy collaboration in Korea. In the future, a larger study to evaluate the clinical effect of pharmaceutical transition care service should be conducted. Second, although the study was conducted with prior consent, the home visit success rate was relatively low. More sophisticated tools are needed to select patients who need home-visit pharmaceutical care.

Conclusion

This study is a considerable achievement; for the first time in Korea, hospital and community pharmacies collaborated to successfully conduct a home-visit pharmaceutical service for safe drug management among high-risk discharge patients. Based on the results of this study, we plan to gradually expand home visit services by improving their shortcomings. As the research in this field expands, an assessment of the performance,

problems, and economic evaluation of home-visit services will be necessary.

Acknowledgments

Conflicts of Interest

The authors declare that there is no conflict of interest.

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