Knowledge, Attitudes, and Practices of Coconut Tappers in Managing Work-Related Musculoskeletal Disorders and Occupational Accidents

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KEYWORDS
Knowledge, attitudes, practise, coconut tappers, work-related musculoskeletal disorders, occupational accidents.

ABSTRACT

Introduction: In an effort to improve occupational safety and health for coconut tappers, it is essential to implement strategic public health measures. Coconut tappers are at risk of work-related musculoskeletal disorders and occupational accidents, which necessitate appropriate prevention and control strategies. This study aimed to assess and implement measures to enhance the occupational safety and health of coconut tappers in Wonosobo District, Central Java, Indonesia, with a primary focus on the knowledge, attitudes, and practices (KAP) of coconut tappers regarding the interventions provided, which include simple stretching, BSM acupressure, and the use of safety harnesses.

Methods: This study was conducted between January 2024 and June 2024 to assess the knowledge, attitudes, and practices (KAP) related to the interventions provided in the form of simple stretching, BSM acupressure, and the use of safety harnesses among coconut tappers in Wonosobo Regency. The assessment was accompanied by training in simple stretching, BSM acupressure, and the use of safety harnesses in the workplace. Evaluations were conducted before and after the training to assess the potential impact of these interventions. Using SPSS version 25, a t-test was conducted to analyze the data, revealing significant differences ($p < 0.05$) in hand dimensions and strength assessments between the two genders. These results highlight the need for surgical tools that are configurable and adaptive to meet the ergonomic requirements of all users, especially considering that many instruments are predominantly designed for larger male hands.

Results: The results of the simple stretching interventions, BSM acupressure, and the use of safety harnesses can statistically improve the knowledge, attitudes, and practices of coconut sugar tappers in minimizing the incidence of work-related musculoskeletal disorders (WMSDs) and workplace accidents. When examining the mean difference values after the interventions, the intervention group showed a greater mean difference than the control group. Specifically, after 4 weeks of intervention, the increase in mean difference values for the intervention group compared to the control group was as follows: knowledge +2.35, attitude +5.38, and practice +6.76.

Conclusion: Occupational safety and health interventions, including simple stretching, BSM acupressure, and the use of safety harnesses, are considered effective and can be implemented to improve the knowledge, attitudes, and practices of coconut tappers.

INTRODUCTION

The work of coconut tappers is often exposed to numerous hazards due to inadequate risk control measures and cannot be considered "decent," as workers are not guaranteed a safe and healthy working environment[1] . Harvesting coconuts is a very difficult and dangerous job because the structure of the coconut tree is unbranched, and only skilled individuals can perform this work[2,3] . The work of coconut climbers is categorized as heavy labor because it requires a significant amount of energy[4,5,6] . The WHO and ILO stated that from 2000 to 2016, workers in various types of jobs are vulnerable to risk factors for

occupational injuries, with the agricultural sector being one of the most affected[7] . The causes of work-related musculoskeletal disorders (WMSDs) in tree climbers include work posture, duration of work, age, and tenure[8] . Workers who climb coconut trees are at a higher risk of musculoskeletal disorders compared to other types of injuries and diseases[9] .

Musculoskeletal disorders are related to the physical workload performed by workers[10] . Climbing work primarily relies on the strength of the upper extremities and shoulders, which increases the risk of musculoskeletal disorders[11] . The variables that are significantly related to work-related musculoskeletal disorders (WMSDs) in workers include age, smoking habits, physical fitness, body mass index (BMI), repetitive activities, work posture, and workload. The most dominant variable is workload[12] . The International Labor Organization reported in 2018 that every year, 380,000 workers, or 13.7% of the 2.78 million workers, experience health problems related to their work. Additionally, more than 374 million people are injured, wounded, or fall ill each year due to work-related musculoskeletal disorders (WMSDs) [13 , 14] . Based on BPJS Employment data from 2022, there were 234,370 cases in 2021, which resulted in the deaths of 6,552 workers, representing an increase of 5.7% compared to 2020. Work-related Musculoskeletal Disorders (WMSDs) can have an impact on worker accidents[15] . According to data from BPJS Employment, the number of work-related accident cases reached 105,182 in 2015, resulting in 2,375 fatalities. Of these 105,182 cases, 38% were due to falls from heights. Law No. 1 of 1970 highlights the need for guidelines for working at heights using rope access[16] . Falls from coconut trees often result in severe back injuries and death[9] .

Data from 702 coconut tappers in Banyumas Regency have reported accidents since the last five years. Work accidents in coconut tappers are caused by 5 factors, namely knowledge, availability of PPE, behavior, self-efficacy, and the role of stakeholders[17] . Data from the People's Welfare of the Banyumas Regional Secretariat from 2017 to October 2019 there were 323 cases of coconut tappers falling, 236 coconut tappers were disabled and 87 of them died[18] . Lack of awareness of the use of PPE triggers the high rate of work accidents in coconut tappers. [19] . Government efforts related to occupational safety and health are contained in RI Minister of Health Regulation Number 48 of 2016 which explains the importance of stretching for 10-15 minutes every 4 hours of work. [20 , 21] . Research on stretching proves Workplace Stretching Exercise can reduce fatigue and WMSDs disorders[22 , 23] . In addition, BSM (Body Space Medicine) acupressure with a simple and easy massage at certain points to nourish damaged cells and launch energy so that sore muscles and blood flow that is not smooth can return to normal[24] .

Maryam et al's research states that the use of safety equipment such as a date tree climber device (DTCD) when climbing trees can reduce WMSDs and work accidents. [25] . Furthermore, OSHA recognizes fall protection standards covering both people and equipment (safety harness) with SNI standards in protecting workers from falls. [26 , 27] . There is no specific policy on this matter in the Ministry of Labor. The current policy is a general policy in efforts to measure and prevent the ergonomic work environment as stated in Permenaker No.5 of 2018 article 5 paragraph 2. The importance of supervising the use of safety harnesses also needs to be considered. [28] . Therefore, interventions related to stretching, BSM acupressure and the use of safety harnesses can be applied to coconut sugar coconut tappers. Our study aims to assess and implement measures to control Work Related Musculoskeletal Disorders (WMSDs) and Prevention of Occupational Accidents in Coconut Tappers in Wonosobo District. These measures mainly focus on the knowledge, attitude and practice of coconut tappers through stretching training, BSM (Body Space Medicine) acupressure and Safety harness use.

METHODOLOGY

This research was conducted in order to improve the safety and health of coconut tappers in Wonosobo Regency. The research was conducted in three sub-districts namely Leksono, Kaliwiro and Kepil. The overall project objective was to improve the safety and health of coconut tappers through interventions provided in the form of stretching training, BSM (Body Space Medicine) acupressure and the use of Safety harness with an intervention for 4 weeks with every 2 weeks an assessment and recheck after 1 month of intervention.

Research population:
The population in this study is coconut tappers in Wonosobo Regency, whose numbers are unknown (infinite population). [29] . Samples taken from the research population must be representative. [30] . In determining the sample size the author uses the following Frederer Formula. From the results of the above calculations, the sample size is 29.16 which is rounded up to 30 respondents in each group. Based on the formula calculation, the total sample size is 68 research samples consisting of a control group of 34 respondents and an intervention group of 34 respondents, including the number of drop out subjects. In determining the sample size, the researcher used simple random sampling, by drawing lots until the required number of samples was obtained. All coconut tappers at the time of this study were eligible and invited to participate. Written informed consent was obtained.

Study design:
Our study aimed to improve coconut tappers' understanding of WMSDs control and Accident Prevention while they are at work climbing coconut trees. The study specifically assessed coconut tappers' KAP on simple stretching, BSM acupressure and safety harness usage. The training was conducted specifically after the Pre Test. In addition, we conducted a qualitative study to conduct a more in-depth assessment of the coconut tappers' beliefs and attitudes (Data being submitted). The results shown in this study are in phase two research, which has previously been tested on small groups in phase one of the research. The research conducted was a quantitative and quasi-experimental study using a pre-test and post-test control group design. [31] . Respondents were divided into two groups using randomization techniques, namely intervention and control. The intervention group was given stretching movements, independent BSM acupressure and the use of safety harness. The control group was only given a safety harness.
Our study consisted of six phases, including four assessment periods: (1) preparatory phase, (2) baseline KAP assessment of knowledge, attitudes and practices on simple stretching, BSM acupressure and safety harness use before the intervention, (3) training on simple stretching, BSM acupressure and safety harness use, (4) first post-training follow-up assessment of knowledge, attitudes and practices on simple stretching, BSM acupressure and safety harness use after two weeks of intervention, (5) the second follow-up assessment on simple stretching, BSM acupressure and safety harness use after 4 weeks of intervention, (6) the fourth follow-up assessment on simple stretching, BSM acupressure and safety harness use after 1 month without intervention.
Knowledge, attitude and practice assessments were conducted using questionnaires adapted from previous studies. [23] . The knowledge, attitude and practice questionnaires used are questionnaires that have previously been validated directly by experts on stretching material, BSM acupressure and safety harness. The initial product results were validated by 13 experts through interviews. Table 5.1 below is the result of the validity level of the acupressure material expert 92.5% and the use of safety harness 85.8% with very valid criteria and can be used without revision. The results of the stretching material expert validation are 81.6% with fairly valid criteria and need minor revisions. Material expert validation as in Table 1 below.

Table 2. Questionnaire Validation

Questionnaire Value			
Expert	**Stretching**	**Acupressure**	**Safety Harness**
1	31	38	33
2	32	38	32
3	35	35	38
Total	98	111	103
Results	(98/120)x100%= 81.6%	(111/120)x100% = 92.5%	(103/120)x100%= 85.8%

The intervention consisted of face-to-face training provided by the researcher, who had previously

received training on stretching, BSM acupressure and safety harness use from experts, consisting of theoretical and practical sessions on stretching, BSM acupressure and safety harness use. We used the flip sheet media to deliver the training to the coconut tappers due to the location of the training in the plantation. Table 1 is the average result of the level of validity of media experts on the backsheet of stretching movements obtained at 94% with very valid criteria and can be used without revision. The results of media expert validation on videos and acupressure backsheets averaged 93% with very valid criteria and can be used without revision. The results of media expert validation on videos and back sheets for the use of safety harness averaged 92% with very valid criteria and can be used without revision. The media used has previously been validated by media experts as in table 2 below.

Table 2. Media Expert Validation

Media Value			
Expert	**Stretching**	**Acupressure**	**Safety Harness**
1	37	33	35
2	35	32	37
3	35	33	36
4	40	32	38
5	40	37	38
Total	187	167	184
Results	(187/200)x100% = 93.5%	(167/200)x100% = 83.3%	(184/200)x100% = 92%

Data collection and statistical analysis:

All data were entered in SPSS version 16 [32] and analyzed using STATA Standard Edition (StataCorp LCC Version 17). We conducted a pairwise analysis of the KAP questionnaire results to assess the impact and significance of the training by comparing those who participated in the entire assessment period. The knowledge score used a nominal scale with correct and incorrect answers to questions where each "correct" answer was worth 1 point for a total of 14 questions (maximum score: 28 points). As the knowledge scores across all periods were not normally distributed, they were plotted as median and interquartile range (IQR), and compared using the Wilcoxon pairwise signed rank test. Attitude scores using a Likert Scale (1=strongly disagree to 4=strongly agree) attitude responses between periods were analyzed using the Wilcoxon paired signed rank test with median and IQR reporting. The attitude questionnaire consisted of 11 questions (maximum score: 44 points). A two-sided p value of less than 0.05 was considered statistically significant across all statistical analyzes and tests. The practice questionnaire used an ordinal frequency scale (0=never to 4=always) consisting of 13 questions (maximum score: 52 points).

Univariate analysis was conducted to determine the frequency distribution of 4 variables, namely: dependent, independent, intermediate and confounding variables. The description of the characteristics of respondents in the central tendency table is in accordance with the answers from the questionnaire. [33] . The characteristics of continuous data samples are described by the parameters n, mean, SD, sample character, minimum and maximum. [34] . Bivariate analysis is processed to determine the influence between variables. [35] . Interventions used paired t-test on normally distributed data and non-parametric Wilcoxon test on non-normally distributed data. [36] . The test was conducted before and after the intervention to determine any differences in knowledge, attitudes, practices, incidence of WMSDs, and work accidents. Then to determine the difference in the value of knowledge, attitudes, practices, incidence of WMSDs, work accidents, and work accidents between the intervention and control groups, an unpaired t-test (independent t-test) is used if the data is normally distributed, but if the data is not abnormally distributed, a non-parametric test is used, namely the Mann Whitney test. To determine the relationship of confounding variables with knowledge, attitudes, practices, incidence of WMSDs and work accidents using the Pearson test if both data are normally distributed and vice versa if not normal using the Spearman test . [37]

Knowledge, attitudes, and practices were observed 4 times and tested to determine the increase and change before and after the intervention, this test uses RMA (Repeated Measuring Anova). Multivariate analysis is used to precisely estimate changes in the dependent variable at different times after intervention and control for confounding variables. Eta squared is the result of repeated measure anova analysis of between-group effects, total effects, between-group effects by including interaction effects and total effects by including interaction effects.

Eta squared is an analogue of R squared, which is a form of relationship measure such as a correlation coefficient on a 0-1 scale that tells how many dependent variables are explained by each independent variable. Path analysis intervention is carried out after the classical assumption test, where this path analysis is used to measure the relationship between independent and dependent variables through mediators or intermediate variables. The classical assumption test is useful for testing regression interventions that produce regression interventions from least squares methods that produce unbiased linear estimators. The data analysis requirements test is carried out to determine the classic assumption test, namely the statistical test used whether to use a parametric or non-parametric statistical test.

Then testing with parametric inferential statistics requires several things, such as multicollinearity test, normality assumption test, linearity test, and autocorrelation test. Parametric statistical tests require that the data analyzed must be interval scale, ratio and random sampling. Normality testing is carried out to determine whether the data distribution is normal or not, this test is important for selecting the statistical test used, because parametric statistical tests require data to be normally distributed. Multicollinearity test, normality assumption test, linearity test, and autocorrelation test need to be done before analyzing data or statistical calculations and testing research hypotheses. This test is part of parametric type inferential statistics if the analysis requirements have been met. [33] .

Research with path analysis which can be used to see the magnitude of the influence of direct and indirect variables. The path coefficient to determine the magnitude of the dependent variable, then the path coefficient itself does not have a unit so it can be concluded that the greater the path coefficient, the greater the influence given by the variable. In this study, an analysis was carried out using path analysis, namely to determine the magnitude of the effect of the intervention on knowledge, attitudes, practices, the incidence of WMSDs and work accidents, both direct and indirect effects and to find out what variables could interfere with the success of providing interventions. The recursive arrow intervention was used in this study, which is an arrow pointing in one direction. The researcher believes that the relationship between variables is linear, additivity, normally distributed, and the variables have a one-way relationship and have an adequate sample size.

RESULTS

This research was conducted in Leksono District, Kaliwiro District, and Kepil District, Wonosobo Regency, Central Java. Coconut sugar tappers are tappers who work in regular hours every morning around 06.00 - 08.00 and in the afternoon at 15.00 - 17.00 to produce processed coconut sugar on a home scale. Coconut tappers in their activities are usually carried out manually without any sophisticated equipment used during the sap tapping process. The coconut tappers will carry a set of tapping tools consisting of: deres (a knife used for the tapping process by slicing the coconut mayang to stimulate the sap water to come out), tubung (a container used by coconut tappers to collect sap water which is usually made from large bamboo trees or the rest of mineral water bottles. Deres and tubung will be carried by the coconut tappers who are usually tied to the back of the waist with a rope tied to the waist with extreme work attitudes such as climbing and descending coconut trees whose height ranges from 15-30 meters, static positions when tapping on coconut trees, repetitive work and loading on certain muscles such as the waist evening with regular hours, because if in just one of them is not tapped, the sap produced by the coconut tree will be damaged or stale. For example, if a coconut tapper forgets not to tap in the morning, the sap water can no longer be used for collection in the afternoon and vice versa. The damaged or stale sap water can no longer be used and must be disposed of.

1. Overview of Knowledge, Attitudes and Practices of Coconut Tappers Pre-Post Test

a. An overview of the knowledge research variables was carried out with descriptive

analysis in the form of central tendency values.

The initial measurement (pre-test) in the three groups obtained a different average score. The intervention group was 23.29 (SD 3.05) and the control group was 22.91 (SD 2.84). The minimum score obtained was 17 and the maximum was 27. In the final measurement (post-test 3), the average score of the research group was relatively high, namely the intervention group of 25.26 (SD 1.91) while the control group was relatively low at 23.35 (SD 2.57). The minimum score obtained was 16 and the maximum was 28. The central tendency value of the knowledge variable can be seen in table 3.

Table 3. Central Tension Values of Knowledge Variables Based on Pre-test and Post-test Group Differences

	Intervention				Control			
Variables	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Knowledge_Pre	23.29	3.05	17	27	22.91	2.84	17	27
Knowledge_Post 1	24.85	2.03	21	29	22.97	2.84	16	27
Knowledge_Post 2	25.65	1.63	21	28	23.35	2.75	15	27
Knowledge_Post 3	25,26	1.93	21	28	23.35	2.57	16	27

b. An overview of the research variables of coconut sugar coconut tappers' attitudes was carried out by descriptive analysis in the form of central tendency values.

Assessment of central tendency before intervention (pre-test) obtained a picture of different mean scores. The average score of the intervention group pre-test was 25.59 (SD 5.49) and the control group was 25.79 (SD 4.57). The measurements after the intervention (post-test 3) showed that the average score of the intervention group was 30.59 (SD 4.77) and the control group was relatively low at 26.00 (SD 3.79). The minimum score obtained was 20 and the maximum was 37. The central tendency value of the attitude variable can be seen in the following table (Table 4).

Table 4. Central Tension Values of Attitude Variables Based on Pre-test and Post-test Group Differences

	Intervention				Control			
Variables	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
Attitude_Pre	25.59	5.49	20	36	25.79	4.57	20	36
Attitude_Post 1	28.76	4.95	21	38	26.09	3.86	20	36
Attitude_Post 2	30.97	5.07	23	38	2.88	4.47	20	36
Attitude_Post 3	30.59	4.77	23	37	26.00	3.79	20	35

c. The description of the research variables of coconut sugar coconut tappers' practices was carried out by descriptive analysis in the form of central tendency values.

Assessment of the central tendency of practice variables before the intervention (pre-test) obtained by the intervention group was 33.41 (SD 3.42), and the control group with 33.59 (SD 3.55). The minimum score obtained was 28 and the maximum was 40. In the measurement after the intervention (post-test 3), the intervention group was 39.74 (SD 4.05) and the control group was relatively low at 33.71 (SD 3.76). The minimum score obtained was 25 and the maximum was 40. The following is in (table 5.13).

Table 5. Central Tension Values of Practice Variables Based on Pre-test and Post-test Group Differences

	Intervention				Control			
Variables	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**

Practice_Pre	33.41	3.42	28	40	33.59	3.55	28	40
Practice_Post 1	36.65	3.36	29	44	33.76	3.43	28	40
Practice_Post 2	40.18	3.62	30	45	33.88	3.11	28	39
Practice_Post 3	39.74	4.05	30	45	33.71	3.76	25	40

d. Test of Differences between Intervention and Control Groups Before and After Intervention (Pre-test and Post-test)

This analysis was used to test differences in knowledge, attitudes and practices of the intervention and control groups. The tests carried out were before intervention and after 2 weeks of intervention (Post-test 1), before intervention and after week 4 intervention (Post-test 2), and before and after 8 weeks of intervention (Post-test 3). Statistical tests using the Paired T Test and Wilxocon test, the use of these tests refers to the results of normal and abnormal data distribution. In the pre - post 1, pre - post 2 and pre - post 3 knowledge variables, the difference in the average score was highest in the intervention group so that there was an increase from before the intervention (pre-test) and after the intervention (post-test). The intervention group had a significant difference between before the intervention (pre-test) and after the intervention (post-test) because the p value <0.05. Meanwhile, the control group did not have a significant difference because the p value was > 0.05. The results of the analysis can be seen in table 6.

Table 6. Test Results of Knowledge Differences in Intervention and Control Groups Before and After Intervention (Pre-test and Post-test)

Knowledge									
Group	**Pre-post 1**			**Pre-post 2**			**Pre-post 3**		
Intervention									
Mean	23.29	-	24.85	23.29	-	25.65	23.29	-	25,26
SD	3.05	-	2.03	3.05	-	1.63	3.05	-	1.93
Mean Diff	1.56			2.35			1.97		
P-value	0,000	*		0,000	*		0.001	*	
Control									
Mean	22.91	-	22.97	22.91	-	23.35	22.91	-	23.35
SD	2.84	-	2.84	2.84	-	2.75	2.84	-	2.57
Mean Diff	0.06			0.44			0.44		
P-value	0.603	*		0.124	*		0.110	*	

Notes: * = Wilcoxon Test, SD - Standard Deviation

In the pre - post 1 and pre - post 2 attitude variables, which have the most difference in mean scores, namely in the intervention group so that there is an increase from before the intervention / pre-test and after the intervention / post-test , but the difference in mean scores in the pre - post 3 intervention group only has a slight change. The intervention group had a significant difference between before the intervention/pre-test and after the intervention/post-test because the p value was <0.05. In the control group, there was no significant difference because the p value > 0.05, as in table 7.

Table 7. Test Results of Attitude Differences in Intervention 1, Intervention 2 and Control Groups Before and After Intervention (Pre and Post-test)

Attitude			
Group	**Pre-post1**	**Pre-post2**	**Pre-post3**

Intervention									
Mean	25.59	-	28.76	25.59	-	30.97	25.59	-	30.59
SD	5.49	-	4.95	5.49	-	5.07	5.49	-	4.77
Mean Diff	3.18			5.38			5.00		
P-value	0.004	*		0,000	*		0,000	*	
Control									
Mean	25.79	-	26.09	25.79	-	25.88	25.79	-	26.00
SD	4.57	-	3.86	4.57	-	4.47	4.57	-	3.79
Mean Diff	0.29			0.09			0.21		
P-value	0.208	*		0.806	*		0.386	*	

Notes: * = Wilcoxon test

In the pre - post practice variable which has the most difference in the average score, namely in pre post 2 so that there is an increase from before the intervention / pre-test and after the intervention / post-test. The intervention group had a significant difference between before the intervention/pre-test and after the intervention/post-test because the p value was <0.05. Meanwhile, the control group did not have a significant difference because the p value > 0.05 (Table 8).

Table 8. Test Results of Differences in Practices in Intervention and Control Groups Before and After Intervention (Pre-test and Post-test)

Practice									
Group	**Pre-post1**			**Pre-post2**			**Pre-post3**		
Intervention									
Mean	33.41	-	36.65	33.41	-	40.18	33.41	-	39.74
SD	3.42	-	3.36	3.42	-	3.62	3.42	-	4.05
Mean Diff	3.24			6.76			6.32		
P-value	0.004*			0,000*			0,000*		
Control									
Mean	33.59	-	33.76	33.59	-	33.88	33.59	-	33.71
SD	3.55	-	3.43	3.55	-	3.11	3.55	-	3.76
Mean Diff	0.18			0.29			0.12		
P-value	0.475**			0.357**			0.640**		

Notes: * = Wilcoxon test; ** = paired t-test

e. Analysis of the Effect of Intervention and Control Groups on Knowledge, Attitudes and Practices after the Intervention

This analysis was used to test the difference in knowledge, attitude and practice scores between the intervention and control groups, between after 2 weeks of intervention (Post-test 1), week 4 of intervention (Post-test 2) and after week 8 of intervention (Post 3). [38] . The statistical tests used are the Independent T Test and the Mann Whitney test, the use of these tests refers to the results of homogeneous or inhomogeneous variant data distribution. Statistically using the Mann Whitney test, it is known that there is a significant difference in knowledge scores in the two groups because the p value is <0.05 (Table 9).

Table 9. Test Results of Knowledge Differences in the Intervention Group with Control After Intervention / Post-test (Post)

Knowledge		Intervention - Control		
Post				
	Mean	24.85	-	22.97
	SD	2.03	-	2.84
	P-value	0.005*		
	Mean Diff	1,882		
Post2				
	Mean	25.65	-	23.35
	SD	1.63	-	2.75
	P-value	0,000*		
	Mean Diff	2,294		
Post3				
	Mean	25,26	-	23.35
	SD	1.93	-	2.57
	P-value	0.001*		
	Mean Diff	1,912		

Description: * = Mann Whitney test

The difference test between the intervention group and the control group, the attitude variable is statistically significantly different only in post 2 and post 3, statistically using the Mann Whitney test or the Independent T Test test, it is known that there is a significant difference in attitude scores with ap value <0.05 (Table 10).

Table 10. Test Results of Attitude Differences in the Intervention Group with Control After Intervention / Post-test (Post)

Attitude		Intervention - Control		
Post1				
	Mean	28.76	-	26.09
	SD	4.95	-	3.86
	P-value	0.014*		
	Mean Diff	2,676		
Post2				
	Mean	30.97	-	25.88
	SD	5.07	-	4.47
	P-value	0,000*		
	Mean Diff	5,088		
Post3				
	Mean	30.59	-	26.00
	SD	4.77	-	3.79
	P-value	0.001*		
	Mean Diff	4,588		

Description: * = Mann Whitney test; ** = Independent t-test

The group difference test in the following analysis used the Mann Whitney test or the Independent T Test. The intervention and control groups were found to have statistically significantly different practice variables with a value of p = 0.001 (p < 0.05) as shown in Table 11.

Table 11. Test Results of Differences in Practices in the Intervention Group with Control After Intervention / Post-test (Post)

Practice		Intervention - Control
Post1		
	Mean	36.65 - 33.76
	SD	3.36 - 3.43
	P-value	0.001**
	Mean Diff	2,882
Post2		
	Mean	40.18 - 33.88
	SD	3.62 - 3.11
	P-value	0,000*
	Mean Diff	6,294
Post3		
	Mean	39.74 - 33.71
	SD	4.05 - 3.76
	P-value	0.001*
	Mean Diff	6,029

Description: * = Mann Whitney Test; ** = Independent T-Test

f. Trend Analysis of Time-Based Influence of coconut tappers on Knowledge, Attitudes and Practices

1. Trend of the Effect of Knowledge of Coconut Tappers in the Intervention and Control Groups

Trend in the intervention group from pre-test to post-test 2 increased the average knowledge score of coconut tappers. At week 8 (post-test 3) coconut tappers were not given the intervention, then there was a decrease in the average knowledge score. This is due to coconut tappers returning to their initial habits, namely not having special time to stretch before work, acupressure and the use of safety harnesses. In the control group, there was an increase of 0.06 knowledge score from pre-test to post-test 1. The score increased by 0.68 from post-test 1 to post-test 2, then the score decreased by 0.3 from post-test 2 to post-test 3. The graph of the effect of knowledge on the coconut sugar coconut tappers group can be seen in the following figure (Figure 1).

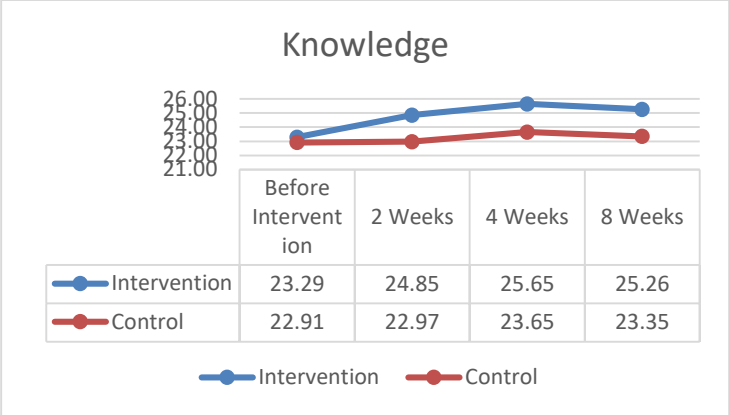

Figure 1. Trend of the Effect of Knowledge of Coconut Tappers in the Intervention and Control Groups

2. Trend of Influence on Attitudes of Coconut Tappers in Intervention and Control Groups

In the intervention group from pre-test to post-test 2 there was an increase in the mean score of coconut tappers' attitudes. At week 8 (post-test 3) coconut tappers were not given intervention, so there was a decrease in post-test 3. This is due to coconut tappers returning to their initial habits, namely not having special time to stretch before work, acupressure and the use of safety harnesses. In the control group, there was an increase in the average knowledge score from post-test 2 to post-test 3. The graph of the effect of attitude on the coconut sugar coconut tappers group can be seen in the following figure (Figure 2) .

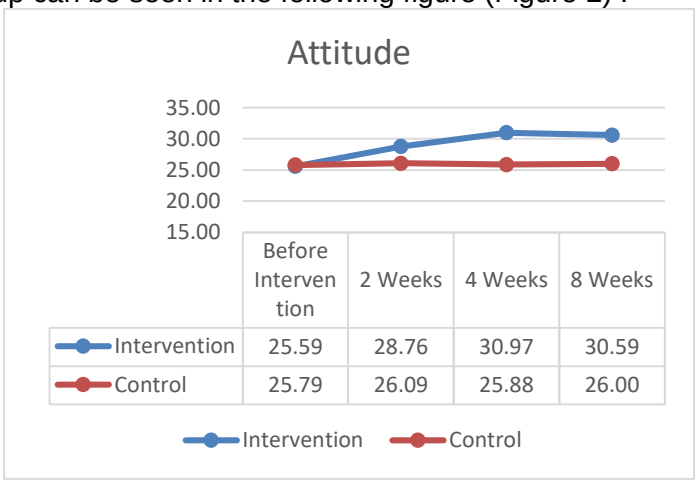

Figure 2. Trend of Influence on Attitudes of Coconut Tappers in Intervention and Control Groups

3. Trend of the Effect of Coconut Tapping Practices in Intervention 1, Intervention 2 and Control Groups

In the intervention group from pre-test to post-test 2 there was an increase in the average score of coconut tappers' practice. At week 8 (post-test 3) coconut tappers were not given intervention, so there was a decrease in post-test 3. This is due to coconut tappers returning to their initial habits, namely not having special time to stretch, acupressure and use safety harnesses while working. In the control group, there was an increase from pre-test 1 to post test 2 and decreased again from post test 2 to post test 3. The graph of the effect of practice on the coconut sugar coconut tappers group can be seen in the following figure (Figure 3).

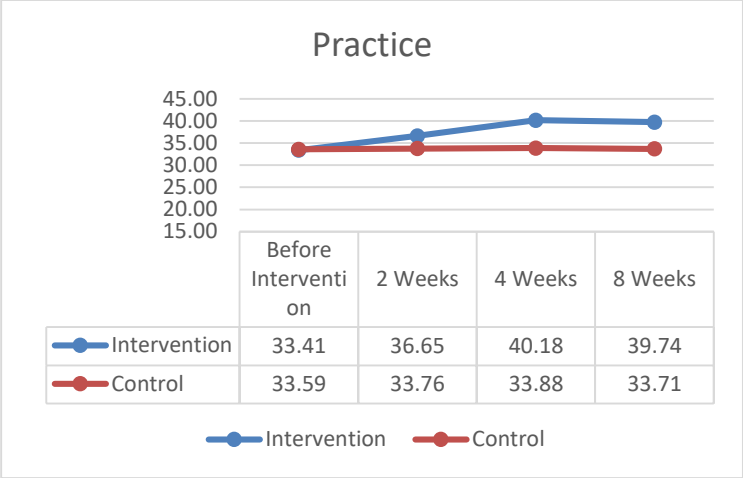

Figure 3. Trend of Effect of Coconut Tapping Practices in Intervention and Control Groups

DISCUSSION

Knowledge, attitudes, and practices of coconut sugar tappers experienced positive changes after being given occupational safety and health interventions. Changes in the variables of knowledge, attitudes, practices, incidence of WMSDs and work accidents were seen in the intervention group while the control group experienced changes in the opposite direction. Based on the results of the study, there was an increase in the variables of knowledge, attitudes, and practices regarding occupational safety and health interventions. A decrease occurred in the variables of the incidence of WMSDs and work accidents after being given the intervention for 4 weeks.

Both types of interventions used can statistically improve the knowledge, attitudes, and practices of coconut sugar tappers in minimizing the incidence of WMSDs and work accidents, but when viewed based on the mean difference value after the intervention. Based on the results of the difference test, the intervention group has a greater mean difference value than the control group. The increase in the mean difference value after 4 weeks of intervention knowledge +2.35 (Intervention) attitude +5.38 (Intervention) and the practice of coconut sugar coconut tappers +6.76 (Intervention) as in table 5.18-5.20.

The highest increase in mean difference value was practice (+6.76) and the lowest was knowledge (+2.35), but in general, the mean difference value on the three variables increased after the intervention. The increase in attitude was at the second level higher than knowledge. Improving the attitude of coconut sugar tappers is easier because coconut tappers generally know the importance of maintaining a safe and secure attitude when climbing, tapping and descending trees. Knowledge can be explained as a description of the level of "knowing" about something that has not been accompanied by action, while attitude is considered as a readiness to act based on pre-existing knowledge but not yet functioning as an action. The attitude of coconut sugar tappers to make an effort to improve safety and health is quite high.

Practice as a combination of knowledge and attitude of coconut sugar tappers has the highest increase of +6.76. This is because coconut sugar tappers who already have good knowledge will behave more in accordance with their knowledge. The low knowledge of coconut sugar coconut tappers can also be influenced by the absence of information they get, the coconut tappers have never received information related to the handling and culture of occupational safety and health. Based on the results of direct interviews, there has never been socialization related to occupational safety and health before.

Coconut tappers who have good knowledge and attitudes in practicing the occupational safety and health intervention model in the workplace are better at minimizing health risk factors such as musculoskeletal events and occupational accidents. [39] and occupational accidents. In Afshar, Bahrami and Hamedian's research, it explains that workers with low knowledge have low practical abilities in staying away from risk factors for occupational safety and health hazards that occur. [40] . A good attitude can illustrate the depth of knowledge of

workers in order to prevent the risk of hazards that will arise and endanger health. [41] . Research by Dr. Karibasappa GN, Dr. Sujatha Anandan, and Dr. Rajeshwari K also explained that significantly good knowledge and attitudes towards the practice of preventing health problems can reduce the incidence of WMSDs and ergonomic hazards. [42] . Annika Launiala also explained that good knowledge and attitudes need to be balanced with the desire to prevent a disorder and make better practices. [43] .

CONCLUSION

Our study has some limitations that need to be acknowledged. The knowledge, attitude and practice questionnaires related to simple stretching, BSM acupressure and safety harness use were not previously validated by a global agency such as WHO, but were developed locally and adapted to the context. The duration of the intervention was only 4 weeks and the intervention was 2 sessions per day. However, the intervention time of 4 weeks can already minimize the incidence of WMSDs and work accidents. In the implementation of the intervention, it was not possible to use video media due to the limited space in the plantation to be able to display the media so that the video was sent to several coconut tappers who had cellphones. Simple stretching movements, BSM acupressure and the use of safety harnesses are demonstrated directly to respondents using a flip sheet by adjusting the situation and conditions.

In conclusion, we can recommend: (1) Coconut tappers are expected to carry out safety and health interventions as an effort to improve workstation design and ergonomics training so as to reduce risk factors for WMSDs and work accidents. (2) Coconut tappers have an obligation to carry out occupational safety and health efforts, committed to continuing the intervention program that has been provided, especially in stretching, acupressure and the use of safety harnesses even though they have guaranteed themselves to BPJS for curative and rehabilitative services. (3) Coconut tappers to be able to provide time to do stretching, acupressure and safety harness interventions as an important effort to prevent health problems and skills to intervene. (4) OHS supervisors at both the central and regional levels can provide guidance through advocacy and socialization to coconut tappers to ensure the implementation of the sustainability of the occupational safety and health intervention model. (5) Follow-up efforts in the form of promotion of occupational safety and health intervention models need to be made to the Ministry of Health, Ministry of Manpower, Ministry of Industry, Local Government, coconut tappers, trade unions, MSMEs through tiktok media , short videos, national seminars to produce policy briefs at the national level.

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