Validity of medical history taken by pharmacists using a medical history taking tool

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Abstract
Background: The progress in aging and the shortage of physicians is a significant problem in Japan. Hence, healthcare professionals including pharmacists should cooperate to provide medical services with limited resources. However, pharmacists might have inadequate skills in taking medical histories. Therefore, we developed an interview tool to collect accurate medical history. In this study, we aimed to validate the contents of medical histories taken by a pharmacist using the interview tool and investigate physician consultation length.

Methods: Setting intervention days alternately, adult outpatients of the Kitaibaraki Center for Family Medicine who had new symptoms had their medical histories taken by one of two pharmacists before their physician visit during the study period. The contents of the medical history taken by a pharmacist using text analysis were validated on other four days. All sentences collected by a pharmacist or five physicians were divided into segments, and six other physicians assessed each segment. Differences in length of the physician consultation between those with and without (intervention and control groups, respectively) medical history taken by a pharmacist were investigated.

Results: Of 23 patients’ medical histories taken by a pharmacist using the interview tool, 84.4% of segments were related to the clinical diagnosis. The mean consultation length was 10.1±8.4 minutes in the intervention group (n=104) and 13.0±10.4 minutes in the control group (n=96) (p=0.048).

Conclusions: Medical histories taken by a pharmacist using the interview tool had high content validity and might reduce physician consultation length.

KEYWORDS
consultation length, content validity, medical history taking tool, pharmacist, physician, transprofessional education

1 | INTRODUCTION

1.1 | Background

An aging society has many medical needs of community, which requires healthcare professionals to cooperate when providing healthcare services in a community as medical resources are limited.¹

The vision of pharmacy for patients (called the “Kanjya no tameno yakkyoku vision”) and the concept of pharmacy (called “Kenkou support yakkyoku no arikata ni tuite”) suggest that community pharmacists should cooperate with other healthcare professionals such as...
physicians and nurses to collect information about patients’ symptoms in order to give appropriate health advice such as recommending an over-the-counter (OTC) medication or consulting a physician.\textsuperscript{2,3} Considering that pharmacists’ role is expanding into comprehensive patient care, not just medicine care, pharmacists should conduct appropriate interview about medical history for symptoms of each patient.\textsuperscript{4} However, these skills might be lacking in Japanese pharmacists.\textsuperscript{5} Therefore, there is an effort to change the Japanese pharmacy school curriculum and re-educate graduates.\textsuperscript{6} Moreover, considering the rapid increase in medical needs of community in Japan, an interview tool to assist medical history taking on the job is useful for community pharmacists in addition to the education changes mentioned above. If community pharmacists communicate with physicians using such a tool, the load on physicians might be reduced. However, few studies have focused on either developing such a tool to assist medical history taking for common symptoms or examining the collaborative relationship between community pharmacists and physicians in the provision of patient care. There are recognized needs to clarify professional roles, identify efficient ways to communicate, and determine compensation mechanisms to enhance collaboration.\textsuperscript{7,8}

For pharmacists to collaborate with physicians, we developed an interview tool for pharmacists to collect patients’ information and inform physicians about accurate medical history. With the availability of a validated medical history taking tool, pharmacists can contribute to dealing with the increase in medical needs of community and collaborate with physicians. Our tool might help such collaboration with physicians in community and hence contribute to each patient’s quality of life.

\subsection{Objective}

The purposes of this study were to validate the contents of medical histories taken by a pharmacist using a newly developed interview tool and analyze its effect on physician consultation length as metric of actual impact on clinical practice.

\section{Methods}

\subsection{The interview tool}

Figure 1 shows a sample of the interview tool to assist with medical history taking. The tool is in the format like a questionnaire or interview sheet. It contains multiple-choice questions about common symptoms such as fever, chills, fatigue, sore throat, cough, runny nose, headache, difficulty breathing, palpitations, chest pain, numbness, abdominal pain, nausea, anorexia, weight loss, diarrhea, constipation, vertigo, insomnia, forgetfulness, back pain, joint pain, boils, edema, and urinary difficulty. Two physicians (JH and TM, who are Japan Primary Care Association-certified family physicians), and two pharmacists (AM and TS, who each have more than 8 years of experience as pharmacists) collaboratively developed the interview tool by discussing the structure and flow of medical history taking.

\subsection{Outcome}

Interprofessional collaborative practice between physicians and pharmacists enables a synergistic influence of grouped knowledge and skills. Through the partnership, we can work on common goals effectively. In this study, we focus on “quality of information” and “consultation length” as impacts on interprofessional collaborative practice because we hypothesized pharmacists could contribute by asking patients about their medical history and reduce physician consultation time using grouped knowledge and skills. There are some studies using physician consultation length as outcome to evaluate the intervention such as joining other medical staffs that assist outpatient examination.\textsuperscript{9–11}

Originally, it might be necessary to consider the influence on patients about the validity of the interview tool, but first, this research focused on the information using the interview tool and the influence on a physician.

Therefore, the primary outcomes of this study were the contents of medical history by pharmacists and the difference in physician consultation length.

\subsection{Study setting and participants}

This clinical study was conducted at the Kitaibaraki Center for Family Medicine. This clinic is located in Kitaibaraki city in northern Ibaraki Prefecture, Japan, with a population of 43 000 people. The clinic has no medical beds and attends to approximately 40–50 outpatients per day. As study participants, adult outpatients at the Kitaibaraki Center for Family Medicine who had new symptoms were included. Patients who had difficulty answering in Japanese and patients who declined to participate in this study were excluded.

| Symptom         | Question                                    | Add to applicable items |
|-----------------|---------------------------------------------|-------------------------|
| Cough           | When did it start?                          | 3                       | Days ago |
|                 | Is it a productive cough?                   | Yes, No                 |          |
|                 | Intensity of symptoms                       | Mild, Moderate, Severe  |          |
|                 | Is there a specific time of day when your cough is worse? | Not specific, Morning, Evening, Night, I don’t know |          |
|                 | Did you have a runny nose or sore throat before you started coughing? | Yes, No |          |

\textbf{FIGURE 1} Example of “cough” in the tool to assist medical history taking
2.4 | Content validity

The data collection period consisted of July 12, 13, 15, and 20, 2016. One pharmacist (AM) took a medical history using the interview tool before the physician consultation to prevent personal information from being known by others. The information gathered by a pharmacist was not shared with a physician, so the physician conducted their consultations as usual (Figure 2).

The information gathered by a pharmacist was compared to that of five physicians using text analysis. First, one family physician (JH) and one pharmacist (AM) divided all sentences into segments. Next, they categorized the segments into the following three categories: A, gathered by both pharmacist and physicians; B, gathered by physicians only; and C, gathered by a pharmacist only.

We asked six other physicians with Japan Primary Care Association-certified family physician to evaluate the segments in categories B and C. They used the entire medical history of each patient to form their opinion on the relevance of the segments to the clinical diagnosis using a four-point Likert scale (very useful, somewhat useful, not very useful, and not at all useful). A segment as one rated as “very useful” or “somewhat useful” by five or more of the six physicians was defined as a valid segment. The six physicians do not work at the Kitaibaraki Center for Family Medicine.

2.5 | Comparison of physician consultation length

Intervention and nonintervention days were alternately set between January 18 and February 26, 2016. Each period included 10 intervention and 10 nonintervention days. Patients who came to the clinic on intervention days were classified as the intervention group, and patients who came to the clinic on nonintervention days were classified as the control group. The inclusion criteria and exclusion criteria were the same as before.

On intervention days, one of two participated pharmacists (AM or TS) took medical histories using the interview tool and entered the information into an electric health record (Figure 2).

Physician consultation length was defined as the period between consultation starting and ending times. Consultation starting time was defined as when the physician began accessing the patient’s electric health record. Consultation ending time was defined as printout time of the outpatient scheduling paper, which was usually printed at the end of each consultation. The physician consultation length between the intervention and control groups was compared. Mann-Whitney U test was used for consultation length and age and chi-squared test for gender and patient type. Statistical significance was judged as a P-value of less than .05. All statistical analyses were conducted using IBM SPSS Statistics for Windows version 23.0.

2.6 | Ethical considerations

This study was approved by the ethics committee of Kitaibaraki City Hospital.

3 | RESULTS

3.1 | Content validity

There were 24 patients who met inclusion criteria, of whom 23 were included in the analysis. One patient who withdrew consent for study participation was excluded. The mean age (± standard deviation, SD) was 52.2±21.0 years, and 73.9% were females. The mean number of
segments taken by five physicians and a pharmacist per patient was 9.8±6.7 and 14.5±6.1, respectively.

Physicians generated a total of 225 segments, and a pharmacist generated 334 segments. Of these, 108 segments taken by both a pharmacist and physicians were overlapping. There were 117 segments taken only by physicians and 226 segments taken only by a pharmacist. Of the physician-generated segments, 71.8% (84 of 117) were highly relevant to differential diagnosis and rated as valid segments. Meanwhile, 77.0% (174 of 226) of pharmacist-generated segments were rated as valid (Figure 3). The proportion of pharmacist-generated segments related to the clinical diagnosis, which is the sum of overlapping segments (108) and valid segments (174) over the total number of pharmacist-generated segments (108+174/334), was 84.4%.

3.2 | Comparison of physician consultation length

There were 215 patients in the intervention group during the intervention study of whom 200 patients were included in the analysis. One patient who withdrew consent for study participation and one patient whose consultation length was not recorded because of a recording error were excluded.

In the intervention study, mean age (±SD) was 56.5±18.9 years, females were 66.0%, and new patients were 57.5%. The intervention group included 104 patients, and the control group included 96 patients. There were 34 males (32.7%) and 70 females (67.3%) in the intervention group, and 34 males (35.4%) and 62 females (64.6%) in the control group (P=.684). Mean age was 54.5±18.8 years in the intervention group and 58.7±18.9 years in the control group (P=.151). Fifty-seven patients (54.8%) in the intervention group were new patients, and 47 patients (60.4%) in the control group were new patients (P=.423) (Table 1). Mean length of medical histories taken by a pharmacist was 7.6±4.9 minutes. Overall, the mean physician consultation length for new patients was 12.3±11.2 minutes, compared with 10.4±6.4 minutes for established patients. The mean consultation length was 10.1±8.4 minutes in the intervention group and 13.0±10.4 minutes in the control group (P=.048) (Table 2).

4 | DISCUSSION

Medical histories gathered by a pharmacist using the interview tool had high content validity and might reduce physician consultation length in this study.

It is novel to show high content validity of the medical histories taken using an interview tool for common symptoms. A previous study has shown that pharmacists should have adequate knowledge of how to ask questions about symptoms and understand the algorithm for medical history taking at the pharmacy. Another study in Nepal investigated acceptance of a tool to assist medical history taking developed for nonphysician medical staff. The study did not validate the content of the medical histories taken, but rather assessed patient preferences about using the tool. There are studies that mentioned tools

![FIGURE 3](https://example.com) Results of content validity. The numbers in the figure indicate the number of segments. In the segments taken by a pharmacist only, 174 segments (77.0%) were highly relevant to differential diagnosis and 52 segments (23.0%) were slightly relevant to differential diagnosis.

| TABLE 1 | Characteristics of the study participants (Intervention and control groups) |
| --- | --- | --- |
| | Intervention group | Control group | P-value |
| Sex | Male | 34 | 34 | .684 |
| | Female | 70 | 62 | |
| Age (y), mean (±SD) | 54.5±18.8 | 58.7±18.9 | .151 |
| Patient type | New patient | 57 | 58 | .423 |
| | Established patient | 47 | 38 | |

χ²-test was used for sex and patient type, Mann-Whitney’s U test was used for age.
Furthermore, when information about symptoms by pharmacists is including the symptoms most commonly encountered in pharmacies. Therefore, content validation and shorter tool to physicians, it might encourage collaboration among physicians taking by community pharmacists, we should improve the tool by including the symptoms most commonly encountered in pharmacies. Furthermore, when information about symptoms by pharmacists is sent to physicians, it might encourage collaboration among physicians and pharmacists. Therefore, content validation and shortened physician consultation length might indicate that pharmacists using the interview tool might collect appropriate information about common symptoms and make judgments about the necessity of physician consultation. The possibility of adjusting the tool for the community pharmacy setting warrants examination.

4.1 | Limitations

There are several limitations to the present study. First, this study was conducted only at one facility, so it is difficult to make generalizations. Next research needs to explore the impact on patients and community residents.

Second, only two pharmacists participated in this study. It is necessary to verify the generalizability of medical history by pharmacists using these interview tools with more pharmacists.

5 | CONCLUSION

The medical history taken by pharmacists using the interview tool has high content validity for clinical diagnosis. Information collected beforehand could reduce physician consultation length.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

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