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Study on the Influence of Pharmaceutical Intervention on Patients with Type 2 Diabetes Mellitus

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Abstract

Objective to explore the effect of pharmaceutical intervention on patients with type 2 diabetes mellitus. Methods 100 patients with type 2 diabetes mellitus admitted to a hospital from March 2020 to March 2021 were selected as research objects, and 100 patients were randomly divided into intervention group and control group, with 50 cases in each group. Patients in the control group were treated with conventional treatment mode, while patients in the intervention group were treated with pharmaceutical intervention mode. The blood glucose control level, medication compliance, medication deviation, incidence of adverse drug events and patient satisfaction were taken as evaluation indexes. Results the fasting blood glucose (7.13 ± 1. 12 mmol/L) and postprandial blood glucose (10.11 ± 1. 51 mmol/L) in the intervention group were significantly lower than those in the control group (10.12 ± 1. 23 mmol/L) and postprandial blood glucose (12.95 ± 2. 11 mmol/L), with statistical significance (P < 0.05); The medication compliance rate of patients in the intervention group (90.0%) was significantly higher than that of patients in the control group (30.0%), with statistical significance (P < 0.05); The deviation rate of medication in the intervention group (14.0%) was significantly lower than that in the control group (48.0%), which was statistically significant (P < 0.05); The adverse drug reaction rate in the intervention group (10.0%) was significantly lower than that in the control group (30.0%), with statistical significance (P < 0.05); The nursing satisfaction rate of patients in the intervention group (98.0%) was significantly higher than that in the control group (80.0%), and the difference was statistically significant (P < 0.05). Conclusion the application of pharmaceutical intervention in patients with type 2 diabetes mellitus, it can reduce the blood sugar level of diabetic patients, increase the drug compliance of patients, reduce drug deviation and adverse drug reactions, and improve the satisfaction of patients. It can make diabetic patients have safety and rationality when using drugs, and has significant clinical guiding significance.

Keywords: pharmaceutical intervention; Type 2 diabetes mellitus; Blood sugar; Compliance; Adverse reactions

1. Introduction

Diabetes mellitus is a disease caused by metabolic problems, which is mainly caused by the lack of secretion and function of insulin by the body. In clinical physiological symptoms, blood sugar gradually increases during the onset of patients [1]. Diabetic patients will suffer from chronic progressive diseases such as eyes, kidneys, nerves and blood vessels [2]. Due to the improvement of people's living standards and changes in the surrounding environment, the incidence rate of diabetic patients in China is increasing year by year, accompanied by complications in various systems. In addition, the prevalence rate and mortality rate of diabetic patients are affected by the age, urban and rural areas and course of disease. The cost of hospitalization for diabetic patients accounts for a large part, especially due to the increase of living cost, the treatment of complications caused by diabetes will bring great economic pressure to diabetic patients [4-6]. Therefore, how to effectively treat diabetic patients and reduce the cost in the treatment process has always been a hot topic for scholars. In order to control the collective blood sugar level and complications produced by various systems of the body, coordinated treatment of different drugs is usually required, and many patients take drugs to control the development of diseases [7]. Therefore, in the process of treating diabetic patients, it is very important for patients to know the use of drugs, the time of taking drugs and the possible side effects after taking drugs. If the patient does not have enough knowledge, in other words, if the pharmaceutical intervention work will

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be implemented, then the patient lacks a scientific and comprehensive understanding of his own state, thus making them mistakenly believe in false propaganda in the society, which may directly affect the progress of the patient's medication or even worsen the diabetes condition [8]. However, clinical pharmacists should publicize the necessity of pharmacological intervention and actively carry out pharmacological services to promote the rational use of drugs. This article mainly takes patients with type 2 diabetes as the research object, and explores the effects of pharmaceutical intervention on medication compliance, adverse reaction incidence, medication deviation, blood sugar control and patient satisfaction of patients with type 2 diabetes, in order to provide certain theoretical guidance for clinical treatment of patients with type 2 diabetes.

2. Literature Review

Huang Qiping et al. (2019) observed the medication compliance of 368 outpatients. After pharmacist intervention (drug consultation and medication guidance), the medication compliance of the patients was higher than that of the control group (94.02% and 87.5%, respectively), with significant difference (P < p.05). Lang Yi et al. (2018) provided pharmaceutical care to 51 type 2 diabetes patients with poor compliance and poor control of glycosylated hemoglobin (3 times of face-to-face service, drug history establishment and telephone consultation). After 12 weeks, the compliance increased from (48.3 ± 25.6) % to (95.9 ± 8.2) %, and glycosylated hemoglobin decreased from (7.8 ± 1.3) % to (7.21.1) % (P < 0.05). Li Xiaojing et al. (2020) l studied 60 patients with diabetes after discharge. Pharmacists instructed 30 patients to take medication at home, and regularly provided services in the form of telephone, interview and teaching. Half a year later, medication compliance increased from 66.7% to 90.0%, glycosylated hemoglobin decreased from ((7.102.73) % to ((6.18 ± 0.89) %, while control group compliance increased from 70.0% to 76.7%, Glycosylated hemoglobin changed from (6.18 ± 2.59) % to (6.6411.19) % (P < 0.05).

The above research shows that pharmacists' pharmaceutical care for patients can improve the medication compliance of patients and the effect of drug treatment. But at present, the experimental design about the influence of pharmacists on patients' medication is not rigorous enough in China. For example, some studies have no controlled trials, some studies have no requirements for patients' inclusion, and some studies lack compliance evaluation criteria, which affect the accuracy of the results.

In many foreign hospitals, pharmacists are able to enter the clinic, supervise the medication of patients, and share the clinical drug treatment work with doctors. The role of clinical pharmacists in the health of patients with chronic diseases, including diabetes, in the United States

Health care has played an important role in health care. Horning (2018) and others studied 411 patients in six long-term care institutions, who suffered from diabetes, coronary heart disease, stroke, heart failure, hypertension, hyperlipidemia, osteoporosis and other seven diseases. Among them, 107 received consulting services provided by pharmacists, who focused on disease state management (DSM) of these patients, and 304 received traditional drug treatment (DRR). The results showed that in the treatment of four diseases, DSM patients were better than DRR patients in improving the compliance of clinical practice guideline (CPG) (P < 0.05). The compliance of antiplatelet drugs was 89.7% (71.0% in the control group), and the control rate of HbA1c < 7% was 86.2% (62.0% in the control group).

Al Rashed et al. (2019) studied 43 elderly patients with an average age of 80.2 years before discharge (40 cases in the control group, with an average age of 81.8 years). The contents of pharmacists' service included "hospitalization summary, drug prompt card, information of drug effects and adverse reactions, importance of compliance and harm of too much or too little dosage". This will improve the understanding and compliance of patients (P < 0.01) and reduce the rate of unplanned visits and readmission (P < 0.05). After 2-3 weeks and 3 months of discharge, the compliance of pharmacists increased from 48% to 70% (P < 0.001), consolidating the improved results.

3. Research Objects and Methods

3.1 Research Subjects

According to questionnaire survey method, 100 patients with type 2 diabetes admitted to a hospital from March 2020 to March 2021 were selected as research objects, and 100 patients were randomly divided into intervention group and control group, with 50 cases in each group. In the control group, there were 30 males and 20 females, aged from 45 to 70 years, with an average of (50.81 1.22) years. The course of disease was from 1 to 13 years, with an average of (5.13 ± 1. 03) years. In the intervention group, there were 32 male patients and 18 female patients, aged from 44 to 71 years, with an average of (51.51 1.12) years. The course of disease ranged from 1 to 13 years, with an average of (4.91 ± 1. 21) years. There was no significant difference in age, sex and course of disease

between the two groups (P > 0.05), which was comparable.

Inclusion criteria: ① Meet the diagnostic requirements of WHO for type 2 diabetes, that is, the patient's condition is relatively stable, has good consciousness, can express well, and has a certain understanding of his own condition; ② The hospitalization records of the patients were relatively completed, and the data of fasting and 2h postprandial blood glucose of the patients were recorded at the same time; (3) Can independently complete the survey questionnaire; ④ Understand the purpose of this study and voluntarily sign the informed consent form.

Exclusion criteria: ① the patient has organ function problems, mental abnormalities, physical allergy and other malignant diseases at the same time; (2) The patient suffers from other types of diabetes besides type 2 diabetes; (3) Incomplete hospitalization records of patients and lack of blood glucose monitoring data; ④ Patients are unwilling to join the study; ⑤ the questionnaire of patients is incomplete.

3.2 Research methodology

Patients in the control group adopted the conventional treatment mode, that is, clinicians made ward rounds on time, prescribed therapeutic drugs according to the patient's condition, and clinical nursing nurses took drugs to patients according to the medication time. The patients in the intervention group adopted the treatment mode of pharmaceutical intervention, that is, clinical pharmacists participated in medical ward rounds and carried out pharmaceutical ward rounds, reviewed medication orders, carried out pharmaceutical care, and guided patients to use drugs according to their basic conditions and the inspection results after hospitalization. At the same time, drug consultation was conducted to answer the questions raised by patients on the spot. Pharmaceutical intervention mainly includes the following measures.

3.2. 1 Review of doctor's orders

According to the guiding principles of clinical application of medication for patients with type 2 diabetes mellitus, the clinical pathway, clinical diagnosis guidelines and drug instructions of patients are reviewed by doctors' orders, including whether the drug selection is sufficient, whether there are contraindications, the dosage, time, route, time and combination of medication. The doctor's order review also includes a separate drug treatment plan: whether gender, age, heart function, liver function, kidney function, gastrointestinal function, patient's economic endurance, psychological factors, etc. are taken into account in the medication. Due to the worsening of diabetes, this will lead to renal function metabolism problems in diabetic patients, and at the same time, side effects will occur when taking some drugs, such as antidepressants, insulin, -endophthalamines, etc. Liver is an important metabolic organ of human body. When liver function is poor, drug metabolism will be affected and poisoning may be caused. The presence of congestion in the patient's digestive tract will slow down the absorption of drugs by the patient's body. Patients with edema will use oral drugs to consider whether they will affect drug absorption. Patients with cardiovascular diseases and cardiac function NYHA3 and 4 may increase the risk of cardiovascular diseases when they take antidepressants together with insulin [9-10].

3.2. 2 Pharmaceutical care

After the initial treatment plan for the patient was determined, the patient entered the treatment process and the clinical pharmacist began to carry out drug control. First of all, the drug monitoring plan is formulated, including the order of taking drugs and whether the time of taking drugs is in accordance with the doctor's advice, whether there are special requirements, whether there are special reactions in the administration process, clinical indicators that need to be observed after administration, and how to prevent, diagnose and treat patients with type 2 diabetes. When specific diabetic patients are involved, special attention should be paid to the time of oral administration of drugs, insulin injection methods and time, and methods of controlling drugs, common, rare and serious adverse reactions, drug-drug and food-drug interactions. In addition, it is planned to implement the monitoring plan for patients by monitoring drug intake, communicating with patients and reading relevant indicators, evaluate the effectiveness of treatment, and analyze and find potential drug problems in time. For critically ill patients and key patients, pharmaceutical care can determine whether the treatment is correct or not and prevent potential risks. Pharmaceutical care can be reflected in medical calendar, ward round log and work summary [11-12].

3.2. 3 Medication education

3.2. 3.1 Individualized treatment

At the current medical level, diabetes is still an incurable disease, and most diabetic patients rely on drugs to treat this disease all their lives. Diabetes treatment programs include comprehensive treatment measures, such as nutrition control,

rational exercise, glucose monitoring, diabetes self-control education and anti-sugar drugs. Intervention is the basic therapy for the treatment of type 2 diabetes, and the treatment of diabetes and exercise therapy are the main measures to control hyperglycemia. Train each patient who enters the group to adjust their lifestyle and tell them the control goals they must achieve. In the short term, the goal of treatment is to control diabetes and prevent serious metabolic complications. In the long run, chronic complications can be prevented through good metabolic control to improve the quality of life and prolong the life of diabetic patients. The goal of diabetes control follows the principle of individuation, especially for the elderly over 60 years old, who can relax the treatment goal appropriately [13].

Eat properly. Control the intake of total calories, balance the daily intake of nutrients, fat does not exceed 30% of total calories, and avoid eating high-calorie foods corresponding to vegetable oil; Carbohydrate accounts for 50% of the total. Foods containing cellulose should be eaten more at ordinary times, while protein intake is limited to 1.0 g/kg, while salt addition limit for milk, eggs, lean meat, fish and other foods is within 6g/day, while foods with low salt content should be the first choice.

Exercise properly. Proper exercise can improve insulin sensitivity, blood sugar control and blood pressure control. Exercise should be carried out within 30-60 minutes after eating, and at least 150 minutes per week should be used for aerobic exercise, such as fast walking and a kind of traditional Chinese shadowboxing (tai chi chuan) striking. However, if there are diabetic complications, physical exercise cannot be carried out.

Self-glucose monitoring. Self-blood glucose monitoring is an important measure for the control of blood glucose reaching the standard, and it can also reduce the occurrence of hypoglycemia, which is applicable to all diabetic patients; ① Fasting blood glucose test,

When the blood sugar of diabetic patients is at a high level, when they do not eat food, the blood sugar of patients should be monitored in time; However, diabetic patients with low blood sugar level or who can control their blood sugar level well should also monitor their blood sugar in time. (2) For the monitoring of blood glucose of patients two hours after meals, it is suitable for patients whose blood glucose can be controlled on an empty stomach but fails to reach the treatment target of patients [14].

3.2. 3.2 Proper application of drugs

Time of medication. Eating nutrients can increase blood sugar, thus stimulating insulin secretion and increasing the use of blood sugar. The medication time of hypoglycemic drugs is closely related to meals: sulfonated pulse drugs such as gliclazide, glimemai, gretzanone, etc. stimulate pancreatic cells to secrete insulin and reduce blood sugar. Within two hours after intake, the blood drug concentration is the highest, usually taken half an hour before intake. Drugs such as repaglinide and nateglinide stimulate insulin production at a very young age and lower blood sugar after meals, which is quick and short, and can be taken 15 minutes before meals. Because-sugar enzyme inhibitors such as acarbose can slow down the decomposition and absorption of carbohydrates, it is necessary to chew inhibitors such as carbohydrates that regulate blood sugar. Dimethyl muscle can reduce liver glucose secretion, improve insulin resistance to upper tissues and reduce blood sugar level. They are usually taken on an empty stomach. If gastrointestinal discomfort occurs, they can be taken while eating or after eating. Thiazolidinedione drugs rosiglitazone and pioglitazone mainly affect liver, fat, muscle and other surrounding tissues, improve the sensitivity of target cells to insulin and reduce blood sugar. Take pills better half an hour before breakfast. Insulin controls blood sugar hunger and must be injected before going to bed or in the morning [15].

Interval of administration. Most drugs must maintain relatively stable drug concentrations, relatively stable intervals between drugs related to half-lives, and be taken every six to twelve hours, that is, two or four times a day. Controlled release preparations can be taken once a day. In addition, hypoglycemic drugs usually do not need to be proportional to the speed of drugs, and the specific interval between them is related to the influence mechanism, pharmacology and pharmacokinetics of drugs. Drugs that lower blood sugar after meals, such as Gleevec, -sugar enzyme inhibitor, quick-acting insulin or short-acting insulin. After taking three meals, drugs to reduce fasting blood glucose are mainly used, such as long-term yellow similar insulin secretion promoter, thiazolidinedione insulin sensitizer and dimethyldouble muscle, but they only need to be taken once or 2-3 times a day.

Dosage. The dosage of the drug is closely related to blood sugar, blood pressure, blood lipid, etc. It has personalized characteristics. If the dosage of the drug is too small, the therapeutic effect cannot be achieved, but if the dosage of the drug is too large, the side effects will be large. The fluctuation of blood sugar follows the rhythm of human

biological characteristics. Usually, in the early morning, the blood sugar level reaches a relatively high level, and at this time, the insulin intake is also required to be higher. In addition, the change of blood sugar level depends on factors such as diet, exercise, mood, sleep, stress and drug adjustment.

3.2. 3.3 Drug dosage forms requiring special attention

The use of drugs is related to the characteristics of drugs, telling patients what drugs need special attention, especially when patients are in serious or unable to take care of themselves, and telling patients that drugs taken cannot be injected or ground. Sustained-release preparation refers to the slow and uneven release of drugs in a specified environment. As a drug to reduce and control the patient's condition, its purpose is to stabilize the drug concentration, avoid the peak and valley phenomenon, make it last longer, reduce the number of medications, and thus reduce the toxic and side effects. Most sustained-release and controlled-release preparations, according to their unique technology, cannot be decomposed and chewed, otherwise they may lead to a sharp rise in drug concentration, accumulation in the body, increase side effects and even lead to poisoning. Enteric-coated preparations made of drugs are determined by their properties and usage methods. For example, drugs that enter the gastric juice of patients and undergo chemical reactions to make their efficacy ineffective, drugs that have stronger stimulation of gastric mucosa, drugs that will be absorbed by the intestinal tract or hope to exist in the intestinal tract for a long time. The goal is to keep the drug intact in the stomach and decompose or dissolve in the intestinal tract. Enteric-coated preparations are beneficial when taken on an empty stomach. Taking such drugs after meals at the same time as antacids will affect drug absorption or increase side effects [16].

3.2. 3.4 Prevention of adverse drug events

Hypoglycemic reaction. If the blood sugar is lower than 3.9 mmol/L, it is necessary to eat glucose or sugary food. Hypoglycemia reaction can immediately measure blood sugar, give sugary food to the patient for intake, and immediately call a doctor for examination when the patient has consciousness disorder. In addition, it is reported that if hypoglycemia occurs, patients must use glucose or honey when using sugar. If patients take sucrose or starch foods to treat hypoglycemia, the effect may be poor. Because acarbo breaks down sucrose into fructose and glucose slowly, patients should take glucose instead of sucrose in case of acute hypoglycemia.

Gastrointestinal reaction. The most common side effects of dimethyl muscle and acarbose are gastrointestinal reactions. Symptoms such as nausea, vomiting, dyspepsia, stomachache and diarrhea usually decrease or disappear with the decrease of drug dosage. Most patients shift the taking time of dimethyl muscle to eating or after eating, reducing the possibility of side effects. However, the gastrointestinal symptoms of acarbose can decrease or disappear with the increase of intake time. GLP-1 receptor agonist exenatide usually produces gastrointestinal side effects. For example, nausea occurs. The degree of nausea of patients is generally mild to moderate, mainly occurring at the beginning of treatment and gradually decreasing with the increase of treatment time.

Liver function damage. Tins lipid-regulating drugs, acarbose, etc. can cause liver transaminase to rise. If symptoms such as nausea, vomiting, abdominal pain, fatigue, loss of appetite, pain in the right upper abdomen, deepening urine color, light stool color, yellowing skin and the like occur for unknown reasons, liver function should be checked. Long-term use of thiazolidone drugs also requires liver function monitoring, and those whose aminoconvertase level exceeds 2.5 times the normal upper limit should not be used.

Renal function changes. The renal function of diabetic patients will change due to the increase of disease course, and the renal function of the elderly is also physiologically reduced. In the process of kidney function decline, the clearance of many drugs will slow down and accumulate in the body, increasing side effects. The function of the patient's kidney depends on the amount of blood, uric acid nitrogen, urinary protein and urinary albumin. In the case of mild and moderate reduction of renal function, patients can take hypoglycemic drugs such as gliozone and acarbose. Long-term use of ACEI to reduce blood pressure also requires monitoring renal function.

Allergy. Many drugs may cause allergic symptoms of patients, especially skin damage, such as local erythema, acne, dermatitis, and exfoliative dermatitis in severe cases. General allergy is measles, accompanied by angioneurotic edema and respiratory symptoms, such as asthma. In patients treated with multipurpose drugs, an imperceptible allergy appeared. Under normal circumstances, once treatment is stopped, side effects can be eliminated, and patients with severe symptoms can use antiallergic drugs to treat diseases.

Serious adverse reactions. Dimethyl muscle can cause lactic acid poisoning, which is an acute

complication of diabetes. Symptoms include vomiting, abdominal pain, hyperventilation and mental disorder. Drug overdose is often accompanied by nonspecific symptoms such as muscle pain, lethargy and dyspnea. If the patient has the above symptoms, he should go to the hospital in time. Rosiglitazone and pioglitazone can increase blood volume, cause anemia and body fluid storage in patients, and aggravate heart failure in patients.

3.3 Observation indicators

3.3. 1 Glucose control level

Fasting blood glucose and 2 h postprandial blood glucose levels were measured at admission and discharge of the two groups.

3.3. 2 Medication compliance

The treatment of type 2 diabetes requires a variety of drugs, which need to be used at strict time or intervals, and whether the patient takes them according to the doctor's requirements directly affects the effectiveness of the treatment. This paper mainly studies quantitative compliance and time compliance. Quantitative compliance shows the percentage of drugs actually taken by patients in the total number of prescription drugs. Time dependence is a parameter that determines whether the patient has time deviation in taking drugs, which reflects the patient's compliance or is consistent with the doctor's requirements.

2.3. 3 Deviation of medication

Comparing the current doctor's advice with the actual medication varieties and methods of patients, all medication behaviors inconsistent with the current doctor's advice are classified as medication deviation, including the use of drugs outside the doctor's advice, wrong dosage or frequency of administration, self-adjustment of infusion dripping speed, etc.

3.3. 4 Incidence of adverse drug events

The occurrence of adverse drug events includes adverse reactions caused by correct use of drugs and adverse consequences caused by drug abuse (such as overdose, drug abuse, etc.). It is necessary to explain in detail all possible side effects that patients have experienced, and analyze whether drug intervention will reduce the incidence of drug side effects.

3.3. 5 Patient satisfaction

The evaluation of patient satisfaction includes two parts, one is the patient's satisfaction with the general medical process, and the other is the satisfaction with medication guidance during hospitalization, which is divided into four grades: very satisfied; Satisfied; In general; Not satisfied.

3.4 Statistical methods

SPSS 24.0 statistical software was used to analyze the data, and the measurement data were expressed by $x \pm s$ and tested by t; The adoption rate of counting data (%) is expressed by 2 tests, and the difference is statistically significant by $P < 0.05$.

4 Results

4.1 Comparison of general data between the two groups

Table 1 is a comparison of the basic conditions of the two groups of patients. T test showed that there was no significant difference in the average age between the two groups ($P > 0.05$). Two tests were carried out on the gender, course of disease, education level and medical insurance of the two groups, and the results showed that there was no significant difference, but they were statistically significant ($P > 0.05$). This shows that the age, sex, course of disease, education level and medical insurance of the two groups of patients are comparable.

4.2 Comparison of blood glucose between the two groups after pharmaceutical intervention

Table 2 shows the changes of fasting and 2h postprandial blood glucose in the two groups after intervention. It can be seen from the table that the fasting blood glucose level of patients in the control group is 10.12 1.23 mmol/L, and the blood glucose level two hours after meals is 12.95 2.11 mmol/L; The fasting blood glucose level of the patients in the intervention group was $7.13 \pm 1.$ 12mmol/L, and the blood glucose level two hours after the meal was $10.11 \pm 1.$ 51mmol/L. The fasting blood glucose and postprandial blood glucose levels of the two groups were tested by t test. The results showed that the blood glucose levels of the two groups were significantly different ($P < 0.05$), that is, the fasting and postprandial blood glucose levels of the patients in the intervention group were lower than those of the control group.

4.3 Medication compliance of patients in the two groups after pharmaceutical intervention

Table 3 Comparison of medication compliance between the two groups after pharmaceutical intervention. It can be seen from the table that the medication compliance rate of patients in the control group after pharmaceutical intervention is 30.0%, while that of patients in the control group is 90.0%. Two tests were carried out on the

medication compliance rate and non-compliance rate of the two groups of patients. The results showed that there was a significant difference in medication compliance between the two groups (P < 0.05), that is, the medication compliance rate of patients in the intervention group was higher than that of the control group.

Table 1. **Comparison of basic conditions between the two groups**

Project	Control group	Intervention group	T/2	*P value*
Age (years)	50.81 ± 1. 22	51.51 ± 1. 12	0.314	0.932
Gender			0.125	0.865
Male	30	32		
Female	20	18		
Course of disease			0.168	1.112
< 1 year	10	11		
2 ~ 5 years	15	12		
6 ~ 10 years	20	22		
Education level			0.145	0.942
Junior high school	18	19		
Junior college	22	19		
Bachelor degree or above	10	12		
11 years and over	5	5		
Medical insurance situation			0.091	0.657
At one's own expense	0	0		
Public expense/medical insurance	31	31		
New rural cooperative medical system	18	19		

Table 2. **Changes of fasting and 2h postprandial blood glucose in the two groups after pharmaceutical intervention**

Group	Number of Cases (N)	Fasting blood glucose (mmol/L)	2h postprandial blood glucose (mmol/L)
Control group	50	10.12 ± 1. 23	12.95 ± 2. 11
Intervention group	50	7.13 ± 1. 12	10.11 ± 1. 51
T		-5.132	-3.782
P		0.001	0.001

Table 3. **Comparison of medication compliance between the two groups after pharmaceutical intervention**

Group	Number of Cases (N)	Compliance rate (%)	Non-compliance rate (%)
Control group	50	30.0	70.0
Intervention group	50	90.0	10.0
2	12.321		
P	0.001		

4.4 Deviation of medication between the two groups after pharmaceutical intervention

Usually, the medication deviation of patients with type 2 diabetes is that they do not take the medicine on time, do not strive for insulin injection methods, and adjust the drug dosage or reduce the hypoglycemic plan by themselves. The effect of pharmaceutical intervention on medication deviation of the two groups of patients is shown in Table 4. It can be seen from the table that 52.0% of the patients in the control group did not have medication deviation after pharmaceutical intervention, while 86.0% of the patients in the intervention group did not have medication deviation. Two tests were carried out on the medication deviation of the two groups of patients, and the results showed that the medication deviation of the two groups of patients was

significantly different, with statistical significance (P < 0.05), that is, the medication deviation rate of patients in the intervention group was significantly lower than that of the control group.

Table 4. **Effect of Pharmaceutical Intervention on Drug Deviation of Two Groups of Patients**

Group	Number of Cases (N)	Deviation (%)	No deviation (%)
Control group	50	48.0	52.0
Intervention group	50	14.0	86.0
2		9.121	
P		0.001	

4.5 Adverse drug reactions of patients in the two groups after pharmaceutical intervention

Generally, the adverse reactions of patients with type 2 diabetes to drugs are hypoglycemia, gastrointestinal reactions and skin allergy, as well as liver dysfunction and edema, without serious side effects of drugs. Table 5 shows the effect of pharmaceutical intervention on adverse drug reactions of two groups of patients, As can be seen from that table, The incidence of adverse drug reactions in the control group was 30.0%, However, the adverse drug reaction rate of patients in the control group was 10.0%. Two tests were carried out on the adverse drug reactions of patients in the two groups. The results showed that the adverse drug reactions of patients in the two groups were significantly different and statistically significant (P < 0.05), that is, the adverse drug reaction rate of patients in the intervention group was significantly lower than that in the control group.

Table 5. **Effect of Pharmaceutical Intervention on Adverse Drug Reactions of Two Groups of Patients**

Group	Number of Cases (N)	Adverse reactions (%)	No adverse reactions (%)
Control group	50	30.0	70.0
Intervention group	50	10.0	90.0
2	6.225		
P	0.001		

4.6 Satisfaction of patients in the two groups after pharmaceutical intervention

Table 6 shows the effect of pharmaceutical intervention on the satisfaction of patients in the two groups. As can be seen from the table, the proportion of patients in the control group who are satisfied with and very satisfied with medical services is 44.0%, while the proportion of patients in the intervention group who are satisfied with and very satisfied with medical services is 70.0%. Two tests were carried out on the satisfaction of patients in the two groups, and the results showed that the satisfaction of patients in the two groups was significantly different, with statistical significance (P < 0.05).

Table 6. **Effect of Pharmaceutical Intervention on Satisfaction of Patients in Two Groups**

Group	Number of Cases (N)	Very satisfied	Satisfied	General	Not satisfied
Control group	50	8.0	36.0	36.0	20.0
Intervention group	50	30.0	40.0	28.0	2.0
2			20.121		
P			0.001		

5 Discussion

Type 2 diabetes is a disease that accompanies patients for a lifetime. Currently, patients cannot be completely cured clinically. Long-term drugs are needed to control blood sugar and reduce complications. In long-term hospitalization or long-term treatment, patients will gradually doubt the effectiveness of drugs, which leads to resistance to drugs and greatly reduces patients' medication compliance. Lin Shanshan [17] intervened in drug services for patients with type 2 diabetes complicated with hypertension, To explore its influence on patients' physical function, the results showed that the incidence of adverse reactions in the control group was significantly higher than that in the experimental group after six months of intervention in the two groups of patients, which indicated that pharmaceutical care intervention in patients with type 2 diabetes complicated with hypertension could improve the effect of blood sugar control. Liang Shujuan et al. [18] explored the influence of pharmaceutical care intervention on the treatment compliance and blood glucose index of diabetic patients. The research results show that

pharmaceutical care intervention can improve the treatment compliance and blood glucose index of diabetic patients during treatment, which is conducive to controlling blood glucose level. Zhang Jie et al. [19] analyzed the effect of pharmaceutical intervention on medication compliance and adverse drug reactions of patients with type 2 diabetes. The results showed that pharmaceutical intervention for patients with type 2 diabetes can stabilize the blood sugar level of patients, reduce the incidence of adverse drug reactions and improve the medication compliance of patients. Pan Hongli [20] analyzed the clinical value of clinical pharmacist's pharmaceutical intervention for diabetic patients in improving their blood sugar control effect and medication compliance. The research conclusion shows that clinical pharmacist's intervention for diabetic patients can effectively improve their blood sugar control effect and improve medication awareness and teaching compliance.

In this study, the influence of pharmaceutical intervention on the blood glucose level of patients with type 2 diabetes was analyzed. The experimental results showed that the fasting and postprandial blood glucose levels of diabetic patients in the control group were significantly higher than those of patients in the intervention group, and the difference was statistically significant ($P < 0.05$). This indicates that during the treatment of patients with type 2 diabetes, clinical pharmacists can improve their blood sugar level by educating them on diabetes prevention and treatment. Explain the adverse reactions that may occur if the doctor's advice is not implemented, and provide professional guidance and suggestions to patients with type 2 diabetes, so that patients can take drugs in a standardized way, and patients with type 2 diabetes can take drugs in time and accurately, thus controlling the blood sugar level of patients.

For patients with type 2 diabetes mellitus, the medication compliance is affected by pharmaceutical intervention. The experimental results show that patients with type 2 diabetes mellitus in the intervention group can take medication in time according to the doctor's advice, and the medication compliance rate is higher, which is significantly higher than that of patients with diabetes mellitus in the control group. This shows that the medication compliance of patients with type 2 diabetes can be improved through diabetes education and medication training for clinical pharmacists, thus improving the therapeutic effect of patients taking drugs.

For patients with type 2 diabetes mellitus, the drug deviation is affected by pharmaceutical intervention. The experimental results show that patients with type 2 diabetes mellitus in the intervention group have less drug deviation problems, and the drug deviation rate is lower, which is significantly lower than that of patients with type 2 diabetes mellitus in the control group. The difference is statistically significant ($P < 0.05$). This shows that the cognitive level of patients with type 2 diabetes on diabetes and related therapeutic drugs can be improved through pharmaceutical intervention. Through education and training of patients, patients can be familiar with the use of therapeutic drugs, thus reducing the drug deviation rate of patients with type 2 diabetes.

As for the influence of pharmaceutical intervention on adverse drug reactions of patients with type 2 diabetes mellitus, the results showed that the incidence of adverse drug reactions in the intervention group was significantly lower than that in the control group. This shows that pharmaceutical intervention can train and guide patients with type 2 diabetes mellitus in medication education, identification of drug side effects and treatment methods, let patients know the correct time and method of drug use, possible common drug side effects, and methods to prevent side effects, so as to effectively reduce the incidence of drug defects in patients.

As for the influence of pharmaceutical intervention on the satisfaction of patients with type 2 diabetes mellitus, the results showed that there was a significant difference between the two groups ($P < 0.05$). This shows that the use of pharmaceutical intervention to implement comprehensive medical care for patients with type 2 diabetes can improve the satisfaction of patients, thus confirming that clinical pharmacists play a very important role in the treatment of patients with type 2 diabetes. Clinical pharmacists will also provide humanitarian care to patients during pharmacological examination, medicinal manuals, drug consultation and control of adverse reactions, providing social welfare for patients, which is helpful to improve patients' satisfaction with medical services.

6 Implications

(1) Objective to establish pharmaceutical pathway for type 2 diabetes. At the same time of carrying out the clinical pathway of type 2 diabetes, the establishment of type 2 diabetes.

The pharmaceutical pathway of Urology, the work plan and specific pharmaceutical care methods of clinical pharmacists, has formed a model for type 2 diabetes

Standardized pharmaceutical care procedures for patients with diabetes, as a beneficial and necessary complement for clinical pathway, provide a reference template for the promotion of pharmaceutical pathway in the country.

(2) A randomized, controlled experiment was designed for the first time in China to study the effect of pharmaceutical intervention on the medication compliance of patients with type 2 diabetes receiving multi drug treatment, and the effect of professional pharmaceutical intervention on the medication compliance of patients with type 2 diabetes was also investigated

(3) The research ideas of clinical pharmacy for patients with type 2 diabetes designed in this project are also applicable to the clinical pharmacy for patients with type 2 diabetes

Cardiovascular disease, bronchial asthma, kidney disease and other chronic disease patients, therefore, the research program of this topic can be further extended to related fields, which is conducive to carry out other professional pharmaceutical research at the same time. It can be seen that the completion of this project provides a reference template for clinical pharmacists to carry out scientific research in patients with chronic diseases.

7 limitations

(1) The evaluation method of medication compliance needs to be improved

The evaluation of patients' medication compliance should include pharmacist's observation, patient's self-report and more objective evaluation

Indicators. There are many methods of compliance evaluation at home and abroad, such as self-report, tablet counting, biological markers, electronic testing equipment, these methods have their own advantages and disadvantages. In the experiment, we used the methods of pharmacist observation and patient self-report, found out the reasons of poor compliance and made a summary and analysis. However, patients sometimes miss the frequency of medication deviation, or conceal it, which is not conducive to the accuracy of the results.

(2) Limitation of pharmaceutical follow-up

In the experiment, some patients failed to participate in the regular pharmaceutical follow-up after discharge, especially some patients in the control group

It is impossible to verify the long-term results of pharmacist intervention. Studies have shown that phased telephone follow-up can enhance patient compliance and reduce mortality. The results showed that pharmaceutical follow-up increased patients' satisfaction with the medical process, improved medication compliance, and reduced preventable ADE. The way of follow-up can be diversified, such as domestic research using SMS service, it is also worth learning.

8 Conclusion

Patients with type 2 diabetes often need to take drugs for many years, and their medication compliance and safety are long-term concerns. The incidence of type 2 diabetes in China is increasing every year, so it is very important to study the influence of pharmaceutical intervention on diabetic patients. The results of this study show that comprehensive pharmaceutical intervention for patients with type 2 diabetes can effectively reduce the blood sugar level of patients, improve the compliance of patients with medication, reduce medication deviation and adverse drug reactions, improve patient satisfaction, and ensure the safety and rationality of drug use for patients. It has significant clinical guiding significance.

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Schedule

Questionnaire for patients with type 2 diabetes mellitus

Dear Sir/Madam,

Hello! First of all, thank you for participating in this questionnaire survey. In order to better provide high-quality medical services for patients with type 2 diabetes, please take a few minutes to fill out the questionnaire or tick the most appropriate option. Please answer according to the actual situation. All contents of this questionnaire survey are confidential. Thank you for your cooperation.

1. Your gender: A male B female
2. Your age: A < 45 years old B 45-65 years old C > 65 years old
3. Your height: cm weight: kg
4. Your educational background: A junior high school B junior college C bachelor degree or above
5. Your medical insurance type: self-funded rural cooperative medical care and public medical care
6. Your course of diabetes: A ≤ 1 year B 2-5 years C 6-10 years D 11 years and above
7. Diabetic complications (multiple choices): A hypertension B hyperlipidemia C peripheral neuropathy
D cerebral infarction E diabetic nephropathy F retinopathy G coronary heart disease H others
8. Blood glucose level: fasting mmol/L; 2 hours after meal mmol/L
9. Drug treatment mode: A unused B oral hypoglycemic agent C insulin D insulin + oral medicine
10. Types of hypoglycemic drugs (multiple choices are allowed): A biguanides (metformin) B sulfonylureas (lattice
Limepiride, gliclazide, gliquidone) C glycosidase inhibitors (acarbose) D thiazolidinediones (rosiglitazone) E insulin F others
11. Have adverse drug reactions occurred: A Yes B

No

The adverse reactions are (multiple choices): A hypoglycemia B gastrointestinal reaction C skin allergy D liver dysfunction E edema F others

12. Do you take the medicine according to the doctor's advice: A Yes B No.
13. Whether to control diet: A Yes B No
14. Exercise for half an hour at least 3 days a week: A has B
15. The frequency of fasting blood glucose measurement every year: A 0 times, B 1 time, C 2 times and D 2 times or more
16. The times of measuring blood glucose 2 hours after meals every year: A 0 times, B 1 time, C 2 times, D 2 times or more
17. Satisfaction with medical services in our hospital: A very satisfied, B satisfied, C generally, D dissatisfied