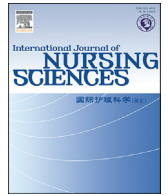


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International Journal of Nursing Sciences

journal homepage: <http://www.elsevier.com/journals/international-journal-of-nursing-sciences/2352-0132>

Original Article

Predictors of health-promoting behaviour among older adults with hypertension in Indonesia

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ARTICLE INFO

Article history:

Received 21 August 2017

Received in revised form

7 March 2018

Accepted 2 April 2018

Available online 14 April 2018

Keywords:

older adults

Hypertension

Health behaviour

Health promotion

ABSTRACT

Objectives: This study aimed to determine the predictors of health-promoting behaviour among older adults with hypertension in Bengkulu City, Bengkulu, Indonesia.

Methods: A cross-sectional study was conducted in 333 older adults with hypertension, who were selected using multistage sampling method. Data were obtained by face-to-face interview with structured questionnaires. The questionnaires used in this study included the Health-Promoting Lifestyle Profile II (HPLP II), Hypertension Knowledge-Level Scale (HK-LS), Self-Rated Abilities for Health Practices Scale (SRAHP), Barriers to Health-promoting Behaviour Scales (BAS), Benefits to Health-Promoting Behaviour Scales (BES), Multidimensional Scale of Perceived Social Support (MSPSS) and Situational Influences Questionnaire (SIQ). Data were analysed by using multiple linear regressions.

Results: The mean and standard deviation (Mean \pm SD) of each questionnaire were as follows: HPLP II, 2.55 ± 0.19 ; HK-LS, 11.83 ± 3.00 ; SRAHP, 2.00 ± 5.87 ; BAS, 27.89 ± 2.70 ; BES, 34.29 ± 2.29 ; MSPSS, 60.35 ± 8.12 ; and SIQ, 47.71 ± 6.66 . According to the multiple linear regression model, 36.9% of the variation in health-promoting behaviour among older adults with hypertension can be explained by six variables, namely, education, knowledge, self-efficacy, perceived barriers, social support and situational influences (adjusted $R^2 = 0.369$).

Conclusions: High and good-quality education will increase the level of health-promoting behaviour, whereas barriers, such as expense and time requirement, can decrease it. Situational influences and support from family and friends can also influence the older adult's attempts to change their health behaviour. Increased self-efficacy will clearly result in improved health-promoting behaviour of older adults with hypertension.

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1. Introduction

Hypertension is one of the most common noncommunicable diseases (NCDs) that have been recognised as a public health problem worldwide, especially in developing countries. Serious complications, such as cardiovascular and renal disease, can arise from uncontrolled hypertension [1]. According to the World Health Organization (WHO), hypertension complications account for 9.4 million deaths worldwide annually [2].

The Ministry of Health in Indonesia indicated that the

prevalence of hypertension in 2008 in the country is 37.4% among older adults, and this number increases to 41% in 2012 [3]. Despite the high prevalence of hypertension, only 36.8% of the patients have been diagnosed and received regular treatment and follow-up from health personnel. Two-thirds (63.2%) of these patients generally remain undiagnosed [4]. The Department of Health in Bengkulu City reported that the portion of the population diagnosed with hypertension by health personnel is only 24% [5].

Long-term care, management and continual pharmacotherapy are needed by hypertensive patients. This condition affects the patients' quality of life and increases healthcare costs. Health behaviour modification is a management strategy for blood pressure control [6]. The use of medical services, compliance with medical regimens and self-directed health practices are all health-promoting behaviour. The health promotion model (HPM) focuses

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Peer review under responsibility of Chinese Nursing Association.

on achieving high levels of well-being and self-actualisation [7]. This model has been applied to improve the health conditions of individuals with hypertension in various group settings.

The HPM by Pender [8], which was developed in 1990, comprises individual characteristics and experiences (prior related behaviour and personal factors), behaviour-specific cognitions and effects (activity-related effects, interpersonal influences, situational influences, as well as perceived benefits, barriers and self-efficacy) and behavioural outcomes (health-promoting behaviour). The individual's perception and how the person values the importance of health will also affect the individual's behaviour. Cues to action are indirectly linked to the likelihood of individuals' action to improve their health. Readiness to act refers to the individual's expectations. The outcomes of any action can influence the cues for undertaking a behaviour [8].

Self-efficacy, perceived barriers and benefits, situational influences and social support are both related and nonrelated to the health-promoting behaviour among the older adults with hypertension [9–16].

Other factors that may affect health-promoting behaviour are age, gender, education level, income and knowledge about the health condition [6,9–11,17]. Education level, family income, gender, age and hypertension duration are positively related to health-promoting behaviour among the older adults with hypertension [6,10,11,13,16,19,20]. Comorbidity is also correlated with health-promoting behaviour [18]. However, some studies found that age, gender, income and education level are negatively correlated with health-promoting behaviour among older adults with hypertension [9,21,22].

On the basis of the condition of cardiovascular diseases (including hypertension), which impose important health threat to disadvantage and poor segments of population, the South-East Asia WHO Regional Office promotes reliable, inexpensive and surveillance systems for major NCDs [23]. In Bengkulu, a province located in Sumatra Island, Indonesia, most locals prefer to eat food that is salty, oily and cooked with coconut milk. Moreover, people in this city hardly exercise, and they are unaware of fitness facilities, which are provided by their local government in their neighbourhood [24]. This lifestyle can lead to the development of NCDs, such as hypertension.

Hence, with the importance of the subject and given the gaps in the situation, this study was performed to determine the predictors of health-promoting behaviour among older adults with hypertension, according to some components of HPM by Pender [8]. Several studies also identified factors predicting health-promoting behaviour, but they used a population of older adults with hypertension and different characteristics in Bengkulu City. The present results may be used to establish future guidelines for the development of interventions that will increase health-promoting behaviour among older adults with hypertension in Bengkulu City, Indonesia.

2. Materials and method

2.1. Study population and design

This study was conducted by using a cross-sectional design. The subjects were adults aged 60 years old and above. A total of 333 older adults with hypertension from four primary health centres (PHCs) in Bengkulu City, Bengkulu, Indonesia were recruited to participate in this study. The inclusion criteria were as follows: adults aged 60 years old and above, diagnosed with hypertension for at least 6 months based on the PHC's registration records, can speak and write in Indonesian language and willing to volunteer as participants. The exclusion criteria included the following:

affliction with dementia and Alzheimer's disease as diagnosed by a physician, suffering from complications of hypertension (stroke) or hospitalised during the data collection period. This study was approved by the Ethical Review Board (ERB) for Research Involving Human Research Subjects, Boromarajanoni College of Nursing, Nopparat Vajira (ERB No. 19/2558). The respondents underwent face-to-face interview using structured questionnaires. The researcher and two research assistants performed the interview at the four PHCs. An informed written consent was obtained from each respondent. The research assistants were nurses who were trained by the researcher. The survey was conducted from September 2015 to October 2015.

2.2. Instrument

Data were collected via face-to-face interview using structured questionnaires. The questionnaires used in this study included the Health-Promoting Lifestyle Profile II (HPLP II) developed by Walker et al. [25]. The HPLP has been further redefined over the last 10 years to a 52-item questionnaire. Nevertheless, in the present study, the instrument was modified to 45 items, which were appropriate for the test subjects. The possible scores range from 1 to 4, with high scores indicating good health-promoting behaviour. The behaviour was divided into three levels based on the mean and standard deviation (SD): good (2.75–3.07), fair (2.36–2.74) and poor (2.04–2.35). Hypertension Knowledge-level Scale (HK-LS) was developed by Erkoc et al. [26]. This instrument is composed of 18 items, with the scores ranging from 0 to 18. The score of all items was classified into three levels of knowledge about hypertension as follows: good ($\geq 80\%$ of the total score), fair (60%–79% of the total score) and poor ($\leq 60\%$ of the total score). The Self-Rated Abilities for Health Practice Scale (SRAHP) was developed by Becker et al. [27], and it consists of 14 items. The scores range from 14 to 56, with a high score indicating high self-efficacy. Self-efficacy was divided into three levels based on the mean and SD as follows: high (32.87–40), fair (21.14–32.86) and low (10–21.13). The Barriers to Health-Promoting Behaviour Scale (BAS) developed by Murdaugh and Verran [28] is consisted of 12 items. The possible scores range from 12 to 48, with a high score indicating considerable perceived barriers. These barriers were divided into three levels based on the mean and SD as follows: high (30.59–34), fair (25.20–30.58) and low (19–25.19). The Benefits to Health-Promoting Behaviour Scale (BES) was developed by Murdaugh and Verran [28], and it is consisted of 12 items. The possible scores range from 12 to 48, with a high score indicating considerable perceived benefits. Perceived benefits were divided into three levels based on the mean and SD as follows: high (36.59–41), fair (32–36.58) and low (28–31.99). The Multidimensional Scale of Perceived Social Support (MSPSS) was developed by Zimet et al. [29]; this instrument consists of 12 items, with scores ranging from 12 to 84. The scale measures the support from significant others, family and friends. The scores were divided into three levels of social support based on mean and SD as follows: high (68.47–82), fair (52.24–68.46) and low (34–52.23). The Situational Influences Questionnaire (SIQ) developed by Nuryanto [30] consists of 14 items, which include questions from the national and the local levels. The questionnaire presents four dimensions encompassing nutrition, physical activity, stress management and specific behaviour for hypertension. The total scores range from 14 to 70, with high scores indicating good situational influence on health-promoting behaviour. Situational influences were divided into three levels based on the mean and SD as follows: high (54.37–63), fair (41.06–54.36) and low (30–41.05).

Each questionnaire was evaluated for content validity and reliability. Content validity was examined by experts in hypertension disease and a community nurse. Research methodology was also

assessed to gain a numerical value that indicates the level of content-related validity evidence. Furthermore, several items were modified according to the experts' recommendations. The content validity index items score for each item was equal to 1. The internal consistency reliability of HK-LS was tested using Kuder and Richardson 20 because the answers to the questionnaires were dichotomous. The obtained result was 0.85. The Cronbach's alpha coefficient for each variable was as follows: 0.902, HPLP II: 0.811, SRAHP: 0.744, BAS; 0.764, BES; 0.832, MSPSS; and 0.862, SIQ. All the questionnaires in this study were acceptable. Data were analysed by stepwise multiple linear regression method. The included variables of health-promoting behaviour were gender, age, education level, income, comorbidity, hypertension duration, knowledge about hypertension, self-efficacy, perceived barriers and benefits, social support and situational influences.

3. Results

3.1. Sample characteristics

Most of the participants were female (58.9%), more than half of the participants were suffering from hypertension for less than 5 years (68.8%), and a majority of participants were aged 60–69 years old (72.4%). More than one-third of the participants (37.2%) reached primary school, and 14.1% of them graduated with a bachelor degree or higher. More than one-third of the participants reported moderate income (US\$ 109.05–181.75), which was comparable to the average income in Bengkulu Province (US\$ 167.21) [31]. Majority of the participants (81.7%) presented no other comorbidities (e.g., diabetes mellitus and osteoarthritis). The characteristics of the subjects are shown in Table 1.

The selected group of participants closely represented the age and gender characteristics of the older adults population in Bengkulu City, Indonesia [31]. The economic status of older adults in this study was adequate to support health-promoting behaviour, such as in the nutrition domain. The subjects were confident that they can find healthy food within their budget.

The health-promoting behaviour was divided into three levels based on the mean and SD: good, fair and poor. The majority of the participants (70.3%) showed health-promoting behaviour at the fair level. The numbers of participants with a good (15.6%) and a poor

(14.1%) level of such behaviour were relatively similar. The mean and SD (mean \pm SD) of each questionnaire were as follows: HPLP II, 2.55 ± 0.19 ; HK-LS, 11.83 ± 3.00 ; SRAHP, 2.00 ± 5.87 ; BAS, 27.89 ± 2.70 ; BES, 34.29 ± 2.29 ; MSPSS, 60.35 ± 8.12 ; and SIQ, 47.71 ± 6.66 .

3.2. Predictors of health-promoting behaviour

The final regression model, which was derived from the stepwise multiple regression analysis, revealed that six variables, including education, knowledge, self-efficacy, perceived barriers, social support and situational influences, significantly affected the health-promoting behaviour among the older adults with hypertension in Bengkulu City, Indonesia (Table 2). The stepwise multiple linear regression analysis showed that these six factors accounted for 36.9% of variance in the health-promoting behaviour. Income and perceived benefits were also related to the health-promoting behaviour, but they cannot explain the variance.

4. Discussion

This cross-sectional research was conducted to examine the factors predicting the health-promoting behaviour among the older adults with hypertension in Bengkulu City, Bengkulu, Indonesia. Each participant was interviewed using structural questionnaires. Stepwise multiple linear regression analysis was used to examine the effects of personal factors (gender, age, hypertension duration, education level, income and comorbidity), knowledge about hypertension, self-efficacy, perceived barriers and benefits, social support and situational influences on the health-promoting behaviour.

Education was positively correlated with health-promoting behaviour. Participants with high education levels were likely aware of their health behaviour, which can be explained by that older adults with high education level are willing to seek information about their condition. Moreover, they can easily understand the information regarding hypertension and healthy behaviour. This result was supported by some studies, which showed that high education level is positively associated with hypertension control [6,9,32,33]. Older adults with high education level demonstrated good health-promoting behaviour. However, Mokadem [22] showed that education is uncorrelated with health-promoting behaviour. This result can be explained by that the majority of sample was illiterate or had received only primary education. The characteristics of the participants from Bengkulu City presented varied educational backgrounds, which included primary level, bachelor's degree or even higher. Hence, the different effects of education level on health-promoting behaviour were observed clearly.

Knowledge about hypertension was also found a predictor and positively related to health-promoting behaviour among the older

Table 1
Number and percentage of participants according to demographic characteristics.

Characteristic		n	%
Gender	Male	137	41.1
	Female	196	58.9
Age	60–69	249	74.8
	70–79	67	20.1
	≥ 80	17	5.1
Education	Primary School	124	37.2
	Junior High School	75	22.6
	Senior High School	87	26.1
	Bachelor and higher	47	14.1
Monthly Income	Low (<US\$ 109.05)	109	32.7
	Moderate (US\$ 109.05–181.75)	124	37.3
	High (US\$ 181.76–254.45)	72	21.6
	Very High (>US\$ 254.45)	28	8.4
Comorbidity	Others	272	81.7
	Diabetes mellitus	51	15.3
	Osteoarthritis	10	3.0
Hypertension Duration (year)	<5	229	68.8
	5–10	59	17.7
	>10	45	13.5

Table 2

Final model of predictive factors for health-promoting behaviour in geriatric patients with hypertension ($n = 333$) as evaluated via stepwise method.

Factors	B	SE	β	t	P
Education	0.006	0.002	0.114	2.597	0.010
Knowledge	0.009	0.003	0.141	2.833	0.005
Self-efficacy	0.011	0.002	0.321	5.380	<0.001
Perceived barriers	-0.009	0.003	-0.129	-2.882	0.004
Social support	0.005	0.001	0.195	3.423	0.001
Situational influences	0.004	0.001	0.145	3.204	0.001
$R^2 = 0.380$					
Adjusted $R^2 = 0.369$					

adults in Bengkulu City. Puraya [19], Nkosi and Wright [34] and Greenberger et al. [35] also supported this result; they demonstrated that knowledge about the condition is related to good behaviour that enhances the control of hypertension. The study among older adults in Bengkulu City showed that most of the participants reported a fair level of knowledge, which was concordant with their fair level health-promoting behaviour. Therefore, a good level of knowledge about hypertension will facilitate positive changes in health-related behaviour because participants will become aware of the medications that they should take regularly. They can also understand the importance of changing health practices to prevent complications.

Self-efficacy was indicated as the strongest predictor of health-promoting behaviour when other variables were kept constant. Self-efficacy displayed a positive relationship with health-promoting behaviour. The level of health-promoting behaviour increased with increased self-efficacy. This result was consistent with that of Kamran et al. [12]; they investigated the behaviour prediction using HPM constructs, and result showed that self-efficacy is related to behaviour. The correlation between self-efficacy and health-promoting behaviour was also proven by Jaiyungyuen et al. [6], Li et al. [36] and Shin et al. [37]. Self-efficacy can motivate patients directly by levelling the expectations for behavioural changes and indirectly by affecting the perceived barriers and the level of commitment required to adopt health-promoting behaviour [8]. If older adults are assured that hypertension is controllable and that their own ability to perform the recommended behaviour is sufficient, then the probability of performing effective behaviour will increase.

Perceived barriers consist of perceptions about unavailability, inconvenience, expenditures, difficulties and time consumption related to health-promoting behaviour [8]. In the present study, perceived barriers were negatively correlated with health-promoting behaviour among older adults with hypertension. The present findings were concordant with those of Sharoodi et al. [38], Greenberger et al. [35], Thanavaro et al. [10] and Arras et al. [15]. The older adults may encounter barriers in the process of changing their habits, and these barriers can prevent them from improving their health-promoting behaviour.

Social support is an interpersonal influence that was positively correlated with health-promoting behaviour. Social support was the second strongest predictor of health-promoting behaviour. Social support taps into the sustaining resources offered by other people [8], who can be family members, friends or significant others. Shin et al. [37], Kamran et al. [12] and Whicason and Muangphourn [39] also found similar findings. Social support refers to the relationship of the older adults with their support system (e.g., family, friends and significant others). Older adults with social support present good health-promoting behaviour. Limited or negative interactions with family members can become a stressor for the older adults. This result was attributed to that social support can influence health-promoting behaviour.

Situational influence was positively correlated with health-promoting behaviour among older adults with hypertension in Bengkulu City, Indonesia. This result was consistent with that of Nuryanto's study [30], which explained that situational influences affect health-promoting behaviour among the older adults with hypertension in Bali, Indonesia. Shahroodi et al. [38] also found that situational influences can predict the variance in health-promoting behaviour among the older adults. In the HPM, situational influences are conceptualised to influence health behaviour directly and indirectly [8]. Situational influences affecting the health-promoting behaviour of the older adults in Bengkulu City include the national campaign on hypertension, mass media programs that provide knowledge about hypertension and exercise program set

up by the PHCs. These programs aim to improve the level of hypertension knowledge among Indonesians, especially among older adults. A high level of knowledge may increase the understanding and willingness of participants to change their behaviour to control hypertension and consequently prevent future complications. Situational influences are important in the development of new other effective strategies that will facilitate the performance and maintenance of health-promoting behaviour of older adults in Bengkulu City, Indonesia.

5. Conclusion

Pender's HPM, the conceptual framework in this study, was considered an appropriate model for health-related behaviour among older adults with hypertension in Bengkulu City, Indonesia. Self-efficacy and social support were strong predictors of health-promoting behaviour among participants. Family and friends should encourage and help the older adults to facilitate changes that will lead to health-promoting behaviour. For instance, family can influence the diet of older adults because family members mostly prepare the food at home for these patients. Knowledge was also found a predictors of health-promoting behaviour. However, the level of knowledge among the older adults in Bengkulu City was still low despite the routine services (e.g., health education) of PHCs. Therefore, the health education program provided by healthcare providers should be further evaluated in future studies. In conclusion, the factors that can predict the variance in health-promoting behaviour among the older adults with hypertension included self-efficacy, social support, knowledge, education, perceived barriers and situational influences. All six factors accounted for 36.9% of variance in health-promoting behaviour among older adults with hypertension.

Acknowledgments

The authors would like to express gratitude to the elders in Bengkulu City, Indonesia for their participation in this study, the Boromarajonani College of Nursing Nopparat Vajira (an affiliated institution of Kasetsart University and the Institute of Health Science Tri Mandiri Sakti for their support, as well as the Directorate General of Higher Education and the Ministry of Research, Technology and Higher Education of The Republic of Indonesia for the funding.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.ijnss.2018.04.002>.

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