




BMJ Open Qualitative study on the problems and potential solution strategies for part-time clinical pharmacists' clinical services work in a tertiary hospital in China

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ABSTRACT

Objective To provide an initial understanding of problems and potential solution strategies for part-time clinical pharmacist work in China, and provide references for the training of part-time clinical pharmacists.

Methods The study was conducted in a tertiary teaching hospital in China, and the project lasted 6 months. Phenomenological methods were used to guide the research design. Research data were obtained by conducting one-to-one semistructured interviews with part-time clinical pharmacists, and interview data were coded and analysed through thematic analysis.

Results A total of 21 pharmacists were interviewed in a semistructured manner, and the results showed that following problems exist in the work of part-time clinical pharmacists: the existing professional knowledge is not adequate to meet the demands of clinical service; the career orientation of part-time clinical pharmacists is not clear; lack of professional self-confidence in clinical pharmacy practice; there is no suitable entry point to carry out pharmacy service work; it is difficult to communicate effectively, and for in addition, 17 potential solution strategies are proposed for the current problems, which can provide reference for the development of part-time clinical pharmacists' work.

Conclusions The work performed by part-time clinical pharmacists is currently immature and the strategies derived from this study may serve as potential solutions to resolve the part-time clinical pharmacy practice challenges.

INTRODUCTION

Since the implementation of the clinical pharmacist system in China, the role of clinical pharmacists is gaining more and more recognition and acknowledgement in promoting rational clinical use of and safeguarding patient access to medication.^{1 2} A systematic review showed that clinical pharmacists play an important role in antimicrobial management, chronic disease state management and multidimensional clinical pharmaceutical

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The strength of this study lies in the use of a qualitative method. This approach can fully tap the work practice and psychological experience of part-time clinical pharmacists, and the findings are highly practical.
- ⇒ Based on the rootedness theory, this study tapped into the influencing factors in the current work process of part-time clinical pharmacists and preliminarily explored potential solutions to the problem, which can provide some lessons for other healthcare organisations to carry out this work.
- ⇒ The study was conducted in a large teaching hospital, and the results may be suitable for large teaching hospitals and less applicable to primary hospitals.

services at present in China.³ Clinical pharmacists are becoming an integral part of the healthcare team with their ability to improve patient outcomes and save on healthcare costs.⁴ Many medical institutions, especially teaching hospitals, take clinical pharmacists as an important member of the medical team or multidisciplinary treatment group.⁵⁻⁸ Due to China's large population base and ageing society, there is a huge demand for clinical pharmacy services.⁹ However, due to the late start of clinical pharmacy in China, the numbers and services of clinical pharmacists are far from meeting the demand.^{10 11} There is a huge difference in developed countries, where clinical pharmacy has developed into an independent discipline, and become an important part of hospital inpatient monitoring.^{4 12} In view of the huge difference between developed countries, there is an urgent need to explore a new suitable clinical pharmacy model for the current situation in China.



Given the current development status of hospital pharmacy in China, a large-scale expansion of the clinical pharmacist team in a short period of time is not feasible.¹³ Chinese hospital pharmacists are mainly engaged in the dispensing of medicines. However, they are required to have an educational background in pharmacy and to pass the appropriate qualification exams so they have a better background in basic pharmacy knowledge. The results of our previous study showed that the hospital pharmacists played an important professional value in the treatment of COVID-19 patients and affirmed by other healthcare professionals in China.^{14 15} Hospital pharmacists have the foundation and scenario to transform into part-time clinical pharmacists, this may be an important measure to solve the serious shortage of clinical pharmacists' size. The results of a cross-sectional study in China showed that most hospital pharmacists have the desire to transform into clinical pharmacists.^{1 16} Hospital pharmacists could combine drug dispensing security with clinical pharmacy service, which is more convenient to serve patients. Therefore, many domestic teaching hospitals have started to try the systematic transformation of hospital pharmacists.¹⁷⁻¹⁹ However, the transformation of hospital pharmacists into part-time clinical pharmacists is still in the exploration stage in China, and there is a lack of exploration of what problems part-time clinical pharmacists face in this process and how to make systematic improvements, which restricts the continuous optimisation of the work. Therefore, we conducted a qualitative study based on the transition practice of hospital pharmacists in a large teaching hospital in central China and explored the current problems and potential solutions to carry out clinical pharmacy services for part-time clinical pharmacists.

METHODS

A part-time clinical pharmacist is defined as hospital pharmacist engaged in the dispensing of medicines, who use their free time to carry out clinical pharmacy services while completing their normal work of ensuring the supply of medications. The study was conducted at the First Affiliated Hospital of Zhengzhou University (the largest teaching hospital in China), currently, 65 part-time clinical pharmacists routinely provide pharmacy services in the clinic.

Study population

A purposive sampling method²⁰ and typical case sampling method²¹ were used to select participants. At present, the work of part-time clinical pharmacists has not formed a system, and only a few large-scale teaching hospitals have carried out this pilot work in China. The First Affiliated Hospital of Zhengzhou University has been one of the earliest hospitals in China to start this innovative work since 2016, and it has accumulated rich experience with the problems and the corresponding solution strategies in carrying out the part-time clinical pharmacist pilot work. Therefore, this study we took the First Affiliated

Hospital of Zhengzhou University as the sampling object and adopted the principle of purposive sampling to select the participants who worked in the hospital. To guarantee the representativeness of the research subjects, the inclusion criteria for pharmacists as interviewees were as follows: (1) were engaged or had been engaged in part-time clinical pharmacy work for more than 3 months and (2) were willing to participate in the study and signed a written informed consent. Exclusion of those unwilling to sign an informed consent form or to undergo an audio-recorded interview.

Data collection

The study used exploratory qualitative methods to conduct a one-on-one semistructured interview from June 2022 to December 2022. Combined with the purpose and topic of this study, through discussions within our research group, consultation with clinical pharmacy administrators and full-time clinical pharmacists. Ultimately, we initially identified the main questions of the interview: (1) What problems have you encountered while working as a part-time clinical pharmacist? (2) In response to the current problems, what aspects of preparation or what measures do you think can solve them? The study began with preinterviews with four part-time clinical pharmacists and further revising and refining the interview outline with the results of the preinterviews (see online supplemental materials S1 for the formal interview outline).

Each interview lasted approximately 35 min and was recorded in do-not-disturb mode via a smartphone or other recording device. Before conducting the formal interviews, the researcher first introduces the purpose of this study so that the respondents can understand the direction and facilitate the development of the subsequent in-depth interviews. Each interview was carried out by 2-3 members of the research team, with one main interviewer and 1-2 recorders to record the key information in the process. The main interviewer meets the following criteria: (1) received more than 3 months of qualitative research training, (2) participated in more than 3 projects of qualitative research practice and (3) passed the assessment to be able to conduct research independently. The interview process and text transcription were conducted in standard Chinese Mandarin.

Basic information about the participants was collected, including gender, academic background and clinical pharmacy training experience used paper questionnaires. Although we designed the interview outline in advance, the participants' responses determined the exact flow and order of the discussion. Interviewers checked participants in real time during the interview to ensure that they understood the participants' views and opinions. The recordings were transcribed into text by the research assistant within 24 hours after the interviews were completed, then the reviewed information was returned to the interviewee for further verification of the content and the interviewees' identifying information was removed at the end of the interview.

Qualitative analysis

Thematic analysis is commonly used to assess participants' perspectives and identify similarities and differences in responses, creating a rich description of the data.²² This study used thematic analysis to identify, analyse, organise, describe and report themes guided by the social constructivism theory. The first interview data were first reviewed independently by four members of the research team (including two with extensive experience in qualitative methods) and a preliminary coding was developed using comparison and consensus, then each interview profile was independently coded by two separate research team members using this coding. The codebook was collaboratively reviewed and refined as new codes emerged or existing codes required clarification. Codes were iteratively grouped into themes. Thematic saturation was reached when the codes managed new data without further modification. All transcripts were independently recoded by two members of the research team once the codebook was finalised. Any discrepancies in coding were discussed until a consensus was reached. To ensure that the study was trustworthy, the following considerations were made: (1) The principal investigators of the project (XJ, ZY and WZ) received a qualitative study training programme offered by Peking University, and the other participants participated in the in-house training of the research project; (2) the text transcriptions were returned to the interviewees to confirm the authenticity and completeness of the content and (3) two members of the subject group independently conducted the same data to refine the themes and subthemes, and the themes were further summarised through collective discussions in the research group. Finally, the research themes and typical questions were recorded in standard English and sent back to the participants for further confirmation to ensure that the information was correct. Data were reported under the guidance of the Consolidated Criteria for Reporting Qualitative Studies checklist (online supplemental material S2)²³ and Standards for Reporting Qualitative Research checklist (online supplemental material S3).²⁴

Patient and public involvement

Patients and the public were not involved in the production of the present research.

RESULTS

The included part-time clinical pharmacists were recruited through the Part-Time Clinical Pharmacist Pilot Programme at the First Affiliated Hospital of Zhengzhou University, and all participating pharmacists were proactive in participating as part-time clinical pharmacists. A total of 21 of them were finally included in this study, 85.7% of them were female, the highest education level was master's degree, the time spent in part-time clinical pharmacist work was mainly 1–3 years and only 3 of them had participated in clinical pharmacist training

Table 1 Basic information of the participants

Item	Number (%)
Age (year)	
26–30	2 (9.5)
31–35	16 (76.2)
36–40	3 (14.3)
Gender	
Female	18 (85.7)
Male	3 (14.3)
Academic level	
Master	16 (76.2)
Undergraduate	5 (23.8)
Engaged in part-time clinical	
≤1 year	4 (19.0)
1–3 years	14 (66.7)
>3 years	3 (14.3)
Part-time clinical pharmacist days per month	
≤4 days	2 (9.5)
4–10 days	13 (61.9)
>10 days	6 (28.6)
Pharmacists trained in clinical pharmacist programmes*	3 (14.3)
Major	
Clinical pharmacy	4 (19.0)
Other disciplines of pharmacy	17 (81.0)

*Represents the number of included part-time clinical pharmacists who have received full-time clinical training (training programme for full-time clinical pharmacist qualification in china).

programmes (training programme for full-time clinical pharmacist qualification in China), details are shown in table 1.

Problems of part-time clinical pharmacists engaged in clinical pharmacy services

Problem 1: the existing professional knowledge is not adequate to meet the demands of clinical service

Although part-time clinical pharmacists have a good educational background in basic pharmacy, however, they generally lack training in clinical practice skills. Therefore, pharmacists' knowledge of disease mastery and comprehensive clinical application of drugs is relatively scarce. They are unable to use a systematic clinical thinking model to carry out pharmacy service work.

P4: When I go to the clinic, I feel that the knowledge I have mastered is not comprehensive enough, and it is difficult to discuss complex medication problems with doctors at my current level.

P8: I am not familiar with the diagnosis, testing and treatment of common clinical diseases, and I do not



know how to integrate my pharmacy knowledge with clinical needs.

P10: I do not have a clear understanding of the treatment process of patients, and I am unable to make a clear understanding of the patient's medication.

P14: Some of what we know is from the guidelines or literature, but what the doctor needs to solve is more practical, and the actual application may still be different from the guidelines.

P19: The same patient may have many diseases and complications at the same time, and the patient's nutritional problems and psychological problems are also considered in clinical treatment, which require comprehensive judgment, but none of these elements are in the pharmacist's knowledge system.

Problem 2: the career orientation of part-time clinical pharmacists is not clear

Because the main work of part-time clinical pharmacists is still focused on securing drug supply, clinical pharmacy services are often suspended due to the need to participate in medication reconciliation efforts, and the work content of part-time clinical pharmacists lacks unified standards. The clinical orientation of part-time clinical pharmacists is unclear, resulting in a lack of clear professional orientation by themselves, doctors, nurses and patients, and a generally low sense of professional identity, which urgently needs to be further strengthened.

P9: I do not know what work should actively carry out when I go to the clinic.....

P7: we need to explain our work content repeatedly and continuously with doctors and nurses, and the working hours of part-time clinical pharmacists are not fixed, so the work lacks continuity.

P13: When I first went to the clinic, the clinicians had high expectations of the pharmacist's career and thought that all drug-related problems were more professional. However, the professional competence of pharmacists is not sufficient for complex medication problems.

P10: Patients do not understand the part-time clinical pharmacist profession and are not clear about what aspects of the pharmacist can provide help to them, and some patients even think that the pharmacist is just here to sell drugs.

P3: Other hospital pharmacists do not see the feedback of part-time clinical pharmacists and think that it is easy and idle to work in clinical pharmacy.

Problem 3: lack of professional self-confidence in clinical pharmacy practice

Part-time clinical pharmacists generally lack professional self-confidence in both the preparation and working periods of clinical pharmacy services. This is mainly reflected in the fear of unknown clinical problems, lack of confidence in their current knowledge structure,

anxiety about communication between other healthcare professionals and patients, and lack of professional identity. Thus, they are unable to achieve the expected effect.

Preparation period

P3: During the preparation process of getting ready to work as a part-time clinical pharmacist, I was in a very apprehensive state of mind, always worrying that I wouldn't be able to answer most of the questions posed by the doctors, and that I would feel a little bit humiliated.

P11: I was more worried and scared before I had to go to the clinic, and I was afraid that I would feel especially embarrassed by the doctor's difficult questions.

P7: I am not confident in my professional knowledge and I am afraid that I will not be able to answer the doctor's in-depth questions about clinical issues.

Working period

P15: After I went there, I really felt that I was not worthy of the job. I felt that my ability was too poor....."

P16: The director of the clinical department raised a problem today I have not yet solved, and then the next day raised a problem, and then there will be a lot of questions every day, and the fear is increasing day by day, which will bring a huge invisible pressure on myself.

Problem 4: lack of appropriate entry points for clinical service

Part-time clinical pharmacists are all transformed from hospital pharmacists and have no experience in patient pharmacy services. Therefore, they have not formed a fixed working pattern in China so far. In terms of working hours, there is a need to collaborate on drug dispensing and clinical pharmacy service. In terms of work style, there is no suitable work entry point for service delivery. This is not conducive to the development of the part-time clinical pharmacist career and the continuous improvement of the team.

P13: I am not very familiar with clinical pharmacy service work, so I am very confused to find a suitable work status and appropriate work entry point.

P15: I was unfamiliar with clinical pharmacy services and felt overwhelmed with work.

P17: When I first came to the clinic, I had to find an entry point..... I feel it is quite difficult to let us assist in carrying out some of the work.

P18: There is no fixed clinical work time, often because of the busy pharmacy work, the clinical services are canceled, so that clinicians feel that we do not pay attention to bedside work.

Problem 5: lack of communication skills and difficulty in effective communication with doctors, nurses and patients

Part-time clinical pharmacists lack clinical practice experience and are generally not trained in communication skills. Therefore, they are unable to communicate

effectively when carrying out clinical pharmacy services. Thus, the expected effect of pharmacy services could not be achieved, and there is an urgent need to strengthen the training of pharmacists' communication skills in the future.

P12: I often don't dare to think about my own ideas and express my own opinions.

P13: Some patients may be heavily ill and may not be in a good mood, so I worry about how to communicate with them.

P15: I think the most difficult thing is communication and exchange..... I don't know what to say, how to communicate and cooperate.

P19: Some patients are not highly educated..... they need to repeat it again and again. I don't know what other communication skills can solve these problems.

Potential strategies to solve the current problems

By systematically organising and summarising the qualitative study data of 21 part-time clinical pharmacists, a total

of 17 potential solution strategies were obtained. Strategies 1–6 are potential solution strategies for 'problem 1'; strategies 7–8 are potential solution strategies for 'problem 2'; strategies 9–10 are potential solution strategies for 'problem 3'; strategies 11–15 are potential solution strategies for 'problem 4' and strategies 16–17 are potential solution strategies for 'problem 5'. We summarised the frequency of these strategies among the respondents, and found that 'strategy 10—increase introductory training in clinical pharmacy services', 'strategy 16—develop communication skills and methods training' and 'strategy 9—increase the service teaching of experienced clinical pharmacists' were the top three solution strategies, and the detailed solution strategies are shown in [table 2](#).

DISCUSSION

As far as we know, this study is one of the earliest studies to explore the work of part-time clinical pharmacists in China. The results revealed five major problems in the

Table 2 Results of potential solution strategies for difficulties faced by part-time clinical pharmacists

Problems with the work	Strategy number	Potential solution strategies	Frequency (%)
Problem 1: the existing of expertise is not adequate to meet the demands of clinical service work	Strategy 1	Learning about the diagnosis, treatment and disease management of common clinical diseases	17 (80.95)
	Strategy 2	Learn the guidelines for the treatment of common diseases	15 (71.43)
	Strategy 3	Organise and learn commonly used therapeutic drugs in advance according to the disease characteristics of the service department	9 (42.86)
	Strategy 4	Read patient cases in the department to develop clinical thinking	6 (28.57)
	Strategy 5	Rotation training in various clinical departments	3 (14.29)
	Strategy 6	Conduct evidence-based clinical practice training and develop evidence-based thinking for solving clinical problems	4 (19.05)
Problem 2: unclear professional orientation of part-time clinical pharmacists	Strategy 7	Accumulate and summarise the daily work problems and gradually develop the characteristic clinical pharmacy service contents.	5 (23.81)
	Strategy 8	Establish pharmacy service team work mode	5 (23.81)
Problem 3: lack of professional self-confidence	Strategy 9	Increase the teaching of experienced clinical pharmacists	18 (85.71)
	Strategy 10	Increase introductory training for clinical pharmacy service work	21 (100)
Problem 4: lack of appropriate entry points for pharmacy service delivery	Strategy 11	Take drug dispensing service extension as an entry point and integrate into clinical teams	10 (47.6)
	Strategy 12	Use clinical research collaboration as an entry point for pharmacy services	2 (9.52)
	Strategy 13	To carry out pharmacy services with the entry point of precise drug use and individualised drug use	5 (23.81)
	Strategy 14	To carry out pharmacy services with the rational application of national key monitored drugs as the entry point	4 (19.05)
	Strategy 15	Carry out pharmacy services with the entry point of systematic prescription review and improving the rate of rational clinical drug use	4 (19.05)
Problem 5: lack of communication skills	Strategy 16	Conduct training on communication skills and methods to develop pharmacists' communication skills	19 (90.48)
	Strategy 17	Take the initiative to communicate with clinicians and explore new modes of collaboration between doctors, nurses and patients	1 (4.76)

work of part-time clinical pharmacists in China: the existing professional knowledge is not adequate to meet the needs of clinical services; the unclear professional orientation of part-time clinical pharmacists; lack of professional self-confidence; lack of appropriate entry points for pharmacy service delivery and lack of communication skills. 17 potential solution strategies were explored through this study, which can provide a reference for systematic training of part-time clinical pharmacists.

This study showed that the current existing professional knowledge of part-time clinical pharmacists cannot meet the work demands of clinical services. Since the implementation of the clinical pharmacist system in China since 2017, the training of clinical pharmacists has been classified as a national scarce talent training programme,^{5 25 26} and training programmes for clinical pharmacists have started to emerge in China. There are training programmes led by government health departments and specialty associations, all of which aim to improve the clinical service capabilities of pharmacists through a 6-month to 1-year training effort.^{27–29} However, the focus of part-time clinical pharmacists' daily work is still ensuring the supply of medicines, lack of sufficient time to guarantee large-scale training. Therefore, part-time clinical pharmacists lack clinical practice sessions and are generally not competent for clinical pharmacy services. In response to the reality, the potential solution strategies obtained from this study are more suitable for the large-scale professional transformation of hospital pharmacists. Strategies 1–4 emphasise the importance of pharmacists undertaking self-directed learning related to their profession. Previous studies have also shown that self-directed learning in various forms is conducive to the establishment of pharmacists' knowledge system and the enhancement of their job competencies.^{30 31} Strategy 5 emphasises clinical rotation learning to develop pharmacists' clinical thinking and familiarity with common diseases and medicines in the department, and strategy 6 emphasises the importance of training pharmacists in evidence-based thinking to provide problem-solving ideas for subsequent pharmacists when they encounter clinical problems. Overall, these six potential solution strategies are more suitable for the actual work of hospital pharmacists, more operable and implementable and can provide important references for the competency development of part-time clinical pharmacists.

This study showed that part-time clinical pharmacists lack professional self-confidence both before and during the work of clinical pharmacy services. The negative psychology arose from fear of the unknown professional environment, fear of social interaction in the process of direct pharmacy services and most importantly, pharmacists were not confident in their professional abilities and worried about their inability to perform the work of clinical pharmacy services and the resulting professional disapproval. These similar problems also existed during the development of full-time clinical pharmacists in China.^{1 32} Both strategy 7 and strategy 8 emphasised

the importance of increasing pharmacist mentoring and introductory training. In the future, before part-time clinical pharmacists carry out pharmacy services, they can increase the clinical practice tutoring of full-time clinical pharmacists in their own units so that pharmacists can accumulate certain clinical practice experience, and then gradually transition to independent pharmacy service work. This can increase the professional self-confidence of part-time clinical pharmacists.

This study shows that part-time clinical pharmacists have a poor career orientation, and they need to balance the drug dispensing and clinical pharmacy service. The formation of professional orientation is a process of long-term friction and exploration, so focusing on accumulating and summarising problems in daily work, gradually forming their own professional expertise, forming professional complementarity with medical and nursing, and establishing a pharmacy service team work model to jointly carry out collaborative pharmacy services may be an important potential strategy to solve this problem.

The results of this study show that part-time clinical pharmacists currently lack a fixed working model and do not have a suitable entry point to carry out pharmacy service work. Our findings suggest that the clinical pharmacy services can be individualised by combining the pharmacist's own knowledge structure, professional expertise and the pharmacy service needs of the clinical department as well as the characteristics of the patients in the department. Initially, one or more of the strategies 11–15 presented in this study, drug dispensing service extension, scientific research collaboration, individualised medication use, monitoring of key drugs or feedback on problematic medical prescriptions, can be used as an entry point.

The results of this study show that part-time clinical pharmacists generally lack communication skills and have difficulty in communicating effectively with doctors, nurses and patients. As part-time clinical pharmacists work mainly in the drug dispensing room, they have relatively little professional communication with patients and doctors and nurses, and they do not understand the traditional physician–nurse collaboration model so they lack the relevant communication skills and have miscommunication. Good communication skills are one of the core competencies of pharmacists to be able to perform pharmacy services³³ so strengthening the training of pharmacists' communication skills is an important prerequisite for pharmacists to carry out quality pharmacy services, and several previous studies have emphasised the importance of this.^{34–36} Therefore, it is necessary to strengthen the training of pharmacists' communication skills and methods through a variety of forms, and in addition, it is necessary to play the subjective initiative of the pharmacists, take the initiative to communicate with the clinic and clarify the department's pharmacy service needs.

Future pharmacy departments can apply a combination of the 17 potential solution strategies proposed in this study when developing part-time clinical pharmacists.

Strategies 1–4, 7 and 17 all emphasise the subjective initiative of part-time clinical pharmacists. It is recommended to be listed as a self-improvement component for pharmacists, which can be assigned as a self-learning programme or an assessment programme; Strategies 5–6 emphasise the importance of clinical practice. Pharmacy departments can collaborate with healthcare administration to establish part-time clinical pharmacist practice departments, to develop pharmacists' clinical practice skills and evidence-based thinking patterns; Strategies 8–10 and 16 can be achieved through the harmonisation of training programmes by pharmacy departments. Reasonable arrangement of professional tutoring by full-time clinical pharmacists and the construction of pharmacist service teams are realised; strategies 11–15 provide entry points for part-time clinical pharmacists to carry out pharmacy service work. Part-time clinical pharmacists can combine the current work status of the clinical departments they serve to establish the direction of the pharmacist's work priorities, first identifying a few of them as priorities to carry out and then gradually improving to form a work system.

The limitations of the study are as follows: (1) As this study was an exploratory study, only pharmacists from a large teaching hospital were included as subjects, which may make the content of the study more suitable for large teaching hospitals and less applicable to primary hospitals; (2) Most of the subjects included in this study were female, which corresponds to the current male-to-female ratio of pharmacists in Chinese hospitals, but the impact of gender on the research questions could not be explored and (3) Since English is not our native language and we conducted the study in Chinese Standard Mandarin, some of the content may not be expressed in a particularly artistic way during the translation and transcription process.

CONCLUSION

Chinese part-time clinical pharmacists have problems with poor communication skills, lack of professional competency and scattered work patterns in the process of carrying out clinical pharmacy services. The coping strategies proposed in this study may respond to the current problems to some extent, and future research strategies need to be incorporated into the core training system of part-time clinical pharmacists to further improve the professional competency of part-time clinical pharmacists.

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SUPPLEMENTARY MATERIALS

S1--Interview outline

1. What difficulties or challenges have you encountered in the process of moving from the drug dispensing office to clinical pharmacy services?

- 1.1 Difficulties and challenges in collaborating with physicians professionally
- 1.2 Difficulties and challenges in collaborating with nurses
- 1.3 Difficulties and challenges faced in the process of patient pharmacy services
- 1.4 Difficulties and challenges faced in collaboration with pharmacy pharmacists
- 1.5 Difficulties and challenges faced in self-adaptation to new positions

2. In response to the current problems in your work, what aspects of preparation or what measures do you think can solve these problems? The following questions were selected for in-depth interviews.

- 2.1 How to solve the difficulties and challenges of professional collaboration with physicians
- 2.2 How to solve the difficulties and challenges of collaborating with nurses
- 2.3 How to solve the difficulties and challenges faced by patients in the process of pharmacy services
- 2.4 How to solve the difficulties and challenges of collaboration with pharmacy pharmacists
- 2.5 How to solve the difficulties and challenges faced by self-adaptation to new positions

S2--COREQ for reporting qualitative studies

The checklist of the research

Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

No Item	Guide questions/description	Answers
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Xuedong Jia and Zhao Yin
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	MD (Zhao Yin) or MD (Xuedong Jia)
3. Occupation	What was their occupation at the time of the study?	Pharmacist
4. Gender	Was the researcher male or female?	Male (Xuedong Jia) and Male (Zhao Yin)
5. Experience and training	What experience or training did the researcher have?	Theoretical training and experience of conducting several qualitative studies with other groups.
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	Yes
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Reasons for doing the research
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Reasons and interests in the research topic
Domain 2: study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Phenomenology.
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Purposive and convenience.
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Face-to-face interview
12. Sample size	How many participants were in the study?	21
13. Non-participation	How many people refused to participate or dropped out? Reasons?	No
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Workplace.
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	No
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Yes, demographic data.
Data collection		

17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Yes
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No
19. Audio/visual	Did the research use audio or visual recording to collect the data?	Audio recording
20. Field notes	Were field notes made during and/or after the interview or focus group?	Yes
21. Duration	What was the duration of the interviews or focus group?	Approximately 35 minutes
22. Data saturation	Was data saturation discussed?	Yes
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	Yes
Domain 3: analysis and findingsz		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two
25. Description of the coding tree	Did authors provide a description of the coding tree?	No
26. Derivation of themes	Were themes identified in advance or derived from the data?	Yes
27. Software	What software, if applicable, was used to manage the data?	Not applicable
28. Participant checking	Did participants provide feedback on the findings?	Yes
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	Yes
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Yes
31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Yes

S3-- SPQR checklist

Item 1. Title: Concise description of the nature and topic of the study. Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended.

Answer: Yes. Stated in page 1, lines 1-3.

Item 2. Abstract: Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions.

Answer: Yes. Stated in pages 1, lines 13-27.

Item 3. Problem Formulation: Description and significance of the problem /phenomenon studied; review of relevant theory and empirical work; problem statement.

Answer: Yes. Stated in page 3, lines 70-76.

Item 4. Purpose or research question: Purpose of the study and specific objectives or questions.

Answer: Yes. Stated in page 4, lines 105-108.

Item 5. Qualitative approach and research paradigm: Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., post-positivist, constructivist/interpretivist) is also recommended; rationale

Answer: Yes. Stated in page 5, lines 132-134.

Item 6. Researcher characteristics and reflexivity: Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and/or transferability.

Answer: None.

Item 7. Context: Setting/site and salient contextual factors; rationale.

Answer: Yes. Stated in page 3-4, lines 89-95.

Item 8. Sampling strategy: How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale.

Answer: Yes. Stated in page 4, lines 96-100.

Item 9. Ethical issues pertaining to human subjects: Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues.

Answer: Yes. Stated in page 5, lines 141-143.

Item 10. Data collection methods: Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process,

triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale.

Answer: Yes. Stated in page 3, lines 84-86.

Item 11. Data collection instruments and technologies: Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study.

Answer: Yes. Stated in page 4, lines 107-111.

Item 12. Units of study: Number and relevant characteristics of participants, documents, or events included in the study; level of participation.

Answer: Yes. Stated in page 6, lines 160-166. Detailed information of participants is shown in Table 1.

Item 13. Data processing: Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding and anonymization / de-identification of excerpts

Answer: Yes. Stated in page 5, lines 131-150.

Item 14. Data analysis: Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale.

Answer: Yes. Stated in page 5, lines 131-132.

Item 15. Techniques to enhance trustworthiness: Techniques to enhance trustworthiness and credibility of data analysis, (e.g., member checking, triangulation, audit trail); rationale

Answer: Yes. Stated in page 5-6, lines 142-153.

Item 16. Synthesis and interpretation: Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory.

Answer: None.

Item 17. Links to empirical data: Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings.

Answer: Yes. Stated in "Results" section.

Item 18. Integration with prior work, implications, transferability, and contribution(s) to the field: Short summary of main findings, explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field.

Answer: Yes. Stated in "Discussion" section.

Item 19. Limitations: Trustworthiness and limitations of findings

[Answer: Yes. Stated in page 12, lines 358-365.](#)

Item 20. Conflicts of interest: Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed.

[Answer: Yes. Stated in page 13, line 386.](#)

Item 21. Funding: Sources of funding and other support; role of funders in data collection, interpretation, and reporting.

[Answer: Yes. Stated in page 13, line 388-389.](#)