The influence of strengthen health education to the rural Left-behind elderly patients with type 2 diabetes in Guangyuan city of Sichuan province

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Abstract: Objective: the purpose of this article is to analyze the influence of strengthen health education to the rural Left-behind elderly patients with type 2 diabetes in Guangyuan city of Sichuan province. Methods: 240 patients in Guangyuan city of Sichuan province were randomly divided into the intervention group and the control group (n = 120). using strengthen health education to the Intervention group, and the control group give the Regular health education, after 6 months we evaluated the 2 groups of patients the changing of the self-management behavior, and self-management efficiency. Results: the intervention group patients self-management efficiency compared with the control group, 20 entries has 13 items with statistical difference ($P < 0.05$), 7 items no statistical difference ($P > 0.05$); Self-management behavior compared with the control group there are 8 items have statistical significance ($P < 0.05$), there are 4 items has no statistical significance ($P > 0.05$), total score has significant difference ($P < 0.000$). Conclusion: Then strengthen health education, can effectively improve the self-management effectiveness and self-management behavior of rural left-behind elderly patients with type 2 diabetes, and raised the patients compliance, improved the quality of their life.

1. Introduction

At present, the number of patients with type 2 diabetes in China is gradually increasing. The latest epidemiological survey shows that the prevalence of adult diabetes in China has reached 11.6% in 2010. As a special group, the prevalence of left-behind elderly in rural areas is on the rise year by year due to changes in their lifestyles and living standards [1]. Strengthening health education is the most urgent need for patients. One-to-one help patients master the knowledge and skills required by the disease, which can improve patients' self-management ability and behavior to a certain extent. Self-management is currently more common in the treatment and control of type 2 diabetes, and the effect is significant. Due to the limitation of medical and economic conditions, as well as the lack of education level, the left-behind elderly in rural areas have a big gap in diabetes prevention and self-management compared with urban family pension and institutional pension. At the same time, due to differences in family relations and living habits, patients' self-management of diseases is uneven and unsatisfactory [2]. Therefore, this study adopts intensive health education and is applied to rural left-behind elderly patients with type 2 diabetes in order to improve their self-management level. It is reported as follows.

2. Subject and method

2.1. Subject

From August 2016 to March 2017, 240 elderly patients with type 2 diabetes mellitus who met the inclusion criteria in Jiange County, Guangyuan City, Sichuan Province were randomly selected as the research object. In this study, the selected patients were randomly divided into control group and experimental group according to the order of investigation. Inclusion criteria:①WHO 1999 diagnosis and classification criteria for diabetes [4];②Age ≥ 60 years old;③Time of illness ≥ 3 months, volunteer to participate in this study. Exclusion criteria:①Tumor patient;②Severe mental

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illness;③Other serious systemic disorders.

2.2. Method

2.2.1. Investigation method

The self-designed general information and disease-related knowledge questionnaire, Chinese version of diabetic self-management efficacy scale (C-DMSES) and diabetes management self-behavior scale (SDSCA) were used as evaluation tools.①General: The content includes the patient's age, gender, cultural level, etc.②Chinese version of diabetic self-management efficacy scale (C-DMSES) [5] : used to evaluate the determination of study subjects in diet, exercise, medication, self-monitoring and other aspects. There are 20 items in the scale, and each item is divided into 3 levels. "Totally impossible" is 0-2, "maybe yes, maybe no" is 3-7, and "totally possible" is 8-10. Scores are directly proportional to self-efficacy.③Diabetic self-management behavior scale (SDSCA): Revised by Toobert et al. [6] and translated by Wan qiaoqin et al. [7]. The 12-item scale was used to assess the number of days a patient engaged in diet, blood glucose monitoring, foot exams, medication use, insulin, exercise and other related activities in the past 7 days. The score is the number of days, and the higher the score, the higher the self-efficacy behavior.

2.2.2. Intervention method

In the early stage, the status quo of patient self-management was investigated, and a more targeted and intensive health education program was produced. The control group used the general follow-up question-and-answer method, and the intervention group used a targeted intensive health education program, which mainly included [8]:①Centralized on-site education in stages: It mainly includes diet, exercise, drugs, insulin injection, blood glucose monitoring, self-protection and treatment of complications, etc. Once a month, each time a topic is taught, for a total of 6 months. Using a dedicated demonstration, hands-on teaching, and with pictures, videos to deepen the patient's sensory impression and knowledge mastery.②Diabetes diets, medications, and blood glucose test records are issued, and patients or their families are recorded daily.③Targeted guidance: The patient's phone number is reserved, and the patient can consult at any time in case of problems, and the researcher will conduct regular telephone follow-up (every 2 weeks) for 6 months to understand the patient's mastery of each topic. At the same time, according to laboratory tests such as blood sugar and glycated hemoglobin, understand the actual situation of the patient's disease, and conduct targeted health guidance and answering questions. Conduct professional knowledge guidance on diabetes self-management.④Mental health counseling: Explain to patients the importance of adhering to diabetes self-management. Inform patients to control blood sugar smoothly, and effective control of weight gain will delay the occurrence and development of acute and chronic complications. Let the patient maintain a healthy state of mind and face the life with good emotions, and at the same time use the patient's live presentation to establish self-management confidence and determination [9].

2.2.3. Statistical Analysis

After double entry with Epidata, SPSS19.0 was used for data analysis. The data type is counting data, which is expressed by frequency and percentage. Comparison between groups using $\chi 2$ test; For measurement data, t-test is used for comparison between groups, and the data is expressed by mean ± standard deviation; The test level is $\alpha=0.05$.

3. Results

3.1. Basic situation

According to the inclusion and exclusion criteria, 240 patients were included as subjects. In the intervention group, the control group was 120 cases each. There were 91 males (37.9%) and 149

females (62.1%); The age is mainly concentrated in 60-70 years old (81.3%); Most of the patients were not highly educated, with 81.3% of the patients having less than primary school education. Good family relationship (67.9%); 92.1% of the elderly live with their children, and 79.2% of the patients get the attention of their children. 85% of people with type 2 diabetes for less than 10 years, and 15% for those over 10 years. Acute and chronic complications occurred in 55% of patients, 90.4% of patients took the drug after the disease, and 14.2% used insulin injection. According to the general data, there were no statistical differences in the 11 items between the two groups (P>0.05), which are comparable (see Table 1 for details).

Table 1 General information of patients [n(%)]

project	**group**		χ^2	*p*	**project**	**group**		χ^2	*p*
	control group	intervention group				control group	intervention group		
gender			0.018	0,894	**whether living with children**			0.514	0.473
male	46(38.3)	45(37.5)			yes	109(90.8)	112(93.3)		
female	74(61.7)	75(62.5)			no	11(9.2)	8(6.7)		
age			0.227	0.893	**whether the children are concerned about the condition of the elderly**			0.101	0.751
60-70	98(81.7)	97(80.8)			yes	96(80)	94(78.3)		
71-80	17(14.2)	19(15.8)			no	24(20)	26(21.7)		
⩾80	5(4.1)	4(3.4)			**time of illness**			0.774	0.856
education level			0.086	0.993	1-5years	65(54.2)	66(55)		
no education experience	17(14.2)	16(13.3)			6-10 years	35(29.2)	38(31.7)		
primary school	85(70.8)	87(72.5)			10-15 years	15(12.5)	13(10.8)		
junior high school	16(13.3)	15(12.5)			more than 15 years	5(4.1)	3(2.5)		
high school and above	2(1.7)	2(1.7)			**whether to take drugs**			0.048	0.826
marital status			0.416	0.937	yes	108(90)	109(90.8)		
married	87(72.5)	86(71.7)			no	12(10)	11(9.2)		
divorced	6(5)	7(5.8)			**whether to use insulin**			0.137	0.711
widowed	17(14.2)	19(15.8)			yes	18(15)	16(13.3)		
separation	10(8.3)	8(6.7)			no	102(85)	104(86.7)		
family relationship			0.342	0.843	**whether complications occur**			0.067	0.879
good	82(68.3)	81(67.5)			yes	62(51.7)	60(50)		
general	20(16.7)	18(15)			no	58(48.3)	60(50)		
bad	18(15)	21(17.5)							

3.2. Comparison of self-management efficacy after intervention

After 6 months of intervention, 7 of the 20 entries in the questionnaire were not statistically different from the control group (P>0.05), which were Article 3(When my blood sugar level is too low, I have the ability to adjust my blood sugar value myself.), Article 5(I have the ability to choose different types of food to maintain a healthy diet plan.), Article 6 (I have the ability to control my weight to the desired range), Article 8(I have the ability to do enough physical activity.), Article 11(When the doctor advises me to do more physical activities, I have the ability to do it.), Article 14(When I am out, I have the ability to choose the type of food I choose and maintain my diet plan.), Article 16(When I am dining out or attending a party, I have the ability to choose different types of food and maintain my healthy eating plan.). The other 13 items in the intervention group were statistically different from the control group (P<0.05), and were superior to the control group. See Table 2 for details.

Table 2 Comparison of self-efficacy of diabetes management in two groups after intervention

Item	group	Self-efficacy			χ^2	*P*
		Can not	neutral	can		
1. I have the ability to detect blood sugar when I need it.	control group	54	30	36	24.007	0.000*
	intervention group	20	36	64		
2. When the blood sugar level is too high, I have the ability to adjust my blood sugar value by myself. (e.g.: eating different kinds of food)	control group	12	50	58	8.393	0.015*
	intervention group	9	31	80		
3. When my blood sugar level is too low, I have the ability to adjust my blood sugar value myself. (e.g.: eating different kinds of food)	control group	10	50	60	4.918	0.086
	intervention group	7	36	77		
4. Ability to choose the food that is most conducive to my health.	control group	23	35	62	20.258	0.000*
	intervention group	3	36	90		
5. I have the ability to choose different types of food to maintain a healthy diet plan.	control group	3	29	88	4.198	0.123
	intervention group	0	30	90		
6. I have the ability to control my weight to the desired range.	control group	5	35	80	5.713	0.057
	intervention group	1	25	94		
7. I have the ability to check my feet on my own. (e.g.: wound or blisters)	control group	6	18	96	6.992	0.030*
	intervention group	2	8	110		
8. I have the ability to do enough physical activity. (e.g.: dog walking, yoga, gardening or stretching, etc.)	control group	2	20	98	0.126	0.939
	intervention group	2	18	100		
9. When I am sick, I can still maintain my diet plan.	control group	13	25	82	6.840	0.033*
	intervention group	3	26	92		
10. Most of the time, I can really follow my healthy eating plan.	control group	8	38	74	6.274	0.043*
	intervention group	3	26	91		
11. When the doctor advises me to do more physical activities, I have the ability to do it.	control group	3	25	92	1.175	0.556
	intervention group	1	28	91		
12. When my physical activity increases, I have the ability to adjust my diet plan.	control group	9	22	85	7.025	0.030*
	intervention group	1	23	96		
13. When I go out, I can still follow a healthy diet plan.	control group	19	39	62	9.231	0.010*
	intervention group	7	31	82		

14. When I am out, I have the ability to choose the type of food I choose and maintain my diet plan.	control group	15	45	60	0.227	0.893
	intervention group	11	30	79		
15. I am still able to follow a healthy diet plan during special holidays.	control group	20	52	48	19.938	0.000*
	intervention group	8	30	82		
16. When I am dining out or attending a party, I have the ability to choose different types of food and maintain my healthy eating plan.	control group	15	45	60	0.227	0.893
	intervention group	11	30	79		
17. When I face stress or anxiety, I can still maintain my diet plan.	control group	16	53	51	17.333	0.000*
	intervention group	8	29	83		
18. I can go to the doctor at least four times a year to monitor my diabetes status.	control group	16	41	63	6.345	0.042*
	intervention group	5	44	71		
19. I am able to take the medicine on time according to the doctor's prescription.	control group	8	42	70	7.343	0.025*
	intervention group	3	28	89		
20. When I am sick, I can still maintain my diabetes medication.	control group	10	37	73	6.596	0.037*
	intervention group	3	28	89		

(Note: * represents the intervention group compared with the control group, P＜0.05)

3.3. Comparison of self-management behavior after intervention

After 6 months of intervention, 4 of the 12 items are not statistically significant (P>0.05), which are Article 4(days to consume greasy food or whole milk products in 7 days), Article 5(days of exercise lasting >30 minutes within 7 days), and Article 6(days of moderate intensity activity within 7 days); The remaining 9 items and total scores are statistically different between the intervention group and the control group (P<0.05). See Table 3 for details.

Table 3 Self-management behavior score analysis after intervention ($\bar{\chi}$ ±s)

Item	group		t	P
	control group	intervention group		
1. The number of days that a diabetic diet requires a reasonable diet within 7 days	4.42±2.722	6.04±2.124	5.151	0.000*
	3.66±2.673	6.12±1.986	4.837	0.000*
2. The average number of days of diabetes diet per week in the past month	4.02±2.291	4.24±1,988	0..909	0.923
	3.56±2.526	4.17±2.416	1.906	0.840
3. Days in which five or more fruits/vegetables are eaten in one day	3.36±1.913	6.63±1.695	1,179	0.525
	4.83±2.532	5.63±2.477	2.475	0.564
4.Days to consume greasy food or whole milk products in 7 days	2.94±2.613	6.80±1.371	5.769	0.023*
	2.54±2.275	5.73±2.356	7.299	0.043*
5.Days of exercise lasting >30 minutes within 7 days(including "walking")	3.18±2.168	6.61±1.844	1.668	0.043*
	2.73±1.709	6.76±1.226	1.464	0.001*
6. Days of moderate intensity activity within 7 days (including brisk walking, swimming, cycling, etc.)	3.63±3.186	5.35±2.755	4.465	0.000*
	1.35±0.478	0.25±0.432	1.727	0.001*
7.Number of days of blood glucose monitoring within 7 days				
8.The number of days to complete the blood glucose monitoring times for your condition within 7 days				
9. Within 7 days, carefully check the number of days with or without problems on your feet.				
10. The number of days in which the inside of the shoe is checked for foreign matter, flatness, and comfort within 7 days.				
11.The number of days to take the drug or insulin injection as required by the doctor within 7 days				
12.Average number of cigarettes a day in 7 days				
Total score	31.38±3.372	69.68±3.245	49.012	0.000*

(Note: * represents the intervention group compared with the control group, *P ＜0.05*)

4. Discussion

According to the notice of the General Office of the National Health and Family Planning Commission on strengthening the management of health education information services, no matter what form of health education, it is necessary to start from the actual needs of local residents. The control of type 2 diabetes cannot be solved by drugs alone. There is a huge gap between the self-management level of rural left-behind elderly with type 2 diabetes and that of urban elderly. Based on the needs of rural elderly patients, relevant health education programs have been developed. The one-to-one format is used to educate patients on diet, exercise, drugs, blood glucose monitoring and other related knowledge and skills, so that they can form good self-management behavior to control the occurrence and development of complications [10, 11]. The improvement of patients' self-management ability can enhance the confidence of patients and disease resistance, increase the medical ability, relieve the family's economic burden to a certain extent, and rationally and effectively utilize medical institutions' resources.

4.1. The self-management efficiency of rural left-behind elderly patients with type 2 diabetes has been improved

This study showed that after 6 months of intensive health education intervention, 13 of the 20 items in the intervention group had statistical differences in self-management efficacy compared with the control group ($P < 0.05$), while 7 items had no statistical differences ($P > 0.05$). That is: ① Blood sugar control: The patient's self-testing ability to measure blood sugar is improved, and when his own blood sugar is too high, the confidence in adjusting blood sugar through food increases; However, when blood sugar is too low, you cannot choose the right food type to raise blood sugar. According to the analysis, due to the low general cultural level of patients, the clinical manifestations of such complications of hypoglycemia and the knowledge related to post-occurrence treatment are not known; At the same time, most patients' knowledge of diabetes remains at any level when diabetics cannot eat sugar or sweets. Therefore, in the health education of blood sugar control, the treatment of complications related to hypoglycemia should be paid more attention to. At the same time, it should promptly correct the obvious misunderstandings of patients in self-management. The results are similar to those of Hu Jianjiang et al. [12].②Diet: Patients have the ability to choose healthy foods with increased confidence, and at the same time have a determination to adhere to a healthy diet plan during special periods such as illness, increased exercise, special holidays, and anxiety; However, the effects on the choice of food types are still not satisfactory during the usual and outings. It may be because the elderly usually lack economic resources and their lives are frugal, which leads to a single choice in the choice of food types; In such cases, researchers should consider the social support of patients, especially the support of their children, when conducting dietary health education. Usually give the elderly the corresponding economic support to ensure the development of the diet plan. The results of this study are consistent with the results of Luo Qianqian et al. [13].③Drugs: In the usual time and in the special period of illness, the confidence of adhering to the drug is increased, and the elderly are more uncomfortable due to the increase in the body during the illness, and the demand for the drug and the disease are more important than usual; However, in health education, it is necessary to continuously give the elderly the importance of regular medication for disease control.④Foot examination: The ability to check the feet on their own is increased. The old man is easy to implement, and the abnormality of the foot can be observed during the process of washing the feet.⑤Sports: The overall effect is not good, no matter the amount of exercise, exercise time or sports type is not good. The body's various functions may decline due to the age of the patient. At the same time, since most of the elderly are still engaged in agricultural activities, they think that they have reached the amount of exercise, so the overall situation is poor. This result is consistent with the research of Zhu Lifang et al [14] researchers.

4.2. Left-behind elderly patients with type 2 diabetes in rural areas have improved their self-management behavior

This study showed that after 6 months of intensive health education intervention, among the 12 items, 8 items in the intervention group had statistical significance ($P < 0.05$), and 4 items had no statistical significance ($P > 0.05$), and the total score was significantly different ($P < 0.000$). Therefore, it can be seen that the overall level of self-management behavior after intervention has been significantly improved. It can be seen that the application of intensive health education in rural elderly patients with residual health has certain effects. Research on self-management effectiveness and self-management behavior shows that [18] is directly proportional to the relationship between the two. That is, the higher the self-efficacy, the higher the confidence in the completion of a certain behavior, and therefore the behavior will actually occur.①In the diet, it is mainly reflected in the fact that the number of days for patients who have a reasonable diet per week is significantly higher than that of the control group. In the process of strengthening health education, the intervention personnel consulted in advance the endocrinologist of a top three hospital to develop a more scientific recipe. In the implementation process, taking into account the patient's education level and understanding ability, the use of food matching display and video, pictures and other means, so that the elderly have a more intuitive and scientific impression of how much to eat, what to eat, how to eat.②The number of days of self-tested blood glucose per week was higher than that of the control group. Self-testing of blood glucose has a certain technical content, and most elderly people do not have the confidence to complete the project; Taking into account the concerns of the elderly, the intervention staff used one-on-one and hands-on teaching on the project. Every old person present at the scene is measured on the spot. During the operation, the old man can see that his companions can complete and strengthen their confidence. At the same time, the blood sugar check record table is distributed to record the daily blood sugar level, which can increase the self-discipline of the elderly to a certain extent.③The number of days of checking the feet and shoes was better than that of the control group. Diabetic foot is the main cause of disability in patients with type 2 diabetes. This item is completed well. Because it can be viewed every time wash feet, the elderly with abnormal vision have a bad effect in the implementation of foot observation; At this time, family members should give corresponding support.④The number of days the patient took the drug correctly and injected insulin was also higher than the control group; After the implementation of intensive health education, patients pay more attention to insulin, especially those with a course of 5-10 years or more. Insulin is a necessary intervention measure for patients with type 2 diabetes in the later stage. Teaching the elderly to inject insulin by themselves can, on the one hand, immediately relieve the crisis caused by hyperglycemia of patients; on the other hand, it is more convenient and faster than going to a medical institution for injection. In strengthening health education, the intervention personnel can help patients master the method, location and matters needing attention of insulin injection through hand-in-hand teaching, model demonstration, patient trial and other methods. We also talked about insulin storage.。⑤However, there was no difference between the two groups in the number of days consumed more than five types of fruits and vegetables, oily foods, exercise time and exercise status. For the elderly's choice of food types, due to the restriction of economic conditions and different regions, there are fewer than 5 kinds of food, most of which are relatively single. In terms of exercise, most of the elderly were still engaged in agricultural work in a more uniform time and manner than in cities, so there was no difference between the two groups in terms of exercise.

5. Conclusion

In summary, through targeted intensive health education for rural left-behind type 2 diabetic patients, self-management efficacy and self-management behavior have been improved to some extent. This increases the patient's knowledge of the disease and the ability to monitor and control the disease to a large extent; At the same time, the patient's initiative to prevent and treat diseases

has increased, and to some extent, improved compliance behavior and improved patient compliance. This is conducive to the outcome of the disease and improve the quality of life of patients. In addition, it also enlightens nursing workers to have a clearer and more detailed intervention direction and intervention level in the health education of diabetic patients. At the same time correct the misunderstanding of the patient's existence. In this study, due to the limitations of actual conditions, the sample size selected is small and has certain limitations; Secondly, the investigation intervention is relatively simple, so this study is only for reference. In the future, multi-angle and multi-factor intervention investigations can be taken, such as the environment in which patients are located, social relationships of patients, friends, and other social relationships, in order to obtain better investigation intervention results and make the results more instructive.

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