The Mediating Effect of Social Support Level of Elderly Hypertensive Patients between Chronic Disease Management and Self-management

Liang Ziyun, Wang Zixian, Li Jinyue

School of Public Health, Sun Yat-sen University, Guangzhou, Guangdong, China, 510220

Keywords: Hypertension; Social Support; Chronic Disease Management; Self-Management; Mediating Effect

Abstract: To explore the relationship between social support level of elderly hypertensive patients and chronic disease management and self-management, 375 elderly patients with hypertension are enrolled. Social support rating scale, chronic disease management rating scale and hypertension patients' self-management behavior rating scale are used for investigation. Based on the final research results, it is concluded that self-management is significantly positively correlated with chronic disease management and social support, while chronic disease management and social support are significantly positively correlated. Social support plays an intermediary role between chronic disease management and self-management, which is reflected in the dimensions of exercise management and disease monitoring. As a result, it is demonstrated that the improvement of chronic disease management system and the social support level of elderly hypertensive patients can improve their self-management level, which is conducive to the disease control.

1. Introduction

Hypertension is a serious global health problem [1].China has become the country with the greatest burden of hypertension in the world. In 2010, there is an estimated 265 million hypertension patients in China. Without corresponding improvement measures, this number is likely to reach 352 million by 2030 [2]. Social support (SS) is an important factor affecting the health and disease of the elderly with chronic diseases. Evidence shows that spouses/partners, families, friends, colleagues, neighbors and community members can be important sources of support during periods of poor health and accompanying stress [3]. Compared with people with insufficient social support, the survival rate of people with good social relations is 50% higher. The degree of this effect is equivalent to quitting smoking and exceeds many well-known risk factors of death (e.g. obesity, lack of physical exercise) [4]. Self-management of hypertension has been proved to improve patients' short-term blood pressure control. Research shows that social support for hypertension is affected by self-management level .Given the complexity of self-management, many patients need the support of family members, friends and professional organizations to successfully manage their diseases. A large amount of literature show that patients with higher level of family support are more likely to show self-management behavior frequently [5]. Relevant research shows that the score of the Patient Assessment of Chronic Illness Care (PACIC) is significantly related to self-management [6]. The purpose of this study is to explore whether there is a mediating effect of social support level of elderly hypertensive patients between chronic disease management and self-management, so as to provide suggestions for more effectively improving the self-management level and controlling blood pressure of elderly hypertensive patients.

2. Objects and Methods

2.1 Research Objects

The subjects of the survey are the patients who have been diagnosed with hypertension in Guangzhou community and have established health records in the community health service center. The elderly who meet the inclusion and exclusion criteria are selected by stratified sampling.

Inclusion criteria: diagnostic criteria for essential hypertension conforming to China's guidelines for prevention and treatment of hypertension (2010 edition); Age ≥60 years old; Taking at least one antihypertensive drug; Having lived in this community for more than 5 years with small migration mobility; Compliance is better and voluntary participation in the study; Signing the informed consent document, meeting the requirements of medical ethics; Exclusion criteria: suffering from severe the physical and mental illness or having mental retardation, mental history and other abnormal communication problems. A total of 375 eligible subjects are collected.

2.2 Research Content

Basic Information: The survey content includes general information. General information includes: age, gender, educational degree, marriage condition, occupation, family economic situation, payment method of medical expenses, smoking behavior, drinking behavior, living pattern, family history of hypertension, disease course, complications and hospitalization times due to hypertension.

Social Support Rating Scale: the Xiao Shuiyuan's revised Social Support Rating Scale (SSRS) consists of 10 items, including objective support (3 items), subjective support (4 items) and social support utilization (3 items) are adopted. Among them, the scoring range of questions 6 and 7 is 0-9 points, and the other items are divided into 4 grades from low to high, with 1-4 points respectively. Social support is divided into the sum of 10 item scores, and the higher total score and the score of each dimension, the more social support is obtained. The scale has been widely used in China and has high reliability and validity.

Patient Assessment of Chronic Illness Care: Patient Assessment of Chronic Illness Care (PACIC) [9] is used for evaluation, which is equipped with five dimensions involving patient initiative, service system design/practice design, target setting/individual treatment, problem solving and follow-up/collaboration, with a total of 20 items. Each item uses a five-level scoring method with a score of 1-5, and a total score can be obtained by adding up each item. The higher the score shows the better the management of chronic diseases in the community.

Self-management Behavior Assessment Scale for Hypertensive Patients: it includes 6 dimensions and 33 items of medication management, disease condition monitoring, diet management, exercise management, work and rest management, and emotion management. The higher the score, the better the self-management behavior is reflected.

2.3 Research Method

Most elderly patients were investigated with a self-administered questionnaire, while those with a lower education level will be interviewed face to face by uniformly trained investigators.

The quality control of ethics and data will be implemented after ethics review. All patients will voluntarily participate in this study and sign an informed consent form. Pre-survey shall be carried out before the survey to fully test the logic of the questionnaire and the feasibility of the implementation process of the survey, which shall be revised. Only the valid questionnaires are entered.

Statistical methods. The research results will be input into EpiData 3.1 database for error and logic check, and SPSS 22.0 statistical software is used for analysis, including descriptive analysis, Pearson correlation and mediation effect analysis. The difference is statistically significant with $P<0.05$.

3. Results

3.1 General Demographic Characteristics and Disease Situation of Elderly Hypertensive Patients

A total of 386 questionnaires were distributed in this survey, and 375 valid questionnaires were recovered with an effective recovery rate of 97.2%. 375 subjects including 177 male patients (47.2%), 198 female patients (52.8%); 339 (90.4%) are married. Other demographic characteristics

and diseases are shown in Table 1.

Tab.1 General Demographic Characteristics and Disease Status of Survey Subjects (n=375)

Variable	Features	Number of cases	Percentage (%)
Gender	male	177	47.2
	female	198	52.8
Age (years)	60~65	216	57.6
	66~70	78	20.8
	71~75	81	21.6
Marriage	Unmarried/divorced/widowed	36	9.6
	Married	339	90.4
Personal Average Monthly Income (Yuan)	No fixed income	103	27.5
	<2000	181	48.3
	2000~4000	80	21.3
	>4000	11	2.9
History of hypertension	< 1 year	14.	3.7
	1~ year	253	67.5
	5~ years	70	18.7
	> 10 years	38	10.1
Complications (medicine)	No	321	85.6
	Yes	54	14.4

3.2 Descriptive Analysis on Self-management Level, Chronic Disease Management Level and Social Support Level of Elderly Hypertensive Patients

The results showed that the self-management score of elderly hypertensive patients was (113.59±25.08), the chronic disease management score was (72.55±18.95), and the social support score was (34.77 ± 6.36), which was shown in Table 2.

Tab.2 Total Scores of Self-management and Dimensions, Chronic Disease Management and Social Support Scores

Self - management	Score (s)	Total score
Diet management	34.29±8.03	113.59±25.08
Drug administration	16.06±4.03	
Emotion Management	24.34±5.91	
Work and rest management	17.34±5.90	
Sports management	8.34±3.48	
Disease surveillance	13.22±4.27	
Total chronic disease management score		72.55±18.95
Total Social Support Score		34.77±6.36

3.3 Analysis of the Relationship among Chronic Disease Management, Social Support and Self-management of Elderly Hypertensive Patients

Self-management was significantly positively correlated with the total score of chronic disease management and social support, while the total score of chronic disease management and social support was significantly positively correlated(Table 3). The total score of chronic disease management and the total score of social support were significantly positively correlated with the dimensions of self-management such as diet management, emotional management, work and rest management, exercise management and disease monitoring, and there was no obvious correlation between them and medication management(Table 4).

Tab.3 Correlation Analysis among Self-management Total Score, Chronic Disease Management Score and Social Support Score

	Total self-management score	**Total chronic disease management score**	**Total Social Support Score**
Total self-management score			
Total chronic disease management score	0.230**		
Total Social Support Score	0.194**	0.186**	

Note: *: $p < 0.05$, * *: $p < 0.01$.

Tab.4 Correlation Analysis of Scores of Self-management Dimensions, Chronic Disease Management and Social Support

	Diet management	Drug administration	Emotion Management	Work and rest management	Sports management	Disease surveillance
Total chronic disease management score	0.191**	0.051	0.149**	0.291**	0.220**	0.158**
Total Social Support Score	0.126*	-0.009	0.110*	0.106*	0.370**	0.313**

Note: *: $p < 0.05$, * *: $p < 0.01$.

3.4 Intermediary Effect Analysis

In this study, the statistically significant total score of self-management and the dimensions of diet management, emotion management, work and rest management, exercise management and disease monitoring in correlation analysis were included in the intermediary utility analysis.

Taking chronic disease management score as independent variable, social support was always divided into intermediate variables, and self-management score was dependent variable (abbreviated as chronic disease management-social support-self-management). Linear regression analysis showed that chronic disease management score could significantly positively predict social support ($\beta=0.0624$, $t=3.6556$, $P<0.01$), and social support had a significant positive predictive effect on self-management score ($\beta=0.6189$, $t=3.9668$, $P<0.01$), indicating that social support played a partial mediating role between chronic disease management score and self-management score. The Bootstrap method is used to test the significance of the mediating effect of social support. The results showed that the 95% confidence interval of the mediating effect of social support between chronic disease management and self-management was [0.0154, 0.0691], indicating the existence of mediating effect with the effect value of 0.0386 and the mediating effect accounting for 12.66% of the total effect.

In terms of other dimensions of self-management, the results were showed in Table5. To sum up, social support had a partial mediating effect between chronic disease management and self-management, which is reflected in the dimensions of exercise management and disease monitoring.

Tab.5 Mediating Effect Analysis Model

Intermediary model hypothesis	Dependent variable	independent variable	β	t	R2	F	Utility value
Chronic disease management -Social support -Self-management	Social support	Chronic disease management	0.0624	3.6556**	0.0346	13.3632**	0.0386
	Self - management	Chronic disease management	0.2662	3.0928**	0.0768	15.467**	
		Social support	0.6189	3.9668**			
Chronic disease management -Social support -Diet management	Diet management	Chronic disease management	0.0736	3.3689**	0.0449	8.7538**	
		Social support	0.118	1.8117			
Chronic disease management -Social support -Emotional management	Emotion Management	Chronic disease management	0.0414	2.5549*	0.0291	5.5811**	
		Social support	0.0792	1.6401			
Chronic disease management -Social support -Work and Rest management	Work and Rest management	Chronic disease management	0.0874	5.5702	0.0873	17.7919**	
		Social support	0.0497	1.0616			
Chronic disease management -Social support -Sports management	Sports management	Chronic disease management	0.0288	3.2425**	0.1605	35.5473**	0.0288
		Social support	0.1867	7.0446**			
Chronic disease management -Social support -Disease surveillance	Disease surveillance	Chronic disease management	0.0233	2.0779*	0.1081	22.5390**	0.0123
		Social support	0.1972	5.8866**			

Note: *: $p < 0.05$, * *: $p < 0.01$

4. Conclusion

The results provided by this study show that there is a positive correlation between self-management and chronic disease management, which is consistent with the research results of Glasgow RE, Anderson R M[11-12]. There is a positive correlation between self-management and social support, which is consistent with the research results of Anke Lenferink and Lee[13-14]. Chronic disease management is significantly positively correlated with social support, which is consistent with research results of Dower [15].

This study shows that social support plays a partial mediating role between chronic disease management and self-management. On the one hand, improving the chronic disease management system can improve the level of social support for patients to a certain extent, which is probably due to the following reasons: (1) A good chronic disease management system can fully incite the enthusiasm of patients and enable them to actively utilize social support; (2) Follow-up for patients has become a new source of social support. On the other hand, improving patients' social support level can make self-management more effective, especially in the dimensions of exercise management and disease monitoring. With more social support, for example, elderly hypertensive patients are more willing to take part in sports when they have peers who play a role of accompanying and urging each other, then patients will perform better in sports management. In terms of disease monitoring, the patient's condition is always concerned when there are children around. Children will take their parents to the hospital for physical examination on their own

initiative while patients without children around are more inclined to ignore the symptoms.

Based on the above analysis of the mediating effect of social support between chronic disease management and self-management, we can understand the relationship between hospital intervention and self-management in chronic disease prevention and control, and at the same time let doctors and patients pay attention to the role of social support. It provides a new way to improve the self-management level of patients, and can predict the self-management level of patients and the perfection degree of hospital chronic disease management system by analyzing the social support level of patients. However, this study only discusses the intermediary role of the total score of social support. Future studies can further explore the specific role of social support classification (subjective support, objective support, support utilization) and the influence of chronic disease management in different dimensions on the level of social support from the perspective of chronic disease related managers, thus providing reform focus for community medical and health institutions in order to obtain more effective management and better results.

Acknowledgement

This study was supported by the Sun Yat-sen University Grant for Medical Humanities Practice and Teaching (No. 23000-18008023).

References

[1] S.S. Lim, T. Vos, A.D. Flaxman, G. Danaei, K. Shibuya, H. Adair-Rohani, et al., A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010, Lancet 380 (2012) 2224–2260.

[2] Li D, Lv J, Liu F, Liu P, Yang X, Feng Y, Chen G, Hao M. Hypertension burden and control in mainland China: analysis of nationwide data 2003-2012. Int J Cardiol. 2015;184(1):637–44.

[3] Heinze J E, Kruger D J, Reischl T M, et al. Relationships among disease, social support, and perceived health: a lifespan approach[J]. American journal of community psychology, 2015, 56(3-4): 268-279.

[4] Holt-Lunstad J, Smith T, Layton J. Social relationships and mortality risk: A meta-analytic review. PLOS Med 2010; 7(7): doi:10.1371/journal.pmed.1000316.

[5] MACIEJEWSKI M L, BOSWORTH H B, OLSEN M K, et al. Dothe benefits of participation in a hypertension self- management trial persist after patients resume usual care[J]. Circulation: Cardiovascular Quality and Outcomes, 2014, 7(2): 269-275

[6] NYAABA G N, STRONKS K, MEEKS K, et al. Is social support associated with hypertension control among Ghanaian migrants in Europe and non-migrants in Ghana? The RODAM study[J]. Internal and Emergency Medicine, 2019.DOI:10.1007/s11739-019-

[7] HU H H, LI G, ARAO T. The association of family social support, depression, anxiety and self-efficacy with specific hypertension self-care behaviours in Chinese local community[J]. Journal of Human Hypertension, 2014, 29: 198EP

[8] Glasgow R E, Wagner E H, Schaefer J, et al. Development and validation of the patient assessment of chronic illness care (PACIC)[J]. Medical care, 2005: 436-444.

[9] Glasgow RE,Whitesides H,Nelson CC, et al.Use of the Patient Assessment of Chronic Illness Care (PACIC) with diabetic patients: relationship to patient characteristics, receipt of care, and self-management.[J].Diabetes care,2005,28(11):2655-2661.

[10] Anderson R M, Fitzgerald J T, Gorenflo D W, et al. A comparison of the diabetes-related attitudes of health care professionals and patients [J]. Patient Education & Counseling, 1993, 21(1-2):41-50.

[11] Anke Lenferink,Job van der Palen,Tanja Effing.The role of social support in improving chronic obstructive pulmonary disease self-management[J].Expert Review of Respiratory Medicine,2018,12(8):623-626. DOI:10.1080/17476348.2018.1489723.

[12] Lee, Loretta T.,Bowen, Pamela G.,Mosley, Michael K., et al.Theory of Planned Behavior: Social Support and Diabetes Self-Management[J].The journal for nurse practitioners: JNP,2017,13(4):265-270.

[13] Dower Jo,Coll Joseph R..Patient Assessment of Chronic Illness Care (PACIC) in Type 2 Diabetes [J].Evaluation & the Health Professions, 2016, 39(2):185-203. DOI:10.1177/0163278714556674.