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Analysis and Discussion on the Influence of Pharmaceutical Science Popularization on Patients' Medication Compliance and Medication Awareness

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Abstract: *Objective:* To explore the effect of providing pharmaceutical science popularization to patients in improving their awareness of medication treatment, as well as its impact on their medication compliance. *Method:* A total of 68 patients were selected for drug therapy, with the implementation period from February 2023 to December 2024. Under the support of sealed envelope sampling method, the subjects were divided into two groups. The control group (34 cases) received routine intervention, while the experimental group (34 cases) received pharmaceutical science popularization. The drug treatment awareness rate, medication compliance, self-management ability score, and incidence of adverse reactions were compared between the groups. *Result:* The awareness rate of medication treatment in the experimental group (97.06%) was significantly higher than that in the control group (76.47%) ($p < 0.05$). The medication adherence of the experimental group (97.06%) was higher than that of the control group (79.41%) ($p < 0.05$). Before intervention, the self-management ability scores between groups were similar ($p > 0.05$). After intervention, the self-management ability scores of the experimental group (17.65%) were higher than those of the control group ($p < 0.05$). The incidence of adverse reactions in the experimental group (2.94%) was lower than that in the control group ($p < 0.05$). *Conclusion:* Providing pharmaceutical science popularization to patients has a significant effect on increasing awareness of medication treatment, and can improve medication compliance and self-management ability, which is conducive to reducing the incidence of adverse drug reactions and has promotional significance.
Keywords: Medication adherence; Pharmaceutical science popularization; Awareness rate of medication treatment

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1. Introduction

In recent years, under the influence of factors such as changes in people's living habits and dietary structure, the incidence of various diseases has gradually increased, especially the incidence of chronic diseases has shown a trend of increasing year by year, which has a negative impact on people's physical and mental health [1].

Drug therapy is one of the main methods used in clinical practice to treat various diseases, which can improve symptoms and control disease progression. However, most patients lack comprehensive understanding of drug related information and often have misconceptions, resulting in non-standard behaviors during medication, such as arbitrarily adding or removing drugs, adjusting drug combinations, etc. This not only increases adverse reactions and reduces treatment safety, but also affects the efficacy [2,3].

Conventional health education focuses on disease education, with low attention to pharmaceutical knowledge, resulting in unsatisfactory outcomes. Therefore, it is crucial to take effective intervention measures to enhance patients' mastery of pharmaceutical knowledge. Pharmaceutical science popularization is the process of explaining drug related information, including efficacy, contraindications, etc., to patients regarding their medication treatment plans. It can promote patients to establish correct health concepts, improve medication compliance, and have a positive impact on ensuring the safety of drug treatment [4,5]. In response to this, this study observed and analyzed the effect of providing pharmaceutical science popularization to patients in increasing awareness of medication treatment, as well as its impact on medication compliance. The report is as follows.

2. Data and methods

2.1. General information

68 cases of drug treatment patients were screened. From February 2023 to December 2024, the subjects were grouped under the support of sealed envelope selection method. In the control group (34 cases), 16 cases were screened for women, and 18 cases were screened for men. The age statistics ranged from 35 to 75 years old, with a mean of (55.36 ± 3.27) years old. Disease types: 6 cases of bronchial asthma, 10 cases of hypertension, 7 cases of coronary heart disease, and 11 cases of diabetes. In the experimental group (34 cases), 15 women were screened and 19 men were screened. The age statistics ranged from 34–75 years old, with a mean of (55.41 ± 3.32) years old. The disease type was 7 cases of bronchial asthma, 11 cases of hypertension, 6 cases of coronary heart disease, and 10 cases of diabetes. Comparing natural information item by item, $p > 0.05$, There is comparability between groups.

2.1.1. Inclusion criteria

(1) Clinical data should be reviewed item by item for completeness;

(2) Agree to participate in the review of relevant information.

2.1.2. Exclusion criteria

(1) Patients who cannot tolerate the therapeutic drug;

(2) Individuals suffering from mental illnesses;

(3) Individuals with hearing and intellectual disabilities.

2.2. Method

The control group received routine interventions, using oral explanations to provide patients with basic information about the disease and medication, and distributing health manuals.

Based on this, the experimental group carried out pharmaceutical science popularization, ① online pharmaceutical science popularization: with the help of social media platform as the main path of online pharmaceutical science popularization, including microblog, WeChat and Tiktok, etc., and with images and text, short videos as information carriers, drug information, medication precautions, etc. were quickly spread. At the same time, pharmaceutical science popularization apps and websites can be established, with sections such as medication guides and drug databases set up for patients to easily access and consult medication information at any time. ② Offline pharmaceutical science popularization: mainly through individual and collective science popularization, after formulating drug treatment plans, detailed medication information, precautions, and possible side effects are explained to patients based on their condition, drug treatment plan, potential risks, etc., and risk identification and treatment methods are guided. In personal science popularization, tools such as videos, mind maps, manuals, and graphic materials can be used for education, and easy to understand language expression can be adopted to avoid using overly technical terms. Regularly organize health lectures, themed activities, knowledge quizzes, etc. in collective science popularization. During the themed activities, "safe medication" can be used as the theme, distribute promotional brochures, set up consultation desks, and conduct

interactive games to popularize knowledge about drug storage methods, drug compatibility taboos, expired drug handling methods, etc. to patients. Special lectures can be organized for patients with different types of diseases, providing information on commonly used drugs for a specific type of disease and emphasizing the importance of rational drug use. In addition, a consultation desk can be set up in the pharmacy, where dedicated personnel can provide pharmaceutical science popularization and answer patients' questions. ③ Pharmaceutical science popularization content: Pharmaceutical science popularization content should be based on the individual condition of patients, reasonable selection of drug types, etc. The core content includes the importance of drug treatment for disease recovery and control, the importance of rational drug use, the negative impact of non-standard drug use behavior, and medication safety precautions. In addition, pharmaceutical science popularization should be strengthened for different types of diseases, such as providing detailed explanations on the mechanisms, types, common adverse reactions, and precautions of antihypertensive drugs for patients with hypertension. For diabetes, in addition to the classification of hypoglycemic drugs, it is also necessary to highlight the blood glucose monitoring methods and drug adjustment precautions, and use case presentation to explain the impact of common non-standard drug use behavior. When presenting content, actual cases, graphics, videos, etc. should be combined, and demonstration methods should be adopted to guide correct medication and timely answer patients' questions. ④ Effect evaluation and strengthened science popularization: Interactive questioning is adopted in the process of pharmaceutical science popularization to obtain feedback and understand the patient's mastery of pharmaceutical knowledge. And before and after the popularization of science, questionnaire surveys, knowledge quizzes, and other methods are used to evaluate patients' mastery of pharmaceutical related knowledge.

Based on this, weak points in science popularization are strengthened, and the science popularization methods are optimized according to the individual situation of patients, including age, condition, cognitive level, etc. Tools such as disease drug association graphs can be used to enhance science popularization.

2.3. Observation indicators

Awareness rate of medication treatment: Using a self-designed survey scale as a tool, if the score is less than 60, it is classified as unknown; Record 60–89 points as belonging to basic knowledge; Fully aware of achieving a score of ≥ 90. Total awareness rate = complete awareness rate + basic awareness rate.

2.3.1. Medication compliance

According to the independently created evaluation scale, non-compliance with the calibration line is ≤ 59 points; Basic adherence to the positioning line scores 60–89 points; Fully comply with the separation line of ≥ 90 points. Total compliance rate = Basic compliance rate + Complete compliance rate.

2.3.2. Self-management ability score

The ESCA Scale (also known as the Evaluation Scale of Self Care Ability) is used as the main evaluation tool, covering four dimensions and supported by a 5-point scoring system. The upper limit is 172 points, and the higher the score of the subject, the stronger their self-management ability.

Adverse reaction incidence: including nausea and vomiting, diarrhea, dizziness, and liver and kidney damage.

2.4. Statistical analysis

Process the obtained data using SPSS 26.0 standard system, with count data represented by n (%) and χ^2 test, and metric data represented by ($\bar{x} \pm s$) and *t*-test. There is a difference in statistical dimension description: $p < 0.05$.

3. Results

3.1. Awareness rate of medication treatment

The value of the experimental group is higher, $p < 0.05$, **Table 1**.

Table 1. Comparison of drug treatment awareness rate n (%)

Group	n	Fully aware	Basic knowledge	Don't knows	Total awareness rate
Experimental group	34	22 (64.71%)	11 (32.35%)	1 (2.94%)	(33) 97.06%
Control group	34	17 (50.00%)	9 (26.47%)	8 (23.53%)	(26) 76.47%
χ^2					6.275
p					0.012

3.2. Medication compliance

The value of the experimental group is higher, $p < 0.05$, **Table 2**.

Table 2. Comparison of medication adherence n (%)

Group	n	Fully comply	Basic compliance	Noncompliance	Overall compliance rate
Experimental group	34	21 (61.76%)	12 (35.29%)	1 (2.94%)	(33) 97.06%
Control group	34	18 (52.94%)	9 (26.47%)	7 (20.59%)	(27) 79.41%
χ^2					5.100
p					0.024

3.3. Self-management ability rating

Before intervention, the values between the groups were similar ($p > 0.05$), but after intervention, the values in the experimental group were all higher, $p < 0.05$, **Table 3** and **4**.

Table 3. Comparison of sense of self responsibility and health knowledge level ($\bar{x} \pm s$, points)

Group	n	Sense of self responsibility		Health knowledge level	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Experimental group	34	16.25 ± 2.32	19.51 ± 2.12	43.71 ± 4.65	54.18 ± 3.82
Control group	34	16.29 ± 2.35	17.48 ± 2.39	43.65 ± 4.72	48.69 ± 3.64
t		0.071	3.705	0.053	6.067
p		0.944	0.000	0.958	0.000

Table 4. Comparison of self-care skills, self-concept and total score of self-protection ability ($\bar{x} \pm s$, points)

Group	n	Self-care skills		Self-concept		Total score of self-protection ability	
		Pre-intervention	Post-intervention	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Experimental group	34	23.74 ± 2.68	29.87 ± 3.73	18.81 ± 2.73	25.73 ± 3.45	101.05 ± 6.35	127.85 ± 4.32
Control group	34	23.71 ± 2.75	24.56 ± 3.68	18.84 ± 2.79	22.46 ± 3.29	101.25 ± 5.92	112.17 ± 4.71
t		0.046	5.909	0.045	4.000	0.134	14.306
p		0.964	0.000	0.964	0.000	0.894	0.000

3.4. Incidence of adverse reactions

The value of the experimental group is lower, $p < 0.05$, **Table 5**.

Table 4. Comparison of adverse reaction rates n (%)

Group	n	Nausea and vomiting	Diarrhea	Dizziness	Liver and kidney damage	Overall incidence rate
Experimental group	34	0 (0.00%)	1 (2.94%)	0 (0.00%)	0 (0.00%)	(1) 2.94%
Control group	34	1 (2.94%)	2 (5.88%)	2 (5.88%)	1 (2.94%)	(6) 17.65%
χ^2						3.981
p						0.046

4. Discussion

The patient's knowledge of medication has a direct impact on their medication adherence and adherence to medication standards. However, currently many patients have a shallow understanding of drugs and have misconceptions, resulting in low medication compliance and a tendency to use drugs improperly [6,7]. Poor medication behavior can increase the risk of adverse drug reactions and have an impact on treatment safety. The factors that affect patients' awareness of drug knowledge mainly include weak pharmaceutical science popularization, imbalanced medical resources, information asymmetry, age factors, education level, etc. [8,9]. Elderly patients may experience a decrease in cognitive level due to factors such as age, poor grasp of medication information, and strong subjective awareness, which can lead to non-compliance or non-standard medication behavior [10,11]. It is of great significance to increase pharmaceutical science popularization efforts, improve patients' grasp of drug information, and promote their formation of healthy behaviors to ensure the safety of drug treatment.

The results of this study showed that in the determination of medication treatment awareness and medication compliance, all data in the experimental group were in a higher range ($p < 0.05$). In the evaluation of self-management ability, the values of the experimental group after intervention were all in a higher dimension ($p < 0.05$). The statistical analysis of the incidence of adverse reactions showed that the experimental group had a lower incidence rate ($p < 0.05$), indicating that the application of pharmaceutical science popularization has a significant effect on improving the awareness of medication treatment, and can enhance patients' medication compliance and self-management ability, which is conducive to reducing the incidence of adverse drug reactions. The reason analysis is that pharmaceutical science popularization is based on authoritative medical research and clinical practice. Adopting diverse information transmission methods for pharmaceutical science popularization can not only enhance the professionalism of science popularization, but also enhance patients' learning interest, meet their individual needs, and promote patients to have a more comprehensive and accurate grasp of relevant information such as drug treatment and pharmaceutical knowledge. For example, the pharmaceutical science popularization through the online and offline mode can meet the needs of different patients. Using WeChat, Tiktok and other media platforms as the main channels to transmit information can solve the time and space limitations of offline science popularization, efficiently transmit drug related information, quickly reach the target audience, and patients can conduct online drug consultation and drug information review at any time, so as to better improve patients' cognition of drug knowledge. Combining offline science popularization through various modes such as health lectures, themed presentations, and individual science popularization can increase the intensity of pharmaceutical science popularization. Detailed explanations of medication methods, precautions, etc. can be provided based on the individual situation of patients, which can meet their individual pharmaceutical service needs. And organize diverse science popularization activities, conducted by experts and specialized doctors, to enhance the authority of science popularization, strengthen patients' awareness of medication safety, and improve their awareness and compliance with medication

treatment through continuous pharmaceutical science popularization. Fully and reasonably utilize diverse information carriers in pharmaceutical science popularization, such as creating video animations PPT, Mind maps and other methods, through dynamic demonstrations and vivid explanations, can concretize abstract pharmaceutical concepts, enhance the vividness and interest of science popularization, and make it easier for patients to understand drug related information, which has a significant effect on improving their mastery of drug treatment knowledge. In addition, in the process of pharmaceutical science popularization, feedback can be obtained through interactive questioning and questionnaire surveys to understand the effectiveness of science popularization and patients' mastery of pharmaceutical knowledge. Based on this, pharmaceutical science popularization methods can be optimized and strengthened, and appropriate language expression and case studies can be adopted according to patients' specific situations to strengthen weak point education. This can better correct patients' misconceptions, promote their formation of good health awareness, enhance their self-management ability and medication compliance, reduce individual influencing factors, and lower the incidence of adverse drug reactions.

In summary, the application of pharmaceutical science popularization has significant effects in improving patients' awareness of medication treatment and medication compliance, and can enhance their self-management ability, which is conducive to reducing the incidence of adverse drug reactions.

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Disclosure statement

The author declares no conflict of interest.

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