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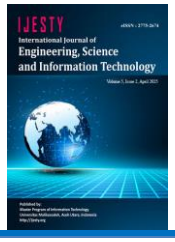

The Incidence Rate and the Effects of Progressive Muscle Relaxation on Fatigue, Muscle Pain, and Sleep Quality Among Coffee Farmers

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Abstract

Farmers frequently endure exhaustion and muscle aches as a result of their heavy labour, which affects their sleep quality and health. Farmers' occupational health is improved by using gradual muscle relaxation to minimize fatigue, muscle pain, and poor sleep quality. The goal of this study is to see how common muscular relaxation is and how effective it is at reducing fatigue, and muscle pain, and improving sleep quality among coffee producers in Bajawa District. This research employs two different designs: descriptive observational research with a cross-sectional design and experimental design with pretest and posttest designs. A total of 240 farmers were sampled using stratified random sampling, while 18 farmers were sampled using multistage random sampling. The findings of this study using descriptive analysis revealed that fatigue, muscle pain, and sleep quality were all high among coffee farmers in Bajawa District, with 119 people (49.6%) reporting severe fatigue, 124 people (51.7%) reporting high muscle pain, and 160 people reporting poor sleep quality (66.67 %). The paired t-test yielded a p-value=0.000, indicating that administering ROP affected farmer tiredness ($p<0.05$), muscle pain ($p<0.05$), and sleep quality ($p<0.05$). ROP, in conclusion, has a tiredness impact that relieves fatigue, calms and comforts the environment, manages pain, and induces sleep.

Keywords: *Occupational Health, Physical Recovery, Stress, Therapy, Well-being.*

1. Introduction

Agriculture is one of the occupational sectors with a high risk of work-related health issues. Extreme environmental conditions, outdated land management technologies, and physically demanding work contribute to the health and safety risks faced by farmers in Indonesia. One of the major occupational health concerns in this sector is ergonomic-related issues. Ergonomics aims to maintain work pressure within tolerable limits to ensure optimal performance and well-being. However, excessive physical strain can lead to errors, accidents, injuries, and increased physical and mental workload [1].

Fatigue is a common problem among agricultural workers, which can reduce productivity and increase the likelihood of errors [2]. Fatigue is a physiological response to stressors that affect the human body, often exacerbated by inadequate sleep quality. Sleep disturbances have been found to have a significant relationship with fatigue, leading to impaired work performance and concentration difficulties [3]. Sleep plays a crucial role in physical recovery, and insufficient sleep can result in prolonged fatigue, reduced cognitive function, and increased health risks [4]. Factors such as illness, emotional stress, medications, environmental disturbances, and work schedules contribute to sleep deprivation. Non-pharmacological interventions, such as relaxation techniques, have been suggested to improve sleep quality and reduce fatigue. Progressive muscle relaxation (PMR) is one such technique that involves systematic muscle contractions and releases to induce relaxation [5].

Pain management strategies can be classified into pharmacological and non-pharmacological approaches. While medications are effective in managing pain, they require medical prescriptions and may have side effects. Non-pharmacological methods, including distraction techniques, warm/cold compresses, deep breathing exercises, music therapy, aromatherapy, guided imagery, and relaxation techniques, are preferred due to their minimal risks [6]. Unmanaged pain can have detrimental effects on individuals and their ability to work, making timely intervention crucial. PMR is a widely used technique that is simple to learn and can be practised anywhere [7].

Coffee farming is a vital agricultural activity in Indonesia, particularly in Ngada Regency, East Nusa Tenggara (NTT) Province. The Bajawa and Golewa sub-districts are the largest coffee-producing areas in this region. Many farmers in Bajawa rely on coffee cultivation as their primary source of income. Coffee farming is labour-intensive, requiring prolonged physical exertion, including standing, bending, squatting, and carrying heavy loads. A preliminary study conducted in Beiwali village, which has a population of 213 coffee farmers, revealed that 9 out of 10 interviewed farmers reported experiencing fatigue, muscle pain, and sleep disturbances. These complaints were associated with unnatural working postures, such as looking upward for extended periods while picking coffee cherries, bending for long hours, and carrying heavy loads. One respondent mentioned that muscle pain and discomfort significantly affected their ability to sleep.

Previous studies have demonstrated the effectiveness of PMR in reducing fatigue and improving sleep quality among rubber tappers [8]. Additionally, research on other relaxation techniques, such as finger-grip relaxation, has shown significant pain reduction in post-laparotomy patients [9]. Musculoskeletal disorders are particularly prevalent among farmers, fishermen, and labourers, with an incidence rate of 31.2% [10]. However, limited research has specifically examined the impact of PMR on coffee farmers, despite the physically demanding nature of their work.

This study aims to investigate the incidence of fatigue, muscle pain, and sleep disturbances among coffee farmers in Bajawa and analyze the effects of PMR as a non-pharmacological intervention to improve their well-being.

2. Methods

This study employed two research designs. First, a descriptive observational study with a cross-sectional design was conducted to assess the incidence of fatigue, muscle pain, and sleep quality. Second, a quasi-experimental study with a one-group pretest-posttest design was used to evaluate the effects of progressive muscle relaxation (PMR) on these variables [11].

The study was conducted in June 2021 in Bajawa District. A stratified random sampling technique was applied to select 240 coffee farmers from three villages with the highest coffee farming populations: Beiwali, Wawowae, and Susu, for the observational study. For the experimental study, multistage random sampling was used to select 18 coffee farmers from Beiwali village who met the inclusion and exclusion criteria.

Data collection involved interviews with respondents and the administration of PMR interventions, with pretest and posttest assessments. PMR is a relaxation technique that systematically tenses and relaxes skeletal muscles progressively, considering factors such as duration and muscle load.

Descriptive statistical analysis was used to determine the prevalence of fatigue, muscle pain, and sleep disturbances. The paired t-test was employed to assess the effects of PMR on these variables.

This study was approved by the Research Ethics Committee of the Faculty of Medicine, Universitas Nusa Cendana, with ethical clearance number 44/UN15.16/KEPK/2021 and registration number UN02210545. Top = 1.5cm.

3. Results and Discussion

3.1. Subject Characteristics

The characteristics of the study subjects are described as follows. The majority of participants were aged 46-55 years, accounting for 70 individuals, which falls within the productive age category. Most subjects were male (135 participants) and had a senior high school education (130 participants). The experimental group had a pulse rate range of 60-112 bpm, which is considered normal.

3.2. Fatigue, Muscle Pain, and Sleep Quality Data Characteristics

Before the intervention, the most commonly reported fatigue symptom was feeling tired throughout the body, with an average score of 3.8, followed by yawning (3.7) and drowsiness (3.6). Muscle pain was predominantly experienced in the right shoulder (mean score: 3.6), lower back (3.0), right upper arm (3.0), and left shoulder (3.0). Sleep disturbances included waking up to use the bathroom (mean score: 2.0), waking up in the middle of the night or early morning (1.9), and feeling cold while sleeping (1.3).

Table 1. Fatigue, Muscle Pain, and Sleep Quality Before and After Progressive Muscle Relaxation Intervention

Category	Mean Score	After Intervention	Difference (%)
Fatigue Symptoms			
Whole body fatigue	3.8	Decrease in poor health symptoms by 58.33%	-58.33%
Yawning	3.7	Decrease in difficulty controlling posture and shoulder stiffness by 54.54%	-54.54%
Sleepiness	3.6	-	-
Muscle Pain			
Right Shoulder	3.6	Decrease in pain in right hand (51.87%), right leg (43.61%), and left hand (43.20%)	-51.87%, -43.61%, -43.20%
Lower Back	3.0	-	
Right Upper Arm	3.0	-	
Sleep Quality			
Waking Up to Use the Bathroom	2.0	Improvement in sleep quality by 95.38%, reduction in nightmares by 93.12%	+95.38%, +93.12%
Waking up in the middle of the night	1.9	-	
Feeling Cold During Sleep	1.3	-	

After the intervention, a significant reduction in fatigue symptoms was observed, with general fatigue decreasing by 58.33%, and difficulty controlling posture and shoulder stiffness decreasing by 54.54%. Muscle pain in the right hand decreased by 51.87%, followed by pain reduction in the right leg (43.61%) and left hand (43.20%). Improvements in sleep quality were also observed, with other unspecified factors improving by 100%, overall sleep quality by 95.38%, and reduced nightmares by 93.12%. These findings suggest that progressive muscle relaxation had a significant impact on reducing fatigue and muscle pain while improving sleep quality among coffee farmers.

3.3. Bivariate Analysis for Experimental Design

The effects of progressive muscle relaxation on fatigue, muscle pain, and sleep quality before and after the intervention in Beiwali Village are presented in the table below.

Table 2. Effect of Progressive Muscle Relaxation on Fatigue

Variable	PI (Mean + SD)	PII (Mean + SD)	Difference	P-value
Fatigue	74.61 + 11.91	44.00 + 6.32	30.61	0.001

Table 2 shows a significant difference in the mean fatigue scores before and after the intervention, with a difference of 30.61. Statistical analysis using a paired t-test resulted in a p-value of 0.000, which is less than 0.05, indicating a significant effect of progressive muscle relaxation on reducing fatigue among coffee farmers.

Table 3. Effect of Progressive Muscle Relaxation on Muscle Pain

Variable	PI (Mean + SD)	PII (Mean + SD)	Difference	P-value
Muscle Pain	70.72 + 8.97	47.72 + 9.35	23	0.001

Table 3 shows a significant difference in mean muscle pain scores before and after the intervention, with a difference of 23. Statistical analysis using a paired t-test resulted in a p-value of 0.000, which is less than 0.05, indicating a significant effect of progressive muscle relaxation on reducing muscle pain among coffee farmers.

Table 4. Effect of Progressive Muscle Relaxation on Sleep Quality

Variable	PI (Mean + SD)	PII (Mean + SD)	Difference	P-value
Sleep Quality	10.44 + 4.46	4.56 + 2.97	5.88	0.001

Table 4 shows a significant difference in mean sleep quality scores before and after the intervention, with a difference of 5.88. Statistical analysis using a paired t-test resulted in a p-value of 0.000, which is less than 0.05, indicating a significant effect of progressive muscle relaxation on improving sleep quality among coffee farmers.

3.4. Incidence of Fatigue in Coffee Farmers

Fatigue is a subjective feeling that varies between individuals, but all forms lead to a loss of efficiency, reduced work capacity, health problems, and a decreased ability to endure, which can result in work-related accidents [12]. Based on the research findings, the majority of respondents reported experiencing severe fatigue, with 119 individuals reporting this condition. Analyzing the dimensions of fatigue, it was found that fatigue predominantly occurred due to activity weakening, with an average score of 26.79. The most dominant symptom of activity weakening was overall body fatigue, with an average score of 3.75, followed by yawning (3.70) and sleepiness (3.62). This is because farming still relies on traditional methods that require significant physical effort, including carrying the harvest on the shoulders. Additionally, the workload a farmer must carry sometimes includes unexpected burdens due to an unfavourable work environment, which can lead to fatigue. Both excessive and insufficient workloads can cause stress, which increases the level of work-related fatigue [13]. Other factors influencing fatigue include individual factors such as age, which has a significant relationship with fatigue. Workers aged 40-50 years are more likely to experience fatigue compared to younger workers. As age increases, workers are more susceptible to fatigue due to the degenerative processes of organs, which result in decreased functionality [14]. This study aligns with the research conducted by previous research, which states that there is a relationship between workload and work fatigue [15]. Work activities contribute to the workload that causes fatigue, and repetitive tasks can lead to static muscle strain, resulting in fatigue. The study concludes that the prevalence of overall body fatigue is common because, during the coffee season, farmers are busy with various stages of coffee management, in addition to the coffee-picking process. This also explains why farmers often yawn and feel sleepy due to insufficient sleep.

3.5. Incidence of Muscle Pain in Coffee Farmers

Muscle pain is a sensory experience that varies between individuals, causing discomfort and unpleasant sensations due to tissue damage. Muscle pain is related to excessive muscle use, overloading, overstretching, and muscle injuries caused by physical activities or daily tasks [16]. Based on the research findings, the majority of respondents reported experiencing severe muscle pain, with 124 individuals experiencing it. Analyzing the items contributing to muscle pain, it was found that pain was most commonly reported in the right shoulder, with an average score of 3.6. This is due to the nature of the work where respondents lift harvest loads that exceed their shoulder capacity. Lifting loads beyond the shoulder's capability and using incorrect lifting positions, if done repeatedly, can cause muscle strain in farmers. If the pain is not addressed immediately, it can lead to prolonged or chronic pain [17]. The second most common pain was in the lower back, and improper posture was a major cause of fatigue and muscle pain, such as lower back pain, which is often unnoticed by the workers. This is especially true for habits such as sitting, standing, or bending, which can lead to fatigue, muscle tension, and pain. Additionally, bones become misaligned, and muscles and ligaments are overstretched [18]. This research aligns with the study which states that non-ergonomic working postures affect fatigue [19]. The pain in the right shoulder, left shoulder, right upper arm, and lower back is due to the farmers' habit of pulling coffee tree branches with their left hand while holding the position and using the right hand to pick the coffee fruit. Working with raised arms like this increases the load on the muscles. The longer this activity

is performed, the more the farmer experiences pain. Moreover, farmers bend over to carry the harvest, which puts a significant strain on the lower back, contributing to the pain.

3.6. Incidence of Sleep Quality in Coffee Farmers

Sleep quality is the state of sleep that results in freshness and vitality upon waking. Poor sleep quality is an indicator of various medical conditions, and poor sleep can lead to a decline in both physiological and psychological health [20]. Based on the research findings, the majority of respondents reported poor sleep quality, with 160 individuals experiencing it. Analyzing the components of sleep quality, it was found that sleep latency, with an average score of 1.57, was the most common issue. Sleep latency refers to the time it takes for an individual to fall asleep. Various factors influence sleep patterns, one of which is the environment. A noisy environment can prevent individuals from sleeping as they struggle to block out the noise, making it difficult to fall asleep and relax [21]. Additionally, when looking at the items that affect the sleep quality of coffee farmers, it was found that the majority of respondents woke up to go to the bathroom, with an average score of 2. The second most common issue was waking up in the middle of the night, and the third was feeling cold. This is because respondents were unable to sleep efficiently, spending more time in bed but not sleeping. The environment, with different climates in various regions, can cause discomfort, especially when transitioning from hot to cold climates. Individuals who feel cold frequently wake up, disrupting their sleep. These findings are consistent with other research which indicates that the environment affects sleep quality [22].

The researcher suggests that the longer the sleep latency, the poorer the sleep quality. Factors influencing sleep latency include lifestyle habits, such as excessive caffeine consumption, which prevents the body from relaxing due to the stimulating effects of caffeine on the heart rate. Additionally, habits like watching TV and using mobile phones also affect sleep latency. Sleep efficiency had the second-highest score, meaning respondents struggled to sleep efficiently, spending more time in bed without actually falling asleep. Respondents reported frequent sleep disturbances, making it difficult for them to return to sleep after waking up, often resulting in staying awake until morning.

3.7. The Effect of Progressive Muscle Relaxation on Fatigue in Coffee Farmers

Progressive muscle relaxation is a systematic technique to achieve a relaxed state, where the method is defined through a progressive approach with continuous training stages. Progressive muscle relaxation can be performed by tensing and relaxing skeletal muscles so that they become relaxed [7].

The bivariate analysis results showed that the mean fatigue score of the respondents decreased from 74.61 points before receiving progressive muscle relaxation therapy to 44.00 points. Progressive muscle relaxation affected reducing the level of fatigue in farmers, with the intervention reducing fatigue by 41.02%. The analysis showed a relationship between progressive muscle relaxation and fatigue in coffee farmers, with a p-value of 0.000. This means that the higher the progressive muscle relaxation training, the more it reduces the level of fatigue in coffee farmers.

The results indicated a difference in fatigue levels before and after the intervention. In the pretest group, 11 people experienced moderate fatigue, 5 had severe fatigue, and 2 had very severe fatigue. In contrast, in the post-test group, 12 people experienced mild fatigue, and 6 experienced moderate fatigue.

Fatigue is a subjective feeling that varies from person to person, ultimately leading to loss of efficiency, reduced work capacity, health issues, and decreased endurance, which can result in workplace accidents [12]. Respondents' views on the effect of progressive muscle relaxation on fatigue in coffee farmers in this study suggest that the technique aims to induce relaxation in each individual. Coffee farmers often experience fatigue, especially since they must continue working at home after returning from the field, extending their work hours beyond 8 hours. Additionally, inadequate rest periods also contribute to this issue. Farmers complained about frequent drowsiness, forgetfulness, thirst, full-body fatigue, and discomfort in their shoulders. These symptoms decreased and even disappeared after the respondents performed progressive muscle relaxation regularly.

The results of this study align with previous research which found that progressive muscle relaxation techniques reduced physical fatigue in the elderly [23]. This is also consistent with research that indicated the effect of progressive muscle relaxation on fatigue. Fatigue can be managed pharmacologically with medications, but non-pharmacological efforts like progressive muscle relaxation are also effective in reducing fatigue by relaxing muscles. According to Stuart, progressive muscle relaxation is one of the most widely used relaxation techniques because it is simple [8]. Relaxation has a calming effect on the body, producing a sense of lightness and warmth throughout. Changes occurring during or after relaxation affect the autonomic nervous system. Emotional responses and the calming effect of relaxation alter the dominant sympathetic physiology of the parasympathetic system. This reduces the hypersecretion of catecholamines and cortisol, boosting parasympathetic hormones and neurotransmitters like DHEA (Dehydroepiandrosterone) and dopamine or endorphins. This parasympathetic regulation ultimately induces a calming effect [24]. The technique aims to reduce tension, anxiety, and fatigue by relaxing body muscles [25]. This suggests that this intervention is effective in reducing fatigue. Progressive muscle relaxation helps reduce fatigue by relaxing the muscles. The relaxed muscle state decreases fatigue in individuals. Furthermore, farmers who perform progressive muscle relaxation enthusiastically and as instructed experience the effects of relaxation according to the procedure.

3.8. The Effect of Progressive Muscle Relaxation on Muscle Pain in Coffee Farmers

Bivariate analysis results showed that the mean muscle pain score of the respondents decreased from 70.72 points before receiving progressive muscle relaxation therapy to 47.72 points. Progressive muscle relaxation influenced the reduction of muscle pain in farmers, reducing muscle pain by 32.52%. The analysis showed a relationship between progressive muscle relaxation and muscle pain in coffee farmers, with a p-value of 0.000. This means that the higher the progressive muscle relaxation training, the more it reduces muscle pain in coffee farmers.

The results indicated a difference in muscle pain levels before and after the intervention. In the pretest group, 11 people experienced moderate fatigue, and 7 had high muscle pain. In contrast, in the post-test group, 13 people experienced low muscle pain, and 5 had moderate muscle pain.

Muscle pain is a sensory sensation resulting from subjective experiences that vary between individuals, causing discomfort and unpleasant feelings due to tissue damage. Muscle pain is related to excessive muscle work, overloading, overstretching, and muscle injuries caused by sports or daily activities [16]. Respondents' views on progressive muscle relaxation and its effect on muscle pain in coffee farmers indicate that progressive muscle relaxation aims to reduce and prevent increasing pain. In this study, farmers often

experienced muscle pain, especially in coffee farmers, who had to pick coffee while standing. Sometimes, farmers also squat or bend and move from one coffee tree to another. They often stand on tiptoe and tilt their bodies to reach ripe coffee fruits that are hard to grasp with their hands. Based on interviews, farmers frequently complained about pain in their shoulders and upper arms because they had the habit of pulling coffee tree branches with their left hand while holding the position and picking coffee fruits with their right hand. Working with raised arms creates excess strain on muscles, leading to muscle pain. Farmers also complained of neck and leg pain due to the standing position while picking coffee for extended periods. These complaints decreased after regularly practising progressive muscle relaxation.

The results of this study align with research which stated that there is an effect of finger grip relaxation on pain reduction [26]. Muscle pain management can be done pharmacologically with medications, and non-pharmacological methods like progressive muscle relaxation are also effective [27]. Progressive muscle relaxation is one of the most widely used relaxation techniques because it is simple [8]. Progressive muscle relaxation is a complementary therapy provided as an adjunct when respondents are not under medical care. This therapy is used to address pain complaints. The results showed that progressive muscle relaxation therapy effectively reduced pain, with most respondents shifting from moderate pain to mild pain. The reduction in pain suggests that progressive muscle relaxation exercises can effectively decrease both the quantity and quality of pain. Interviews revealed that most respondents reported significant pain reduction after therapy. They also noted that the therapy is easy to remember and practice daily. Practicing progressive muscle relaxation regularly can reduce or even eliminate pain. Complementary therapy can have a significant impact when done consistently and correctly. As a complementary therapy, progressive muscle relaxation is believed to reduce pain, especially in mild to moderate categories [28]. Relaxation techniques are independent nursing interventions for reducing pain intensity, providing individuals with control over pain and usable during both healthy and sick conditions. Skeletal muscle relaxation is believed to reduce pain by relaxing muscle tension that causes pain. There is much evidence showing that relaxation is effective in relieving pain. Overall, relaxation is one of the most effective methods, especially for patients experiencing pain, as studies across various places confirm the efficacy of relaxation techniques in reducing pain responses [29].

This suggests that this intervention is effective in reducing muscle pain. Relaxation techniques are methods that can reduce and prevent increasing pain. Progressive muscle relaxation helps relax muscles, which in turn reduces or even eliminates the pain.

3.9. The Effect of Progressive Muscle Relaxation on Sleep Quality in Coffee Farmers

Bivariate analysis results showed that the mean sleep quality score of the respondents decreased from 10.44 points before receiving progressive muscle relaxation therapy to 4.56 points. Progressive muscle relaxation affected the improvement of sleep quality in farmers, with the intervention improving sleep quality by 56.32%. The analysis showed a relationship between progressive muscle relaxation and sleep quality in coffee farmers, with a p-value of 0.000. This means that the higher the progressive muscle relaxation training, the better the sleep quality in coffee farmers.

The results indicated a difference in sleep quality before and after the intervention. In the pretest group, 14 people experienced poor sleep quality, and 4 had good sleep quality. In contrast, in the posttest group, 13 people experienced good sleep quality, and 5 had poor sleep quality.

Sleep quality refers to the state of sleep that an individual experiences, resulting in freshness and wellness upon waking. Poor sleep quality is an indicator of many medical conditions, and inadequate sleep can lead to both physiological and psychological health issues [20]. Respondents' views on progressive muscle relaxation and its effect on sleep quality in coffee farmers suggest that progressive muscle relaxation aims to relax the body muscles, making them comfortable, and improving farmers' sleep quality. In this study, farmers often complained about poor sleep quality, especially coffee farmers, where many respondents in the pretest stage complained of frequent pain. However, as they practised progressive muscle relaxation, the frequency of pain decreased and eventually disappeared. Some respondents also reported experiencing nightmares and waking up in the middle of the night to use the toilet, but these complaints also decreased after performing progressive muscle relaxation exercises.

The results of this study align with previous research, which indicated that progressive muscle relaxation improved sleep quality in the elderly. The impact of progressive muscle relaxation on sleep quality is evident from the increase in sleep duration. At the start of the study, the shortest sleep duration was 4 hours, and the longest was 6 hours. After practising progressive muscle relaxation, the average sleep duration showed an increase. The shortest duration recorded was 5 hours, and the longest was 8 hours. This is consistent with previous studies showing that progressive muscle relaxation helps relieve headaches and improves quality of life, reduces tension and anxiety, improves sleep quality, and helps alleviate insomnia symptoms [30][31]. Progressive muscle relaxation is a simple technique and a procedure to achieve muscle relaxation. It works by activating the sympathetic and parasympathetic nervous systems, which interact and affect the body's organs, reducing tension and promoting restful sleep [32].

It can be concluded that sleep quality improved due to the effect of progressive muscle relaxation training. Respondents in this study shared similar characteristics and lived in the same environment. The results show a significant improvement in sleep quality after practising progressive muscle relaxation. The relaxation induced by the technique helps individuals fall asleep more easily and feel more comfortable upon waking, which improves their sleep quality. This demonstrates that progressive muscle relaxation has an impact on improving sleep quality.

4. Conclusion

Based on the findings of this study, it can be concluded that progressive muscle relaxation has a positive impact on the well-being of coffee farmers in several key aspects. First, this technique has been proven effective in reducing fatigue among farmers. After practising progressive muscle relaxation, they reported a significant decrease in the exhaustion they typically feel after long hours of work in the fields and at home. This indicates that relaxation exercises can help restore energy and improve physical endurance.

Additionally, progressive muscle relaxation plays a role in alleviating muscle pain, which is commonly experienced by coffee farmers due to non-ergonomic postures while picking coffee cherries or performing other tasks. Many farmers who initially experienced moderate to severe muscle pain reported improvements after consistently practising this technique, as it helps relax tense muscles and reduce discomfort.

Furthermore, progressive muscle relaxation positively influences sleep quality. Before the intervention, many farmers complained of poor sleep, frequent awakenings during the night, and a lack of refreshment upon waking. However, after regularly engaging in relaxation exercises, their sleep quality significantly improved, with longer sleep duration and a greater sense of rejuvenation in the morning.

Overall, this study demonstrates that progressive muscle relaxation can be an effective intervention for enhancing the quality of life of coffee farmers. By reducing fatigue, alleviating muscle pain, and improving sleep quality, this technique helps farmers work more productively and maintain better physical and mental well-being. Therefore, it is recommended that this method be more widely introduced as part of health programs for farmers.

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