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EFFECTS OF PARTICIPATORY ACTION-ORIENTED TRAINING (PAOT) INTERVENTION FOR HYPERTENSION MANAGEMENT AMONG INTERCITY VAN DRIVERS

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Abstract

Objectives: This study aims to evaluated the effectiveness of participatory action-oriented training (PAOT) intervention for hypertension management among intercity van drivers. **Material and Methods:** This quasi-experimental study applied concept and process of participatory action-oriented training and self-management to guide the development of the intervention addressing improvement in hypertension management behaviors. A total of 104 intercity van drivers with uncontrolled hypertension in Thailand were recruited to participate in this program. The intervention group (N = 52) received PAOT program, while the control group (N = 52) received conventional program. Data on hypertension management behaviors, and blood pressure were measured at baseline, 1 month and 3 months after intervention. **Results:** At 3 months after intervention, hypertension management behavior, and systolic blood pressure were significantly different between 2 groups ($p < 0.05$). **Conclusions:** This PAOT was found to be feasible and could potentially improve hypertension management, and blood pressure level of intercity van drivers. The program should be applied in further studies with other workplaces in both formal and informal sectors with different characteristics and other health issues. Int J Occup Med Environ Health. 2024;37(2):194–204

Key words:
informal sector, self-management, hypertension, blood pressure, participatory action-oriented training, driver

INTRODUCTION

The World Health Organization has rated hypertension, or elevated blood pressure, as a severe medical condition that significantly increases the risk of cardiovascular disease (CVD), the leading cause of death worldwide [1]. Hypertension was defined as systolic blood pressure (SBP) ≥140 mm Hg and/or diastolic blood pressure (DBP) of ≥90 mm Hg or taking medication for hypertension [2]. It is estimated that 1.28 billion adults aged 30–79 years worldwide have hypertension. About half of adults with hypertension (45%) have their condition uncontrolled [3]. Modifiable risk factors of hypertension include unhealthy diets (high sodium consumption, high in saturated fat and trans fats, low intake of fruits and vegetables), low physical activity, tobacco and alcohol consumption, and being overweight [1].

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Occupational drivers are one such group with a high risk for the development of hypertension [4]. Especially intercity van drivers who drive a transit van between cities for occupational purposes. They are an essential workforce in public transportation, especially outside the metropolitan areas where railroad transportation is unavailable, like in Thailand. The demand for intercity van drivers is increasing due to their convenience, speed, and cost savings [5]. Intercity van drivers receive payment based on the distance and the number of trips; therefore, they are compensated better for working longer hours. Hence, drivers usually spend most of their time at work. They typically work on shifts without a day off and take short breaks during their work period. Their daily driving distances also vary depending on the number of passengers [6].

Intercity van drivers have a high risk of hypertension due to their nature their work and lifestyle factors. They often face high-stress situations through long working hours, irregular work schedule, traffic congestion, dealing with unexpected problems, and responsibility for safety of passengers [7–11]. Most drivers also have unhealthy eating habits, sedentary behavior during long driving, irregular sleep patterns, smoking, and alcohol drinking that can increase blood pressure levels [12]. Hypertension is therefore highly prevalent among occupational drivers, with a low control rate [4,13]. The health impact of hypertension poses a particular problem for occupational drivers because it affects drivers and the large population of passengers.

To promote hypertension management among occupational driver, workplace participation and self-management need to be addressed. The participatory action-oriented training (PAOT) concept based on International Labor Organization [14] is a practical method to stimulate and support workplace initiatives and practical ideas for carrying out immediate improvement with voluntary self-help actions by using local available resources. The PAOT appears to be an effective method to improve work environments because it is adaptable and flexible, it also emphasizes using local knowledge and simple ways to identify specific problems and take necessary action with low-cost improvements. This innovation can encourage a participatory approach and develop creative ideas in the workplace. It has been widely applied in various workplace settings not only on occupational safety and health but also on lifestyle-related health problems [15–23]. The process of PAOT program starts with participants assess point to be improved with action checklist, organize group work to share experiences, identify priorities, build up action plans that can immediately implement. When applying this type of training technique to chronic health condition like hypertension, action checklist should include not only improvement of work environment but also improvement of hypertension management behavior. Self-management concept [24] recognized as an essential approach in chronic conditions therefore could be applied to find necessary improvement by drivers with hypertension that can implement immediately.

Although workplaces lacking expertise and resources including small and medium enterprises as well as informal sectors are the target of PAOT, PAOT has not been applied to occupational drivers to date. As this group of drivers plays a vital role in transportation services and has responsibility for passenger safety, enhancing the driver's health condition could promote health for occupational drivers and assure the safety of others. A participatory approach-based program that applied the PAOT was therefore developed to promote hypertension management and tested for its effectiveness in this study.

MATERIAL AND METHODS

Study design

A quasi-experimental design was used. Two intercity van stations located at the center of the southern region of Thailand representing a high number of passengers were invited to participate in the study. Two stations were then randomly assigned by location to be the intervention and the control group.

Participants

The sample size was estimated using G*Power software with large effect size based on previous study [25]; power of test at 0.80 and α at 0.05. To prevent dropout, 10% of the calculated sample size was added. Eligible participants were intercity van drivers who met inclusion criteria of being diagnosed with hypertension, treated with antihypertensive medication and having SBP of ≥140 mm Hg, and/or DBP of ≥90 mm Hg. Therefore, the total participants were 104 intercity van drivers with uncontrolled hypertension, as defined by the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) [2]. The researchers recruited the participant at the station, those met the inclusion criteria were then invited to participate. Recruitment was ended when the numbers of required participants were reached. Intercity van drivers in the intervention group (N = 52) were given a participatory action-oriented training intervention, while the waitlist control group (N = 52) received hypertension education after the completion of intervention.

PAOT intervention

The researchers are occupational nurses with prior training in PAOT. Experts in occupational medicine, occupational health, behavioral sciences, and PAOT intervention were also invited to join as consultants. Their insights and expertise significantly enhance the quality of research instruments and contribute to the overall improvement of the study. The intervention based on the PAOT approach [14] and self-management [26] concept was applied to promote hypertension management behaviors (e.g., diet control, physical activity, risk reduction behaviors, stress management, health monitoring, and treatment adherence). The activities of PAOT have been divided into 2 parts: improvement of the work environment and hypertension management behaviors. The intervention consists of 4 workshops provided by a researcher.

Workshop 1: Strengthening the capacity of participants

They started the first 2 h of the workshop with an orientation on the hypertension situation and management. Then, the principles of PAOT and action checklist were introduced.

Workshop 2: Identifying the good points and improvement points

The participants were asked to conduct a 1-hour walkthrough survey in their workplace to self-assess work environments that influence hypertension management. The "good points" and "points to be improved" to promote hypertension management were individually identified through an action checklist. The PAOT approach [14] was used to have the employers and workers to work collaboratively in addressing work improvement related to hypertension management, while self-management concept [26] was also applied in the action checklist to guide the practice needed for hypertension management.

The hypertension management action check list was developed to improve work environments for better hypertension management, which covers a wide variety of work environments, including psychosocial work environments (e.g., work schedule arrangement and social support) and non-psychosocial work environments (e.g., physical environment and facilities at the bus station) which might affect hypertension management among drivers. The action checklist was developed by the research team using literature review, focus group discussion with drivers with hypertension, and was reviewed by expert in the field of occupational health and safety and chronic disease management.

The action checklist in this study involved a comprehensive list of 35 items divided into 4 categories:

- work management (9 items),
- employer support (4 items),
- welfare and facilities (15 items),
- work environment (7 items).

These items were designed to assist participants in identifying the good points and improvement points to pro-

mote hypertension management based on their perspectives and considerations.

Workshop 3: Team based participatory workshop

Participants were divided into small groups of 6–8 persons/group. The 2-hour team-based participatory workshop was used in this step. In addition, the researcher separated the workshop into 2 sessions consisting of improvement of:

- work environment,
- hypertension management behavior.

Work environment improvement

Each group starts with brainstorming within their team about the work environment that impacts hypertension management and discusses "good practice" and "points to be improved" related to the action checklist. Next, each team selected only 3-point that they wanted to improve for priority setting following the principle of PAOT, including the efficacy of the measures, feasibility, and cost-effectiveness. Finally, each group established an action plan to improve the work environment and promote hypertension management. The last hour of this workshop ended with proposing a short-term work environment improvement plan. The business owners and co-workers were recruited to help participants seek the appropriate way to improve the work environment.

Hypertension management improvement

Each participant used an action checklist to identify their "good practices" and "point to be improved" to promote hypertension management. Then, they were required to propose "points to be improved." Each participant established an individual action plan regarding self-monitoring, self-evaluation, and self-reinforcement following the concept of self-management [22].

Through this PAOT intervention, each group collaboratively engaged in activities to identify, prioritize, and design an action plan for improving their work environment, focusing on addressing only 3 specific issues per group. Throughout these activities, it became evident that each group had similar areas of concern that needed improvement. Consequently, they decided to create a unified action plan to be implemented within the intervention group. As a result of this collaboration, 3 work environment improvement in the action plan were:

- the employer arrangement of blood pressure monitors and weighing scales in the station for self-monitoring,
- establishing a relaxation corner at the station,
- having healthy lunch at work.

Workshop 4: Implementation and evaluation

The implementation phase starts with the activities for improvement and accomplishment. First, the action was checked and readjusted with the researcher support. Then, the researchers summarized the results of the team-based participatory workshop to reconfirm improvement activity. To sustain the developed strategies, researchers conducted a follow up visit to monitor the implementation of the action plans. The appointments of the visit were made in advance to accommodate work schedule of the drivers. If the action plans did not run appropriately, the researchers investigated the problems and provided relevant advice regarding improvement in work improvement and hypertension-management. The participatory action-oriented training for hypertension management lasted 3 months, September–November, 2019. All 3 work environment improvement in the action plan were achieved.

Outcome measures

Hypertension management behaviors

Hypertension management behaviors were assessed by the questionnaire comprised of diet control (5 items), physical activity (4 items), risk reduction behaviors (4 items), stress management (3 items), health-monitoring (3 items), and treatment adherence (5 items). The items

were scored on a 4-point scale ranging from 1 (never) to 4 (very often). The content validity index (CVI) was 0.89 and reliability with Cronbach's coefficient was 0.94.

Blood pressure

Blood pressure levels were measured using a digital monitor following the JNC 7 guideline [2] with a properly calibrated and validated instrument. Before measurement, the participant was seated quietly for at least 5 min in the chair with feet on the floor and arm supported at heart level. An appropriate-sized cuff in the contralateral arm was used to ensure accuracy. The participants who have SBP <140 mm Hg and DBP <90 mm Hg [2] for at least 2 time of measurements present the effectiveness of hypertension management.

Data collection

Ethical approval was granted by the Ethics Committee for Human Research at the Faculty of Public Health, Mahidol University, Bangkok, Thailand (COA No. MUPH 2017-058). All information was kept strictly confidential and anonymous. The participatory action-oriented training for hypertension management lasted 3 months, September–November, 2019. The hypertension management behaviors, and blood pressure were measured 3 times in August 2019 (baseline), December 2019 (1 month follow up), and in February 2020 (3 month follow up).

Data analysis

The mean difference of hypertension management behaviors, and blood pressure within groups and between groups at baseline, 1 month, and 3 months after completion of intervention were tested using the repeated measure ANOVA with a significance level set at $p < 0.05$.

RESULTS

No significant difference was observed between the 2 groups for participant characteristics and hypertension related factors ($p > 0.05$) (Table 1).

After the intervention at 1 month and 3 month follow-up, the intervention group had overall hypertension management behaviors significantly higher than the baseline and higher than the comparison group, with p-value < 0.001. When considering each aspect of hypertension management, it was found that mean scores of physical activity, risk reduction behaviors, and health monitoring were sig-

Table 1. Characteristics of the intercity van drivers with hypertension involved in the participation action-oriented training for hypertension management, 2019, Thailand

Variable	Participants (N = 104)		p
	intervention group (N = 52)	control group (N = 52)	
Age [years] (M±SD)	49.87±8.80	50.60±8.66	0.13[a]
Body mass index [kg/m^2] (M±SD)	25.62±3.82	25.17±3.49	0.53[a]
Smoking [n (%)]	42 (80.76)	39 (75.00)	0.48[b]
Diabetes [n (%)]	4 (7.70)	9 (17.30)	0.14[b]
Dyslipidemia [n (%)]	6 (11.50)	13 (25.00)	0.08[b]
Blood pressure [mm Hg] (M±SD)			
systolic	155.10±17.81	158.46±15.83	0.31[a]
diastolic	103.06 ±14.72	103.81±15.70	0.80[a]

[a] T-test. [b] Chi-square.

nificantly different between the intervention group and the control group after intervention, with a p-value < 0.05, as presented in Table 2.

Lower blood pressure was expected to indicate effectiveness of the program. The mean score of SBP was significantly different both within group (F = 65.15, p < 0.001) and between group (F = 7.77, p < 0.05). While, DBP was not significantly different both within group (F = 2.25, p > 0.05) and between group (F = 2.63, p > 0.05) as presented in Table 2.

Table 2. Repeated measure analysis of variance (ANOVA) results of hypertension management behaviors and blood pressure in the intercity van drivers, 2019, Thailand

Variable	Variance						
	baseline (M±SD)	1 month (M±SD)	3 months (M±SD)	within groups		between group	
				F	p	F	p
Overall hypertension management				154.560	0.000	41.325	0.000
intervention group	2.14±0.04	2.58±0.31	2.87±0.27				
control group	2.02±0.37	2.15±0.34	2.22±0.33				
Diet control				64.139	0.000	1.929	0.168
intervention group	2.51±0.67	2.74±0.49	2.94±0.43				
control group	2.50±0.63	2.58±0.54	2.66±0.55				
Physical activity				99.014	0.000	24.339	0.000
intervention group	1.94±0.89	2.51±0.57	2.71±0.51				
control group	1.62±0.65	1.85±0.58	1.97±0.56				
Risk reduction behaviors				116.841	0.000	6.670	0.011
intervention group	2.03±0.56	2.47±0.44	2.83±0.45				
control group	2.01±0.87	2.12±0.84	2.17±0.85				
Stress management				31.140	0.000	3.896	0.051
intervention group	2.74±0.74	2.87±0.64	2.98±0.59				
control group	2.51±0.75	2.62±0.65	2.71±0.59				
Health monitoring				205.65	0.000	30.404	0.000
intervention group	1.83±0.95	2.43±0.71	2.88±0.68				
control group	1.70±0.90	1.88±0.82	1.99±0.86				
Treatment adherence				186.986	0.000	43.709	0.300
intervention group	2.14±0.40	2.58±0.31	2.87±0.27				
control group	2.02±0.37	2.15±0.34	2.22±0.33				
Blood pressure [mm Hg]							
systolic				65.15	0.000	7.77	0.006
intervention group	155.10±17.81	148.29±12.81	139.54±12.21				
control group	158.46±15.83	154.77±15.13	152.17±14.39				
diastolic				2.25	0.107	2.63	0.108
intervention group	103.06 ±14.72	94.88±11.35	90.33± 9.14				
control group	103.81±15.70	112.15±97.90	95.71±7.77				

Table 3. Blood pressure level control in intervention and comparison groups of the intercity van drivers, 2019, Thailand

Blood pressure level control	Participants (N = 104) [n (%)]		OR	95% CI	p
	intervention group (N = 52)	comparison group (N = 52)			
Baseline			–	–	–
controlled	–	–			
uncontrolled	52 (100)	52 (100%)			
1 month after intervention			3.19	1.35–7.55	0.012*
controlled	23 (44.2)	12 (23.1)			
uncontrolled	29 (55.8)	40 (76.9)			
3 months after intervention			10.45	3.8–28.79	<0.000**
controlled	38 (73.1)	4 (7.7)			
uncontrolled	14 (26.9)	48 (92.3)			

* $p < 0.5$; ** $p < 0.01$.

The differences in blood pressure level and percentage of well-controlled (≤140/90 mm Hg) of participants between groups were measured after 1 month and 3 months of the intervention. The BP control rate for the intervention group compared was significantly higher than that of the control group at 1 month (OR 3.19, 95% CI: 1.35–7.55) and 3 months after the intervention (OR 10.45, 95% CI: 3.8–28.79) as presented in Table 3.

DISCUSSION

The PAOT program was developed to promote hypertension management among intercity van drivers. This PAOT program emphasized active participation by intercity van drivers in practical and low-cost solutions for improving their work environment and hypertension management behaviors. The immediate outcomes and responses of the participants to this program were positive. Participants perceived that they were empowered to initiative and implement potential solutions by using local resources and skills that are easily available, simple, and inexpensive that can be carried out by drivers themselves.

The PAOT helps participants manage the related risk factors and facilitate workers' immediate goals and improvement activities according to their own ideas and experiences. Moreover, this PAOT program involving business owner participation in group work was necessary because there were some problems drivers could not solve by themselves but were resolved with the support of business owners. The PAOT enhanced the relationship between business owners to raise, share similar problems and discuss the best solutions for health and safety with their own simple ideas that can conduct improvement immediately with available resources. Consistent with the study of Nguyen and Khai [20] which found the significant work environment improvement in small enterprises in Vietnam post participation in PAOT intervention.

In this study, the health behaviors related to hypertension management were successful changes. This might be due to the reason that the PAOT program used in this study assisted participants in identifying not only work environment but also hypertension management behaviors

that need to be improved. In addition, the PAOT program fosters a sense of ownership and responsibility for their own health by empowering drivers to seek practical solutions that can be implemented independently through self-management. Moreover, the self-management concept can help people plan and control their behaviors. This finding is consistent with Barlow et al. [24] and Sutipan et al. [27], which found that self-management interventions affected health behavior change and participants' health outcomes. Self-management focuses on a person's responsibility to continuously care for himself according to each participant's individual needs and problems.

Furthermore, the success of these initiatives can be attributed to the collaboration of business owners in group work by listening to the problems and needs as well as jointly finding solutions. They supported PAOT programs in several ways including:

- encouraging employees to participate in PAOT programs,
- providing resources such as time, funding, and materials and investing in facility improvements that promote better hypertension management,
- supporting continuous improvement by collaborating to monitor progress, evaluate outcomes, and make adjustments to improve PAOT programs.

Employers' support plays a vital role in helping employees manage chronic conditions by promoting healthy behaviors and creating a supportive environment.

Workplace interventions, backed by employer support, can encourage employees to make healthier lifestyle choices, improve their overall health, and prevent or manage chronic conditions effectively [23,28].

Three months after the intervention, the systolic blood pressure between the groups was significantly different. Although the decrease in blood pressure of participants receiving participatory action-oriented was similar with previous studies [23,28], it should be noted that the positive effect of PAOT intervention on blood pressure reported in this study was found in shorter period of time of 3 months. It might be possible that employer arrangement of having blood pressure monitor at the station could promote self-monitoring of blood pressure by participants. It is evident that self-monitoring blood pressure is an effective strategy to better control of blood pressure and is recommended to use as an adjunct method in the management of hypertension [29]. Blood pressure monitor can provide immediate feedback to participants and may result in improving adherence to advice for blood pressure control. However, the sustainability in this control should be assessed in future studies with long term follow-up.

In addition, the success of this program may be due to the focus of PAOT on appreciating and addressing individual problems and needs. As a result, participants can thoroughly assess, analyze, and identify factors influencing their hypertension management positively and negatively. They were then encouraged to seek a way to solve the problem that could be carried out by themselves. Moreover, the self-management step [26] was used to help participants control and maintain appropriate health behaviors to promote their hypertension management. In addition, job strain and ergonomic factors, such as sedentary work, poor posture, and repetitive movements, can contribute to hypertension [30,31]. Support by the employer and work improvement achievement including having resting spaces at the station might contribute to reducing job strain and providing alternative area for relaxing posture after driving.

Results from this study confirmed that the PAOT intervention positively improved hypertension management and health outcomes. The effectiveness of this approach is guaranteed by its broad applicability in different sectors [20,22,25,32]. Moreover, the success of this intervention was due to self-management concept [26] that allied with the program to encourage hypertension management among drivers. A short duration of intervention was also a good fit with the mobile nature of intercity van

drivers work. Therefore, it is appropriate for drivers who face constraints due to economic limitations and the lack of occupational health and safety systems.

Although findings of this study support that PAOT can produce good outcomes in resources constrained setting, there are some limitations of the study. Interventions at organization level such as promoting healthy working hours, dealing with work intensity/staff shortage, etc., are not prioritized by participants, although they are in the action checklist. While the principle of PAOT emphasizes finding simple improvement actions that can be implemented, intervention at the organizational level would be most effective. People can start with intervention that are simple; when small actions are appreciated, people have more confidence to make future improvements. Continuous support for employers to offer organizational solutions is needed. The PAOT interventions in a larger study addressing organization solutions over a longer period of time should be further developed.

CONCLUSIONS

The result of the present study showed that the PAOT intervention, which applied PAOT and self-management concept, could effectively improve hypertension management, and health outcome. This success may indicate this approach's value, which pays attention to each improvement carried out by participants' self-effort and the capacity for voluntary action. It helps participants improve activities according to their ideas and experiences, focusing on simple, low-cost, and easy implementation by mobilizing available local materials and resources. Furthermore, self-management can help participants plan and control their behaviors according to appreciating and addressing their individual needs. Therefore, PAOT intervention is appropriate for drivers with insufficient finances, time, and resources to start any improvement action. It should apply in further studies with other workplaces in both formal and informal sectors with different characteristics and other health issues.

The findings of this study have several implications as follows:

- This PAOT intervention focused on materials and skills that are readily available. It can start with small, simple, inexpensive actions that workers can carry out by themselves. Therefore, it is appropriate to promote health and safety at work, particularly in small-scale or informal workplaces that lack occupational health and safety services. It can encourage people to change and maintain appropriate health behaviors.
- Self-management concept should be integrated into participatory action-oriented training to improve the effectiveness of hypertension management.
- Support from business owners facilitates hypertension management. Therefore, occupational health practitioners should involve business owners to provide social support as an intervention to promote hypertension management.

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