Medication Literacy in a Cohort of Chinese Patients Discharged with Essential Hypertension

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Abstract: To assess medication literacy and important determinants of medication literacy in discharged patients with essential hypertension, we conducted a prospective cohort study in a tertiary hospital in Changsha, Hunan, China between March and June 2016.Patient's demographic and clinical data were retrieved from hospital charts and medication literacy was measured by structured interview using the Chinese version of Medication Literacy Questionnaire on Discharged Patient between 7 and 30 days after discharged. The results showed that medication literacy was insufficient: > 20% did not have adequate knowledge on the type of drugs and frequency that they need to take the drugs, > 30% did not know the name and dosage of the drugs they are taking, and > 70% did not have adequate knowledge on the effects and side effects of the drugs they are taking. Medication literacy score decreased with age but increased with education level and length of hospital stay.

1 INTRODUCTION

With an aging population, chronic non-communicable disease, led by hypertensive disorders, has become China's number one health killer (Hu et al., 2015). On the other hand, the proportion of awareness and preparedness, treatment compliance, and well-controlled patients affected by hypertension in China have been at very low levels (Chen et al., 2015). Self-treatment and self-medication in patients affected by hypertension without appropriate medical supervision were prevalent, and lack of continuation in care and problem arising from multi-drug use were widespread in China (Hu et al., 2010). More importantly, these patients often lack knowledge of appropriate and safe use of anti-hypertensive drugs, so the hypertensive patients have become high risk group of adverse drug events (Hughes et al., 2013). Therefore, the safety of self-medication of patients with hypertension has become a major concern in China. Medication literacy refers to the ability of individuals to acquire and understand drug information and to use this information for safe and appropriate use of medications (Sauceda et al., 2012;

Zheng et al., 2015）. Interventions aiming at improving medication literacy level for patients affected by chronic hypertension have been considered as one of the effective methods to improve self-medication safety (Raynor., 2008; Raynor., 2009). According to the Annual Report of cardiovascular diseases in China in 2015, there were 270 million hypertension patients in the country (Hu et al., 2015). The prevalence of hypertension was 65%, it costs 40 billion yuan each year (Chen et al., 2015). For patients with hypertension, long-term, regular, and correct use of medication is critical to reduce the occurrence of major cardiovascular events (Kripalani et al., 2008). Studies in China found that the medication use of among hypertension patients was often inappropriate or problematic (Hu et al., 2015). A recent survey in China found that the proportion of inappropriate use of anti-hypertensive drugs was very high among outpatients affected by essential hypertension: of the 102 surveyed patients 68 (67%) took these medications inappropriately (Peng et al., 2013). In this study, we further investigated this issue in a cohort of hospitalized patients affected by essential hypertension in China.

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2 EXPERIMENTAL SECTION

2.1 Participants

Patients diagnosed with essential hypertension and admitted to the Third Affiliated Xiangya Hospital of Central South University in Changsha, Hunan, China between March and June 2016 were invited to participate. Inclusion criteria were (1) age ≤ 85 years of age with competent language communication ability; (2) taking anti-hypertensive drugs ≥ 2 weeks; (3) mentally stable; (4) voluntarily participating in the study under the principle of informed consent. Exclusion criteria were (1) mentally unstable or major mental disorder; (2) major chronic diseases such as chronic obstructive emphysema, severe hepatic or renal insufficiency. We obtained ethical approval from third Xiangya Hospital, Central South University Research Ethics Board to conduct this study (project identification code: 2016-S001) before the commencement of the study and all participants provided written informed consent.

2.2 Data Collection

Medication literacy was measured by the Chinese version of Medication Literacy Questionnaire on Discharged Patient developed by Maniaci from Mayo Clinic in the United States (Maniaci et al., 2008). This questionnaire has been translated into Chinese and modifications have been made according to Chinese culture (Zheng et al., 2015). The questionnaire attempts to evaluate the patient's ability to understand, calculate, and process pharmaceutical information. The questionnaire contains 9 items and uses a dichotomy scoring system, with a correct answer for a score of "1" and an incorrect answer for a score of "0". At discharge the attending doctor provided instructions of the prescribed drugs to the patients, including the names, dosage, frequency of use, therapeutic effects, and main side effects. We compared the patient's answers to the doctor's instructions and if the answer was right one score was given and if the answer was incorrect no score was given. Item 7 has only a "Yes" or "No" answer and item 9 has only specific names. Therefore, item 7 and item 9 contribute no score towards total score. As a result, the full score of this questionnaire is 7, with a higher score indicates higher level of medication literacy. For individual patients, the possible score is 0 to 7 without decimals, with 0 means all answers are incorrect and 7 means all answers correct. The Cronbach's α coefficient of the Chinese version of questionnaire content was 0.85, validity index was 0.81, and retesting reliability coefficient was 0.94 (Zheng et al., 2015).

On the discharge date, patient's demographic and clinical data such gender, age, education level, medication, and length of hospital stay were retrieved from hospital charts. Between 7 and 30 days after the patient was discharged from the hospital, staff at the research team made telephone calls to the patients to collect data on medication literacy.

2.3 Data Analyses

Means, standard deviations (SDs), and percentages were used to describe the patient's baseline characteristics and medication literacy level. T-test was used in the univariate analysis and multiple linear regression analysis was used to analyse the independent effect of determinants of medication literacy. Full model with all determinants considered in this study being entered into the multiple linear regression model. SPSS version 19.0 (2010, New York, NY, USA) was used in all analyses.

3 RESULTS

3.1 Medication Literacy

A total of 147 discharged patients with essential hypertension were invited to participate in this study, 5 patients refused to participate in the study and 10 patients did not complete the questionnaire, leaving 132 (91%) for final analysis. Among the 132 patients, 62 were male and 70 were female. Means (SDs) of patient's age were 59.4 (15.7) years, number of medicines that the patients were taking at discharge were 4.4 (2.2), and hospital days were 8.1 (3.7).

Details of the medication literacy for this cohort of discharged patients with essential hypertension are displayed in Table 1. In brief, mean (SD) of medication literacy score was 4.89 (1.28). Although all patients knew that they should take medicines after discharge from hospital, only 55.3% of them knew how many medicines they should take on daily basis, 43.9% could name the medicines they were taking, and about 28% knew the effects and side effects of the medications they were taking.

Table 1: Medication literacy for discharged patients with hypertension, Changsha, Hunan, China, March to June 2016 ($n = 132$).

Items	Number of Correct Answer	Proportion (%)
1. Did you take medicines after you were discharged from hospital?	132	100.0
2. How many kinds of medicine did you need to take every day?	73	55.3
3. Did you know the names of the medicines that you are taking?	58	43.9
4. Did you know the dosage of the medicines that you are taking?	87	65.9
5. Did you know how many frequent you should take the medicines?	131	99.2
6. Did you know the effects of every medicine that you are taking?	128	97.0
7. Have you ever been warned of the side effects of the medicines that you are taking?	22	16.7
8. Did you know the side effects of the medicines that you are taking?	37	28.0
9. Did you know whom you should consult with in case of questions related to the medicines you are taking?		
Local doctors	32	24.2
Doctors who give the prescription	51	38.6
Pharmacist	6	4.5
I don't know	35	26.5
Others	8	6.1

3.2 Determinants of Medication Literacy

Table 2 shows the results of univariate analysis. Four factors were significantly associated with medication literacy, with higher scores observed in male, younger, highly educed patients, and patients who took a lower number of medicines at discharge.

Table 3 presents results from multiple linear regression analysis. Three factors showed independent association with medication literacy, with medication literacy scores decreased with age but increased with education level and prolonged hospital stay.

Table 2: Results of univariate analysis of determinants of medication literacy for discharged patients with hypertension, Changsha, Hunan, China, March to June 2016 ($n = 132$).

Variable Name	Mean (SD) of Total Score	T/H	p
Age		4.078	0.000
<65years	5.23±1.30		
≥65years	4.35±1.05		
Gender		0.759	0.449
Male	4.81±1.27		
Female	5.60±0.97		
Year of schooling		7.550	0.000
≤ 6 years	4.08± 0.97		
7-9	4.81±1.24		
10-12	4.98±1.26		
>12	5.76±1.18		
Marital status		2.526	0.084
Married	4.93±1.29		
Unmarried	4.30±0.95		
Number of medicines taken at discharge		-0.257	0.798
≤7	4.87±1.29		
>7	5.00±1.22		
Length of hospital stay		-2.153	0.033
≤8 days	4.72±1.26		
>8 days	5.22±1.26		

Table 3: Results of multiple linear regression analysis of determinants of medication literacy for discharged patients with hypertension, Changsha, Hunan, China, March to June 2016 (*n* = 132).

Determinants	*B*	*SE*	*p*
Age (each 10 years)	-0.022	0.009	0.018
Education (each year of schooling)	0.428	0.159	0.008
Hospital stay (each day of stay)	0.059	0.027	0.030

4 DISCUSSIONS

Our study, based on a cohort of discharged patients with essential hypertension, found that medication literacy for these patients was insufficient: > 20% did not have adequate knowledge on the types of drugs that they need to take the drugs, > 30% did not know the name of or the dosage of the drugs they are taking, and > 70% did not have adequate knowledge on the effects and side effects of the drugs. As a result, it is critical to improve health literacy of these patients in China as improved literacy could improve medication adherence and therefore outcomes. Our study also found that age, education, hospital stay was independently associated with medication literacy level.

Medication literacy level decreased with age in our study sample. This result was consistent with the finding of previous studies (King et al., 1998; Choi., 2011; Zamora., 2011). The cognition of elder patients may be poorly, therefore their ability of learning and memory may be not as good as younger patients. Our results indicated that high education was associated with a better literacy level. This was inconsistent with Mania et al (Maniaci et al., 2008). The positive correlation between education status and medication literacy level suggested that literacy ability could help in better understanding of medication information and health issues, and therefore enhancing the medication literacy. The positive association between hospital stay and the level of medication literacy is interesting and is first reported by us. We speculate that during longer the patients stay in hospital, the more health information including both hypertension and anti-hypertensive drugs they gained, which translated to medication literacy.

Lack of medication literacy exposed the hypertension patients to increased risks of re-hospitalization, emergency department visits, or serious consequences due to adverse events related to unsafe medication (Toren et al., 2006; Sarkar et al., 2011). Effective communication on medication between patients and health care professionals is an important way to improve medication literacy (Choi., 2011; Yedidia et al., 2003), and it is the key to decrease the medication errors. Verbal communication with physicians, patients could not remember detailed medication information and counselling well, so providing comprehensive written material on medication education for patients is another important method. Meanwhile, follow-up after discharge could remind patients to pay more attention to their medication. Our study has several strengths. First, although studies on medication literacy for patients discharged with hypertension have been conducted in other populations, to the best of our knowledge, this is the first study that has measured the medication literacy and examined the determinants of medication literacy in discharged hypertension patients in a Chinese population. Because of the important differences in culture and health care systems in China as compared with other populations/jurisdictions, a study in the Chinese population is needed. Second, we used a validated tool to measure medication literacy, which lends validity to the study results. Third, patients surveyed in this study had homogeneous condition with accurate diagnoses by a tertiary care centre in China, which lends further validity to the study findings. Fourth, the collected data were analysed by solid statistical methods with results easy to be interpreted.

Limitations of our study should be recognized. First, our data were collected only from a single hospital in Changsha, Hunan. To what extent the results can be applicable in other jurisdictions need to be replicated. Second, we used the same tool to access the participant with different ages, which may not be appropriate for certain age groups.

5 CONCLUSIONS

Medication literacy is insufficient for hospitalized patients affected by essential hypertension. Age, education, and hospital stay are important determinants of medication literacy, with medication literacy level decreases with aging but increases with education level and hospital stay.

AUTHOR CONTRIBUTIONS

CONFLICTS OF INTEREST

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