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Community-Based Occupational Health Promotion for Reducing Blood Pressure: A Randomized Control Trial of Agricultural Health Program

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Abstract

Background: Farmers need the right strategy to control blood pressure through Community-Based Occupational Health Promotion (COHP) Program interventions for reducing blood pressure. This study aims to analyse the effectiveness of COHP interventions to maintain blood pressure of farmers.

Materials and Methods: This study used a randomized control trial design. COHP interventions were performed in intervention (68 participants) and control (67 participants). The study was conducted for 24 weeks with intervention at 0-4 weeks and continued with follow-up at 5-24 weeks for participants in four Public Health Centres (PHC) areas in Indonesia. Data were collected using a stethoscope and aneroid sphygmomanometer to measure blood pressure. Data were analysed using Fisher's exact test, to analyse the differences in systolic (SBP) and diastolic (DBP) blood pressure in both groups.

Results: In after 24 weeks of CHOP, there were significant differences SBP between intervention and control groups (126.81 ± 14.52 Vs. 146.65 ± 16.38; p< 0.001). Meanwhile, there were significant differences DBP between intervention and control groups (83.03 ± 8.31 Vs. 86.91 ± 7.73; p= 0.003). Furthermore, the COHP was effective for reducing SBP and DBP (p< 0.001) among farmers.

Conclusions: This study indicates that COHP can be effective for reducing SBP and DBP among farmers in agricultural areas.

Keywords: Health Promotion, Blood Pressure, Hypertension.

Introduction

The 2018 Indonesian Basic Health Research reported that the prevalence of hypertension in Indonesia was around 34.1% [1]. Hypertension in the farmer group showed 45.2% systolic hypertension and 35.8% diastolic hypertension [2]. The Community-Based Occupational Health Promotion (COHP) program is an effective intervention to control blood pressure [3,4] and as such it could be the right treatment strategy for farmers [5]. Therefore, COHP is used as an alternative therapy to maintain farmers' blood pressure.

Previous research has indicated that the prevalence of hypertension among farmers are greater than fishermen

[6], and also other occupations in rural areas. High occurrence of hypertension in farmers correlates to the workload [4,7], pesticides, stress, supported by inappropriate behaviour patterns of farmers in the agricultural sector [8–14]. Exposure to pesticides for a long time can cause hypertension, due to changes in the characteristics of endothelial dysfunction by stimulating the production of vasoconstrictors such as COX-2 and prostaglandins inhibiting the release of nitrate oxidation [15,16]. Other factors such as stress due to workload and worry about changes in weather are situations which farmers cannot control, and ultimately increase blood pressure in farmers [17].

Health promotion programs for farmers in the workplace are very important, in order to maintain their health status [2]. The problem of non-communicable diseases, such as hypertension, is still very serious, which is related to lifestyle and exposure in the workplace [18], so it requires an education and promotion program. Working position in working hours can also affect blood pressure [4]. Therefore, control and monitoring of work activities and environments are very crucial for farmers in preventing hypertension issues.

The government has been working to address the issue of infectious diseases, including hypertension, through the Integrated Non-Communicable Disease Development Post (INCDC-DP) program. Sub Division of Non-Communicable Diseases at PHC has been implemented in 50.6% of villages throughout Indonesia; however, the prevalence of hypertension is still high [19]. This condition needs to be modified to achieve more optimum results. The strategy that can be implemented to help farmers maintain blood pressure is the COHP.

Based on a systematic review, COHP is a community health-based program focusing on active participation and community empowerment to improve their health [20,21]. In line with this research, farmers in the Jember agricultural area need to improve their knowledge, attitudes, and behaviour so that they can maintain their blood pressure. COHP consists of three basic programs, including increasing knowledge, changing behaviour, and creating an environment to encourage a healthy lifestyle [22]. The process that farmers will go through in this program includes health education, supervision and follow-up, mentoring, and behaviour change for maintaining their blood pressure [23]. Thus, the objective of this study is to evaluate the effectiveness of the COHP intervention in lowering blood pressure among farmers.

Materials and Methods

As the form of the highest level of evidence for establishing causal relationships in medical research, a randomized controlled trial (RCTs) was adopted in this study. The main advantage of RCTs lies in the randomization process, which significantly minimizes confounding from both known and unknown factors. While nonrandomized studies can control for known confounders, the RCT involved farmers and was conducted over 24 weeks, following the Consolidated Standards of Reporting Trials (CONSORT) guidelines. The objective of CONSORT is to guide authors in improving their trials' reporting. Trial reports need to be clear, complete, and transparent. Researchers identified 135 participants in the Public Health Canter (PHC) from the rural areas in Indonesia. This study aimed to analyse the effectiveness of COHP interventions to maintain the Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) of farmers in the agricultural areas.

This study was conducted by four PHCs. The population of this study was active at four PHCs. The sample size was determined using the G*Power program, with a statistical significance level set at 0.05; The effect size was 0.25, the power was 0.80, and two samples resulted in a required sample of 130 farmers. To account for potential dropouts, the final sample size was increased by 10 percent, resulting in 143 participants. The research sample was divided into 2 groups, namely the treatment group which was given COHP and the control group which received standard intervention according to services from PHC. The inclusion criteria in this study included: (1) working as a farmer (own land/farming labour), (2) being in a designated Integrated Non-Communicable Disease Development Post program (INCDC-DP) area, (3) having a normal blood pressure and/or SBP or DBP type I (4), and those who were willing to sign a consent to participate in our research.

This study measures the variable changes in SBP and DBP in farmers. In addition, participant characteristic variables were also measured, which included age, gender, religion, ethnicity, education, as well as duration of hypertension. The primary outcomes in this study were SBP and DBP, measured using a standardized protocol with a stethoscope and aneroid sphygmomanometer after the subject had rested for more than 10 minutes. The measurement instrument was calibrated in our laboratory prior to use. Additionally, the characteristics of the participants were documented and analysed.

Intervention: This study was conducted for 24 weeks, with 0-4 weeks of intervention, and continued with 5-24 weeks of follow-up on farmers. Determining the time period for this research refers to previous research [1], so that each step in the COHP intervention can be implemented optimally. The intervention group received the COHP. We conducted a series of education and training for the respondents on the topics compiled in the handbook. The provision of education and training was carried out in nine sessions over four weeks. Each session was carried out for 180 minutes under the

researcher's and the team's direct supervision. After the training process, participants immediately practiced chronic disease health services with assistance for nineteen weeks. The COHP program was carried out using a combination of health education, training, and interventions promoting healthy behaviors. It included individual and group activities such as counseling, discussions, simulations, and games, along with consultations and facilitation for farmer groups. The program also emphasized practicing healthy behaviors, including engaging in physical activity related to farming, consuming nutritious food, using personal protective equipment, performing stretching exercises, and maintaining ergonomic positions while working on the farm. Health education material provided to the treatment group included: (1) Recognizing Chronic Diseases in Farmers; (2) Exposure to Agricultural Chemicals in Chronic Diseases; (3) Risks of Work Position & Chronic Pain that related hypertension; (4) Treatment of Hypertension in Farmers; (5) Treatment of Back Pain in Farmers; and (6) Healthy Lifestyle Behaviour in Farmers. The control group in this study received routine care from the PHC.

Data collection in this study included three stages: pre-research, research, and post-research. The pre-research stage was carried out by submitting an application for an ethical clearance to the Ethics Committee. After getting permission from ethical committee, the research team sent a letter of request for permission to the Regency Politics and National Unity Agency, then to the District Health Office, and the PHCs. Furthermore, the team conducted an initial Focus Group Discussion (FGD) with the PHC team to coordinate research, including presenting research plans and coordinating prospective sample data according to criteria.

The second stage was research. We divided into four data collection teams according to the research location. At this stage, we have obtained research samples that meet the criteria and are willing to become participants. At Weeks 0-4, we measured SBP and DBP as pretest values in the intervention and control groups. Thereafter, we gave the COHP intervention to the intervention group and the regular Integrated Non-Communicable Disease Development Post program (INCDC-DP) to the control group. At weeks 5-24, it was followed by a follow-up of the intervention given to farmers and continued with measuring blood pressure. At week 24, the SBP and DBP measurements were used as post-intervention values.

The third stage, post-research, involved verifying the completeness of the collected data and conducting data analysis. At baseline, sociodemographic information such as age, gender, religion, ethnicity, education, allergy history, body weight, height, abdominal and waist circumference, cardiovascular or kidney conditions, and duration of hypertension was gathered using a questionnaire. SBP and DBP measurements were taken at INCDC-DP. Participants were seated in a chair and allowed to relax for 10 minutes before their blood pressure was measured at least twice. If the second measurement differed by 10 mmHg from the first, a third measurement was conducted. Among the measurements, the two with the smallest difference were used, with the final calculation based on the closest values [1].

The data were analyzed using SPSS statistical software, version 23.0 for Windows (SPSS Inc., Chicago, IL). The raw data were reviewed for accuracy and tested for normality. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were applied to summarize respondent characteristics such as age, gender, ethnicity, cardiovascular or urinary system conditions, hypertension status, educational background, allergy history, body weight, height, abdominal circumference, and waist circumference. Fisher's exact test, a nonparametric statistical method, was employed to assess the impact of COHP on maintaining SBP and DBP levels among farmers.

Results

In this study, we measured the characteristics of 135 farmer participants in an agricultural area. Table 1 indicates that the age of farmers in the control group has been dominated by middle age (56.7%), female sex (76.2%), chronic diseases, especially hypertension (52.2%), hypertension being more than five years (22.4%), elementary school education (59.7 %), the mean value of body weight (51.6), height (151.7), abdominal circumference (84.4), and waist circumference (92.5). Table 1 shows that the age of farmers in the intervention group has been dominated by middle age (41.2%), female sex (70.6%), chronic hypertension (36.8%), hypertension being less than five years old (26.5%), elementary school education (58.8) %), the mean value of body weight (54.7), height (152.6), abdominal circumference (86.7), and waist circumference (92.6).

Table 1. Characteristics of Control and Intervention Group Farmers

Characteristics		Control Group		Intervention Group	
		n	%	n	%
Age	Young age (25-43 years)	6	9.0	18	27.9
	Middle Ages (44-59 years)	38	56.7	28	41.2
	Elderly Age (60-74 years)	19	28.4	20	29.4
	Advanced Elderly (75-90 years)	3	4.5	1	1.50
	Longevity Age (>90 years)	1	1.6	0	100
	Total	67	100	68	100

Gender	Man	16	23.9	20	29.4
	Woman	51	76.2	48	70.6
	Total	67	100	68	100
Ethnic group	Java	21	31.3	29	42.6
	Madura	45	67.2	39	57.4
	Mixture	1	1.5	0	0
	Total	67	100	68	100
Experienced disease of the cardiovascular system or kidneys	There is no	25	37.3	37	54.4
	Hypertension	35	52.2	25	36.8
	DM	1	1.5	2	2.9
	CRF (Chronic Renal Failure)	0	0	1	1.5
	LBP (Low Back Pain)	6	9.0	1	1.5
	Cholesterol	0	0	2	2.9
	Total	67	100	68	100
Have had hypertension for a long time	Not Hypertension	31	46.3	36	52.9
	<5 years	21	31.3	18	26.5
	>5 years	15	22.4	10	14.7
	Forget	0	0	4	5.9
	Total	67	100	68	100
Education	No formal education	16	23.9	20	29.4
	Elementary School	40	59.7	40	58.8
	Junior High School	7	10.4	4	5.9
	Senior High School	3	4.5	4	5.9
	Total	67	100	68	100
Profession	Farmer	67	100	68	100
	Not Farmers	0	0	0	0
	Total	67	100	68	100
		Means	**Median**	**SD**	**Means**	**Median**	**SD**
Weight (kg)		51.6	52.0	10.3	54.7	53.5	10.8
Height (cm)		151.7	150	9.6	152.6	152	6.9
Abdominal circumference (cm)		84.4	85	10.9	86.7	89	10.8
Waist size (cm)		92.5	92	11.1	92.6	93	9.6

Fisher's exact test with a p-value of less than 0.05 indicates significant differences in blood pressure values between the two groups, with SBP revealing a p-value of 0.005 and DBP showing a p-value of 0.001 (Table 2). In after 24 weeks of CHOP, there were significant differences SBP between intervention and control groups (126.81 ± 14.52 Vs. 146.65 ± 16.38; p< 0.001). Meanwhile, there were significant differences SBP between intervention and control groups (83.03 ± 8.31 Vs. 86.91 ± 7.73; p= 0.003). Furthermore, the COHP was effective for reducing SBP and DBP (p< 0.001).

Table 2. Repeated Measures ANOVA of the People with Hypertension in the Intervention and Control Group

Variable	Groups	Time of Measurements (Mean ± SD)			Repeated Measures ANOVA *(P-Value)*
		Baseline	**After 4 Weeks**	**After 24 Weeks**	
People With Hypertension Systolic Blood Pressure	Intervention	152.68 ± 14.67	133.10 ± 16.50	126.81 ± 14.52	< 0.001[b]
	Control	150.37 ± 15.38	146.91 ± 16.34	146.65 ± 16.38	
	P-between	0.09[a]	<0.001[a]	<0.001[a]	
People With Hypertension Diastolic Blood Pressure	Intervention	90.24 ± 9.76	83.25 ± 8.31	83.03 ± 8.31	< 0.001[b]
	Control	88.28 ± 7.40	86.91 ± 7.73	86.91 ± 7.73	
	P-between	0.08[a]	0.005[a]	0.003[a]	

Note. ANOVA, Analysis of Variance; SD, Standard Deviation;
[a] Independent *t* test; [b]ANOVA; [*]Adapted ANOVA test based on the pre-test score

Discussion

This study aimed to analyse the effectiveness of COHP interventions in reducing blood pressure in farmers. After 24 weeks of COHP, a significant difference in blood pressure was observed between the treatment and control groups. This indicates that COHP is effective on lowering SBP and DBP among farmers. The following section will discuss the effects of the interventions provided.

The tabulation results revealed significant changes in both systolic and diastolic blood pressure among individuals with hypertension, who were divided into intervention and control groups. These measurements were taken at three time points: baseline, 4 weeks, and 24 weeks. In systolic blood pressure, the intervention group revealed a drop from 152.68 ± 14.67 mmHg at baseline to 133.10 ± 16.50 mmHg after 4 weeks, and further decreased to 126.81 ± 14.52 mmHg after 24

weeks. In contrast, the control group experienced a smaller reduction from 150.37 ± 15.38 mmHg at baseline to 146.91 ± 16.34 mmHg after 4 weeks, and 146.65 ± 16.38 mmHg after 24 weeks. Repeated ANOVA test indicated that the changes in systolic blood pressure in the intervention group compared to the control group were statistically significant ($p < 0.001$).

For diastolic blood pressure, the intervention group showed a decline from 90.24 ± 9.76 mmHg at baseline to 83.25 ± 8.31 mmHg after 4 weeks, and remained stable at 83.03 ± 8.31 mmHg after 24 weeks. On the other hand, the control group experienced little change from 88.28 ± 7.40 mmHg at baseline to 86.91 ± 7.73 mmHg after 4 weeks and remained stable after 24 weeks. Statistical tests presented a significant difference in changes in diastolic blood pressure between the two groups with $p < 0.001$. These results indicate that the intervention given is significantly more effective on lowering blood pressure in people with hypertension compared to the control group.

According to the present study results, most respondents came from the adult and elderly age groups: adults as 56.7% in the control group and 41.2% in the intervention group, while the elderly were 28.4% in the control group and 29.4% in the intervention group. Based on data national health survey [1], hypertension occurs in the age group of 31-44 years (31.6%), aged 45-54 years (45.3%), aged 55-64 years (55.2%). The chance of having high blood pressure increases as someone ages [24]. With increasing age, the body's performance diminishes. There is a decrease in the elasticity of blood vessels, because of which the blood vessels become stiff so that the heart's burden becomes heavier in pumping so that many elderlies have a risk of hypertension [25]. Even if not having hypertension by age 55 to 65, lifetime risk for developing it is a whopping 90% [26]. Hypertension in farmers, particularly among the elderly, is closely linked to age-related changes in the cardiovascular system, necessitating knowledge for effective management. Delivering health education can help mitigate factors contributing to hypertension in older adults [2].

This study also found that most of respondents were female. Gender is a factor that cannot be modified in the incidence of hypertension [25]. The results of these findings are not in line with previous study that men have a higher level of hypertension than women [27]. Men have a 2.3x more risk of experiencing an increase in systolic blood pressure than women [28]. However, it is due to hormonal factors in women; women are more likely to have high blood pressure after menopause [24].

In addition to age and gender findings as factors of hypertension, obesity, low education level, a family history of hypertension, and a history of hyperlipidaemia are also risk factors [29]. Obesity is closely associated with negative cardiovascular outcomes. The connection between excess body fat and elevated blood pressure is well-documented, with estimates suggesting that obesity is responsible for 65–78% of primary hypertension cases [30]. The body mass index (BMI) is regarded as an effective measure for evaluating obesity [31-33]. Based on weight and height measurements, the Body Mass Index (BMI) values calculated for each group in the study were 22.4 for the control group and 23.4 for the intervention group. The number refers to the healthy range or ideal weight category. However, BMI alone is not suitable for differentiating between body fat and muscle. Instead, waist circumference (WC) is often used to assess abdominal obesity [34], as it is strongly correlated with visceral fat and is simple to measure [35]. A waist circumference greater than 40 inches (101.6 cm) in men and more than 35 inches in non-pregnant women is associated with an increased risk of developing obesity-related conditions (88,9).

The ethnic factor is one of the variables studied. This study shows that the majority of respondents are Madurese, namely 67.2% in the treatment group and 57.4% in the control group. This study is conducted in Jember regency that majority ethnics are Madurese and Javanese. Previous study reported that Madurese and Javanese ethnic have experienced for risk hypertension [36]. Therefore, routine checks and modifying of healthy lifestyle should practice to maintain blood pressure [3].

The majority of farmers in this study had a history of chronic conditions such as hypertension, diabetes mellitus, chronic renal failure, low back pain, and hypercholesterolemia. The results revealed the prevalence of various health issues [4]. The risk of farmers developing chronic kidney disease increases with longer and more frequent use of insecticides [5]. As chronic diseases continue to rise in Indonesia, the issue of chronic multimorbidity remains insufficiently studied. The findings reveal a strong association between multimorbidity and increasing age, with a high number of patients and healthcare visits across all provinces, except Java. Additionally, hypertension is the leading condition, while the most common comorbidities include diabetes mellitus, chronic cerebral ischemia/stroke, and chronic ischemic heart disease [6]. It can be concluded that farmers are a profession at risk of experiencing chronic diseases, and as such a comprehensive intervention is required to be able to overcome their health problems.

Education level is also a risk factor [37], in this study more than half of the respondents were elementary school educated. Using a national longitudinal study, previous study discovered that participants with a primary school education or lower had a higher risk of newly diagnosed hypertension and poorer blood pressure control compared to those with at least a junior high school education. Education had a broad impact,

influencing not only the participants' lifestyle but also their adherence to medication and the frequency with which they monitored their blood pressure after being diagnosed with hypertension [38]. This statement is supported by previous research that a lack of education among patients often resulted in inadequate disease management [39]. The level of education plays a significant role in shaping respondents' understanding of the intervention program. This study observed a reduction in SBP and DBP among farmers in the intervention group following the implementation of COHP. This outcome is likely due to the farmers actively applying the COHP program knowledge gained through education and training. The intervention group realized that they had to start identifying health problems with their blood pressure and take action according to the COHP program. Therefore, through COHP, farmers adopt a strategy to manage their health [4]

Farmers in the intervention group experienced a reduction in SBP and DBP after 19 weeks of COHP implementation. This improvement can be attributed to farmers adopting healthier lifestyles, supported by a combination of health education, regular supervision and follow-ups, guidance to achieve key healthy living goals, and reinforcement of their skills to sustain the healthy habits they had developed [23].

The community empowerment programs in efforts to prevent and early detection of non-communicable diseases is the Integrated Development Post (Posbindu) for Non-communicable Diseases (NCDs or PTM) or INCDC-DP. Posbindu PTM is one form of health effort in controlling NCD risk factors under the guidance of PHC [40]. The Posbindu PTM program is stated in the Minister of Health Regulation No. 71 of 2015 concerning preventing non-communicable diseases. This program was created to enhance community participation in preventing and detecting risk factors for non-communicable diseases. The community in this activity, individually or in groups, plays an active role in preventing non-communicable diseases through Community-Based Health Efforts [41]. However, the NCD program in Indonesia still focuses on screening coverage of residents aged 15 years and over. There is no specific program to monitor further complications of non-communicable diseases [42].

Community-Based Occupational Health Promotion (COHP) is an intervention program aimed at maintaining and improving the health of farmers through community participation and empowerment. This program focuses on three core components: increasing knowledge, changing behaviours, and creating an environment conducive to a healthy lifestyle. COHP involves health education, supervision, follow-up mentoring, and behavioural change activities tailored specifically to farmers. The effectiveness of COHP has been demonstrated in a study where it significantly reduced both systolic and diastolic blood pressure among participants over a 24-week period.

In comparison, the Integrated Non-Communicable Disease Development Post (INCDC-DP), also known as Posbindu PTM, is a government program designed to control risk factors for non-communicable diseases (NCDs) through community-based efforts under the guidance of Public Health Canters (PHC) [42]. Despite being implemented in over half of the villages in Indonesia, the INCDC-DP has shown limited success in significantly lowering the prevalence of hypertension. This limitation is attributed to several factors, including insufficient follow-up and the overburdening of health cadres with multiple responsibilities, leading to incomplete dissemination of health information [43].

COHP offers unique benefits to farmers that are not fully realized through government programs such as INCDC-DP. Specifically, COHP provides a more tailored approach to health promotion by addressing the unique occupational risks and lifestyle factors associated with farming. This includes mitigating the effects of pesticide exposure, stress from workload, and other risk factors such as poor diet and lack of physical activity. Additionally, the COHP's focus on continuous education and behavioural change empowers farmers to take proactive steps in managing their health, leading to more sustainable health outcomes. This community-centred approach fosters a sense of ownership and accountability among farmers, which is critical for long-term health maintenance.

Therefore, COHP is needed by farmers in their daily lives independently to support the maintenance of controlled blood pressure. By adopting COHP, farmers benefit from a comprehensive and participatory health intervention which also enhances their overall quality of life through improved health literacy and healthier behaviours. This approach addresses the gaps left by broader government programs and provides a more effective strategy for managing chronic health conditions in agricultural communities.

This study also found that in the control group, there was an increase in SBP and DBP before and after the routine INCDC-DP. This can be explained based on previous research reports that DBP although INCDC has been implemented in 50.6% of villages throughout Indonesia, the prevalence of INCDC-DP risk factors is still high [24]. This is due to several inhibiting factors, such as the lack of follow-up role for INCDC-DP participants, which so far has only been left to healthcare team, while the teams are also charged with conducting health education so that the information conveyed is incomplete [44].

This study found that the COHP intervention significantly affects SBP and DBP in farmers. Hypertension has become part of several health problems in farmers [2]. Blood pressure problems such as hypertension experienced by farmers can be caused

by long-term exposure to pesticides. In line with that, other studies explain that farmers experience exposure to practice of pesticides. The practicing for used of pesticides are performed various activities, including carrying and mixing of pesticides, spraying pesticides to plants. However, farmers are lacked for using personal protective equipment (PPE) [45]. In addition, health problems that can occur to farmers when pesticides enter the body are in the form of poisoning [46]. Blood pressure will change to be abnormal due to the continuous impact of pesticide chemicals which can interfere with the working of the acetylcholinesterase enzyme in the body [47]. Pesticide exposure changes the thyroid hormone, an essential factor in increasing the thyroid stimulating hormone (TSH), which ends with an increase in blood pressure [48]. However, pesticides are not the only factor, and there are many other risk factors that cause farmers to experience hypertension, namely smoking habits [49], physical activity [50], alcohol consumption [51], salt intake patterns, and stress [52]. The duration of farmers' work and their exposure to various factors related to their working conditions can contribute to an increase in blood pressure [2].

Managing or preventing hypertension is essential for enhancing farmers' quality of life. Research highlights that maintaining stable blood pressure significantly contributes to improving the well-being of farmers in agricultural settings [53]. Thus, implementing the COHP intervention is crucial to support the health of individuals in farming communities, particularly farmers. However, this study had several limitations. Firstly, we used categorical data to evaluate the effect of program to reduce the prevalence of hypertension. It would have been better if we had also used the quantitative data of blood pressure to evaluate the reduction of systolic and diastolic BP during the program. Then, the sociodemographic data may be related reducing or increasing of blood pressure. Therefore, the sociodemographic data should be analysed with the blood pressure reduction. Furthermore, sociodemographic data should be concerned for the next study for modifying lifestyles of farmers to maintain or reducing their blood pressure.

Conclusion

The COHP program could effectively lower blood pressure among farmers. After 24 weeks of analysis, the control group showed no change in the SBP and DBP categories, while the treatment group experienced an increase in normal SBP and DBP categories. Thus, COHP can be adopted as an occupational health nursing initiative by nurses for the farming community.

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Conflict of interest

None declared.

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Ethical Considerations

The researcher provided information to all participants who were used as respondents to the aims and objectives of the research. Thereafter, participants who were willing to take part in the study until the end of study signed the informed consent form voluntarily. This study also obtained permits from Community Department, District Health Office, as well as permits for the PHCs Head Officers.

Code of Ethics

This study was approved Ethical Clearance Review Board from Faculty of Dentistry, Universitas Jember with No. 1753/UN25.8/KEPK/DL/2022.

Authors' Contributions

Tantut Susanto: Study conception, research questions and design, Final manuscript. Hairrudin: Data collection. Tecky Indriana: Data collection. Rismawan Adi Yunanto: Analysis and interpretation of results. Ira Rahmawati: Analysis and interpretation of results. Ana Nistiandani: Draft manuscript preparation. Wahyuni Fauziah: Draft manuscript preparation, Final manuscript. All authors discussed the results and reviewed the final version of the manuscript.

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