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Medication Knowledge, Safe Use of Medicines and Health Literacy in Southern Taiwan: A Cross-section Study

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Authors' contributions

This work was carried out in collaboration between all authors. Authors MLC and LNC were responsible for design of the project, direct collection of the data, data and statistical analysis and manuscript preparation. Authors HSC and HYC contributed to study design and manuscript preparation. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: There was a high prevalence of non-prescribed medicine usage in Taiwan the reasons for this phenomenon may be the false advertisements on underground radio programs that exaggerate the efficacy of non-prescribed medicines combined with inadequate medication knowledge and the high prevalence of adverse self-medication of Taiwanese people. As the result, it is critical to investigate the health literacy in Taiwan. The aim of this study was to investigate the relationship between medication knowledge, safe use of medicines and health literacy in southern Taiwan.
Methodology: A cross-sectional survey was used in the study. A total of 513 residents were recruited and 87 of these were excluded because of invalid data, giving a response rate of 83.0%.

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Data were collected from February to August 2013.
Results: From 426 residents who participated in the study, 60.6% were women. The mean age of study participants was 45.8±5.2 years and the majority of them (38.7%, N=165) were between 31-50 years old. Health literacy was positively associated with medication knowledge (r =.520, p<.01) and safe use of medicines (r =.643, p<.01). Medication knowledge was positively related to safe use of medicines (r =.378, p<.01).
Conclusion: Medical knowledge and safe use of medicines affect health literacy. Residents with appropriate medical knowledge, reduce adverse self medication behaviors, and promote health literacy.

Keywords: Health literacy; medication knowledge; safe use of medicines; medicine.

1. INTRODUCTION

There was a high prevalence of non-prescribed medicine usage in Taiwan which included10% of Western medicine, 60% of Chinese herbal medicine and 90% of health products were taken without prescriptions [1]. The Taiwanese prevalence of final-stage renal disease is the highest in the world, with 2,547 per 1 million people being affected [2]. Furthermore, residents who lived in southern Taiwan had the highest dialysis rates in Taiwan [3]. Reasons for this phenomenon may be the false advertisements on underground radio programs that exaggerate the efficacy of non-prescribed medicines combined with inadequate medication knowledge and the high prevalence of adverse use of medicines of Taiwanese people [3]. Berkman et al. [4] searched 98 references and found low health literacy was consistently associated with poorer ability to interpret labels and health messages, poorer ability to demonstrate taking medications appropriately, and poorer overall health status. People with limited health literacy are more likely to have risk factors for preventable chronic diseases. As the result, it is critical to investigate the relation between medication knowledge, safe use of medicines and health literacy in southern Taiwan.

The Ministry of Education, Taiwan, ROC identified safe use of medicines is to understand the correct use of medication, to read the label, to acquired the effects and side effects of medication [5]. People experience insufficient medication knowledge; particularly in medication cognitive, but also in treatment belief and health attitude. The weak knowledge could be a result of deficiencies in the basic health literacy. Devraj et al. [6] surveyed 139 chronic patients and found patients with low health literacy had significantly lower pain medication knowledge ($p < 0.05$). Perceived adequate medication knowledge was correlated with beliefs about the necessity of medication, medication treatment and overall health status [7].

Safe use of medicines is delineated to take medicines with prescriptions, to be aware of medication advertised, to distinguish medicines recommended by family or friends, to manage the leftover medicines and to waste appropriately [8]. Adverse medication behaviors are a global concern and have frequently been held responsible for inducing drug resistance, higher cost of further treatment, and other complications. People were familiar with basic information about administration of their prescription medicines, but lacked knowledge about safe use of medicines [9]. Research had shown that increasing safe use of medicines was significantly reducing adverse self medication behaviors [10].

Health literacy is defined as an individual's ability to obtain, process, and understand health information in order to make wise decisions about action and it has an impact on a person's health outcomes [11,12]. Low health literacy may be a barrier in access to health information and health care medication knowledge and use. Therefore, low health literacy has been associated with a range of poor health outcomes. A large proportion of patients with low health literacy have difficulty in reading written descriptions of basic medical procedures and it associated with worse knowledge in individuals with medical problems [13,14]. The purpose of this research was to investigate (1) the relation between socio-demographics and health literacy, (2) the relation between socio-demographics and medication knowledge, (3) the relation between socio-demographics and safe use of medicines, and (4) the relation between medication knowledge, safe use of medicines, and health literacy.

2. METHODOLOGY

A cross-sectional survey was used in the study. Participants were recruited from counties in southern Taiwan for this study. This study started after the approval of the Institutional Review Board (IRB approval number: 102-163B). Interested and eligible participants were informed about the study and written consents were obtained before participants completed the questionnaires. Participants were informed that they could withdraw from the study at any time without reason or penalty.

Selection criteria included participants who (1) were older than 20 years old, (2) had lived in Southern Taiwan over 6 months, (3) were able to communication orally or in writing in Mandarin or Taiwanese. Exclusion criteria were (a) serious mental problems, including dementia, and (b) inability to communicate cogently. Data were collected from February to August 2013. A total of 513 residents were recruited and 87 of these were excluded because of invalid data, giving a response rate of 83.0%.

2.1 Instruments

Socio-demographics data included age, gender, educational level, occupation, diagnosed with chronic diseases, and family members work in medical-related fields.

The Test of Functional Health Literacy in Adults (TOFHLA) was original developed to measure health literacy by Paker [15]. Chang (2007) revised Taiwanese version c-sTOFHLA [16]. The c-sTOFHLA which comprised 36 items and divided into two areas: medical comprehension (20 items) and medical rights (16 items). One correct answer was worth one point, with a total of 36 points available. The higher total instrument scores, the greater health literary. From a previous analysis of responses by 309 residents, the 36 items were determined to be well-internally consistent (α = .87) [16]. In this study, the Cronbach's α was 0.92 for the overall scale and 0.88 and 0.82 for the two subscales.

The Medical Knowledge and Ability Instrument were original developed to measure medication cognition, knowledge and ability of Taiwanese residents by Chi [17]. The instrument comprised 35 items and divided into two dimensions: medication knowledge (19 items) and safe use of medicines (16 items). One correct answer was worth one point with a total of 35 points available. From a previous analysis of responses by 287 residents, the 35 items were determined to have adequate internally consistent (α = .70) (Chi, 2009) [17]. Data from the 426 residents in the present study confirmed that the 35 items had strong internal consistency (α = .974) and 0.78 and 0.82 for the two subscales.

2.2 Data Analysis

Descriptive statistics were used for the demographic characteristics. To answer the research question regarding the relationship between demographic and the variables of medication knowledge, safe use of medicines, and health literacy, the *t*-test and One Way ANOVA were used. A Pearson and Spearman correlation was conducted to examine the relationships between medication knowledge, safe use of medicines and health literacy. In this study, 0.05 was considered as significance level. All analyses were performed using SPSS software (version 18).

3. RESULTS

From 426 residents who participated in the study, 60.6% were women. The mean age of study participants was 45.8±5.2 years and the majority of them (38.7%, N=165) were between 31-50 years old. The majority of participants (52.4%, N=223) had a bachelor's degree, 50.7% were in the service sector and agricultural sector (10.8%, N=46). 16.6% were diagnosed with chronic diseases which were cardiovascular diseases (N=32), diabetic mellitus (N=23) and renal diseases (N=16) (Table 1).

Female participants had significantly higher mean scores in health literacy (mean $_{female}$ =32.85±2.87 VS mean $_{male}$ =31.31±4.10, p < 0.01) and medical knowledge (mean $_{female}$ =17.86±1.36 VS mean $_{male}$ =17.31±2.01, p < 0.01). Over 65 years old residents recorded significantly lower mean scores in health literacy (mean $_{over\ 65}$= 28.52±3.18 VS mean $_{20\text{-}30}$= 33.21±3.72, mean $_{31\text{-}50}$= 33.04±3.44, mean $_{51\text{-}64}$= 31.14±3.56, p < 0.01) and medical knowledge (mean $_{over\ 65}$= 16.79±1.28 VS mean $_{20\text{-}30}$= 17.82±1.55, mean $_{31\text{-}50}$= 17.85±1.83, mean $_{51\text{-}64}$= 17.30±1.68, p < 0.05). Higher educational level recorded significantly higher mean scores in health literacy (mean $_{bachelor}$ =33.23±2.22 VS mean $_{senior\ high}$ =31.94±3.18, mean $_{junior\ high}$ =29.07±2.96, p < 0.01) and medical knowledge (mean $_{bachelor}$ =17.97±1.34 VS mean $_{senior\ high}$ =17.47±1.28, mean $_{junior\ high}$ =16.56±1.46, p <

0.01). Family members work in medical fields affected the mean scores in health literacy (mean $_{\text{family members work in medical fields}}$ =33.44±2.95 VS mean $_{\text{family members not work in medical fields}}$ =32.19±3.94, p < 0.01). Participants with chronic diseases had significantly lower mean scores in health literacy (mean $_{\text{with chronic diseases}}$ =30.15±3.42 VS mean $_{\text{without chronic diseases}}$ =32.72±2.71, p < 0.01) and medical knowledge (mean $_{\text{with chronic diseases}}$ =17.79±1.30 VS mean $_{\text{without chronic diseases}}$ =17.08±1.18, p < 0.05).

Table 1. Participants characteristics (N=426)

Characteristics	N	%
Gender		
Male	168	39.4
Female	258	60.6
Age (45.8, 5.2)		
20-30	83	19.5
31-50	165	38.7
51-65	95	22.3
Over 65	83	19.5
Occupation		
Agricultural sector	46	10.8
Business sector	164	38.5
Service sector	216	50.7
Educational level		
Junior high	75	17.6
Senior high	128	30.0
Bachelor	223	52.4
Family members work in medical-related fields		
Yes	130	30.5
No	296	69.5
Diagnosed with chronic diseases		
No	355	83.4
Yes	71	16.6
Diagnosed with cardiovascular disease	32	45.1
Diagnosed with diabetic mellitus	23	32.4
Diagnosed with renal disease	16	22.5

Higher educational level recorded significantly lower mean scores in safe use of medicines (mean $_{\text{bachelor}}$ =11.70±1.32 VS mean $_{\text{senior high}}$ =12.26±1.08, mean $_{\text{junior high}}$ =12.37±1.96, p < 0.05) (Table 2).

Health literacy and medication knowledge were positively correlated (r =.520, p<.01), participants with higher health literacy had greater medication knowledge. Health literacy and safe use of medicines were positive significantly correlated (r =.643, p<.01), participants with higher health literacy had better safe use of medicines. Medication knowledge was positively related safe use of medicines (r =.378, p<.01), participants with higher medication knowledge had greater safe use of medicines (Table 3).

4. DISCUSSION

Results from this study showed that age-group, gender, highest level of education, diagnosed with a chronic disease and family member work in medical fields were significant factors related health literacy level. Female participants had better health literacy than male participants. Studies showed that females were significantly more likely to seek health information, desired more participation in the health problem-solving and decision-making process, and had higher levels of health literacy than males [18,19]. The mean scores of health literacy of those who were over 65 years old were the lowest of all age sub-groups in this study (Table 2). Several factors may affect health literacy levels in those over 65. The first is the decline of memory and verbal fluency, which are strongly associated with health literacy [20]. The second is that the decline of cognition which has an obvious and direct impact on reading comprehension may impose restrictions on acquiring knowledge of health information [21]. People with higher education level indicated higher health literacy in comparison with people with lower education level. People with higher education have better literacy, reading and comprehension which allow them to understand relevant medical processes, documents or health education provided by medical staffs, hence have positive effects on health literacy [22]. The health literacy of residents living with family members who work in medical fields showed positive association with higher health literacy than residents living without. The family members provided residents with correct medical and healthcare guidance, hence benefiting the health literacy of the residents. Participants who reported a poorer health status or at least one chronic condition had lower health literacy than individuals who perceived their health status as good or had no chronic conditions. People with insufficient health literacy were most likely to do not understand the medical treatment received, and unable to distinguish health related information and take relevant action correctly. These were risk factors for preventable chronic diseases [23]. A key element in promoting health literacy is to provide residents with an appropriate medical decision. To ensure the residents understand the content of healthcare education and are capable of

tending to their own health, public health providers should provide different levels of explanation and healthcare education for residents with different levels of health literacy [24].

Medication knowledge positively related with female participants. Female remained positively associated with medication knowledge consisted of knowledge of drug name, dose, indication, and a potential side effect [25]. Participants were over 65 years old had the worst medication knowledge in the study. Yasein et al. [26] surveyed 400 elderly people aged 71±5.8 years to evaluated their knowledge of the prescribed drugs and found almost two-third of the elder people did not take medicines in a proper way. Based on a Taiwanese study conducted between 1999 and 2008, one of the main reasons for the elderly population dying of intoxication was taking medication without the appropriate knowledge [27]. The results of the

Table 2. Demographic and health literacy, medication knowledge, medication safety (N=426)

Characteristics	Mean (SD)	*p*-value
Health literacy (Gender)		***p* < 0.01**
Male	31.31(4.10)	
Female	32.85(2.87)	
Health literacy (Age)		***p* < 0.01**
20-30	33.21(3.72)	
31-50	33.04(3.44)	
51-65	31.14(3.56)	
Over 65	28.52 (3.18)	
Health literacy (Educational level)		***p* < 0.01**
Junior high	29.07(2.96)	
Senior high	31.94(3.18)	
Bachelor	33.23(2.22)	
Health literacy (Family members work in medical-related fields)		***p* < 0.01**
Yes	33.44(2.95)	
No	32.19(3.94)	
Health literacy (Diagnosed with chronic diseases)		***p* < 0.01**
Yes	30.15(3.42)	
No	32.72(2.71)	
Medication knowledge (Gender)		***p* < 0.01**
Male	17.31(2.01)	
Female	17.86(1.36)	
Medication knowledge (Age)		***p* < 0.05**
20-30	17.82(1.55)	
31-50	17.85(1.83)	
51-65	17.30(1.68)	
Over 65	16.79(1.28)	
Medication knowledge (Educational level)		***p* < 0.01**
Junior high	16.56(1.46)	
Senior high	17.47(1.28)	
Bachelor	17.97(1.34)	
Medication knowledge (Diagnosed with chronic diseases)		***p* < 0.05**
Yes	17.79(1.30)	
No	17.08(1.18)	
Safe use of medicines (Educational level)		***p* < 0.05**
Junior high	12.37(1.96)	
Senior high	12.26(1.08)	
Bachelor	11.70(1.32)	

Table 3. Correlation coefficients among study variables (N=426)

Variables	Health literacy	Medication knowledge	Safe use of medicines
Health literacy	1	.520**	.643**
Medication knowledge	.520**	1	.378**
Safe use of medicines	.643**	.378**	1

*** p < 0.01*

study highlight the importance of taking actions by public healthcare workers to improve elder peoples' medication knowledge are necessary to prevent drug poison accidents. People with higher education level indicated higher medication knowledge in comparison with people with lower education level. The results of this study were consistent with Alkatheri & Albekairy [28] investigated 90 patients at King Abdul Aziz Medical City and found the education level of the patient was positively linked to medication knowledge. In the study, participants with chronic diseases had better medication knowledge than participants without chronic diseases. Increase patients' awareness about medication is essential for all chronic patients in order to improve their understanding, compliance and management and, thereby, their ability to cope with their diseases [29].

The participants' safe use of medicines was not significantly associated with age, gender, and types of health problems; however, it was negative significantly associated with education level. People with higher education believe that medication must have passed safety testing, therefore tend to recommend medication to family or friends compared to people with lower education. Research had surveyed 3,015 residents in South Australia and found residents with higher education levels believed CAMs to be tested for safety and efficacy and were the greatest users of complementary and alternative medicines (CAMs) without prescriptions [30].

Health literacy was positive related with medical knowledge and safe use of medicines. People with a high health literacy possess accurate knowledge of medication use, are able to distinguish medication and take the medication safely, showing that health literacy has an effect on medical knowledge and safe use of medicines [31]. People with a low health literacy have a high prevalence of purchasing products via non-medical professional channels and have low safe use of medicines. Medical professionals should use the language that the patient can understand to provide information on medication and healthcare education, as to strengthen accurate medical knowledge and safe use of medicines, and to prevent inappropriate use causing danger to people, especially to residents with chronic diseases.

This study was only conducted using residents living in southern Taiwan. The outcomes on health literacy, medical knowledge and safe use of medicines do not represent residents outside southern Taiwan. We recommend future research to be conducted covering the entire country to obtain representative and valuable results. The results of the study found who were diagnosed with chronic diseases were associated with health literacy. We recommend future research be conducted on specific groups or residents with particular chronic diseases so as to investigate the specific association between health literacy and medical knowledge and safe use of medicines.

5. CONCLUSION

Health literacy can be affected by many factors, including demographic, medical knowledge and safe use of medicines. The results of the study may provide the government to understand health literacy, medical knowledge and safe use of medicines of southern Taiwan residents and offers references for making medical policies and establishing healthcare content in southern Taiwan. Appropriate medical knowledge and safe use of medicines included teaching residents to take medication correctly and emphasize on the safety and risks of medication. Findings of the study provide references for National Administration of Health and Welfare in Taiwan to establish consumer-targeted policies to prohibit the exaggerate advertisements of non-prescribed medicines and reduce inappropriate medication use in community older adults. This study, together with the international body evidence, suggests that investing educational programs in improving medication knowledge and safe use of medicines are key strategies to promote health literacy of community residents.

ETHICAL APPROVAL

This study started after the approval of the Institutional Review Board (IRB approval number: 102-163B).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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