The Effectiveness of Hypertensive Management Programs and Social Support in Primary Health Care Systems: Preliminary Study

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ABSTRACT

This quasi-experimental study used inclusion criteria obtaining samples taken from high-risk and grade I hypertensive patients aged 35 to 59 without hypertensive complications. The two related groups comprised 36 individuals. Both were enrolled in a hypertensive management program comprising health education strategies, respiratory training, advice on limiting salt and fat intake, exercise, group discussion with social support, telephon counseling, and home visits. Three perception and preventive behavior questionnaires and home behavior records collected data according to individual hypertension risk factors. The study was carried out for four months. Descriptive statistics and a paired t-test were used.

Results showed a statistical significance difference with increased total mean scores with the following variances: health status, self-efficacy and decreased barrier perception (p =.000, .008 and.022, respectively). There was noticeable improvement in exercise and stress management, but no significant change in overall preventive behavior for hypertension (p >.05). Systolic and diastolic blood pressure and heart rate were lower (p <.001). Waist and hip circumference also decreased (p = .002 and .001). Blood chemistry showed a statistically significant decrease of finger blood sugar, and increase in blood urea nitrogen and creatinine (p =.000, .00, and .004) and no statistical significance for increase in blood cholesterol (p >.05).

Primary healthcare services should also be a strategic development, especially focus socially-supported on mental wellbeing which is beneficial for risk and hypertensive groups.

Keywords: Hypertension management program; socially-supported; primary health care systems

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INTRODUCTION

Hypertension is a common illness in Thailand and the world, a silent killer, damaging arteries throughout the body and causing complications in major organs. Fifty four percent of these cases involved multiple organs, 21.08% resulted in cardiovascular complications, 20.79% in kidney problems and 2.25% in strokes.[1] Stroke patients suffered visual and mobility impairments.[2-5] During the past 12 years, the risk of cardiovascular disease has been shown to increase by 1.3 times when systolic and diastolic blood pressure are up by 10 mmHg, while the risk rose by 1.5 times with a blood pressure reading up by 5 mmHg.[6]

While a fraction of direct hypertensive risk factors are genetic, most derive from imbalance in healthy lifestyle, including excess sodium, fat

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and alcohol consumption, smoking and sedentary habits. Stress, which triggers the sympathetic nervous system and adrenaline, causes several diseases including hypertension.[7-11] Indirect factors arise from intrapersonal behavior, including lack of awareness, motivation and support from the surrounding social environment.

Different strategies promote hypertension prevention. One is awareness and lifestyle training along with social support. Pender NJ, et al.,[12] suggested that health promotion can be motivated by activities enhancing people's physical, mental and emotional health. These activities serve to empower people in self-efficacy[13] and can be delivered through primary-level healthcare, the major national healthcare sector working closely with the community.[14]

The purpose was to measure the effectiveness of the hypertensive management program and social support for promoting health behaviors based on primary care unit services.

MATERIALS AND METHODS

Methodology: After the protocol was approved by the Research Ethics Committee of Thammasat University (Code 065/2555), permission was obtained to conduct the study. The patient rights and research-related informed consent were obtained. Sample size was calculated formula of the non-dependent group was measured at $_{\alpha}$= 0.05, 80% of the power of this test.[15,16] Thirty six subjects from 35 to 59 years old, who were voluntary and passed inclusion criteria's screening and living in nine villages of Klongluang District, Pathumthani Province. The inclusion criteria was divided into two groups. The first group where those whose blood pressure was classed as high-normal (measuring 125/80 mmHg on a digital, or 135/85 mmHg on a traditional sphygmomanometer), was suspected to be hypertensive, but not yet diagnosed, and taking medication (new cases). The second hypertensive group with no more than grade 1 hypertension (135-154/85-94 mmHg measured digitally or 140-159/90-99 mmHg on a traditional sphygmomanometer).[5]

Exclusion criteria: those who changed drug regimens for disease complications, doses of physician-prescribed as per standard procedure.

Data was collected from three sources:

1. A questionnaire covering five aspects:1) demographic and general health data, 2) hypertensive risk factors and social support, 3) hypertension knowledge and risk factors, 4) health status perception, self-efficacy and barriers to hypertension preventative behavior and 5) hypertension preventative behaviors. Subjects were asked to rate responses on a 5-level rating scale from the lowest to a highest extent. The knowledge section consisted of 26 closed true or false questions.

All sections were validated by three experts and were test-retest reliable, with a Cronbach's alpha coefficient. self-efficacy perception = .80, barriers perception = .88, preventative behaviors = .86. The section knowledge of hypertension was tested for validity, with a Kuder-Richardson Formula 20 (KR20) score of 0.83. Quality tests scored 0.22±0.274 for discrimination and 0.25±0.30 for difficulty.

2. Diaries were kept by subjects at home recording, type of food consumed, type and duration of exercise, blood pressure and any barriers to performance, and were every two weeks reminders provided by phone, to encourage subjects to complete and follow the program.

3. Subject primary care unite health records, covering physiology and biology.

Medical Instruments: used for health assessment were a tape measuring device, sphygmomanometer, portable digital home blood pressure monitor, body composition monitor (BCM), galvanic skin response (GSR) sensor, and respiratory rate monitor. All instruments were calibrated before use and the same devices were used throughout the study.

Study Design: The quasi-experimental, pre-posttest study was carried out on subjects and was performed during a sixteen-week period as follows:

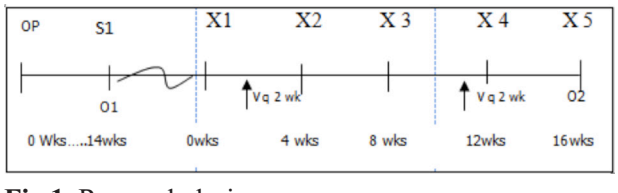

Fig 1. Research design

In Fig 1:
OP signifies a survey of geography and planning in conjunction with organizational leaders contact team in community.
S1 signifies the first health screening of the population.
O1 signifies the first collection of data and the second in O2.
X1 X2 X3 and X4 signifies participation in CCHEP, from X1 (first session) to X4 (last session). X5 signifies the evaluation stage of the program.
V q 2 wks. signifies health check-ups at the PCU telephone counseling

The Comprehensive Continued Health Education Program (CCHEP) comprised of 7 counseling steps:

1) Building relationships and working together to assess the needs and hypertension risk factors.

2) Analyzing causes and determining accurate diagnosis.

3) Enhancing awareness which took 60 minutes in motivation and self-efficacy in three categories: food consumption (including consumption of alcohol and tobacco), emotional management and physical exercise. This included: Demonstrating and practicing breathing techniques, walking, and identification of three food colors –green, yellow and red- associated with low fat and sodium content in a distributed text. http://nutrition.anamai.moph.go.th/) Also local community case studies of healthy people and/or subjects with hypertension-related complications were presented.

4) Collective life planning and goal-setting to foster hypertension preventative behavior.

5) Suggesting choices with a collective commitment to engage in healthy home behaviors.

6) Building support groups among individuals, families, health volunteers, and health teams involved, and monthly home visits.

7) Evaluating from group discussions problems, barriers, and solutions at the end of the project.

Analysis

Quantitative data were analyzed with the Kolmogorov-Smirnov and Shapiro-Wilk tests. The value was >.05, indicating a normal curve. A paired t-test was fore carried out to test variance within the group. Qualitative data were content describing from interviews and focus groups. (SPSS version 15 for windows was used for statistical analysis)

RESULTS

General subjects' data is shown in Table 1. Also the comparative results before and after in samples showed that overall, mean scores of health perception and self-efficacy increased, but barriers perceptions decreased (=.000, .008 and -.022, respectively). There was a clear improvement in emotional management and exercise; although there was no statistical significance in overall preventative behaviors. In addition, there was a decrease in systolic and diastolic blood pressure and heart rate (p=.000 and .001, respectively), and a decrease in waist and hip circumference (p=.001 and .002, respectively). There was also a fall in fingertip blood sugar and a rise in blood urea nitrogen and creatinine (p=.000, .001 and .004 respectively) and no statistically significant increase in cholesterol levels as shown in Tables 2 and 3. In addition, the relaxation scale increased from 30.6 to 71.2%, as shown in Table 4.

According to home records, subjects practiced deep inhalation and exhalation once a day for 30 minutes, while average blood pressure levels were systolic blood pressure = 125.49 ± 7.16 and diastolic blood pressure = 79 ± 8.64 mmHg. Not all subjects completed their food consumption and exercise because these are voluntarily recorded qualitative data are difficulty, and be not practically.

DISCUSSION

Subjects showed improved perception and emotional management. This may be attributed to the seven main steps of the CCHEP which helped to open up new experiences through group education and health counseling strategies, participating in demonstrations and practicing with social

TABLE 1. Number, percentage of hypertensive factors (n = 36)

Hypertensive factors	High normal or at risk group(n=23) number (%)	Hypertensive group (n=13) number (%)	Total (n=36) number (%)
Sleep apnea			
Yes	11 (30.6)	4 (11.1)	15 (41.7)
No	12 (33.3)	9 (25)	21 (58.3)
Hypertension in family history			
Yes	15 (41.7)	2 (5.6)	17 (47..2)
No	8 (22.2)	11 (30.6)	19 (52.8)
The other diseases (n=9)			
Lipidemia	6 (16.7)	1 (2.8)	7 (19.5)
Cardiovascular disease	-	0	1 (2.8)
Asthma or allergies	1 (2.8)	0	1 (2.8)
Hypertensive behaviors factors			
Alcohol consumption			
No	13 (36.1)	11 (30.6)	24 (66.7)
Occasional consumption	10 (27.8)	2 (5.6)	12 (33.3)
Smoking			
No	18 (50)	13 (36.1)	21 (86.1)
Current smokers	4 (11.1)	0	4 (11.1)
Ever but not in present	1 (2.8)	0	1 (2.8)
Knowledge of hypertension			
Passed (score over 60%)	9 (25)	10 (27.8)	19 (52.8)
No passed (score under 60%)	14 (38.9)	3 (8.3)	17 (47.2)

TABLE 2. Comparison of the average values of perceived and hypertension preventative behaviors scores before and after participation in the program (n = 36)

The perceived and hypertension preventative behaviors	Before $\bar{X} \pm SD$	After $\bar{X} \pm SD$	Diff Mean	95% Cl	t	p-value (2- tailed)
Perceived health status (overall)	4.50 ± 1.34	7.78 ± 1.80	3.27	-4.01,-2.55	9.11	.000***
Self-efficacy in preventive behaviors(overall)	56.47 ± 9.38	61.00 ±12.42	4.53	-7.78, -1.27	2.82	.008**
Aspects-Food consumption	22.42 ± 5.14	23.22 ± 7.39	0.81	- 3.03,1.41	0.73	.467
Physical exercise	15.86 ± 4.65	18.33 ± 5.27	2.47	- 4.25,-0.69	2.82	.008**
Emotional management	18.19 ± 4.52	19.44 ± 3.59	1.25	- 3.00,0.50	1.44	.158
Barriers to preventive behaviors (overall)	57.28 ±12.62	57.28 ±12.62	-5.08	0.77,9.39	-2.39	.022*
Aspects						
Food consumption	20.28 ± 5.21	18.86 ± 4.33	-1.42	-0.49,3.33	- 1.50	.142
Physical exercise	21.05 ± 5.80	18.58 ± 5.05	-2.47	0.21,4.73	- 2.22	.033*
Emotional management	16.25 ± 3.97	14.75 ± 3.56	-1.50	0.18,2.81	- 2.32	.026*
Hypertension preventive behaviors (overall)	58.75 ± 11.09	60.94 ± 8.90	2.19	-0.77, 5.15	1.50	.141

Notes: Paired t-test results * p <.05, **p <.01, ***p <.001

support. There was interaction between knowledge, belief, and motivation in working towards the goal of promoting healthy behaviors in hypertension, as noted by Pender NJ, et al.,[12] and Bloom B and Dale E.[17,18]

Stress relief through slow deep-breathing awareness meditation improves general and peripheral muscle relaxation by stimulating the parasympathetic nervous system, also leading to relaxation of blood vessel walls. The heart rate slows, but the heart beats more effectively.[19] The study showed a slower heart rate of 5.09 beats per minute on average (p =0.01) and the relaxation scale increased from 30.6 to 72.2%, while the stress scale fell from 52.7 to 11.1%. Additional effects from participating in group discussions were the release of tension and anxiety by exchanging experiences. Some subjects felt constrained and uncomfortable when practicing breathing, so group members with positive experiences suggested their own breathing techniques, after which the former felt better. Some subjects reported that they practiced breathing awareness before going to bed, so slept better. These occurrences indirectly impacted emotional wellbeing perception.[9]

Greater incorporation of exercise into daily routine in the form of brisk walking instead of running, cycling to the fields and arm swinging resulted in a decrease in waist and hip circumfe-

TABLE 3. Comparison of the average values in cardiovascular, respiratory and bodily composition and in blood chemistry changes before and after the program (n = 36)

Item	Before $\overline{X}$ ± SD	After $\overline{X}$ ± SD	Diff Mean	95 % Cl	t	p-value 2- tailed)
Systolic blood pressure (mmHg)	126.63 ± 10.82	118.51 ± 10.40	-8.12	4.46,11.77	- 4.51	.000
Diastolic blood pressure (mmHg)	80.37 ± 6.43	75.04 ± 8.80	-5.33	2.79,7.86	- 4.27	.000***
Heart rate (beats/min.)	79.37 ± 9.18	74.28 ± 8.74	- 5.09	2.38, 7.79	- 3.82	.001**
Mean respiratory rate (breaths/min.)	15.81 ± 4.89	15.31 ± 5.55	-0.49	-1.41, 2.38	- 0.52	.605
Waist circumference (cm.)	93.47 ± 9.92	89.92 ± 9.09	- 3.55	1.63, 5.47	- 3.76	.001**
Hip circumference (cm.)	104.25 ± 7.68	101.11 ± 8.26	- 3.14	1.19, 5.08	- 3.28	.002**
Waist / Hip ratio	0.90 ± 0.07	0.87 ± 0.09	- 0.23	-0.01,0.05	-1.58	.122
Weight (kg)	70.05 ± 11.43	69.44 ± 11.62	- 0.62	-0.04,1.27	- 1.91	.064
Body Mass Index (kg/m^2)	27.44 ± 3.89	27.20 ± 3.40	- 0.24	-0.02,0.49	-1.88	.069
Subcutaneousfat (%)	32.83 ± 6.72	32.52 ± 6.42	- 0.30	-0.34, 0.94	- 0.95	.347
Cholesterol (mg%)	228.62 ± 39.33	235.77 ± 36.87	7.15	-25.22, 10.91	0.86	.405
HDLChol. (mg%)	53.69 ± 11.45	55.31 ± 12.69	1.62	-6.12, 2.89	0.78	.450
LDL Chol. (mg%)	150.08 ± 37.35	153.84 ± 38.12	3.77	-21.87, 14.33	0.45	.658
Triglycerides (mg%)	123.92 ± 46.22	139.08 ± 62.45	15.15	-40.98, 10.68	1.28	.225
Finger blood sugar (mg%)	133.62 ± 18.99	109.69 ± 10.39	- 23.92	15.06, 32.78	5.88	.000***
Blood urea nitrogen	10.77 ± 1.96	14.92 ± 3.90	4.15	-6.17, -2.14	4.49	.001**
Blood creatinine	0.75 ± 0.15	0.88 ± 1.77	0.14	-0.22, -0.05	3.60	.004**

Notes: Paired t-test results* p <.05, ** p <.01, ***p <.001

Table 4. Comparison in stress scale in samples before and after the program (n = 36)

	Before (n=36) number (%)	After (n=36) number (%)
1. Relaxation as defined by warm skin	11 (30.6)	26 (72.2)
2. normal as defined by balanced skin temperature	6 (16.7)	6 (16.7)
3. Stress as defined by cold, clammy skin	19 (52.7)	4 (11.1)

rence (3.55 and 3.14 cm.at p <.01, respectively).

Breathing, meditation and continuous exercise increased blood vessel wall flexibility, with consequent decreased systolic blood pressure and diastolic blood pressure (-8.12 and -5.33 mmHg, respectively). These results were reflected in findings of an experiment in which for 15 minutes per day subjects practiced breathing less than 10 times per minute and exhaling slowly[20-22] and exercise with inhalation practice study in the hypertensive patients group decreased diastolic blood pressure (-10.14 mmHg at p< .001).[23] Also the study in the healthy group was a decrease in systolic blood pressure and diastolic blood pressure (4.3 and 2.7 mmHg) (p<.05).[24]

There was an increase of blood cholesterol and lipids (p<.05). It is possible that the blood fat all of subjects before the program might have been above normal, but this was accounted for by increase in HDL cholesterol. This happened because it takes time to clear the system of harmful fats. There was no statistical difference in overall behavior, especially eating, where it was difficult to control sodium and fat consumption due to subject habits or preferences, Although they were suggested that reducing salt, carbohydrate and lipid in three color zones. The two subjects had experienced increasing weight due to increased appetite.

Possibly, changes in mental and physical perceptions are internal processes requiring additional methods to highlight the need for more strategic advice designed for specific individuals. Blood chemistry may change due to different factors, including long-term behavioral changes lasting over four months.[25-27]

The primary healthcare team and community leaders provided practical help in social support to positively influence health perception. Studies have shown that subjects with more social support had better preventative behavior than those without it.[28] Similarly, those with emotional support had lower stress levels, reducing the risk of hypertension and cardiovascular disease.[29] Those with less support were at higher risk due to greater stress.[30] Family members and caregivers encouraged patients to exercise continuously.[31]

CONCLUSION

General subjects data revealed that interestingly the samples had similar risk findings which corresponded with national and international organizational studies of hypertension and arterial conditions.[5,12] This program enhanced preventative motivation research is beneficial for inhibiting and slowing complication in two groups.

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