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RESEARCH ARTICLE

Factor Analysis of Patient with Hypertension on Self-Regulation Based on Self-Belief

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Abstract

Objective: The purpose of this study was to analyze the factors that influence self-regulation based on the self-beliefs of hypertension patients. Methods: The design of the study used observational analytics with a cross-sectional study approach. The sample size consisted of 108 patients with hypertension in health centers in Malang Regency, East Java, Indonesia. The independent variables were physical activity, food consumption, medication adherence, control in health care and stress management. The dependent variable was self-regulation. Data were collected using a questionnaire tested for validity and reliability. Logistic regression was used to analyze the results. Results: Age ($p = 0.014$) and support of health workers ($p = 0.004$) had an effect on the self-regulation of food consumption. Age ($p = 0.008$), gender ($p = 0.006$), family history ($p = 0.004$), family support ($p = 0.014$) and health insurance ($p = 0.028$) had an effect on the self-regulation of medication adherence. Age ($p = 0.022$) affected the self-regulation of control to health services. Peer support ($p = 0.008$) was significantly associated with stress management. Conclusion: The consolidation of social support and health services is important to improve self-regulation based on self-beliefs in patients with hypertension.

Keywords: *Self-regulation, Confidence, Hypertension.*

Introduction

Globally, the overall prevalence of raised blood pressure in adults aged 25 and over was around 40% in 2008. The proportion of the world's population with high blood pressure, or uncontrolled hypertension, fell modestly between 1980 and 2008. However, because of population growth and ageing, the number of people with uncontrolled hypertension rose from 600 million in 1980 to nearly 1 billion in 2013 [1].The prevalence of hypertension in Indonesia is high.

In 2013, the national prevalence of hypertension was 25.8%. This figure increased rapidly in 2018 by 34.1% [2,3].The ability to self-care is an important quality for hypertensive patients to possess in order to maintain blood pressure and prevent complications [4, 5].However, the self-care ability for patients with hypertension is still relatively low, which is characterized by the inability to achieve the expected blood pressure [6, 8]. Many researchers believe that major changes in lifestyle behaviors play an important role in the prevalence of hypertension [9]. Several studies showed that low level of physical activity, being overweight, malnutrition and being a smoker could be associated with increased risk for hypertension, even in early adulthood, with a prediction of hypertension during adolescence [10, 12].

Researchers believe that taking antihypertensive medication as well as modifying lifestyles will result in the best therapeutic effect. However, some studies have shown that when hypertensive patients

are informed of their disease, they fail to change their lifestyle behavior [12].The ability for people with hypertension to self-care includes adherence to taking medication, regulating food patterns, routinely carrying out physical activities, control of health services and being able to perform stress management [5, 13, 14].The results of studies on hypertensive patients in Indonesia showed that 13.3% failed to take antihypertensive drugs, 32.27% were inconsistent, and 50.4% were taking drugs regularly.

Of those who did not take drugs, 59.8% stated it was because they felt healthy, 41.0% failed to maintain a routine, 47.0% were irregular in their routine, and 12.0% were routine for measuring blood pressure [14].This shows that ability of patients with hypertension to self-care is still relatively low. One of the factors causing low self-care is the inability to effectively self-regulate [15].Self-regulation is the main component that facilitates individual success by supporting personal adaptive and interpersonal behavior [16].

Some research results show that self-regulation causes changes in self-efficacy that will affect a person's behavior [17]. Further, self-regulation can reduce risky health behaviors and improve healthy living behaviors [18]. Additionally, the theory of self-regulation was found to serve as a useful framework in understanding the role of goal-setting and goal-striving in the management of chronic conditions [18]. The health belief model (HBM) is a guiding framework that predicts the emergence of a person's health behavior [19].

One study showed that the implementation of an educational program based on the HBM has a positive impact on self-regulatory behaviors and reducing the blood pressure values in hypertension patients [7]. At present, there are no studies that explore the effect of self-belief on self-regulation in people with hypertension.

Therefore, this study places emphasis on the integrations of self-belief factor with self-regulation of hypertensive patients in the hope that it will be able to improve the ability to self-care. Self-regulation based on self-belief is expected to increase self-care in hypertensive patients to control blood pleasure and to reduce the risk of complications. The purpose of this study was to analyze the factors that influence self-regulation based on the self-belief of hypertension patients.

Materials and Methods

Research Design and Settings

This study was an observational analytic study with a cross-sectional study approach conducted in August 2019. The population was patients with hypertension who attend Donomulyo Health Center, Pagelaran Health Center and Tur Health Center in Malang Regency, East Java, Indonesia.

Samples

Samples were taken from 108 people with hypertension using the inclusion criteria. The sampling technique used a type of multistage sampling: gradual sampling. There were three sampling stages. Stage one determined the three selected community health centers from the five integrated health posts in the Malang Regency through the use of simple random sampling. The selected health centers were Donomulyo, Pagelaran and Tur Health Center.

Stage two established the integrated health post in each of the selected community health centers. Simple random sampling was also used to assess 20% of the total integrated health posts available. Stage three determined patients with hypertension. Inclusion criteria included hypertensive patients with the ability to self-care and the willingness to respond. Respondents who participated in the research process were explained the purpose of the study, procedures, rights, and obligations, benefits and losses during data collection. Respondents who agreed to participate signed an informed consent sheet. This study has received ethical approval from the Health Research Ethics Committee of the State Polytechnic of Health Malang with Register Number: 214/KEPK-POLKESMA/2019.

Data Collection

A questionnaire was used to collect the data, detailing the individual or patient and their social support, health service factors and self-regulation base on self-belief [20]. Patient factors included age, sex, education, occupation, income, marital status, family history with hypertension and the duration of hypertension. Social support factors included family support and peer support. Health

service factors included ownership of health insurance (card ownership, type of health

insurance card, utilization of health insurance cards), access to health services (availability of health services, distance travelled, utilization of health services), availability of infrastructure (completeness of infrastructure, utilization of infrastructure facilities) and support of health workers. The questionnaire was developed by researchers of several theories, including the PRECEDE-PROCEED Model, self-regulation model and the HBM.

The questionnaire on self-regulation based on self-belief contained integration questions between self-regulation and beliefs which consist of perceived susceptibility, perceived severity, perceived threat, perceived benefit, perceived barrier and self-efficacy [20]. Self-regulation consisted of five components: self-regulation in carrying out physical activities, food consumption, medication adherence, control to health services and stress management.

Each component of self-regulation had six questions with answer choices in the form of a Likert scale including: never, sometimes, often and always, with a Cronbach α physical activity value of 0.893; food consumption value of 0.986; medication adherence value of 0.985; control to health services as 0.969; and stress management value of 0.977. The total score in each component of self-regulation was 0-18, with a score of 9–18 indicating a good classification of self-regulation and a score of 0-8 suggested self-regulation was lacking.

Data Analysis

Logistic regression was used to analyze the influence of the patient, social support and health service factors on self-regulation based on the beliefs of hypertensive patients. Descriptive analysis is presented in the form of frequencies and percentages to describe patient factors, social support factors, health service factors and self-based self-regulation on components of physical activity, food consumption, medication adherence, control to health services and stress management. Data analysis was performed using SPSS version 24.1 software.

Result

Patient, Social Support and Health Service Factors

The majorities of patients with hypertension were > 46 years old (88.9%) and employed (73.1%).Most hypertensive patients were female and had an elementary school education (73.1%). Almost all were married (99.1%).Over half the patients had a family history of hypertension (57.4%).Most patients had good family support (68.5%) and peer group support (62.0%).Almost all respondents had health insurance (95.4%) and used the card (96.3%) (Table 1).

Table 1: Patients, Social Support and Health Service Factors (n = 108)

Variable	n (%)	Variable	n (%)
A. Patient Factors			
Age (years)		Sex	
26–45	12 (11.1)	Male	29 (26.9)
> 46	96 (88.9)	Female	79 (73.1)
Education		Marital Status	
No school	3 (2.8)	Single	1 (0.9)
Elementary school	47 (43.5)	Married	107 (99.1)
Middle school	22 (20.4)	Occupation	
High school	23 (21.3)	Does not work	29 (26.9)
College	13 (12.0)	Work	79 (73.1)
Family History of Hypertension			
Yes	62 (57.4)		
No	46 (42.6)		
B. Social Support Factors			
Family Support		Peer Support	
Good support	74 (68.5)	Good support	67 (62.0)
Poor support	34 (31.5)	Poor support	41 (38.0)
C. Health Service Factor			
1. Health Insurance Ownership Availability		3. Health Care Access Availability	

Yes	103 (95.4)	Yes	
No	5 (4.6)	No	103 (95.4)
Type		Distance	5 (4.6)
BPJS	105 (97.2)	‹1 km	
Private health insurance	3 (2.8)	›1 km	98 (90.7)
Utilization		Utilization	10 (9.3)
Yes	104 (96.3)	Yes	
Not	4 (3.7)	Not	104 (96.3)
2. Availability of Infrastructure Facilities Completeness			4 (3.7)
Well	99 (91.7)	4. Support of Health Workers	
Not good	9 (8.3)	Good support	
Utilization		Poor support	91 (84.3)
Well	93 (86.1)		17 (15.7)
Not good	15 (13.9)		

Self-Regulation Based on Self-Belief

Patients with hypertension have good self-regulation based on self-belief in carrying out physical activity (82.4%). Of the six components of self-regulation based on self-belief for physical activity, self-regulation based on perceived benefit has the highest score (2.21 ± 0.80), while the lowest score (2.07 ± 0.87). Food consumption has good self-regulation based on self-belief (68.5%) with the highest score found in the self-efficacy-based components of self-efficacy (1.98 ± 0.95) and perceived severity (1.98 ± 0.97). Self-regulation based on perceived susceptibility had the lowest score (1.92 ± 0.93). Adherence to taking medication obtained good confidence-based self-regulation (69.4%) with its highest score being perceived self-regulation based on perceived susceptibility (0.74 ± 0.44) and its lowest score being perceived self-regulation based on benefits (0.67 ± 0.47). Furthermore, control to health services also had good self-regulation based on confidence (77.8%), with the highest score on perceived benefit-based self-regulation being (2.16 ± 0.92) and the lowest score on perceived susceptibility-based self-regulation being (2.05 ± 0.90). Self-care in stress management has a good self-regulation based on confidence (58.3%) with the highest score on perceived self-regulation based on perceived (1.74 ± 0.93) and the lowest score on self-regulation based on perceived susceptibility (1.66 ± 0.92) (Table 2 and Table 3).

Table 2: Self-Regulation Based on Self-Belief in People with Hypertension (n = 108)

Variable	n (%)	Variable	n (%)
Physical Activity		Control to Health Services	
Good self-regulation	89 (82.4)	Good self-regulation	84 (77.8)
Poor self-regulation	19 (17.6)	Poor self-regulation	24 (22.2)
Food consumption		Stress Management	
Good self-regulation	74 (68.5)	Good self-regulation	63 (58.3)
Poor self-regulation	34 (31.5)	Poor self-regulation	45 (41.7)
Medication Compliance			
Good self-regulation	75 (69.4)		
Poor self-regulation	33 (30.6)		

Table 3: Item Scores of Self-Regulation Based on Self-Belief in Self-Care

Self-Care	Self-Regulation Based on Belief	Mean	SD
Physical activity	Self-regulation based on perceived susceptibility	2.13	0.88
	Self-regulation based on the perceived severity	2.07	0.87
	Self-regulation based on the perceived threat	2.16	0.95
	Self-regulation based on perceived benefits	2.21	0.80
	Self-regulation based on perceived barriers	2.18	0.84
	Self-efficacy-based regulation	2.19	0.84
	Average	2.16	0.86
Food consumption	Self-regulation based on perceived susceptibility	1.92	0.93
	Self-regulation based on the perceived severity	1.98	0.97
	Self-regulation based on the perceived threat	1.97	0.99
	Self-regulation based on perceived benefits	1.97	0.94
	Self-regulation based on perceived barriers	1.94	0.95
	Self-efficacy-based regulation	1.98	0.95
	Average	1.96	0.95
Medication Adherence	Self-regulation based on perceived susceptibility	0.74	0.44
	Self-regulation based on the perceived severity	0.71	0.45
	Self-regulation based on the perceived threat	0.68	0.47
	Self-regulation based on perceived benefits	0.67	0.47
	Self-regulation based on perceived barriers	0.69	0.46

	Self-efficacy-based regulation	0.69	0.46
	Average	0.70	0.46
Control to Health Services	Self-regulation based on perceived susceptibility	2.05	0.90
	Self-regulation based on the perceived severity	2.07	0.90
	Self-regulation based on the perceived threat	2.08	0.93
	Self-regulation based on perceived benefits	2.16	0.92
	Self-regulation based on perceived barriers	2.11	0.93
	Self-efficacy-based regulation	2.12	0.95
	Average	2.10	0.92
Stress Management	Self-regulation based on perceived susceptibility	1.66	0.92
	Self-regulation based on the perceived severity	1.72	0.89
	Self-regulation based on the perceived threat	1.74	0.93
	Self-regulation based on perceived benefits	1.73	0.93
	Self-regulation based on perceived barriers	1.71	0.91
	Self-efficacy-based regulation	1.72	0.90
	Average	1.71	0.91

Effects of Individuals, Social Support and Health Service Factors with Self-Regulation Based on Self Belief in Patient with Hypertension

Type of ownership of health insurance cards (p = 0.081) affect self-regulation in carrying out physical activities. Age (p = 0.014) and support of health workers (p = 0.004) influence the self-regulation of food consumption. Age (p = 0.008), gender (p = 0.006), family history (p = 0.004), family support (p = 0.014), health insurance ownership (p = 0.028) and the availability of health services (p = 0.059) influence self-regulation based on belief of medication adherence. Age (p = 0.022), and utilization of infrastructure (p = 0.087) influences self-regulation in control of health services. Peer support (p = 0.008) influences the self-regulation of stress management (Table 4).

Table 4: Multivariate Regression Analysis

	Coefficient	SE	Wald	df	Value of p	OR	95% CI	
							Min	Max
A. Physical Activity								
Support of health workers	-1.140	0.606	3.543	1	0.060	0.320	0.090	1.048
Type of health insurance card	2.243	1.286	3.041	1	0.081	9.424	0.757	117303
B. Food Consumption								
Age	-1.670	0.681	6.011	1	0.014	0.188	0.049	0715
Support of health workers	-1.680	0.580	8.405	1	0.004	0.186	0.060	0.580
C.Medication Adherence								
Age	-4.617	1.728	7.137	1	0.008	0.010	0.000	0.292
Gender	3.070	1.118	7.543	1	0.006	21.535	2.409	192.530
Family history	1809	0.623	8.432	1	0.004	6.103	1.800	20.691
Family support	-1.501	0.610	6.063	1	0.014	0.223	0.067	0.736
Health insurance	-4.383	1990	4.850	1	0.028	0.012	0.000	0.618
Availability of health service	3.350	1.771	3.579	1	0.059	28.505	0.886	916.656
D. Control to Health Services								
Age	-1.481	0.646	5.263	1	0.022	0.227	0.064	0.806
Support of health workers	-1.040	0.608	2.927	1	0.087	0.353	0.107	1.164
E. Stress Management								
Peer support	-1.146	0.429	7.137	1	0.008	0.318	0.137	0737
Support of health workers	-1.166	0.600	3.781	1	0.052	0.312	0.096	1.009

Discussion

Self-regulation based on self-belief is critical for patients with hypertension to control blood pressure and prevent complications. Several factors can affect hypertension sufferers in carrying out these self-regulations. The results of this study indicate that the individual patient, social support and health service factors influence the ability to conduct self-regulation based on self-belief in facilitating self-care in patients with hypertension. More than half of respondents showed good self-regulation based on the belief in physical activity, food consumption, medication compliance, controlling health services and stress management. Self-regulation is an important component that will influence an individual's behavior [18].Self-regulation is an approach to individual social psychology to set and achieve expected goals [21].

When comparing the average values of each item of self-regulation in performing self-care, the sequence scores from highest to

lowest are physical activity, control to health services, regulation of food consumption, stress management, and medication adherence.

Control to health care is the second-highest average score after physical activity. Self-benefit-based regulation is the highest value that supports hypertension sufferers to control health services. These results illustrate that people with hypertension exercise control over health services based on confidence in the benefits felt by them when attending health services.

The perceived benefits will increase the patient's knowledge to influence a positive change in behavior [22]. In terms of food consumption, the highest score is on self-regulation based on perceived severity and self-efficacy. These results illustrate that hypertension sufferers perform self-management in the selection of food consumption due to the consideration of hypertension being a serious disease.

Self-efficacy also underlies hypertension sufferers in regulating food consumption patterns. Self-efficacy plays an important role in the adoption of blood pressure control behaviors. With these results, it shows it is important hypertension sufferers increase self-efficacy so that blood pressure expectations are controlled. Increased self-efficacy can be done by providing education about belief-based blood pressure control [23]. The average score of stress management is highest in self-regulation based on the perceived threat.

These results illustrate that hypertension sufferer self-regulate stress management because they have confidence that hypertension is a threatening condition. Therefore, they take steps to control their blood pressure by managing stress. Threats to health conditions will influence a person to make changes in behavior for the better [24].Health threats to one's self are closely related to personal self-control in health behaviors.

The average value of self-regulation based on the belief in adherence to taking drugs is the lowest of all categories. The results show that adherence to taking medication is described as the highest in self-regulation based on perceived susceptibility and the lowest based on perceived benefit. This shows that as hypertension sufferers feel that they are a group that is at risk to continued increase in blood pressure, they adhere to treatment.

However, these results also indicate that sufferers do not respond to the benefits of medication adherence. The results of this study are in line with other studies that show low adherence to treatment in patients with hypertension. Hypertension patients with high perceptions of susceptibility and severity better adhere to treatment [25]. Based on the results of factor analysis, it was found that the individual, social support and health service factors influence self-regulation in conducting self-care such as physical activity, food consumption management, medication adherence, control to health services and stress management in hypertensive patients.

The faith-based regulation in carrying out physical activities is influenced by the support of health workers and the ownership of health insurance cards. Support provided by health workers affects the self-regulation of hypertension sufferers in carrying out physical activities. Social support is an important component that can affect one's health behavior. Social support is credited with reducing health problems and improving their quality of life [26], [27].

There is a compelling relationship between social support and physical activity [28]. Social support is the main key in promoting health to patients with chronic diseases [29].Social support has an impact on changes in health behaviors and adverse health behaviors such as dietary habits, physical activity, smoking habits and alcohol intake, as well as promoting adherence to therapeutic regimens [30].

Health insurance ownership also affects self-regulation based on belief in physical activity. As many as 94.5% of respondents had a health insurance card, of which 96.3% used the card to acquire health services both in health centers and hospitals. The ownership and utilization of the health insurance card shows that almost all respondents attended to the health conditions they experienced.

The ownership of health insurance affects the efforts of carrying out treatments for the prevention of diseases and improving health behavior [30]. Self-regulation based on self-

belief in regulating food consumption patterns is influenced by age and the support of health workers.

This is in line with research [31], where the behavior of consuming food was found to improve with age.

A person of advanced age with health concerns will be motivated to improve their food consumption behavior [32]. In patients with hypertension, age is also a factor influencing the increase in blood pressure [33].Therefore, older hypertension sufferers are expected to be able to regulate their food consumption patterns to prevent excessive blood pressure.

This is certainly necessary to prevent complications of hypertension. Support of health workers provided in the form of information support, instrumental support, emotional support and appreciation support can influence hypertension sufferers in self-regulation to maintain food consumption patterns. Self-regulation based on self-belief in adherence to taking medication is influenced by age, gender, family history, family support, ownership of health insurance and availability of health services. Increasing age is one of the factors that can affect medication adherence [34]. The family closest to the patient has a considerable role in the care and treatment of hypertension sufferers. The results of this study indicate that good family support has a positive effect on the ability of hypertension sufferers to self-regulate medication adherence.

Support from the family of someone who is experiencing health problems will be able to reduce the stress in the patient which will enable the patient to attend to improved healthcare behaviors [35]. The family can provide daily monitoring of medication compliance of sufferers [36]. Families who do not provide support result in a negative effect on the sufferer's ability to adhere to treatment [37]. Family history also affects hypertensive sufferers' compliance with medication regimes.

This could be due to past family experience, resulting in hypertensive sufferers having increased awareness of the importance of taking medicine. Family history is also one of the risk factors that can cause an increase in blood pressure [38].Health services as a place for providing care and treatment for people with hypertension also affects self-regulation in adherence to taking medicine. The role of health workers in providing information and

motivation for people with hypertension is significantly useful to improve medication adherence for people with hypertension. Control to health services is a component of self-care that must be addressed by people with hypertension.

This is needed to monitor the condition of hypertensive patients to ensure blood pressure remains controlled to prevent complications. In this study, age and efforts to use existing infrastructure in health services are factors that influence patient with hypertension to control health services. The healthcare system plays an important role in the management of the care needed to control blood pressure in people with hypertension [39].

Current developments, communication systems and information technology can be used for effective management of hypertension and to improve the quality of care for hypertension sufferers [40].Controlling blood pressure for people with hypertension through stress management is also crucial. In this study, it was found that peer support and support of health workers influence the self-regulation in stress management for hypertension sufferers. This suggests that peer groups provide information sharing, instrumental assistance, emotional support or rewards for people with hypertension.

Assisting such support will affect how a patient of hypertension is able to manage stress. Peer support assists self-management by providing social support from someone with similar background and experience. Peer support effectiveness includes sharing experiences, the building of trust, engaging with the patient, maintaining a positive attitude and the need for accountability [41]. Peer support through peer health education is proven to improve better health statuses in the context of preventing cardiovascular disease in the community [42].

Conclusion

Blood pressure control in patients with hypertension is paramount to prevent complications. Efforts to control blood pressure through self-regulation based on

confidence can be made to maximize self-care for people with hypertension, including regulating food consumption patterns,

adherence to taking antihypertensive drugs, controlling health services and effective stress management. The individual patient, social support and health service factors are proven to affect self-regulation based on perceived susceptibility, perceived severity, perceived threat, perceived benefits, perceived barrier and self-efficacy for hypertensive sufferers.

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References

1. Who A (2013) Global brief on hypertension. World Heal Organ.
2. Kementrian Kesehatan RI (2018) Laporan Nasional Riskesdas 2018. Jakarta Badan Penelit dan Pengemb Kesehat.
3. Penelitian B (2013) Riset kesehatan dasar. Jakarta Kementeri Kesehat RI., 95.
4. Zhu X, Wong FKY, Wu CLH (2018) Development and evaluation of a nurse-led hypertension management model: A randomized controlled trial. Int. J. Nurs. Stud., 77: 171-8.
5. Ma C (2018) An investigation of factors influencing self-care behaviors in young and middle-aged adults with hypertension based on a health belief model. Hear Lung., 47(2):136-41.
6. Huang G, Xu J, Zhang T, Li Q, Nie X, Peng S, et al (2017) Prevalence, awareness, treatment, and control of hypertension among very elderly Chinese: results of a community-based study. J. Am Soc. Hypertens, 11(8): 503-12.
7. Sharifi A, Jeihooni AK, Vahdat S (2016) The study of the impact the training program on behavior self-regulating blood pressure in patients with hypertension in Shiraz, based on Health Belief Model in 2016. Int. J. Adv. Res. Sci. Eng. Technol., 3(7): 2352-8.
8. Borghi C, Tubach F, De Backer G, Dallongeville J, Guallar E, Medina J, et al (2016) Lack of control of hypertension in primary cardiovascular disease prevention in Europe: Results from the Eurika study. Int. J. Cardiol., 218: 83-8.
9. Antman EM, Appel LJ, Balentine D, Johnson RK, Steffen LM, Miller EA, et al (2014) Stakeholder discussion to reduce population-wide sodium intake and decrease sodium in the food supply: a conference report from the American Heart Association Sodium Conference 2013 Planning Group. Circulation, 129(25):e660-79.
10. Walther D, Curjuric I, Dratva J, Schaffner E, Quinto C, Schmidt-Trucksäss A, et al (2017) Hypertension, diabetes and lifestyle in the long-term-Results from a swiss population-based cohort. Prev. Med. (Baltim), 97: 56-61.
11. Alicea-Planas J, Greiner L, Greiner PA (2016) Hypertension and related lifestyle factors among persons living in rural Nicaragua. Appl. Nurs. Res., 29: 43-6.
12. Oka M, Yamamoto M, Mure K, Takeshita T, Arita M (2016) Relationships between Lifestyle, Living Environments, and Incidence of Hypertension in Japan (in Men): Based on Participant's Data from the Nationwide Medical Check-Up. PLoS One, 11(10):e0165-313.
13. Han H-R, Lee H, Commodore-Mensah Y, Kim M (2014) Development and validation of the hypertension self-care profile: a practical tool to measure hypertension self-care. J. Cardiovasc. Nurs., 29(3):E11.
14. Liu LS (2010) Chinese guidelines for the management of hypertension. Zhonghua Xin Xue Guan Bing Za Zhi. 2011;39(7):579-615.
15. Fuladvandi M, Safarpour H, Malekyan L, Moayedi S, Mahani MA, Salimi E (2017) The Survey of self-regulation behaviors and related factors in elderly with hypertension in south-east of Iran. Health (Irvine Calif)., 9(4): 592-600.
16. Vohs KD, Baumeister RF (2016) Handbook

of self-regulation: Research, theory, and applications. Guilford Publications.

17. Schwarzer R, Antoniuk A, Gholami M (2015) A brief intervention changing oral self- care, self- efficacy, and self- monitoring. Br J. Health Psychol., 20(1): 56-67.
18. Miller AL, Gearhardt AN, Fredericks EM, Katz B, Shapiro LF, Holden K, et al (2018) Targeting self-regulation to promote health behaviors in children. Behav. Res. Ther., 101: 71-81.
19. Conner M (2010) Cognitive determinants of health behavior. In: Handbook of behavioral medicine. Springer, 19-30.
20. Smit K, de Brabander CJ, Boekaerts M, Martens RL (2017) The self-regulation of motivation: Motivational strategies as mediator between motivational beliefs and engagement for learning. Int. J. Educ. Res., 82: 124-34.
21. Mann T, De Ridder D, Fujita K (2013) Self-regulation of health behavior: social psychological approaches to goal setting and goal striving. Heal. Psychol., 32(5):487.
22. Shojaei S, Farhadloo R, Aein A, Vahedian M (2016) Effects of the health belief model (HBM)-based educational program on the nutritional knowledge and behaviors of CABG patients. J Tehran Univ Hear Cent., 11(4):181.
23. Khorsandi M, Fekrizadeh Z, Roozbahani N (2017) Investigation of the effect of education based on the health belief model on the adoption of hypertension-controlling behaviors in the elderly. Clin Interv. Aging., 12: 233.
24. Ferrer RA, Klein WMP (2015) Risk perceptions and health behavior. Curr. Opin Psychol., 5: 85-9.
25. Kamran A, Ahari SS, Biria M, Malpour A, Heydari H (2014) Determinants of patient's adherence to hypertension medications: application of health belief model among rural patients. Ann Med. Health Sci. Res., 4(6): 922-7.
26. Xie H, Peng W, Yang Y, Zhang D, Sun Y, Wu M, et al (2018) Social support as a mediator of physical disability and depressive symptoms in Chinese elderly. Arch. Psychiatr. Nurs., 32(2):256-62.
27. Costa DC, Sá MJ, Calheiros JM (2012) The effect of social support on the quality of life of patients with multiple sclerosis. Arq Neuropsiquiatr, 70(2):108-13.
28. Smith GL, Banting L, Eime R, O'Sullivan G, Van Uffelen JGZ (2017) The association between social support and physical activity in older adults: a systematic review. Int. J. Behav. Nutr. Phys. Act., 14(1):56.
29. Brooks AT, Andrade RE, Middleton KR, Wallen GR (2014) Social support: a key variable for health promotion and chronic disease management in Hispanic patients with rheumatic diseases. Clin Med Insights Arthritis Musculoskelet Disord.,7: CMAMD-S13849.
30. Harvey IS, Alexander K (2012) Perceived social support and preventive health behavioral outcomes among older women. J. Cross Cult. Gerontol., 27(3): 275-90.
31. Whitehead BR (2017) Health behaviors in older adults: Considering age, affect, and attitudes. J. Health Psychol., 22(13): 1652-7.
32. Dijkstra SC, Neter JE, Brouwer IA, Huisman M, Visser M (2014) Motivations to eat healthily in older Dutch adults-a cross sectional study. Int. J. Behav. Nutr. Phys. Act., 11(1):141.
33. Fikriana R, Devy SR (2018) The Effects of Age and Body Mass Index on Blood Glucose, Blood Cholesterol, and Blood Pressure in Adult Women. Indian J. Public Heal. Res. Dev., 9(11).
34. Gomes MB, Negrato CA (2016) Adherence to insulin therapeutic regimens in patients with type 1 diabetes. A nationwide survey in Brazil. Diabetes Res Clin Pract., 120: 47-55.
35. Miller TA, DiMatteo MR (2013) Importance of family/social support and impact on adherence to diabetic therapy. Diabetes, Metab Syndr Obes targets Ther., 6: 421.
36. Triharini M, Sulistyono A, Adriani M, Armini NKA, Nastiti AA (2018) Adherence to iron supplementation amongst pregnant mothers in Surabaya, Indonesia: Perceived benefits, barriers and family support. Int. J. Nurs. Sci., 5(3):243-8.
37. Mayberry LS, Osborn CY (2012) Family support, medication adherence, and glycemic control among adults with type 2

diabetes. Diabetes Care, 35(6):1239-45.

38. Fikriana R (2016) Faktor–faktor yang Diduga Menjadi Prediktor Terjadinya Peningkatan Tekanan Darah Sistolik pada Penderita Hipertensi. J. Kesehat Mesencephalon, 2: 4.
39. Maimaris W, Paty J, Perel P, Legido-Quigley H, Balabanova D, Nieuwlaat R, et al (2013) The influence of health systems on hypertension awareness, treatment, and control: a systematic literature review. PLoS Med., 10(7):e1001490.
40. Omboni S (2019) Connected Health in Hypertension Management. Front Cardiovasc Med., 6: 76.
41. Goldstein KM, Zullig LL, Oddone EZ, Andrews SM, Grewe ME, Danus S, et al (2018) Understanding women veterans' preferences for peer support interventions to promote heart healthy behaviors: A qualitative study. Prev Med reports, 10: 353-8.
42. Fikriana R, Afik A (2018) The Influence of Peer Health Education Toward the Decreasing Risk of Heart Disease. J. Ners., 13(1):42-9.

