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Strengthening Occupational Safety Practices among Woodworkers through OHS Training in Banjarmasin

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ABSTRACT

Wood-processing activities involve occupational hazards associated with cutting equipment, wood dust, machine noise, wood particles, and unsafe workplace conditions. Initial observations among woodworkers in Alalak Tengah, Banjarmasin, indicated inconsistent use of personal protective equipment (PPE) and safe-working procedures. This community service program aimed to strengthen workers' knowledge and practical awareness of occupational health and safety (OHS). The activities included OHS education, hazard identification, PPE demonstrations and hands-on practice, safe-working procedures, workplace housekeeping, discussion, and pre-test–post-test evaluation. The evaluation produced 15 pre-test responses and 14 post-test responses. Because participant identities were not recorded for matching, the results were analyzed descriptively at the group level. The mean score increased slightly from 93.33 to 94.90, while improvements were observed particularly in eye-protection knowledge and first-aid procedures for cuts. The high baseline score suggests a possible ceiling effect that limited the instrument's ability to detect further change. Overall, the activity provided practical opportunities for participants to identify occupational hazards, select appropriate PPE, and discuss safer working practices relevant to small-scale wood processing.

Keywords: occupational health and safety, personal protective equipment, safety training, wood processing, woodworkers

INTRODUCTION

Occupational health and safety (OHS) is an important aspect of wood-processing activities because workers are exposed to various physical and health hazards during cutting, planing, sanding, assembly, and finishing processes. Woodworking activities may expose workers to wood dust, machine noise, cutting equipment, and other workplace hazards that can affect respiratory health, hearing, and occupational safety (Ekman et al., 2023; Ibrahim et al., 2022; Stephen & Banerjee, 2025). Studies among small-scale and informal woodworkers have reported considerable occupational injury risks and gaps in safety practices, particularly where formal OHS training and PPE use are limited (Bentum et al., 2022; Girma et al., 2022; Hoque et al., 2023).

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The occupational risks associated with wood processing can become more serious when appropriate preventive measures are not consistently implemented. Personal protective equipment (PPE), such as respiratory protection, safety glasses, hearing protection, and other protective devices, represents an important component of occupational risk control when workers are exposed to specific hazards. However, the effectiveness of PPE depends not only on its availability but also on workers' knowledge, awareness, attitudes, and willingness to use it properly and consistently (Maharja et al., 2022; Nurfaizah et al., 2022). Evidence from informal woodworkers has similarly shown that awareness of occupational hazards does not necessarily translate into consistent PPE practices, highlighting the importance of practical and context-specific safety interventions (Bentum et al., 2022).

Small-scale wood-processing enterprises may face particular challenges in implementing occupational safety practices because work activities are frequently performed using a combination of manual tools and relatively simple machinery (Zamorano et al., 2023). In such working environments, safety practices need to be adapted to actual production activities so that workers can recognize hazards and apply appropriate preventive measures. Occupational safety education and training can therefore provide workers with practical knowledge regarding hazard identification, appropriate use of PPE, and safer working procedures (Fitriyah et al., 2025; Sutarno et al., 2024; Tampubolon et al., 2025). Participatory safety training has also been recognized as a useful approach for informal and small-scale workplaces because it connects occupational safety principles with workers' actual tasks and working conditions (Kawakami, 2024).

Woodworkers in Alalak Tengah, Banjarmasin, represent a productive community engaged in small-scale wood-processing activities, including the manufacture of furniture, frames, and other wood products. Their production activities involve cutting, planing, sanding, assembly, and finishing using manual equipment and machinery. Initial observations conducted by the community service team indicated that OHS practices had not been fully implemented. The use of PPE was still limited, standardized safe-working procedures had not been consistently applied, and several workplace conditions presented potential risks to workers.

Potential hazards identified at the partner's workplace included injuries from cutting tools, exposure to wood dust, machine noise, wood particles, unsafe workplace arrangements, and exposure to substances used during finishing activities. These conditions indicated the need for a practical intervention that could strengthen workers' ability to recognize occupational hazards and apply appropriate preventive measures (Ekman et al., 2023; Ibrahim et al., 2022; Stephen & Banerjee, 2025). Comparable findings have also been reported among small-scale and informal woodworkers, where formal OHS training was limited despite substantial exposure to occupational hazards.

The initial assessment also indicated a gap between workers' general awareness of workplace risks and the consistent implementation of safety practices. The use of masks, gloves, hearing protection, and other PPE had not become a consistent working habit, while risks associated with dust, noise, wood particles, and production equipment had not been fully controlled. Therefore, an intervention combining safety education with direct demonstration and practice was considered appropriate to address the needs of the partner community.

Previous community-based OHS activities have demonstrated the usefulness of safety education in improving awareness and introducing safer working practices (Fitriyah et al., 2025; Harisan & Rasuki, 2026; Sutarno et al., 2024). More specifically, assistance programs in furniture-related MSMEs have incorporated PPE provision, hazard and risk mapping, safety signs, and safe-work procedures to support occupational safety implementation (Hermawan et al., 2024). Similar occupational safety concerns have also been reported

among small-scale and informal woodworkers, where limitations in OHS knowledge and safety practices indicate the importance of appropriate training and protective measures (Girma et al., 2022; Hoque et al., 2023).

However, the available literature remains relatively limited in documenting short-duration, participatory OHS training that combines hazard identification, PPE demonstration, hands-on practice, workplace housekeeping, and descriptive pre-test–post-test evaluation specifically among experienced small-scale woodworkers in Banjarmasin. Most previous programs have been conducted in educational institutions, construction settings, health facilities, or other geographic and occupational contexts. Therefore, the present program extends previous community-based OHS initiatives by adapting the training directly to the daily work processes and occupational hazards encountered by small-scale woodworkers in Alalak Tengah, Banjarmasin.

Based on these conditions, a community service program consisting of OHS socialization and training was implemented for woodworkers in Alalak Tengah, Banjarmasin. The activity included hazard-identification education, demonstrations and hands-on practice in using PPE, safe-working procedures, workplace housekeeping, discussion of occupational problems encountered by workers, and evaluation using pre-test and post-test instruments. The program aimed to strengthen participants' knowledge of occupational safety principles, improve their ability to identify workplace hazards, develop appropriate PPE-use skills, and encourage safer working practices in small-scale wood-processing activities.

In addition to addressing the immediate occupational safety needs of the partner community, the activity represents a form of community empowerment through the application of engineering knowledge and occupational safety practices. The program also supports efforts to develop safer and more sustainable small-scale production environments through education and practical capacity building.

METHOD

This community service activity was conducted on 12 July 2026 with woodworkers in Alalak Tengah, Banjarmasin, and lasted approximately three hours. The program adopted a participatory approach involving lecturers, students, and partner participants. A total of 15 male woodworkers voluntarily participated in the activity. The participants were approximately 30–55 years old, had 5–10 years of experience in wood-processing activities, and had educational backgrounds ranging from junior to senior high school. Their main work activities included wood cutting, frame production, furniture making, finishing, and other related wood-processing tasks. None of the participants had previously attended formal occupational health and safety (OHS) training.

The activity was implemented in three main stages: preparation, training implementation, and evaluation. During the preparation stage, the community service team coordinated with the partner regarding the implementation schedule, training needs, and participant involvement. Initial observations were also conducted to identify work activities, equipment use, workplace conditions, and potential occupational hazards. Based on these observations, the team prepared OHS learning materials, presentation media, simple educational guidelines, personal protective equipment (PPE) for demonstrations, and pre-test and post-test instruments.

The training stage began with an introduction to the objectives and importance of OHS in small-scale wood-processing activities. Participants received information on basic OHS principles and workplace hazards, including injuries from cutting tools, exposure to wood dust, machine noise, wood particles, unsafe workplace arrangements, and risks

associated with finishing activities. The material was delivered through short explanations, interactive discussion, and examples based on the participants' daily work situations.

The next session focused on the introduction and practical use of PPE. The community service team demonstrated the appropriate use of masks, safety glasses, hearing protection, gloves, and other protective equipment relevant to wood-processing activities. Participants then practiced selecting and using PPE according to the type of work performed. This practical component was intended to connect OHS concepts with the actual occupational hazards encountered by the participants.

Participants were also introduced to basic safe-working procedures and workplace housekeeping practices. These included maintaining the cleanliness of the production area, arranging tools and materials appropriately, regularly removing accumulated wood dust, checking the condition of equipment before use, and ensuring that machines were operated according to safe procedures. The training concluded with a discussion and question-and-answer session in which participants shared occupational risks and problems encountered in their daily work, followed by practical recommendations from the community service team.

Evaluation was conducted using pre-test and post-test instruments consisting of seven multiple-choice questions covering basic OHS concepts, wood-dust exposure, eye protection, hazards associated with loose clothing or gloves, fire prevention, first aid for cuts, and blade-guard functions. All 15 participants completed the pre-test, while 14 participants completed the post-test because one participant did not submit the post-test response. Participant identities were not recorded for individual matching; therefore, the pre-test and post-test data were treated as unpaired group-level data. The results were analyzed descriptively using the number of responses, mean score, minimum and maximum scores, the number of perfect scores, and the proportion of correct responses for each evaluation item. No paired statistical test was performed because individual pre-test and post-test responses could not be matched.

RESULTS AND DISCUSSION

The OHS socialization and training activity was attended by 15 male woodworkers from Alalak Tengah, Banjarmasin. The participants were approximately 30–55 years old, had 5–10 years of experience in wood-processing activities, and were involved in various tasks such as wood cutting, frame production, furniture making, and finishing. None of the participants had previously attended formal OHS training. During the activity, participants were actively involved in discussions, PPE demonstrations, hands-on practice, and workplace-safety observations.

The practical sessions focused on occupational hazards that were directly relevant to the participants' daily work. These included exposure to wood dust and machine noise, injuries from cutting equipment, inappropriate use of loose clothing or gloves near rotating machinery, fire risks, first aid for cuts, and the function of blade guards. Participants also practiced selecting and using appropriate PPE, including masks, safety glasses, hearing protection, and gloves. The implementation of the OHS socialization and practical activities is presented in Figure 1.



(a) (b)

Figure 1. OHS training activities: (a) group photo with participants and the community service team and (b) demonstration and practice of PPE use

Participant involvement during the discussion suggested that several occupational risks encountered in daily work were already familiar to them, although these risks had not always been addressed through consistent safety practices. The discussion enabled the training material to be related directly to workplace situations experienced by the participants. This practical orientation is consistent with previous community-based OHS activities emphasizing that safety education should not be limited to conceptual knowledge but should also provide opportunities to apply protective measures in actual or simulated work situations (Maharja et al., 2022; Sutarno et al., 2024).

Quantitative evaluation was based on 15 pre-test responses and 14 post-test responses. One participant did not submit the post-test. Because participant identities were not recorded for matching, the two sets of responses were analyzed descriptively as unpaired group-level data rather than as paired individual measurements.

The mean pre-test score was 93.33, while the mean post-test score was 94.90. The minimum score remained 85.71, and the maximum score remained 100.00. The number of respondents obtaining a perfect score was 8 of 15 in the pre-test and 9 of 14 in the post-test. The descriptive results are presented in Table 1.

Table 1. Pre-test and post-test evaluation results

Indicator	Pre-test	Post-test
Number of responses	15	14
Mean score	93.33	94.90
Highest score	100.00	100.00
Lowest score	85.71	85.71
Participants with a score of 100	8/15	9/14

The descriptive comparison shows a small increase of 1.57 points in the group mean. However, this change should be interpreted cautiously. The pre-test score was already very high, with more than half of the respondents obtaining a perfect score before the training. This pattern indicates a possible ceiling effect, in which the evaluation instrument had limited ability to detect further improvement because many participants were already near the maximum score at baseline. Therefore, the post-test result should not be interpreted as evidence of a causal training effect, but rather as a descriptive indication that the high level of baseline knowledge was maintained, with improvement observed in several specific items.

Item-level analysis showed that knowledge of wood-dust risks, hazards related to loose clothing or gloves, fire prevention, and blade-guard functions was already high in the pre-test and remained high in the post-test. More noticeable descriptive changes were found in knowledge of appropriate eye protection and first-aid procedures for cuts. Correct responses related to eye protection increased from 13 of 15 participants in the pre-test to 13 of 14 participants in the post-test, while correct responses for first aid for cuts increased from 14 of 15 to 14 of 14.

These findings suggest that the participants entered the program with substantial practical knowledge of several basic safety issues, which may partly reflect their relatively long work experience of approximately 5–10 years. However, practical experience does not necessarily ensure consistent OHS practices. Previous studies among informal and small-scale woodworkers have reported gaps between awareness of occupational hazards and actual PPE use, while inadequate OHS training and non-use of PPE have also been associated with occupational injuries (Bentum et al., 2022; Girma et al., 2022; Hoque et al., 2023). In the present activity, some specific aspects of PPE selection and emergency response still showed room for reinforcement.

The relevance of combining safety education with direct demonstration and hands-on practice is also supported by previous community-based activities. Structured OHS education has been used to strengthen understanding of occupational hazards and safer working procedures (Fitriyah et al., 2025; Sutarno et al., 2024), while a furniture MSME assistance program incorporated PPE provision, hazard mapping, safety signs, and safe-work procedures as practical components of workplace safety improvement (Hermawan et al., 2024). Participatory OHS approaches are particularly relevant in informal and small-scale workplaces because training can be adapted to actual work processes and locally observed hazards (Kawakami, 2024).

Nevertheless, the magnitude of change in the test scores was limited. This differs from community-training studies in which lower baseline knowledge provides greater room for post-intervention improvement. In the present activity, the high pre-test mean and the large proportion of perfect scores suggest that the instrument was more useful for identifying specific knowledge gaps than for measuring large overall knowledge gains. For future activities, evaluation instruments with more varied difficulty levels and additional behavioral indicators may provide a more sensitive assessment of change.

From a practical perspective, the contribution of the activity was not limited to test scores. Participants were exposed to structured discussions on hazard identification, PPE selection, workplace housekeeping, equipment inspection, and safer working procedures. These practical components are particularly relevant for small-scale wood-processing environments, where formal safety systems may be limited and safety behavior often depends on workers' daily routines and work habits.

This evaluation has several limitations. First, the pre-test and post-test responses could not be paired at the individual level because participant identities were not recorded. Second, the number of responses differed between the pre-test and post-test because one participant did not complete the post-test. Third, the very high baseline scores indicate a possible ceiling effect that reduced the sensitivity of the seven-item instrument to detect further change. Finally, the evaluation focused primarily on short-term knowledge and participation and did not measure long-term changes in safety behavior or workplace accident rates. Therefore, the findings should be interpreted as descriptive evidence from this specific community-service activity rather than as proof of a causal intervention effect.

CONCLUSION

The OHS socialization and training program for woodworkers in Alalak Tengah, Banjarmasin, provided participants with structured opportunities to identify occupational hazards, select appropriate personal protective equipment, discuss safer working procedures, and practice workplace housekeeping relevant to small-scale wood-processing activities. The descriptive evaluation showed that participants already had a high level of basic OHS knowledge before the activity, with the mean score increasing slightly from 93.33 in the pre-test to 94.90 in the post-test. More noticeable improvements were observed in knowledge related to eye protection and first-aid procedures for cuts.

These findings should be interpreted cautiously because the pre-test and post-test responses were not paired at the individual level, one participant did not complete the post-test, and the high baseline scores indicate a possible ceiling effect. Therefore, the results cannot be interpreted as evidence of a causal training effect. Nevertheless, the activity provided practical exposure to hazard identification, PPE use, and safer work practices that were directly relevant to the participants' daily work.

Future community-service activities should consider using more sensitive evaluation instruments, paired participant identifiers, and follow-up observations to assess whether knowledge and safety practices are maintained over time.

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