ORIGINAL ARTICLE

Evaluation of Clinical Pharmacist Collaborating Service with Oncologist at Outpatient Booth in Cancer Chemotherapy from a Questionnaire Survey

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ABSTRACT

Background: The department of pharmacy at the National Cancer Center Hospital East is the first hospital which has performed outpatient pharmacy service which pharmacists work with oncologists at outpatient clinic booth in Japan since 2007 in Japan. The pharmacists shared oncologist outpatient, and explained and instruct medicines for patients in beside oncologists. **Objective:** To evaluate the outpatient pharmacy service, we conducted a questionnaire survey. **Methods:** We conducted questionnaire survey for 24 oncologists from six medical division and 13 nurses, who have worked with the outpatient pharmacists and 192 patients who received the outpatient pharmacy service. **Results:** The response rate was 83% (n=20) from oncologists. The usefulness of the pharmacy service was "very useful" (n=16, 80%) and "useful" (n=4, 20%). Average estimated percentage of reduction in medical examination due to the pharmacy service was 24 ± 14 (S.D.) and estimated health reimbursement fee by oncologists was JPY 1560 ± 740. The response rate was 85% (n=11) from nurses. The usefulness of the pharmacy service was "very useful" (n=9, 82%) and "useful" (n=2, 18%). Estimated health reimbursement fee by nurses was JPY 1310 ± 550. The response rate was 92% (n=177) from patients who had received the outpatient pharmacy service at least two times. The usefulness of the pharmacy service was "very useful" (n=101, 57%) and "useful" (n=73, 41%). **Conclusions:** The study clarified that the outpatient collaborating pharmacy service with oncologists at an outpatient booth was beneficial.

Keywords: Outpatient chemotherapy, clinical pharmacy, questionnaire

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Access this article online
Website: www.jbclinpharm.org
Quick Response Code:

INTRODUCTION

According to development of new anticancer agents and healthcare system for ambulatory care, outpatient chemotherapy has been dramatically increased and pharmacists' interventions for the outpatient chemotherapy are important in Japan.[1] Before administration of outpatient chemotherapy, pharmacist's counseling for patients is considered beneficial and important[2-5] and they need comprehensive information and communication, such as friendly and interested attitude, through the counseling by pharmacists.[6] So far, outpatient pharmacy service which only pharmacists work for patients in a separated room has been reported,[7,8] however, outpatient service that clinical pharmacist collaborating service with oncologist at outpatient booth in cancer chemotherapy has not reported in Japan. The department of pharmacy at the National Cancer Center Hospital East (NCCHE) is the first hospital which has performed outpatient pharmacy service which pharmacists work with oncologists at outpatient clinic booth in Japan since 2007. The pharmacists shared oncologist outpatient, and explained and instruct medicines for patients in beside oncologists. The pharmacists also checked patient medication, and suggest prescriptions. Between June 2016 and November 2016, a total of 2,177 business hours were accumulated by six pharmacists. Of the total 9,775 outpatient visits, pharmacists worked for 5,142 (53%) oncologist outpatient clinics which pharmacists evaluated as warranting interventions, particularly chemotherapy cases. The service is divided in three interventions: (1) before oncologist's outpatient examination, (2) during oncologist's outpatient examination and (3) after oncologist's outpatient examination. In the "(1) before oncologist's examination", the pharmacist collects information about patient's adverse drug reactions, adherence and number of medicines adverse drug reactions, adherence, medicines which patients want to use and number of patient's medicines. In the "(2) during oncologist's outpatient examination", the pharmacist attends to oncologist outpatient examination and promptly tell information of the patients status, such as adverse drug reactions, adherence, medicines which the patient wants and number of medicines. In addition, the pharmacist suggests prescriptions and provides drug information for oncologists. In the "(3) after oncologist's outpatient examination", the pharmacist checks prescription errors and gives medication counseling for patients about their prescriptions [Figure 1].

The service is new innovative pharmacy service in Japan, and therefore, it has not achieved health reimbursement fee for the pharmacy service yet. To evaluate the outpatient pharmacy service, we conducted a questionnaire survey. Here, we report results of the questionnaire survey for oncologists, nurses and patients to evaluate the collaborating pharmacy service with oncologists at outpatient medical booth.

METHODS

We conducted questionnaire survey for 24 oncologists from six medical division and 13 nurses, who have worked with the outpatient pharmacists and 192 patients who received the outpatient pharmacy service between June 2016 and January 2017. The questionnaire was written in Japanese because most patients only read Japanese language. We use different questionnaires for oncologists, nurses and patients [Table 1]. Especially, we used easy understand expressions in the questionnaire for patients without difficult medical terminologies. In the study, we did not use questionnaire which was validated in the previous survey, and we used original questions to make the

Cite this article as: Sugama Y,Suzuki S,Kamata H,Suzuki H,Demachi K, Ikegawa K,Igarashi T,Yamaguchi M. Evaluation of Clinical Pharmacist Collaborating Service with Oncologist at Outpatient Booth in Cancer Chemotherapy from a Questionnaire Survey. J Basic Clin Pharm 2017;8:111-115.

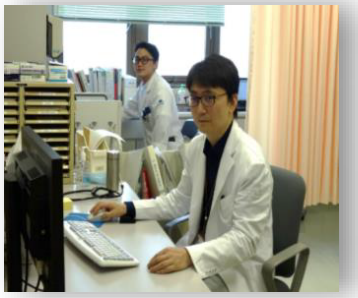
(1) Before oncologist's outpatient examination	(2) During oncologist's outpatient examination	(3) After oncologist's outpatient examination
The pharmacist collects information about patient's adverse drug reactions, adherence and number of medicines (A) adverse drug reactions (B) adherence (C) medicines which patients want to use (D) number of patient's medicines	The Pharmacist attends to oncologist outpatient examination and promptly tell information of the patients status, such as (A) adverse drug reactions (B) adherence (C) medicines which the patient wants (D) number of medicines. In addition, the pharmacist suggests	The pharmacist checks prescription errors and gives medication counseling for patients about their prescriptions
		

Figure 1: Flow of the clinical pharmacist collaborating service with oncologist at outpatient booth

Table 1: Response

	Oncologists N=24	**Nurses N=13**	**Patients N=192**
Number of response (%)	20 (83%)	11 (85%)	177 (92%)
Medical oncology divisions			
Thoracic Oncology	8 (40%)	n.a.	n.a.
Gastrointestinal Oncology	2 (10%)	n.a.	n.a.
Head and Neck Medical Oncology	4 (20%)	n.a.	n.a.
Hepatobiliary and Pancreatic Oncology	1 (5%)	n.a.	n.a.
Palliative Medicine	1 (5%)	n.a.	n.a.
Breast and Medical Oncology	4 (20%)	n.a.	n.a.
Q1 How do you think about the outpatient collaboration pharmacy service?	n=20	n=11	n=177
Very useful	16 (80%)	9 (82%)	101 (57%)
Useful	4 (20%)	2 (18%)	73 (41%)
Neutral	0	0	2 (1%)
Not useful very much	0	0	1 (1%)
Not useful	0	0	0
Q2-1 If you answer useful or very useful in Q1, please tell us reasons you evaluated	n=20	n=11	n=174
Improve treatment quality	18 (90%)	9 (82%)	149 (86%)
Improve medical safety	19 (95%)	9 (82%)	125 (72%)
Save medical costs	3 (15%)	1 (9%)	20 (11%)
Reduce amount of clinical works	15 (75%)	8 (73%)	n.a.
Others	4 (20%)	2 (18%)	40 (23%)
Q2-2-1 If you choose "(1) Improve treatment quality" in Q2-1, please tell us reasons you evaluated			
[Oncologists and nurses]	n=18	n=9	
Suggest prescriptions or examination orders	16 (89%)	n.a.	n.a.
Provide drug information, such as drug interaction, dose reduction or alternative medicines	16 (89%)	9 (100%)	n.a.
Instruction medication for patients	17 (94%)	9 (100%)	n.a.
Evaluate patients' medication adherence	13 (72%)	9 (100%)	n.a.
Others	1 (6%)	1 (11%)	n.a.
[Patients]			n=147
Know how to use medicine	n.a.	n.a.	127 (86%)
Choose better medications	n.a.	n.a.	77 (52%)
Tell patient's wish to an oncologist efficiently	n.a.	n.a.	92 (63%)
Others	n.a.	n.a.	5 (3%)

Q2-2-2 If you choose "(2) Improve medical safety" in Q2-1, please tell us reasons you evaluated			
[Oncologists and nurses]	n=19	n=9	
Evaluation of prescription by pharmacists	18 (95%)	8 (89%)	n.a.
Management of adverse drug reactions and disease conditions	18 (95%)	9 (100%)	n.a.
Others	3 (16%)	0	n.a.
[Patients]			n=121
Prevent prescription errors	n.a.	n.a.	67 (55%)
Understand how to manage medicines for adverse drug reactions or diseases	n.a.	n.a.	114 (94%)
Others	n.a.	n.a.	2 (2%)
Q2-2-3 If you choose "(3) Save medical costs" in Q2-1, please tell us reasons you evaluated			
[Oncologists and nurses]	n=3	n=1	
Avoid duplicate prescriptions	2 (67%)	1 (100%)	n.a.
Adjust number of patients' medicines	3 (100%)	1 (100%)	n.a.
Suggest unnecessary drugs and drug dose reduction	3 (100%)	1 (100%)	n.a.
Rounding of anticancer medicines	2 (67%)	1 (100%)	n.a.
Others	0	1 (100%)	n.a.
[Patients]			n=20
Reduce number of medicines	n.a.	n.a.	16 (80%)
Reduce number of kinds of medicines	n.a.	n.a.	16 (80%)
Others	n.a.	n.a.	1 (5%)
Q2-2.4 If you choose "(4) Reduce amount of clinical works" in Q2-1, please tell us reasons you evaluated	n=15	n=8	
Instruction medicines for patients	14 (93%)	8 (100%)	n.a.
Check adverse drug reactions	10 (67%)	6 (75%)	n.a.
Check what medicines patients need	11 (73%)	4 (50%)	n.a.
Evaluate patient's medicine usage	11 (73%)	8 (100%)	n.a.
Others	1 (7%)	1 (13%)	n.a.
Q3-1 Please evaluate the pharmacy collaborating service with oncologist at an outpatient booth, compared to current outpatient pharmacy service which is conducted in a separated room or outpatient chemotherapy center	n=20	n=11	n=173
Very useful	11 (55%)	4 (36%)	75 (43%)
Useful	6 (30%)	7 (64%)	83 (48%)
Same	2 (10%)	0	13 (8%)
Not useful very much	1 (5%)	0	2 (1%)
Not useful	0	0	0
Q3-2 If you answer useful or very useful in Q3-1, please tell us reasons you evaluated	n=17	n=11	n=149
Ask consultation about prescriptions during medical examination promptly in an outpatient booth	15 (88%)	8 (73%)	85 (57%)
Consult any topics immediately	15 (88%)	10 (91%)	n.a.
Face to face communication	9 (53%)	7 (64%)	n.a.
More collaboration and share information	14 (82%)	10 (91%)	131 (88%)
Pharmacy interventions before and after doctor's outpatient examination	6 (35%)	5 (45%)	63 (42%)
Others	3 (18%)	4 (36%)	4 (3%)
Q4 Evaluate expected healthcare reimbursement fee of the outpatient service, average ± [S.D.] JPY	1,560 ± [740]	1,310 ± [550]	n.a.
Q5-1 How much percent of your clinical work can be reduced by the outpatient pharmacy service? , average ± [S.D.]	n=20 24 ± [14]	n.a.	n=119 17 ± [38]
-Patients who answered reduced, n=83 (69%)	n.a	n.a.	35 ± [21]
-Patients who answered increased, n=19 (15%)	n.a.	n.a.	47 ± [39]
Q5-2 Please tells us reasons why you evaluated the percentage in Q5-1?			
	n=14		n=118
Pharmacy interventions before or after doctor's outpatient examination	10 (71%)	n.a.	91(77%)
Before oncologist examination, pharmacists check adverse drug reactions	12 (86%)	n.a.	70 (59%)
Before oncologist examination, pharmacists check patients' wish for contents of prescription, and suggest the medicines efficiently	12 (86%)	n.a.	53 (45%)
Before oncologist examination, pharmacists evaluate patients' medication adherence, and provide the information efficiently	12 (86%)	n.a.	59 (50%)
Others	1 (7%)	n.a.	3 (3%)

n.a.: not available question for subjects, S.D.: Standard deviation

questionnaire. The study was approved by the Institutional Review Board of National Cancer Center (Approval #2016-225) and was conducted in accordance with all applicable ethical standards.

We conduct an anonymous survey using three different questionnaires, which were adjusted type and contents of questions, for oncologists, nurses and patients. The outpatient pharmacists distributed the questionnaire, and collected the answers from boxes which we installed in outpatient counter desks.

RESULTS

Oncologists

The response rate was 83% (n=20) from oncologists. The usefulness of the pharmacy service was "very useful" (n=18, 80%) and "useful" (n=16, 80%). The reasons of the answer were follows: "improve medication safety" (n=19, 95%), "improve quality of pharmacotherapy" (n=18, 90%), "reduce drug related service" (n=15, 75%) and "reduce or save medicine costs" (n=3, 15%).

Of the 18 oncologists who answered "Improve treatment quality", most of reasons for the answer were as follows: "Instruction medication for patients" (94%), "Suggest prescriptions or examination orders" (89%), "Provide drug information, such as drug interaction, dose reduction or alternative medicines" (89%) and "Evaluate patients' medication adherence" (72%). Of the 19 oncologists who answered "Improve medical safety", most of reasons for the answer were as follows: "Evaluation of prescription by pharmacists" (95%) and "Management of adverse drug reactions and disease conditions" (95%). Of the 15 oncologists who answered "Reduce amount of clinical works", most of reasons for the answer were as follows: "Instruction medicines for patients" (93%), "Check what medicines patients need" (73%), "Evaluate patient's medicine usage" (73%) and "Check adverse drug reactions" (67%). Only three oncologists answered the pharmacy service was related to the cost saving on their clinical practice.

Compared to current outpatient pharmacy service, which is conducted by pharmacists in a separate room from an outpatient oncologist booth, 85% (n=17) of oncologists answered the service was better than the current outpatient pharmacy service. Reasons of the evaluation were as follows, "Ask consultation about prescriptions during medical examination promptly in an outpatient booth" (88%), "Consult any topics immediately" (88%), "More collaboration and share information" (82%), "Face to face communication" (53%) and "Pharmacy interventions before and after doctor's outpatient examination" (35%).

Average estimated time reduction percentage of medical examination due to the pharmacy service was 24 ± 14 (standard deviation [S.D.]) and estimated average expected health reimbursement fee by oncologists was JPY 1560 ± 740. Reasons for reduced time was as follows: "Pharmacy interventions before or after doctor's outpatient examination" (n=10, 71%), "Before oncologist examination, pharmacists check adverse drug reactions" (n=12, 86%), "Before oncologist examination, Pharmacists check patients' wish for contents of prescription, and suggest the medicines efficiently" (n=12, 86%) and "Before oncologist examination, pharmacists evaluate patients' medication adherence, and provide the information efficiently" (n=12, 86%).

Nurses

The response rate was 85% (n=11) from nurses. The usefulness of the pharmacy service was "very useful" (n=9, 82%) and "useful" (n=2, 18%). The reasons of the answer were follows: "improve medication safety" (n=9, 82%), "improve quality of pharmacotherapy" (n=9, 82%), "reduce drug related service" (n=8, 73%) and "reduce or save medicine costs" (n=1, 9%).

Of the nine nurses who answered "Improve treatment quality", most of reasons for the answer were as follows: "Instruction medication for patients" (100%) Provide drug information, such as drug interaction, dose reduction or alternative medicines" (100%) and "Evaluate patients' medication adherence" (100%). Of the nine nurses who answered "Improve medical safety", most of reasons for the answer were as follows: "Management of adverse drug reactions and disease conditions" (100%) and "Evaluation of prescription by pharmacists" (89%). Of the eight nurses who answered "Reduce amount of clinical works", most of reasons for the answer were as follows: "Instruction medicines for patients" (100%), "Evaluate patient's medicine usage" (100%), "Check adverse drug reactions" (75%) and "Check what medicines patients need" (50%). Only one nurse answered the pharmacy service was related to the cost saving on their clinical practice.

Compared to current outpatient pharmacy service, which is conducted by pharmacists in a separate room from an outpatient oncologist booth, all nurses, who responded to the questionnaire, answered the service was better than the current outpatient pharmacy service. Reasons of the evaluation were as follows, "Consult any topics immediately" (91%), "More collaboration and share information" (91%), "Ask consultation about prescriptions during medical examination promptly in an outpatient booth" (73%), "Face to face communication" (64%) and "Pharmacy interventions before and after doctor's outpatient examination" (45%). Estimated average expected health reimbursement fee by nurses was JPY 1310 ± 550.

Patients

The response rate was 92% (n=177) from patients who had received the outpatient pharmacy service at least two times. The usefulness of the pharmacy service was "very useful" (n=101, 57%) and "useful" (n=73, 41%). The reasons of the answer were follows: "improve medication safety" (n=125, 72%), "improve quality of pharmacotherapy" (n=149, 86%) and "reduce or save medicine costs" (n=20, 11%). Of the 147 patients who answered "Improve treatment quality", most of reasons for the answer were as follows: "Know how to use medicine" (86%), "Choose better medications" (52%) and "Tell patient's wish to an oncologist efficiently" (63%). Of the 121 patients who answered "Improve medical safety", most of reasons for the answer were as follows: "Prevent prescription errors" (55%) and "Understand how to manage medicines for adverse drug reactions or diseases" (94%). Of the 20 patients who answered "Save medical costs", most of reasons for the answer were as follows: "I Reduce number of medicines" (80%) and "Reduce number of kinds of medicines" (80%).

Compared to current outpatient pharmacy service, which is conducted by pharmacists in a separate room from an outpatient oncologist booth, 91% (n=158) of patients answered the service was better than the current outpatient pharmacy service. Reasons of the evaluation were as follows, "Ask consultation about prescriptions during medical examination promptly in an outpatient booth" (57%), "More collaboration and share information" (88%) and "Pharmacy interventions before and after doctor's outpatient examination" (42%).

Average estimated time change of medical examination due to the pharmacy service was-17 ± 38 (S.D.). The question seemed to be difficult to answer for patients, and therefore, its response rate was 61% (119/192). Reasons for change time was as follows: "Pharmacy counselling before or after doctor's outpatient examination" (n=91, 77%), "Before oncologist examination, pharmacists check adverse drug reactions and tell the information for oncologists efficiently" (n=70, 59%), "Before oncologist examination, pharmacists check patients' wish for contents of prescription, and suggest the medicines efficiently" (n=53, 45%) and "Before oncologist examination, pharmacists evaluate patients' medication adherence, and provide the information efficiently" (n=59, 50%). Of the total 119 respondents, there were 19 patients (16%) who answered their outpatient time was increased, 17

patients (14%) who answered no change and 83 patients (70%) who answered their outpatient time was decreased. Average estimated time reduction of oncologist's medical examination due to the pharmacy service was 35 ± 21 (S.D.) in patients who answered their examination time was reduced. Average estimated time increased of oncologist's medical examination due to the pharmacy service was 47 ± 39 (S.D.) in patients who answered their examination time was increased.

DISCUSSION

In our questionnaire survey clarified that oncologists, nurses and patients evaluated positive to the new service, clinical pharmacist collaborating service with oncologist at outpatient booth in cancer chemotherapy. In addition to real time interventions by the outpatient pharmacists, providing sufficient information for patients is beneficial in cancer therapy.[4,5,9] From our previous nation-wide survey in Japan, most hospital pharmacists could not check outpatient oral chemotherapy prescriptions, compared to injection cancer chemotherapy,[10] because the oral chemotherapy is provided as an outpatient prescription that hospital pharmacists cannot access well. Moreover, community pharmacists who dispense and explain the oral chemotherapy for patients think education and knowledge of oncology and oral chemotherapy is not enough.[11] Improving knowledge of community pharmacists seems important, however, it is vital that hospital pharmacists have intervention for outpatient chemotherapy patients. In fact, our questionnaire survey clarified why oncologists, nurses and patients thought the outpatient pharmacy collaboration service was important, and most of them were real time high quality services. There was a report that showed outpatient pharmacy service was useful in oral chemotherapy,[12] and our collaborating pharmacy service is also beneficial especially oral chemotherapy that is mainly performed in outpatient setting without enough hospital pharmacist interventions.

Surprisingly, cost saving issues was not evaluated as important. The Japanese healthcare insurance is universal government-led national insurance and healthcare cost is relatively low compared to western countries, therefore, they might evaluate this kind of intervention was not important. The service was evaluated as "healthcare reimbursement fee" equivalent service from both oncologists and nurses. A clinical pharmacist works for healthcare based on healthcare reimbursement fee, and the results showed the service was worth in medical practice. Clinical pharmacist collaborating service with oncologist at outpatient booth enable to provide real time intervention for oncologists and nurses and it would save time in their work. Both oncologists and nurses evaluated the service save 20% of their work time. Interestingly, most patients answered their outpatient time was reduced, but 19 patients answered it was increased. As a matter of fact, oncologists and nurses could save their time and patients achieved more time to receive their medication due to the outpatient pharmacy service. Without drug information and pharmacists' interventions, they would have difficulty to conduct safe outpatient chemotherapy in daily practice.[1,10] Compared to oncologists and nurses, outpatient time include examination, consultation, and all other outpatient activities, for patients. Therefore, they evaluated that overall outpatient time is increased due to pharmacy interventions. The evaluation for the pharmacy service is as good as oncologists' and nurses' evaluations, so the additional outpatient time could be favorable impact for the patients.

The study has several limitations. The current study was a questionnaire survey which was conducted in a single center and was only for six medical oncology divisions out of ten medical oncology divisions. The pharmacy department assigned the outpatient pharmacists only for six medical divisions due to limited pharmacy members. The services of the outpatient service, clinical pharmacist collaborating service with oncologist at outpatient booth in cancer chemotherapy, were not defined well due to the new pharmacy service. The service only focuses on cancer chemotherapy, which is one of parts in cancer treatment. The outpatients had also interventions for cancer patients who did not receive chemotherapy, and the questionnaire survey did not clarify the benefits of pharmacy interventions for those patients.

CONCLUSION

The survey clarified that oncologists, nurses and patients evaluated the outpatient pharmacy service useful for safe and valid cancer treatment, and the service is worth for healthcare reimbursement fee in Japan.

Acknowledgements

The authors wish to thank the cancer patients who collaborated with the questionnaire survey, and oncologists and nurses for supporting the study.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors declareno conflicts of interest.

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