The Impact of Clinical Pharmacist-physician Communication on Reducing Drug-related Problems: a RCT in a Tertiary Teaching Hospital in Xinjiang, China

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Research Article

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Abstract

Background

The incidence of drug-related problems (DRP) has caused serious health hazards and economic burdens among poly-medicine patients. Effective communication between clinical pharmacists and physicians (CPP) has a significant impact on reducing DRPs, but evidence is poor.

Methods

A semi-structured interview was conducted to explore the communication mode between CPPs based on the interprofessional approach of the shared decision making model and Relational Coordination theory. A randomized controlled trial (RCT) was used to explore the effects of communication intervention on reducing DRPs. Logistic regression analysis was used to identify the influencing factors of communication.

Results

The mode of communication is driven by clinical pharmacists between CPPs and selectively based on different DRP types. Normally, the communication contents only cover two (33.8%) types of DRP contents or fewer (35.1%). The communication time averaged 5.8 minutes. The communication way is predominantly face-to-face (91.3%), but telephone or other online means (such as WeChat) may be preferred for urgent task or long physical distance. Among the 367 participants, 44 patients had DRPs. RCT results indicated a significant difference in DRP incidence between the control group and the intervention group after the communication intervention ($P = 0.02$), and the incidence of DRP in the intervention group was significantly reduced (15.6% vs 0.07%). Regression analysis showed that communication time had negative impact on DRP incidence ($OR = 13.22$, $p < 0.001$).

Conclusion

Face-to face communication is mainly current practiced mode between CPPs, but they communicate few contents when dealing with DRPs. Communication mode based on the interprofessional approach of the shared decision making between CPPs in medication decision-making could significantly reduce the incidence of DRP and the length of communication time is a significant factor. The longer the communication time, the fewer DRPs occur.

Trial registration:

This trial was approved by the ethics committee of The First Affiliated Hospital of Medical College of Xinjiang Shihezi University Hospital (kj2020-087-03) and registered in the China clinical trial registry (https:// www.chictr.org.cn, number ChiCTR2000035321 date: 08/08/2020).

Introduction

A drug-related problem (DRP) is defined as any undesirable event experienced by a patient that involves, or is suspected of involving drug therapy and potentially or actually interferes with the desired health outcome[1]. DRPs due to medication errors are common, including medication discrepancies (MD) between recorded treatment plans across different medical locations[2]. The unintentional MD may be a potential risk of medication errors that pose a significant threat to patient health and even endanger their lives[3, 4]. According to the World Health Organization (WHO), medication errors are a leading cause of avoidable harm within healthcare, and organizational adverse events occur in about one in every ten hospitalizations[5]. As the aging trend intensifies, older patients with chronic diseases are challenged by the complexities of poly-medicine. Polypharmacy is reported as a heightened risk factor for DRPs occurrence[6]. Midlov's study of elderly patients on multiple medications, showed on average, two medication errors in every care transition[7]. Recent studies have shown that over one-third of patients (35.9%) experience medical advice errors. Because of incomplete data sources and inadequate communication, 85% of patients' errors are due to medication history (e.g., not including aspirin on the preadmission medication list), as almost half are omitted[8]. 67% of hospitalized patients had at least one error in their prescription drug history at the time of admission[9], and 20%-87% of patients had medication discrepancies at the time of discharge[10]. Unresolved drug differences may lead to a significant increase in harmful DRPs[11].

The solution to DRP is closely related to clinical pharmacist-physician (CPP) communication. Intentional communication and collaboration between CPPs can support patients with complex medication decisions and promote better health outcomes[12, 13]. Gerardo's research showed that 90% of physicians agreed that pharmacists' recommendations are clinically helpful, and pharmacists have increased their knowledge of medications they prescribe. Physicians have emphasized the value of clinical pharmacist communication, team care, and medication management[14]. A qualitative survey in Ireland found that effective communication and interprofessional trust are essential to successful collaboration between pharmacists and other health professionals[15]. Lucian et al. proposed that intentional interactive communication between CPPs helps lower the rate of adverse drug events caused by prescribing errors. Medication reconciliation (MR) is a pharmaceutical service dedicated to reducing DRP. In this process, clinical pharmacists need to inform physicians of the types of DRP and possible adverse results and understand the basis of prescribing this drug from physicians. Effective communication can influence a consensus on medication decision-making. However, there is no standardized and effective communication plan between pharmacists and physicians on DRP, and the communication effect lacks evidentiary support[10, 16–19].

However, many DRPs are often the result of inadequate communication across healthcare providers in various departments[20]. Due to the lack of clinical information about patients, the independent and parallel working systems of medical staff, and the imbalance of authority or professional boundary friction when delivering patient care, clinical pharmacists often lack effective communication with physicians[21]. Communication methods are mainly non-face-to-face (such as by fax or telephone), and medical communication is mostly incomplete and fragmented[22]. In the process of MR, clinical pharmacists usually report only an MD list to the physician without further detailed discussions. Case noted studies in the USA found drug related-problems frequently occurred through poor communication between primary and secondary care about medication changes[23]. Although many researchers have recognized the impact of communication between CPPs on patients' medication decisions, they have not paid attention to communication details (such as communication time, communication frequency) that affect the final medication decisions and patients' health outcomes[13, 15].

Theories for understanding CPP communication

Poly-medicine patients are typically faced with complex medication decisions and require collaboration between physicians and pharmacists to support decision-making. There is a lack of information on pharmacists-physician communication and the communication factors that affect the use of medicines.

Traditional shared decision-making models are limited to the patient-physician dyad, yet care is increasingly planned and delivered through interprofessional teams[24]. France et al. proposed a model linking multiple professionals for an interprofessional approach to shared decision making (IP-SDM) in primary care. They argued that such a model could further improve the quality of care by fostering continuity in the decision-making process within the multiple components of the healthcare system[25]. Six key assumptions underlying the IP-SDM model include 1) Equipoise, which refers to a situation where a decision point with more than one option exists and for which potential benefits and harms should be weighed; 2) Exchange of information about the options relevant to the patient's health condition; 3) Values clarification by individuals involved in the decision-making process; 4) Feasibility of the options during the decision-making process; 5) Achieving consensus among all of the healthcare providers. 6) Evaluating the implementation of fidelity and health outcomes[24, 26]. Obviously, IP-SDM can make a difference in the decision-making of poly-medication in the treatment of patients, which can guide care providers to cooperate intentionally, share knowledge and decision-making.

Furthermore, Relational Coordination (RC) Theory provides us with concrete dimensions to understand the possible influencing factors in the process of cooperation and communication between CPPs. Relational Coordination is an organizational performance theory used across industries, including healthcare, that describes the management of interdependence between people and tasks[27, 28]. Cramm et al.'s study indicated that the delivery of chronic illness care was positively correlated with RC[29]. RC has seven dimensions, four of which measure the frequency, timeliness, accuracy, and problem-solving nature of communication. Three dimensions measure the degree of shared goals, shared knowledge, and mutual respectability for assessing the quality of the underlying relationships. These dimensions of communication based on RC theory are suit for understanding CPP communication.

To sum up, three research questions were put forward: (1) what is the current mode of the communication between CPPs? (2) Is the communication between CPPs effective in reducing the occurrence of DRPs? (3) What are the communication factors between CPPs affecting the occurrence of DRPs? This study aimed to use semi-structured interviews to explore the current communication mode between CPPs based on the IP-SDM model and RC theory and conduct randomized controlled trials (RCT) to explore their effects on reducing DRPs. A cross sectional study is designed to explore the impact of communication on the occurrence of DRPs.

Methods

The quantitative and qualitative methods were used in this study. A semi-structured interview was conducted to figure out the current mode of communication between CPPs. Guided by the results of qualitative study, we carried out training for clinical pharmacists based on IP-SDM before intervention. Then we conducted a single-blind RCT to evaluate the effectiveness of communication intervention between CPPs by comparing the occurrence of DRPs during medicine reconciliation. Finally, we used logistic regression analysis to analyze the influencing communication factors of DRPs.

Semi-structured Interviews

A semi-structured interview with clinical pharmacists was conducted to understand the current model of communication between CPPs.

Firstly, a total of six members of the pharmacy department were invited to participate in the interview that was conducted at their place of work. Each interview lasted about half an hour, depending on participant availability. Secondly, two researchers audio recorded the interviews of the clinical pharmacists with seven questions according to an interview outline adopted by Kathryn Mercer et al[30]. (the interview guide is available in Appendix 1) Information was collected on the subjective experiences and perceptions of clinical pharmacists, focusing on the shared decision-making way and frequencies, and the communication process between CPPs.

A thematic qualitative analysis steps are as follows: (1) interviews were transcribed verbatim; (2) core research team members read the transcripts and listened to the audios to familiarize themselves with the interviews; (3) core team members thematically coded the data; (4) the entire team thematically coded a subset of 6 interviews; (5) the team codes were used to develop a working analytic framework; (6) 2 team members recoded the data; and (7) finally, the data were stored, organized and presented to the entire team for discussion and refinement using NVIVO 12 Software.

RCT

Study settings

A randomized controlled trial was conducted between April 2020 and December 2020 at a tertiary teaching hospital in Xinjiang, China. The hospital has 1,500 beds and 2000 open beds. In 2017, there were 64,800 discharged patients and 907,200 outpatient and emergency patients. This trial was approved by the ethics committee of the surveyed Hospital (kj2020-087-03) and registered in the China clinical trial registry (www.chictr.org.cn, number ChiCTR2000035321 date: 2020/08/08). Written informed consent were obtained from all subjects.

Participants

We used PASS to calculate the recommended sample size of 375 in the intervention group and the control group according to the ratio of 1:1.5. Considering the loss of follow-up, we recruited 400 patients. Patients were recruited from chronic disease inpatient units (e.g., cardiology department, nephrology department, endocrine department, etc.) between April 2020 and December 2020. Patients were accessed for eligibility as the study flow in Fig. 1. Finally, 368 patients enrolled, and randomly assigned. One patient withdrew, leaving 367 patients in the intention to study analysis.

Blinding

The research team informed the clinical pharmacists and physicians about the grouping of each patient in the communication stage. Clinical pharmacists collected and compared the histories of patients' medication lists and the list of physicians' prescriptions on the spot, sort out and generate a list of patients' DRPs, and communicate with medical staff on unintentional medication differences.

Interventions measures

Intervention group: Before the intervention, a three-hour workshop on shared decision making was delivered in the pharmacy department, training five stages of communication based on IP-SDM (Fig. 2). Then qualified clinical pharmacists conducted the following interventions: 1) compare patient medication lists before and after admission; 2) evaluate the DRPs using up-to-date guidelines to evaluate the efficacy and safety parameters of the drugs; 3) identify and evaluate any adverse drug reactions or drug interactions by using up-to-date guidelines to assess the efficacy and safety parameters of the drugs; 4) recommend the DRP to physicians for immediate implementation; and discuss the potential solutions of DRP with physicians; and finally reach consensus on a medication decision and help patients implement the plan smoothly.

Control group

The patients received a usual pharmaceutical care provided by physicians and nurses.

Data collection

Medication information of patients

All eligible patients in the study were processed within 24 hours of admission by way of a routine medication history list collection, which was completed by clinical pharmacists. The list included patients' personal information, medication history and assessments of DRPs. Furthermore, for the intervention group, clinical pharmacists collected another list of medication after admission and evaluated the DRPs.

Outcomes of intervention

Clinical pharmacists recorded the primary outcomes measures of DRP by comparing the patient medication list from the HIS system. Researchers investigated the unplanned readmission of patients within 30 days after patients were discharged from the hospital through telephone follow-up. Secondary outcomes were the level of communicative factors including communication ways, physicians' feedback, consensus of communication, communication contents and communication time. Since the communication contents included four kinds of items (Raise medication differences or medication related issues with the physician; Provide clinicians with evidence and information about medication differences and problems; Discuss patient's medication preferences; Weighing different drug use decisions with physicians) and clinical pharmacists can choose one or more items, we set four levels to define this variable (1–4 kinds). Data was collected from the questionnaire that was available in Appendix 2.

Statistical analysis

Data were analyzed using R-4.0.0, and base data was presented as a mean or as percentages within groups. The Student's sample t test was used to evaluate the differences between continuous variables. Fisher's exact and chi-square tests were used to compare categorical data, and p-value < 0.05 was considered to be statistically significant. A binary logistic regression analysis was performed to examine the influencing factors of communication between pharmacists and physicians.

Results

The mode of communication between CPPs

We mainly focused on pharmacists' views on the way and frequency of shared decision-making with physicians, and the handling of disputes when dealing with DRPs. All the pharmacists expressed they have communicated the DRP with physicians in the medical wards frequently. However, if the physicians were busy or unavailable in the medical wards, they would choose other ways (such as phone calls or WeChat) to connect physicians later. Some pharmacists have suggested advanced software developments in the health information system to contact physicians, which could help solve the dilemma of daily attendance in the medical ward and the distance between the pharmacy department and the medical department. As for the communication frequency with physicians, pharmacists expressed that they had no regular communication frequency with physicians. If there is the need for discussing DRPs or the uncertainties of how to deal with DRPs, pharmacists would keep in touch with the physicians. Despite this, they all said they could not communicate fully and effectively in most cases.

The communication mode led by pharmacists between CPPs is selectively based on different DRP types. If the DRP was an easily identified problems such as the repetition of medicine use or the wrong frequency or way of medicine use, which are clearly defined in the instructions of medicines, the pharmacists would deal with patients directly and provide relevant medical education and proper medical suggestions for patients then relay the information to physicians. As for the problems which were not easy to identify, the pharmacists chose to discuss the DRP with physicians. But it was worthy to note that most pharmacists tried to hide the potential DRP before they discussed with physicians. When disagreement arises about DRPs, both pharmacist and physician would be required to provide evidence of their respective opinion The benefits and disadvantages of each option would be compared to decide which one should be adopted. One pharmacist said that if the DRP would not affect the overall treatment plan, he would follow the physicians' recommendations. However, if the DRP is one serious problem which would cause potential harm for the patient, he would insist on his opinion and reach the consensus based on the high evidence-based medical support.

3.2 The effect of communication intervention on DRP

Demographics characteristics of intervention and control groups were mainly 57.5% male, 70.1% high school education, nearly 80% medical insurance for urban employees, 58.5 years old. There were no significant differences in baseline characteristics between the intervention and control groups ($p > 0.05$) (Table 1). Among 367 participants, 44 patients had DRPs. RCT found that there was a significant decrease in the incidence of DRP in the intervention group compared to the control group (15.6% vs 0.07%, $p = 0.02$). However, there were no statistically significant differences in unplanned readmission ($P > 0.05$) (Table 2).

In the intervention group, the communication ways of CPPs were mostly face-to-face (91.3%), and physicians always provided feedback (98.6%). In most cases (97.2%), the two sides can reach a consensus on the solution of DRP. In addition, there were two (33.8%) or fewer (35.1%) kinds of communicational contents between CPPs, and the communication time was usually about 5.8 minutes. Univariate analyses showed that communication time and age were significantly correlated with DRP ($P < 0.001$) (Table 3). Therefore, we included these two variables into the regression model. With logistic regression analysis, it was found that communication time ($OR = 13.22$, $P < 0.001$) between CPPs was the main factor influencing the incidence of DRP in the intervention group. However, the significance of age disappeared (Table 4).

Discussion

Our study found the current mode of communication is driven by clinical pharmacists between CPPs and selectively based on different DRP types. Previous studies also highlighted the positive significance of interdisciplinary medical team collaborations led by clinical pharmacists[31, 32]. However, we found that the current mode between CPPs still has many problems. Many pharmacists said that they could not fully communicate with physicians. We consider the possible reasons: first, clinical pharmacists' participation in MR is still in its infancy in developing countries. Due to different tasks, the interaction between CPPs on drug use decisions is relatively random and nonstandard. In addition, most clinical pharmacists have not received professional training and failed to communicate effectively with physicians. This can result in the exclusion of pertinent information on DRPs. Another study suggests that interpersonal relationship (such as trust) between CPPs is also an essential factor, and physicians will be more inclined to communicate and cooperate with familiar pharmacists[33]. The application of the IP-SDM model in this study shows promising results. This model provides a standard guide for CPPs in dealing with DRP and improves the efficiency of communication.

RCT results indicated that communication between CPPs in medication decision-making could reduce the incidence of DRP. Previous studies also suggested that pharmacists' participation could reduce the incidence of medication errors[4], and our study further confirmed the positive effect of improving CPP communication. The occurrence of DRP is mainly due to physicians' inadequate knowledge of medication information or pharmacy-related knowledge. Clinical pharmacists can help physicians issue appropriate prescriptions. No significant change was observed in the other primary outcomes, 30-day unplanned readmission rates after the intervention, which was similar to the results of previous studies on MR. This may reflect a gap between reducing DRPs and the clinical outcomes of patients. A 2019 overview showed that MR failed to achieve a clear improvement in health outcomes[34]. Hawes's research reported that the intervention group showed a non-significant reduction in health services utilization[35]. Additionally, Gillespie et al. suggested that the time scale of the follow-up period (30-day mark) is too short in the usual study[36]. But in any case, the reduction of DRP will have a more favorable impact on the health of ploy-medicine patients.

Although many researchers have conducted extensive research on communication between pharmacists and patients[37], our study suggests that communication between medical service providers is also critical for providing medical services, and there are factors affecting communication between CPPs. As a cross-sector organizational performance theory, relationship coordination describes the management of interdependence between people and tasks. It provides us with a dimension to explore cross-field cooperation and measure the effectiveness of communication. Based on this, our study utilized these dimensions as independent variables to explore the factors that affect the communication between CPPs when addressing the DRP. Interestingly, logit regression results indicated that the length of communication time significantly negatively affected the occurrence of DRPs. This suggests that the longer the communication time, the fewer DRPs occur, indicating the importance of full communication between CPPs to reduce drug disparities. Aburuz et al. noted in their research that pharmacists' recommendations often lead to lower actual implementation rates due to delays in communicating DRP between health care providers, and our results are consistent with this findings[38]. Due to the different professional backgrounds, inconsistent grasp of patient information, and some objective factors (such as the geographical location of the office, the business scope of doctors and pharmacists), the communication between them is not sufficient[39]. Furthermore, we speculate that lengthening the communication time may help pharmacists feedback some potential DRPs. Previous interview results indicated that pharmacists might be hiding potential DRPs, which may due to limited communication time.

While there is a significant role for collaboration between CPPs in IP-SDM, few studies focus on the specific details of the communication process between CPPs and the related communication factors that affect outcome variables (DRPs). The results of this study provide the following enlightenment: First, we should pay attention to the influencing factors in the process of communication between CPPs, since improving the effectiveness of communication will help to improve and facilitate the outcome of MR. Second, to ensure that there is sufficient communication between CPPs, we suggest two aspects of team building and information technology support: 1) hospitals should establish a professional team including CPPs for the medication decision-making of patients with multiple drugs, conduct standardized training for professionals, clarify the division of responsibilities, and improve the work efficiency of professionals. A study reported that pharmacists completing MR had reduced physician visits and increased clinical time for other health team members[40]. 2) Establish an information-sharing electronic platform based on the interaction of patient medication information records and decision-making so as to realize the real-time sharing of MR information between CPPs and to timely and fully communicate decision-making to reach consensus.

Strengthen & Limitation

Previous studies paid more attention to the changes in clinical outcomes by pharmacist-led medication reconciliation and emphasized the importance of the role of clinical pharmacists[19]. However, few studies focus on the communication details of the collaboration between CPPs during the process of pharmaceutical care. To our knowledge, this is the first RCT study to explore the influence of communication between CPPs on DRPs based on the IP-SDM model and RC theory in China. Our research results will provide a reference in theory and practice to improve the collaboration between CPPs and improve the efficiency and value of MR.

There are several limitations in our study. First, this study is a single-center randomized controlled trial, and further multi-center randomized controlled trials are needed to verify the universality of the experimental results. In addition to the planned 30-day readmissions, we can also consider other clinical outcomes that may be affected by communication between CPPs. Third, although this study found that communication time may be a key factor, extending communication time is not necessarily the best way. Future studies should consider other factors that can improve the inadequate communication between CPPs.

Conclusion

Based on the IP-SDM model and RC Theory, this study investigated the current mode and influencing communication factors between CPPs in medication reconciliation cooperation in China and tested its communicative effect through RCTs. We found that current mode of communication is driven by clinical pharmacists between CPPs and selectively based on different DRP types. Face-to face communication is a mainly practiced, but CPPs communicate few contents when dealing with DRPs. RCT results showed that communication between CPPs in medication decision-making could reduce the incidence of DRP and the length of communication time is a significant factor. The longer the communication time, the fewer DRPs occur. This study provides the theoretical basis and practical enlightenment for the development of pharmaceutical services.

Abbreviations

Drug-related problems (DRP)

Clinical pharmacists and physicians (CPP)

Randomized controlled trial (RCT)

Medication discrepancies (MD)

Medication reconciliation (MR)

Interprofessional approach to shared decision making (IP-SDM)

Relational Coordination (RC)

Declarations

Ethics approval and consent to participate

This trial was approved by the ethics committee of The First Affiliated Hospital of Medical College of Xinjiang Shihezi UniversityHospital (kj2020-087-03) and registered in the China clinical trial registry (https:// www.chictr.org.cn, number ChiCTR2000035321 date: 08/08/2020).Written informed consent were obtained from all subjects. All methods were performed in accordance with the relevant guidelines and regulations or in accordance with the Declaration of Helsinki.

Consent for publication

Not applicable.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

Feiyang Zheng: Data Curation, Methodology, Writing-Original draft preparation, Software. Dan Wang: Conceptualization, Investigation. Xinping Zhang: Writing- Reviewing and Editing, Funding acquisition.

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Tables

Table1 Basic characteristics of patients（n=367）

Variables	Control group	Intervention group	Total	p
	n=218	n=149		
Gender (%)				0.173
Male	119 (54.6)	92 (61.7)	211 (57.5)	
Female	99 (45.4)	57 (38.3)	156 (42.5)	
Age	58.00 [51.25, 70.50]	59.00 [52.00, 71.00]		0.597
Medical Insurance (%)				0.539
Medical insurance for Urban employees	121 (77.6)	14 (73.7)	135 (77.1)	
Medical insurance for urban and rural residents	9 (5.8)	2 (10.5)	11 (6.3)	
The new rural cooperative medical insurance	3 (1.9)	1 (5.3)	4 (2.3)	
Self-paying	14 (9.0)	1 (5.3)	15 (8.6)	
Non-local medical insurance	4 (2.6)	0 (0.0)	4 (2.3)	
Individual medical insurance	5 (3.2)	1 (5.3)	6 (3.4)	
Education (%)				0.236
College or above	9 (4.2)	10 (6.8)	19 (5.2	
Some college	39 (18.1)	24 (16.2)	63 (17.3)	
High School or below	154 (71.3)	101 (68.2)	255 (70.1)	
Illiteracy	14 (6.5)	13 (8.8)	27 (7.4)	
Occupation%				0.567
Government	36 (16.7)	21 (14.3)	57 (15.7)	
Professional and technical personnel	26 (12.0)	28 (19.0)	54 (14.9)	
Service industry personnel	19 (8.8)	13 (8.8)	32 (8.8)	
Agriculture	89 (41.2)	59 (40.1)	148 (40.8)	

Production and transportation	18 (8.3)	12 (8.2)	30 (8.3)
other	28 (13.0)	14 (9.5)	42 (11.6)

Table 2 The effect of communication intervention on primary outcomes (n=367)

	Level 1	Control Group	Intervention Group	X^2	P
n		218	149		
Drug Related Problems	Yes	34	10	5.81	0.02
	No	184	139		
Unplanned Readmission within 30 Days	Yes	7	8		
	No	211	141	0.57	0.45

Table3 The univariate analysis of the intervention group on DRP (n=149)

Variables	N(mean-%)	p
Demographic variables		
Age	59	0.03*
Gender		0.65
male	92 (61.7)	
female	57 (38.3)	
Medical Insurance		0.3
medical insurance for urban employees	14 (73.7)	
medical insurance for urban and rural residents	2 (10.5)	
The new rural cooperative medical insurance	1 (5.3)	
self-paying	1 (5.3)	
non-local medical insurance	0 (0.0)	
Individual medical insurance	1 (5.3)	
Education		0.34
college or above	10 (6.8)	
some college	24 (16.2)	
high school or below	101 (68.2)	
illiteracy	13 (8.8)	
Occupation		0.64
Government	21 (14.3)	
Professional and technical personnel	28 (19.0)	
Service industry personnel	13 (8.8)	
Agriculture	59 (40.1)	
Production and transportation	12 (8.2)	
other	14 (9.5)	
Communication variables		
Communication Ways		0.56
Face to Face	136(91.3)	
Phone/WeChat	13(8.7)	

Physicians’ Feedback		1
Yes	143(98.6)	
No	4(2.8)	
Consensus of Communication		0.38
Yes	141(97.2)	
No	4(2.8)	
Communication Contents		0.77
One Kind	52(35.1)	
Two Kinds	50(33.8)	
Three Kinds	34(23.0)	
Four Kinds	12(8.1)	
Communication Time(minutes)	5.80(3.35)	<0.001*

Table4 Logistic analysis of the influence of communication intervention on DRP (n=149)

Variables	B	Wald	OR (95%CI)	P
Communication time	-0.95	20.78	0.39 (0.25, 0.56)	<0.001
Age	-0.05	2.23	0.95(0.88,1.01)	0.13

Figures

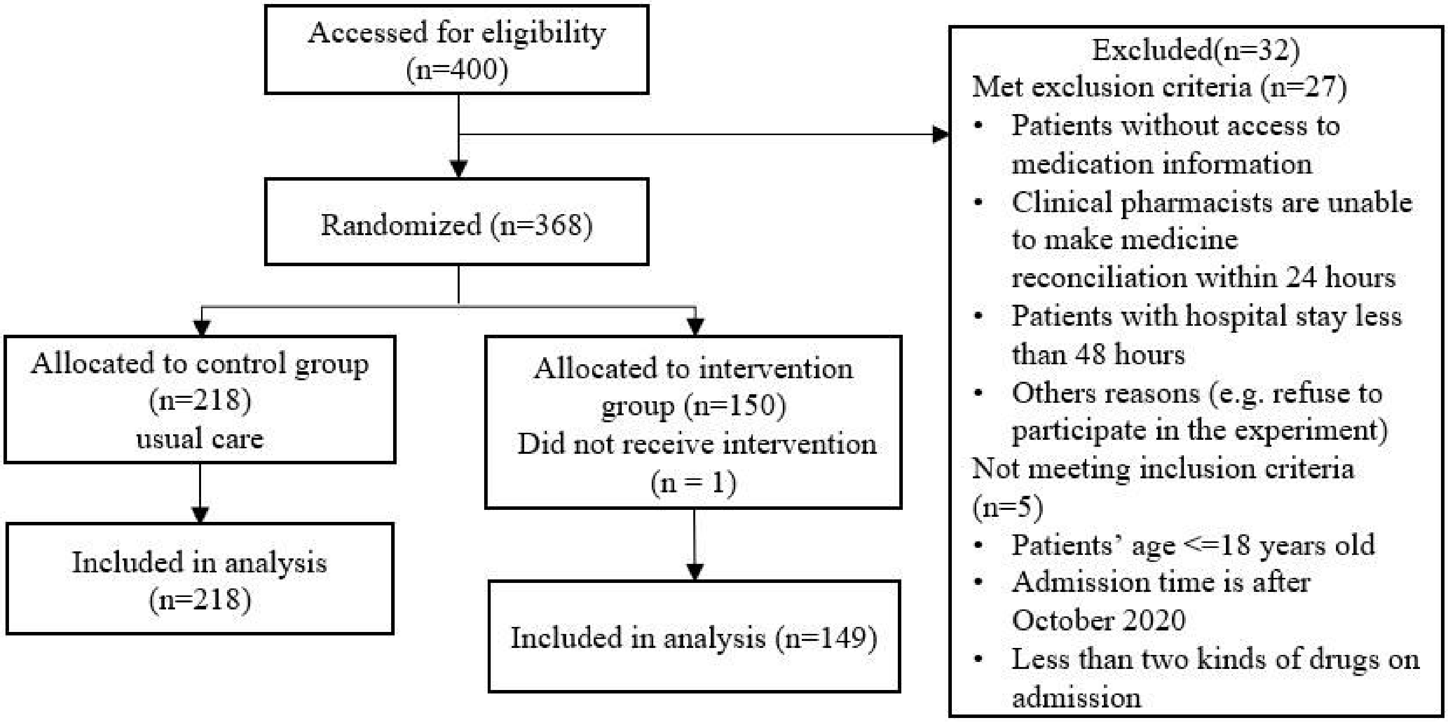

Figure 1 study flow diagram

Figure 1

See image above for figure legend

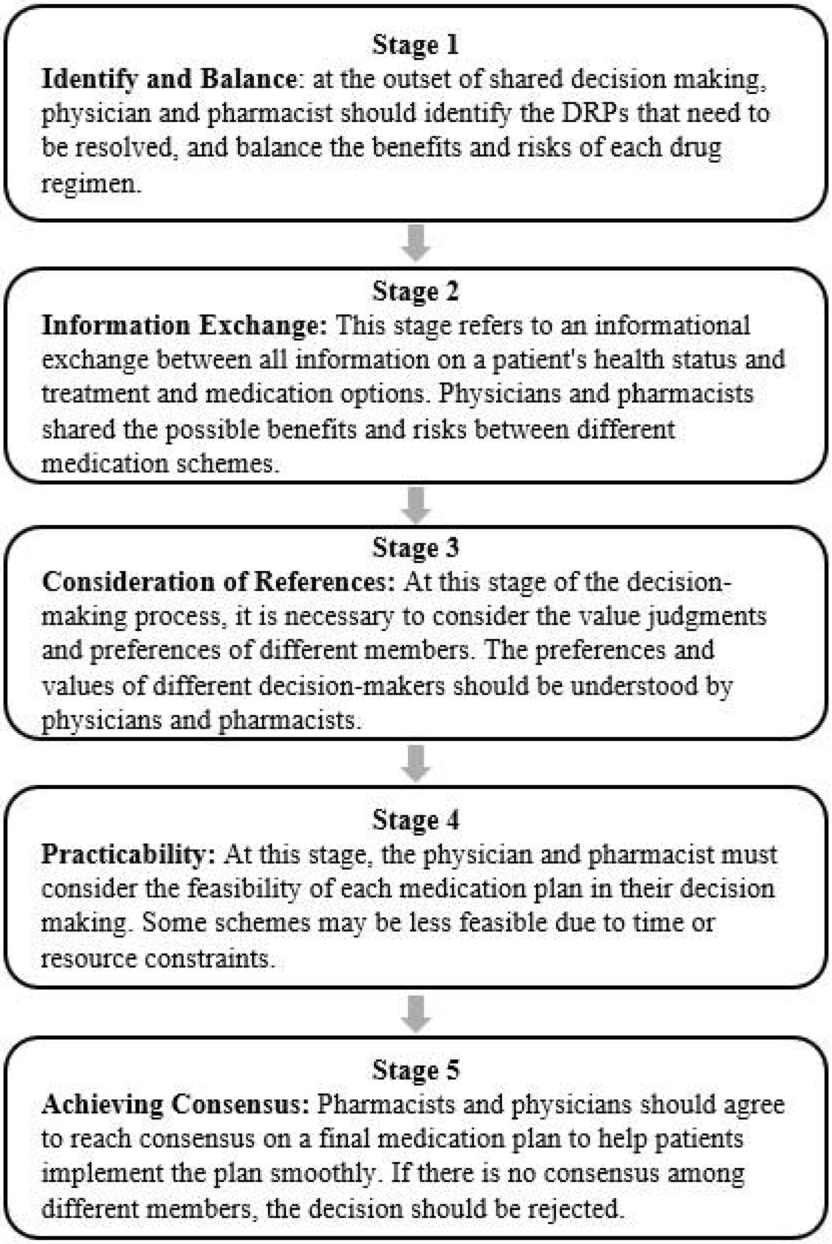

Figure 2 five stages of IP-SDM

Figure 2

See image above for figure legend

Supplementary Files

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- Appendix1.docx
- Appendix2.docx