

Correlation Between Patients' Medication Adherence and Their Psychological Contract with Hospital Pharmacists

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Objective: To investigate the correlation between patients' medication adherence and their psychological contract with hospital pharmacists under the background of the pharmacist-patient relationship, providing a reference for improving the pharmacist-patient relationship and the patients' medication adherence based on the patients' psychological contract with the hospital pharmacists.

Materials and Methods: Some of the patients who received medication dispensing service at the outpatient pharmacies at the First Affiliated Hospital of Zunyi Medical University and the Second Affiliated Hospital of Zunyi Medical University were included and investigated as follows: 320 patients were included through the convenient sampling method for psychological contract and medication adherence questionnaire survey with the self-designed scales for patients' psychological contract with the hospital pharmacists and their medication adherence. SPSS 17.0 was used for reliability and validity testing, correlation analysis, and multiple linear regression analysis.

Results: The average score of the psychological contract was 3.80 ± 0.59 . The average score of the patients' medication adherence was 2.93 ± 0.70 . The patients' psychological contract with the pharmacists and its dimensions (the responsibility of competence, the responsibility of service, and the responsibility of humanistic care) were positively correlated with medication adherence ($P < 0.05$). The results of the multiple linear regression analysis showed that the effect of patients' psychological contract with the pharmacists on medication adherence was statistically significant ($P < 0.05$).

Conclusion: Outpatients' psychological contract with the pharmacists is positively correlated with their medication adherence. Maintaining the patients' psychological contract with the pharmacists may be an effective way to improve medication adherence.

Keywords: psychological contract, medication adherence, the relationship between pharmacists and patients

Introduction

The pharmacist-patient relationship in medical institutions is a type of service relationship between the hospital pharmacists and the patients.¹ With the development of the economic society and the continuous advancement of the reform of the medical system, the professional function of hospital pharmacists is no longer just drug dispensing, but further participation in clinical treatment and providing pharmaceutical care.²⁻⁴ The good medication adherence of patients is the logical starting point and main content of rational drug use. Improving

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medication adherence is an important issue for pharmacy administration in medical institutions and research on rational drug use. Hospital pharmacists are not only providers of drugs but also the main supervisors of patients in rational drug use. Particularly, the hospital pharmacists play an increasingly important role in improving medication adherence, the role of which includes assessing medication adherence, identifying predisposing factors, providing consultations, and recommending targeted medication adherence strategies. The patients' medication adherence is inevitably correlated with the performance of pharmacists,^{5,6} while it may also be dominated by their own social and psychological factors. Some pharmacists fail to fulfill the responsibilities expected by patients, resulting in patients' dissatisfaction with the attitude and behavior of pharmacists in pharmaceutical service, which may exert an adverse effect on the medication adherence of patients.⁷ The examples of pharmacists failing to fulfill the responsibilities expected by patients include insufficient professional abilities of pharmacists, improper communication between pharmacists and patients, and lack of humanistic care and service awareness of pharmacists, especially in less developed countries or regions. Psychological contract theory emphasizes the mutual recognition of their responsibilities and the understanding of each other's obligations between the responsible parties. The doctor-patient psychological contract and the nurse-patient psychological contract are referred to construct the psychological contract between pharmacists and patients. Under this psychological contract, the responsibilities that patients expect pharmacists to fulfill include the responsibility of competence, the responsibility of service, and the responsibility of humanistic care. In this article, based on the psychological contract theory, an empirical study was conducted to investigate the correlation between patients' psychological contract with hospital pharmacists and their medication adherence under the background of the pharmacist-patient relationship.⁸

Materials and Methods

Data Collection

A questionnaire survey was carried out on patients included through a convenient sampling method in the outpatient pharmacies at the First Affiliated Hospital of Zunyi Medical University and the Second Affiliated

Hospital of Zunyi Medical University from November to December in 2019. The survey sites are all class A tertiary hospitals. We only focused our questionnaire survey on outpatients in this study. In China, the outpatient pharmacies in most hospitals are usually divided into the pharmacies for the western medicines and the traditional Chinese medicines. As the dispensing service for the traditional Chinese medicine is only found in China and some small parts of other countries and our research involved the universal topic of medication adherence, to make the research more targeted, specific and having reference significance for other countries or regions, the research subjects were limited to outpatients in western medicine pharmacies. Patients' inclusion criteria include: voluntarily participated in this study; received medication dispensing service at the outpatient pharmacies for western medicine; had basic skills in understanding written language and oral communication.

Self-Designed Scale

The self-designed scales for patients' psychological contract to hospital pharmacists and for patients' medication adherence were formed as below: the preliminary scale was compiled referring to the relevant literature of theories,⁹⁻¹¹ 20 patients in the outpatient pharmacies for western medicine were interviewed and some items of the preliminary scale were corrected and improved based on the patient's interview content;^{12,13} Experts in relevant fields were invited to review and repeatedly modify the scale; and a pre-investigation was carried out to check the reliability and validity of the scales.^{14,15}

Psychological Contract Scale

The psychological contract scale consists of seven questions inquiring about the fulfillment of the responsibilities of the pharmacists' attitude and behavior related to the pharmaceutical service in the patients' perception (see Table 1 for the items included in this study). There are seven items in three dimensions including the responsibility of competence, the responsibility of service, and the responsibility of humanistic care. The responsibility of competence means the professional ability of pharmacists in pharmaceutical services. The responsibility of service represents the proper service attitude and behavior of pharmacists towards patients. The responsibility of humanistic care indicates a pharmacist treating different patients equally and showing respect to the personalities and privacies of all patients. Participants were asked to indicate

Table 1 Scale for Patients' Psychological Contract with Pharmacists

Dimensions	In the Following Description, What Do You Think of the Performance of Pharmacists in Fulfilling Their Responsibilities?
The responsibility of competence	1. The pharmacist checks and reviews the prescription carefully. 2. The pharmacist dispenses the medicine accurately. 3. The pharmacist provides accurate medication instructions (usage, dosage, contraindications, etc.).
The responsibility of service	4. The pharmacist are reasonable, gentle, and smiling when providing services. 5. The pharmacist answers my questions patiently.
The responsibility of humanistic care	6. The pharmacist treats patients equally and protects patients' privacy (seldom asks private questions). 7. The pharmacist respects the patients' right to know and choice in drug treatment.

Note: 5-point Likert scale.

their own opinion on a 5-point Likert scale (1: not fulfilled 2: fulfilled a small part 3: fulfilled half 4: fulfilled most 5: fulfilled all; higher scores indicate better psychological contracts). Answers to the seven questions were averaged to provide a score with a reasonable level of internal consistency. Exploratory factor analysis and reliability test were used, Cronbach's α was 0.726, and KMO was 0.815, while P of Bartlett's sphericity test was 0.000, which indicates that the reliability and validity of the scale were qualified.

Medication Adherence Scale

The medication adherence scale consists of six questions inquiring about different adherence behaviors and reasons (see [Table 2](#) for the items included in this study). There are six items in two dimensions of behaviors of stopping taking medicine and obstacles of medication adherence. The behaviors of stopping taking medicine include the patient's discontinuation of the medicine due to adverse reactions, improvement of symptoms, and other objective reasons, while the obstacles of medication adherence include forgetting, self-adjusting medication dosage, and so on, which can be related mainly to subjective reasons. Participants were asked to indicate their behavior on a 5-point Likert scale (1: always 2: often 3: sometimes 4:

Table 2 Scale for Medication Adherence

Dimensions	In the Following Description, Please Select the Answer that Matches Your Situation.
The behavior of stopping taking medicine	1. Stop taking the medicine on your own, because the side effects of the medicine or the symptoms of the disease are exacerbated. 2. Stop taking the medicine on your own, because you think the medication is not effective or the treatment is not good for you. 3. Stop taking the medicine on your own, because the symptoms have improved.
The obstacle of medication adherence	4. Have you ever forgotten to take medicine? 5. Adjust the dosage of the medicine without discussing with your doctor or pharmacist. 6. When you go out, do you forget to take your medicine with you?

Note: 5-point Likert scale.

occasionally 5: never; higher scores indicate better medication adherence). Answers to the six questions were averaged to provide a score with a reasonable level of internal consistency, with higher scores representing better adherence. Exploratory factor analysis and reliability test were used and the results with Cronbach's α of 0.667 with KMO of 0.777 and P of Bartlett's sphericity test of 0.000 indicated that the scale was qualified with its reliability and validity.

Statistical Analysis

The results of the questionnaires were input into Excel and the data were imported from Excel into SPSS 17.0 for statistical analysis. Exploratory factor analysis and reliability testing were used to test the reliability and validity of the scales. The frequency, mean, and standard deviation in descriptive statistics were used to estimate the degree of dispersion and distribution of data. Correlation analysis was used to evaluate the correlation between the dimensions of the psychological contract and the dimensions of the medication adherence. By taking demographic data and the dimensions of the psychological contract as independent variables and medication adherence as dependent variables, the multiple linear regression analysis was used to investigate whether there are linear relationships. Data were expressed as mean \pm standard

Table 3 Participant Demographics (N=277)

Variables	Demographic Characteristics	n (%)
Gender	Male	112 (40.43)
	Female	165 (59.57)
Age	≤30	36 (13.00)
	30–40	115 (41.52)
	40–50	104 (37.55)
	≥50	22 (7.94)
Education level	High school and below	139 (50.18)
	Undergraduate or junior college	126 (45.49)
	Master degree and above	12 (4.33)

deviation. The confidence level of the analysis was $\alpha = 0.05$.

Results

Sample Characteristics

A total of 320 paper questionnaires were distributed. After excluding invalid questionnaires, 277 valid questionnaires were recovered, with an effective recovery rate of 86.56%. Some main demographic data of the participated patients in the valid questionnaires are listed in Table 3.

Scores of the Psychological Contract and the Medication Adherence

The frequency distribution of each item in the psychological contract and medication adherence scale is shown in Tables 4 and 5. The average score of the psychological contract was 3.80 ± 0.59 . The average score of the patients' medication adherence was 2.93 ± 0.70 . The average score of the responsibility of competence was slightly higher than that of the responsibility of service and the responsibility of humanistic care. The average score of the behavior of stopping taking medicine was slightly higher than that of the obstacle of medication adherence. A higher score means a better patients' psychological contract to the hospital pharmacists or a better patients' medication adherence. The results show that most of the responsibilities of hospital pharmacists in the patients' perceptions were fulfilled, while the patients' medication adherence was generally poor (Table 6).^{16,17}

Correlation Between Psychological Contract and Medication Adherence

According to the Pearson correlation analysis, the correlation coefficient between psychological contract and medication adherence was 0.540 ($P < 0.01$). There was a positive

Table 4 Frequency Distribution for Psychological Contract Scale

Items	1	2	3	4	5
1. The pharmacist checks and reviews the prescription carefully.	6 (2.2)	16 (5.8)	58 (20.9)	126 (45.5)	71 (25.6)
2. The pharmacist dispenses the medicine accurately.	3 (1.1)	24 (8.7)	63 (22.7)	116 (41.9)	71 (25.6)
3. The pharmacist provides accurate medication instructions (usage, dosage, contraindications, etc.).	3 (1.1)	28 (10.1)	55 (19.9)	117 (42.2)	74 (26.7)
4. The pharmacist are reasonable, gentle, and smiling when providing services.	0 (0.0)	19 (6.9)	75 (27.1)	103 (37.2)	80 (28.9)
5. The pharmacist answers my questions patiently.	5 (1.8)	24 (8.7)	77 (27.8)	122 (44.0)	49 (17.7)
6. The pharmacist treats patients equally and protects patients' privacy (seldom asks private questions).	5 (1.8)	30 (10.8)	64 (23.1)	111 (40.1)	67 (24.2)
7. The pharmacist respects the patients' right to know and choose in drug treatment.	4 (1.4)	26 (9.4)	63 (22.7)	109 (39.4)	75 (27.1)

Table 5 Frequency Distribution for Medication Adherence Scale

Items	1	2	3	4	5
1. Stop taking the medicine on your own, because the side effects of the medicine or the symptoms of the disease are exacerbated.	33 (11.9)	65 (23.5)	93 (33.6)	53 (19.1)	33 (11.9)
2. Stop taking the medicine on your own, because you think the medication is not effective or the treatment is not good for you.	39 (14.1)	66 (23.8)	97 (35.0)	53 (19.1)	22 (7.9)
3. Stop taking the medicine on your own, because the symptoms have improved.	19 (6.9)	50 (18.1)	105 (37.9)	71 (25.6)	32 (11.6)
4. Have you ever forgotten to take medicine?	22 (7.9)	74 (26.7)	106 (38.3)	59 (21.3)	16 (5.8)
5. Adjust the dosage of the medicine without discussing with your doctor or pharmacist.	49 (17.7)	58 (20.9)	90 (32.5)	45 (16.2)	35 (12.6)
6. When you go out, do you forget to take your medicine with you?	44 (15.9)	60 (21.7)	99 (35.7)	39 (14.1)	35 (12.6)

Table 6 Scores for Dimensions of the Scale

Scales	Dimensions	Mean \pm SD
Psychological contract	The responsibility of competence	3.84 \pm 0.68
	The responsibility of service	3.78 \pm 0.71
	The responsibility of humanistic care	3.78 \pm 0.83
Medication adherence	The behavior of stopping taking medicine	2.99 \pm 0.81
	The obstacle of medication adherence	2.87 \pm 0.83

correlation between the dimensions of psychological contract and the dimensions of medication adherence (Table 7).

Factors Related to the Patients' Medication Adherence

With different gender, age and education levels of the patients, the responsibility of competence, the responsibility of service, and the responsibility of humanistic care as independent variables, while medication adherence as a dependent variable, multiple linear regression analysis was performed to determine the factors related to the

patients' medication adherence. A multiple linear regression equation was established with the R-square value of 0.309. Gender, age, and educational levels had no significant effect on medication adherence ($P>0.05$). All the three dimensions of the psychological contract, the responsibility of competence, the responsibility of service, and the responsibility of humanistic care, had significant effects on patients' medication adherence ($P<0.05$) (Table 8). Among them, the responsibility of competence is the strongest predictor of medication adherence.

Discussion

Medication adherence is one of the keys to the success of drug treatment and can be affected by many factors. It is of great importance to find effective interventions to resolve the non-adherence problem in drug treatment. The researchers have suggested that social demographic, psychological, and clinical factors all can have an impact on medication adherence.^{18,19} A recent systematic review showed that pharmacist-led interventions have a positive effect on patients' medication adherence.²⁰ From this, we infer that patients' psychological factors associated with the

Table 7 Results of Correlation Analysis

	The Behavior of Stopping Taking Medicine	The Obstacle of Medication Adherence	Medication Adherence
The responsibility of competence	0.398**	0.402**	0.468**
The responsibility of service	0.358**	0.412**	0.451**
The responsibility of humanistic care	0.346**	0.303**	0.379**

Note: ** $P<0.01$.

Table 8 Results of Multi-Factor Linear Regression Analysis Influencing Medication Adherence

Independent Variable	Unstandardized Coefficient		Standardized Coefficient	t	P	95% Confidence Interval for B	
	B	Standard Error	Beta			Lower Limit	Upper Limit
Constant	0.478	0.310		1.543	0.124	-0.132	1.088
Gender	0.000	0.073	0.000	-0.005	0.996	-0.144	0.144
Age	-0.062	0.045	-0.071	-1.371	0.172	-0.150	0.027
Education level	0.037	0.063	0.031	0.595	0.552	-0.086	0.161
The responsibility of competence	0.290	0.065	0.279	4.447	0.000	0.162	0.418
The responsibility of service	0.274	0.058	0.278	4.754	0.000	0.160	0.387
The responsibility of humanistic care	0.104	0.052	0.123	1.047	0.047	0.001	0.208

pharmacists may play an important role in patients' medication adherence and that it is possible to improve patients' medication adherence through maintaining or improving the patients' psychological contract with pharmacists.

The international general scales for medication adherence, such as MARS²¹ and SEAMS,²² usually cover a wider range and have relatively more items for the investigation in an outpatient atmosphere. We ever tried to use the famous Morisky adherence scale directly at first.²³ However, the reliability and validity tests of the Morisky adherence scale in our pre-survey were unsatisfactory and some items in the scale were not applicable for the outpatients who participated in the research. The outpatients only have a short period of time from picking up medicine to leaving the hospital and they are usually reluctant to cooperate and participate in the questionnaire. Too many, too long or too specific questions in questionnaire items may make the outpatients receiving on-site investigations shortly before or after receiving pharmaceutical services at a loss. Based on the existing scales, especially the Morisky adherence scale, the items of the self-designed scale for medication adherence of outpatients in this research were designed with some necessary revision for the sake of the investigation to be more feasible and more adapt to specific situations of the outpatients, while the reliability and validity of the scale were both qualified.

Although the pharmacists–patients relationship is one of the main research topics in the field of pharmacy administration in medical institutions and the psychological contract can be used as an important perspective and means to study the pharmacists–patients relationship,^{24–26} there are no any related scales in patients' psychological contract to pharmacists, according to all the reports we can get at present. Based on the previous research, we designed the scale for outpatients' psychological contract to hospital pharmacists referring to the core content of the doctor–patient psychological contract scale and the nurse–patient psychological contract scale and also addressed the specific situation of patients receiving drug dispensing service at the outpatient atmosphere in hospital. Although the service targets are all patients, pharmacists, doctors, and nurses have different job content and different responsibilities and obligations. Therefore, the patients' perceptions and expectations to pharmacists are different from those to doctors and nurses. The responsibility of treatment and the responsibility of the transaction in the doctor–patient psychological contract and the responsibility of

nursing in the nurse–patient psychological contract cannot be fully and directly applied to the pharmacist–patient psychological contract. Therefore, we designed the items and dimensions focusing on pharmaceutical service according to the pharmacist's responsibilities and the pharmacist–patient relationship.

It can be seen from the results that the average score on the patient's psychological contract to pharmacists was relatively high. This not only showed that patients were basically satisfied with the fulfillment of various responsibilities of pharmacists but also reflected that most pharmacists had a certain awareness of the responsibilities they should fulfill and can put into action. However, the psychological contract scores still had certain room to improve, which means that hospital outpatient pharmacists still need to make further efforts in humanistic care, service attitude, and professional skills to meet the growing expectations of patients for pharmaceutical services. In terms of professional capabilities, pharmacists should actively improve their pharmacy service capabilities by enhancing basic and learning cutting-edge pharmacy knowledge to make patients trust the pharmacists and have confidence in the medication plan; In terms of service attitude and behavior, pharmacists should have a spirit of service and dedication in order to improve communication with patients to avoid disputes and give patients a good service experience while ensuring work efficiency; In terms of humanistic care, pharmacists should understand and respect patients with empathy to further promote the construction and development of a healthy pharmacist–patient relationship. The average score of the patient's medication adherence was relatively low. The patient's medication adherence can be affected by a variety of subjective and objective factors.^{27,28} Actively exploring and strengthening the management and intervention of medication adherence is the eternal mission and the task of clinical rational medication management.²⁹

The results of correlation analysis and multiple linear regression analysis indicated that there was a positive correlation between the patients' psychological contract with the hospital pharmacists and their medication adherence. The patient's psychological contract with the pharmacists can affect the patient's medication adherence, and each dimension of the patient's psychological contract with the pharmacists had a significant positive correlation with the medication adherence. That is, the higher the score of patients' psychological contract with the pharmacists, the higher the patient's medication adherence. The better the

pharmacists' responsibility of competence in the patients' perception fulfilled by the pharmacists, the easier for the patients to accept and implement the medication guidance from the pharmacists, because the professionalism of the pharmacists may be the most convincing factor in patients' adherence to medication. The better the pharmacists' responsibility of service in the patients' perception being fulfilled by the pharmacists means that the pharmacists show a better attitude and behavior to the patients in the pharmaceutical service, which can give the patients a good impression on the pharmacists and are willing to follow the medication instructions. While the pharmacist's responsibility of humanistic care in the patients' perception fulfilled by the pharmacists means that the patient is respected and understood by the pharmacists with empathy, which can make the patients consciously implement drug treatment plans, thereby effectively improving medication adherence. The reason why the score of responsibility of competence is higher than the other dimensions is as mentioned above – high level of professional competence means a guarantee of medication safety for the patients. Compared with service attitude and behavior and humanistic care, patients tend to trust the pharmacists with professionalism and high level of professional competence and follow their medication guidance, because these competent pharmacists have effectively responded to their key concerns about medication. Therefore, by investigating and understanding the psychological contract status of the patients to the pharmacists in time and actively maintaining or improving the patients' psychological contract to the pharmacists through purposeful patient education and targeted improvement of hospital pharmacists' pharmacy services according to patients' psychological needs, it will be expectable to build a harmonious relationship between the patients and the pharmacists and to improve the patients' medication adherence effectively.³⁰

The medical industry needs to continuously improve the service awareness of medical personnel and build service-oriented medical institutions. Pharmacists need to enhance the fulfillment of relevant responsibilities and improve the quality of pharmaceutical services.³¹ Continuing education and training can strengthen the psychological skills of pharmacists and communication skills between pharmacists and patients.³² The hospital pharmacists should strive to enhance communications with different kinds of patients and fulfill patients' expectations based on respecting and taking care of patients. Patients

also need to actively cooperate with the hospital pharmacists.³³ Relevant departments can strengthen education and publicity on the rational use of drugs by patients to improve patients' sense of responsibility.^{34,35} The mutual understanding and mutual respect between the hospital pharmacists and patients may be a key point for improving the patients' medication adherence.

Limitations and Considerations of Future Research

The current research has some limitations and needs to be considered in future research. First, the survey sites are all class A tertiary hospitals, which may make the results biased. Because the outpatients' psychological contract with pharmacists in different grades of hospitals may be different, while the degree to which pharmacists affect the adherence of outpatients may also be different. Subsequent studies should carry out stratified sampling of hospitals of different grades to analyze the effect of the patients' psychological contract with the pharmacist on their medication adherence under different medical conditions. Secondly, outpatients have relatively large population mobility, and it is difficult to carry out follow-up studies. The follow-up qualitative research should be carried out on the basis of quantitative research to enrich the connotation of the research and implement the guiding role of the research in practice. Finally, in this study, the patient's sensitive information and demographic data were not collected sufficiently, such as the patient's income, disease type, medication type, and medication beliefs, which may affect the results of the study.³⁶ This study is only a study of the current status and relevance of psychological contract and medication adherence of patients with limited samples. Follow-up studies may be considered to investigate the potential mechanisms of psychological contract interventions on medication adherence.

Conclusion

The outpatients' psychological contract with the hospital pharmacists was significantly positively correlated with their medication adherence. Maintaining the patients' psychological contract with the pharmacists can effectively improve patients' medication adherence and promote the harmonious development of the pharmacist–patient relationship. Relevant governmental departments and medical institutions should pay attention to the maintenance of the

psychological contract between hospital pharmacists and patients.

Ethical Approval

The study was approved by the Medical Ethics Committee of Zunyi Medical University, China (ZMCER2018-1-153) and conducted in accordance with the Declaration of Helsinki. Through the explanation letter at the front of the questionnaire and the explanation work at the investigation site, all the patients involved in the investigation clearly understood the purpose of the study. Participation in the study was voluntary and anonymous. Written or verbal informed consent was obtained (Most of the participants provided written informed consents, and only a small part of participants who cannot read or write provided verbal informed consents, which was approved by the Medical Ethics Committee of Zunyi Medical University).

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Disclosure

The authors report no conflicts of interest in this work.

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