

Strengthening Maritime Safety Culture through Community Counseling in Tambrau Regency

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Abstract

Maritime transportation is essential for mobility, fisheries, and goods distribution in remote coastal regions; however, reliance on small vessels is often accompanied by limited safety knowledge and inconsistent application of basic precautions. This community service program aimed to strengthen maritime safety knowledge and awareness among maritime actors in Tambrau Regency, Southwest Papua, Indonesia. A one-group pretest-posttest intervention was conducted on 9-10 December 2025 with 22 participants, including traditional fishermen, motorboat operators, coastal residents, community leaders, and officers of the Tambrau Regency Transportation Agency. The program combined structured counseling, interactive discussion, practical demonstrations of life-jacket use, recognition of navigation signs, basic emergency-response procedures, and information on formal maritime training opportunities. Knowledge was assessed using a 20-item multiple-choice test administered before and after the activity. The mean score increased from 45.0 (SD 7.15) to 80.0 (SD 5.28), representing a 35-point gain. Knowledge-category distributions shifted from 77% low and 23% moderate at baseline to 73% high and 27% moderate after the program. A paired-samples t-test showed a statistically significant pretest-posttest difference, $t(21) = -26.22$, $p < .001$. These findings indicate a substantial immediate improvement in measured maritime safety knowledge following the intervention. However, the single-group design, absence of a comparison group, unreported validity and reliability coefficients, and lack of behavioral follow-up limit inferences about causality and long-term effects. Periodic refresher training, practical drills, consistent use of safety equipment, and continued coordination with local authorities are recommended to support sustained maritime safety practices and preparedness for routine voyages and emergency situations.

Keywords: maritime safety; safety culture; coastal community; safety education; small vessels

Abstrak

Transportasi laut sangat penting bagi mobilitas, perikanan, dan distribusi barang di wilayah pesisir terpencil, tetapi ketergantungan pada kapal kecil sering disertai keterbatasan pengetahuan keselamatan dan penerapan tindakan pencegahan yang tidak konsisten. Program pengabdian kepada masyarakat ini bertujuan memperkuat pengetahuan dan kesadaran keselamatan pelayaran pada pelaku maritim di Kabupaten Tambrau, Papua Barat Daya, Indonesia. Intervensi satu kelompok pretest-posttest dilaksanakan pada 9-10 Desember 2025 dengan 22 peserta yang terdiri atas nelayan tradisional, operator perahu motor, masyarakat pesisir, tokoh masyarakat, dan pegawai Dinas Perhubungan Kabupaten Tambrau. Program memadukan penyuluhan terstruktur, diskusi interaktif, demonstrasi penggunaan jaket keselamatan, pengenalan rambu navigasi, prosedur dasar tanggap darurat, serta informasi mengenai peluang pendidikan dan pelatihan maritim formal. Pengetahuan dinilai menggunakan tes pilihan ganda 20 butir sebelum dan sesudah kegiatan. Nilai rata-rata meningkat dari 45,0 (SD 7,15) menjadi 80,0 (SD 5,28), atau bertambah 35 poin. Distribusi kategori pengetahuan bergeser dari 77% rendah dan 23% sedang pada awal menjadi 73% tinggi dan 27% sedang setelah program. Uji t berpasangan menunjukkan perbedaan pretest-posttest yang bermakna secara statistik, $t(21) = -26,22$, $p < 0,001$. Temuan menunjukkan peningkatan segera yang substansial pada pengetahuan keselamatan pelayaran yang diukur setelah intervensi. Namun, desain satu kelompok, ketiadaan kelompok pembandingan, koefisien validitas dan reliabilitas yang tidak dilaporkan, serta tidak adanya tindak lanjut

perilaku membatasi interpretasi kausal dan jangka panjang. Pelatihan penyegaran, latihan praktis, penguatan penggunaan alat keselamatan, dan koordinasi berkelanjutan dengan pemerintah daerah direkomendasikan untuk mendukung praktik keselamatan pelayaran yang berkelanjutan dan memperkuat kesiapsiagaan menghadapi pelayaran rutin serta kondisi darurat secara berkelanjutan.

Kata kunci: keselamatan pelayaran; budaya keselamatan; masyarakat pesisir; edukasi keselamatan; kapal kecil

INTRODUCTION

Maritime transportation plays an essential role in supporting daily activities and economic mobility in coastal and island regions. For communities with limited land-transport infrastructure, sea transport often becomes the primary means of access for fishing, passenger movement, and goods distribution. Coastal and island regions therefore depend heavily on maritime transport, particularly where land-based connectivity is limited or unavailable (Boile et al., 2023; Depellegrin et al., 2020; Spadon et al., 2025). Under these conditions, small vessels and motorboats are widely used because they are well suited to local geographic and accessibility constraints.

Small boats are commonly used for fishing, personnel and cargo transfer, border and fishery protection, and local passenger transportation, particularly in shallow waters, canal-like routes, and remote coastal areas where larger vessels cannot operate (Pokusaev et al., 2023). Despite their advantages in speed and accessibility, small vessels also present important safety challenges, including lower comfort, high exposure to noise and vibration, greater vulnerability to adverse weather, and increased crew fatigue. These factors can compromise operational safety and increase the risk of maritime accidents (Pokusaev et al., 2023). Maritime transportation safety should therefore be understood as a multifactorial system shaped by interactions among human behavior, vessel conditions, and environmental factors (Wang et al., 2020).

Tambrau Regency is characterized by an extensive coastline and direct exposure to the Pacific Ocean. These geographic conditions make maritime transportation an important means of mobility and connectivity for coastal communities (Statistics Indonesia, Tambrau Regency, 2025). As in many coastal and island regions, limited land infrastructure and geographic barriers increase local dependence on sea transport (Boile et al., 2023; Depellegrin et al., 2020). Consequently, motorboats and small vessels are widely used to transport passengers, fishery products, and daily necessities between coastal communities (Pokusaev et al., 2023).

High dependence on maritime transportation, however, is not always accompanied by adequate awareness or consistent application of maritime safety principles. In Tambrau Regency, maritime operations are often shaped by routine practice and accumulated field experience rather than standardized safety procedures. Essential precautions, including the use of life jackets, recognition of navigation signs, and preparedness for emergencies, may therefore be overlooked. Such gaps can increase the risk of maritime accidents and their potential consequences, including material losses, injuries, and fatalities.

Similar safety concerns have been documented in other coastal areas of Southwest Papua. On Doom Island, Sorong, sea-taxi operations were reported to involve overloading, unsafe

passenger positioning, and inadequate life-saving appliances. Many crew members were also unfamiliar with applicable safety regulations before targeted maritime-safety outreach activities (Sumarta et al., 2024). Studies of speedboat operations and small-scale fisheries in Indonesia likewise indicate that consistent life-jacket use remains limited. Passengers may wear life jackets only during inspections and remove them afterward because of discomfort, while operators do not always enforce safety requirements (Saifudin et al., 2024).

A major challenge in coastal communities is limited understanding of maritime safety standards and procedures. Many boat operators and passengers have not received formal maritime-safety education or training. Consequently, safety equipment may not be used optimally, and emergency situations may be handled inconsistently. Knowledge of safe navigation practices, weather awareness, and vessel readiness can also remain limited. At the global level, reviews show that many unintentional coastal fatalities are associated with unsafe behavior and low safety awareness, indicating that equipment and signage alone are insufficient without sustained education and community engagement (Koon et al., 2021).

A further concern is the limited development of a strong maritime safety culture within coastal communities. Maritime safety culture encompasses collective awareness, attitudes, and behaviors that consistently prioritize safety in maritime activities. Without continuous education, reinforcement, and shared expectations, unsafe practices may become normalized. Strengthening safety culture therefore requires sustained efforts through education, counseling, practical reinforcement, and direct engagement with maritime actors at the community level.

Local government, particularly the Transportation Agency, has an important role in supporting maritime safety implementation. Collaboration between maritime actors and government institutions is needed to ensure that safety principles are not only understood conceptually but also applied consistently in practice. Such collaboration is increasingly important in anticipation of new port development in TAMBRAUW Regency, which may increase maritime traffic and associated safety risks if not accompanied by adequate preparedness and capacity building.

Given these conditions, community service focused on maritime safety counseling is both relevant and necessary. Community-based programs provide a practical platform for transferring knowledge, increasing awareness, and encouraging safer practices among maritime actors. Participatory and educational approaches can also connect formal safety principles with the everyday operating conditions experienced by local communities.

This community service program aimed to strengthen maritime safety knowledge and awareness among maritime actors in TAMBRAUW Regency. Specifically, the program sought to improve participants' understanding of safety equipment, emergency-response procedures, navigation signs, and safe navigation practices. It also introduced relevant maritime education and training opportunities as pathways for continued competency development.

The program was expected to provide an initial foundation for stronger safety awareness and preparedness while supporting continued collaboration between maritime actors and local

government. Because the evaluation focused on immediate knowledge change, longer-term improvements in routine behavior and safety culture require additional follow-up evidence.

Recent Indonesian evidence reinforces the need for structured safety capacity building among small-vessel users. A study involving small-scale fishermen in Jember found that sailing-safety practices remained unsafe and recommended government-supported training and appropriate personal protective equipment (Indrayani et al., 2023). Community-service programs in Rembang and Raam Island likewise reported substantial improvements in knowledge following participatory safety education and practical demonstrations (Priyadi et al., 2025; Gumelar et al., 2025). These findings support the relevance of a locally adapted intervention in Tambrau, where formal training opportunities and routine safety reinforcement remain limited.

Current official statistics for Tambrau Regency indicate continuing variation in village infrastructure and access to public services, making reliable transportation particularly important for dispersed communities (Statistics Indonesia, Tambrau Regency, 2025). In such settings, maritime safety interventions should combine formal safety principles with the operational realities of small boats, local weather knowledge, fishing routines, limited equipment, and long travel distances. The present program therefore positioned community members as active participants in safety improvement rather than passive recipients of regulation.

Tambrau Regency is a coastal region in Southwest Papua Province with extensive marine and coastal areas. It forms part of the Bird's Head Seascape and has rich marine biodiversity that supports local livelihoods. Maritime activities are central to community life, particularly for mobility, fisheries, and the transport of goods and people between coastal settlements. This dependence on marine resources and sea transportation makes maritime safety directly relevant to both social and economic activity (Yayasan Konservasi Alam Nusantara (YKAN), 2025).

The program involved 22 participants, including traditional fishermen, motorboat operators, coastal residents, community leaders, and officers of the Tambrau Regency Transportation Agency. These groups represent key stakeholders who interact directly with maritime transportation as users, operators, community representatives, or local authorities. Strengthening their knowledge and application of basic safety practices is therefore relevant to reducing operational risk and supporting safer maritime activities.

Maritime transportation in the coastal areas of Tambrau Regency faces several fundamental safety-related challenges. These are not exclusively technical but also involve limitations in knowledge, skills, perceptions, behavior, and institutional support. Based on field observations and preliminary coordination with local stakeholders, three priority problems were identified within the broad domains of safety education, safety behavior, and institutional support.

Table 1. Partner profile and priority problem

Target	Characteristics	n	Priority problem
Maritime stakeholders	Traditional fishermen, motorboat operators, coastal residents, community leaders, and Transportation Agency officers	22	Limited safety knowledge, inconsistent compliance with safety procedures, and low emergency preparedness

The first problem concerns limited understanding of standardized maritime safety procedures. Traditional fishermen and motorboat operators generally have substantial practical experience in vessel operation and local navigation; however, activities are often guided by accumulated experience and traditional practices rather than formal safety standards. Knowledge of safety equipment, navigation signs, emergency procedures, and accident-prevention measures may therefore remain incomplete. Similar conditions have been reported in artisanal and small-scale fisheries, where safety practice depends heavily on traditional knowledge and informal routines rather than standardized systems or written procedures (Saldanha et al., 2020; Utama et al., 2024).

The second problem concerns inconsistent implementation of maritime safety practices and limited emergency preparedness. Although many maritime actors are familiar with routine vessel operations, basic safety procedures are not always applied consistently. Life jackets may be neglected, navigation rules may not be followed systematically, and preparedness for emergency situations can remain limited. Such patterns reflect a weak safety culture in which unsafe practices become normalized through habit, perceived inconvenience, or insufficient supervision. Indonesian evidence indicates, for example, that passengers may wear life jackets only during inspections and remove them afterward despite requirements for continuous use during voyages (Saifudin et al., 2024).

The third problem concerns institutional support, particularly limited dissemination of maritime safety information and limited access to structured training at the local level. Coordination between maritime actors and local authorities, including the Transportation Agency, has not yet been fully utilized as a continuous educational platform. As a result, opportunities for capacity building through formal maritime training (diklat) remain underused. This issue is increasingly important in anticipation of growing maritime activity associated with planned port development. Policy analyses in Indonesia identify human error and weaknesses in human-resource management as important contributors to maritime accidents and position functional maritime-transport training as a policy instrument for improving safety performance (Lamatokan et al., 2024).

The program response was designed as a structured and participatory intervention addressing the priority maritime safety problems identified in Tambrauw Regency. The intervention was organized into sequential stages to connect needs assessment, knowledge transfer, practical learning, behavioral reinforcement, institutional coordination, and evaluation.

The first stage involved preparatory coordination and needs assessment with local stakeholders, including the Tambrauw Regency Transportation Agency and participant representatives. This process helped align the intervention with locally identified safety

priorities. Similar approaches in inclusive maritime planning emphasize the importance of identifying and validating relevant stakeholders through participatory processes so that the perspectives of fishers and community members are adequately represented (Papageorgiou et al., 2024).

The second stage focused on knowledge transfer through maritime safety counseling covering safety equipment, navigation signs, emergency-response procedures, and safe navigation practices. These topics correspond to key competency areas for accident prevention and onboard emergency management (Bulgakov et al., 2025; Frias et al., 2022; Irwan, 2020). The material was delivered using accessible explanations and practical examples related to participants' everyday maritime experiences.

The third stage emphasized practical skill development through demonstrations and participatory discussion. Participants practiced the correct use of life jackets, learned to recognize navigation lights and buoys, and discussed basic emergency-response procedures. Basic safety training is intended to develop life-saving competencies, including correct life-jacket use and safe abandonment procedures (Chiong, 2023). Interactive discussion also enabled participants to reflect on unsafe practices and consider more appropriate responses.

The fourth stage focused on reinforcing safety awareness and safer behavior. Repeated reminders and discussion were used to encourage consistent safety practices. Behavior-based safety approaches emphasize observation, feedback, and reinforcement as mechanisms for reducing unsafe practices (Subramanyam & Dhankher, 2022; Gumelar et al., 2025). Safety awareness is also associated with safety behavior and safety citizenship behavior among maritime personnel (Prasetyawan et al., 2024; Wibawanti et al., 2025). In addition, regulatory involvement through supervision, training, and enforcement can contribute to stronger safety standards and compliance (Baig et al., 2024; Hasibuan et al., 2025; Priyadi et al., 2025; Størkersen et al., 2017).

The fifth stage encouraged continued capacity building through participation in formal maritime training (diklat). Participants were informed about technical maritime-transport education and training programs that could support further professional competency development. In Indonesia, functional technical maritime-transport training is positioned as an important policy instrument for strengthening knowledge, skills, and professional development in the maritime sector (Lamatokan et al., 2024).

The final stage evaluated immediate knowledge change using a pretest-posttest design. Similar community-empowerment programs in maritime settings have reported substantial post-training knowledge gains using one-group pretest-posttest evaluations (Amanda et al., 2024). In the present program, pretest and posttest scores served as the primary measurable educational outcome.

Through these integrated stages, the program sought to improve maritime safety knowledge, reinforce awareness and emergency preparedness, and strengthen collaboration between maritime actors and local government. The immediate evaluation focused on

knowledge acquisition; sustained changes in behavior, preparedness, and safety culture require longer-term follow-up.

Table 2. Priority problems, program responses, and intended indicators

Priority problem	Program response	Intended indicator
Limited understanding of standardized maritime safety procedures	Maritime safety counseling and educational materials	Improved pretest-posttest knowledge scores
Inconsistent safety practices and emergency preparedness	Demonstration, mentoring, and participatory discussion	Improved awareness and correct use of safety equipment
Limited dissemination, training access, and coordination	Information on formal maritime training and coordination with Transportation Agency	Greater awareness of training opportunities and stronger institutional collaboration

METHODS

This community service program was conducted in Tambrau Regency, Southwest Papua Province, on 9-10 December 2025. It aimed to strengthen maritime safety knowledge and awareness among coastal maritime actors through counseling, practical demonstrations, and participatory discussion.

The program involved 22 maritime actors, including traditional fishermen, motorboat operators, coastal residents, community leaders, and officers of the Tambrau Regency Transportation Agency. Participants were selected based on their direct involvement in maritime transportation and coastal activities in Tambrau Regency.

Implementation consisted of preparation and coordination, pretest administration, maritime safety counseling, practical demonstrations, interactive discussion, and posttest evaluation. The implementation stages are summarized in Table 4.

The intervention combined educational, participatory, persuasive, empowerment-oriented, and evidence-informed approaches. Maritime safety counseling addressed safety equipment, navigation signs, emergency procedures, and safe navigation practices. Participants were actively engaged through interactive discussion and practical demonstrations designed to relate the material to local maritime conditions.

Evaluation used a one-group pretest-posttest design and a 20-item multiple-choice knowledge test. Item validity was assessed using product-moment correlations, and internal consistency was assessed using Cronbach's alpha. Pretest and posttest scores were summarized descriptively and compared using a paired-samples t-test. Detailed validity coefficients, the reliability coefficient, knowledge-category cut-points, and test-assumption diagnostics were not available in the program records and are therefore not reported.

Table 3. Participant profile

Variable	Description
Total participants	22 persons
Participant categories	Traditional fishermen, motorboat operators, coastal residents, community leaders, and officers of the Tambrau Regency Transportation Agency
Location	Tambrau Regency, Southwest Papua Province

Variable	Description
Selection criteria	Individuals directly involved in maritime transportation and coastal activities

RESULTS

The program evaluated immediate changes in maritime safety knowledge among 22 participants representing traditional fishermen, motorboat operators, coastal residents, community leaders, and officers of the Tambrauw Regency Transportation Agency. The assessment focused on essential safety topics introduced during the program, including safety-equipment use, emergency-response procedures, navigation signs, and safe navigation practices. Participants' knowledge scores were classified into low, moderate, and high categories. The distribution of knowledge levels before and after the counseling activity is presented in Table 5. Table 5 shows a marked shift in knowledge categories after the counseling activity. Before the program, 17 participants (77%) were classified in the low-knowledge category and 5 (23%) in the moderate category; none were classified as high. After the program, no participants remained in the low category, 6 (27%) were classified as moderate, and 16 (73%) reached the high-knowledge category. This pattern indicates a substantial immediate improvement in measured maritime safety knowledge.

To assess whether the observed score change was statistically significant, pretest and posttest scores were compared using a paired-samples t-test. The results are presented in Table 4.

Table 4. Maritime safety knowledge levels before and after counseling

Knowledge level	Pretest n	Pretest %	Posttest n	Posttest %
Low	17	77	0	0
Moderate	5	23	6	27
High	0	0	16	73
Total	22	100	22	100

Table 5 Paired pretest-posttest knowledge results

Measure	n	Mean	SD	t	df	p
Pretest	22	45.0	7.15			
Posttest	22	80.0	5.28	-26.22	21	< .001

The paired-samples analysis showed a statistically significant difference between pretest and posttest knowledge scores, $t(21) = -26.22$, $p < .001$. The mean score increased from 45.0 (SD 7.15) to 80.0 (SD 5.28), representing an immediate within-group gain of 35 points. Because the evaluation did not include a comparison group, this statistically significant change should be interpreted as an association with the program rather than definitive evidence of a causal intervention effect.

DISCUSSION

The program was followed by a substantial immediate improvement in participants' maritime safety knowledge. Mean scores increased from 45.0 to 80.0, and the categorical distribution shifted from predominantly low knowledge at baseline to predominantly high

knowledge after the intervention. These findings support the educational value of combining structured counseling, participatory discussion, and practical demonstrations. However, because the evaluation used a single-group pretest-posttest design, the observed change should not be interpreted as definitive proof of intervention effectiveness.

The direction of the findings is consistent with previous studies showing that limited safety knowledge and reliance on traditional experience without formal safety systems can increase maritime risk, particularly in small-scale and artisanal operations (Saldanha et al., 2020; Utama et al., 2024). In such settings, operational decisions may rely on personal experience and informal sensemaking rather than standardized procedures. Indonesian evidence also indicates that inconsistent life-jacket use and weak enforcement of safety requirements remain common behavioral concerns among small-vessel operators (Saifudin et al., 2024).

The participatory approach used in this program is consistent with behavior-based safety principles, which emphasize observation, feedback, and reinforcement to reduce unsafe practices (Subramanyam & Dhankher, 2022; Gumelar et al., 2025). Safety awareness is also associated with safety behavior and safety citizenship behavior among maritime personnel (Prasetiawan et al., 2024; Wibawanti et al., 2025). Involving regulatory authorities can further strengthen institutional reinforcement through supervision, training, and enforcement, all of which contribute to stronger safety standards and compliance (Baig et al., 2024; Hasibuan et al., 2025; Priyadi et al., 2025; Størkersen et al., 2017).

The integration of knowledge transfer, practical demonstration, and institutional engagement therefore provides a feasible approach to strengthening maritime safety capacity in Tambrauw Regency. The observed improvement in test scores supports the immediate educational value of structured and participatory safety counseling, while sustained reductions in risky behavior and longer-term changes in safety culture require longitudinal observation.

The observed direction of change is consistent with community maritime-safety interventions in other Indonesian coastal settings. Simulation-based training for fishermen on Raam Island substantially increased mean safety-knowledge scores, while a two-day participatory safety program for traditional fishers in Tasikagung, Rembang, also reported a large pretest-posttest improvement (Gumelar et al., 2025; Priyadi et al., 2025). Basic onboard-safety socialization in Sapa Timur likewise highlighted the practical value of combining explanation with hands-on training (Saifudin et al., 2024). Together, these findings suggest that locally adapted safety education can address immediate knowledge gaps, although sustained change depends on continued practice, access to equipment, and institutional reinforcement.

Practical demonstrations are particularly important because maritime safety requires procedural competence as well as factual knowledge. Correctly fitting a life jacket, interpreting navigation signs, recognizing hazardous conditions, and responding to emergencies require practice. Maritime education research identifies training as an important safety-improvement factor, while community programs increasingly use simulation to make learning more transferable to real operating conditions (Frias et al., 2022; Gumelar et al., 2025). Future Tambrauw programs should therefore retain practical demonstrations and add structured

observation checklists so that procedural performance can be assessed directly rather than inferred from written-test scores.

Safety culture is a broader construct than knowledge alone. Research among maritime personnel indicates that safety competence and safety culture can influence safety behavior through safety awareness (Prasetiawan et al., 2024). Knowledge gain may therefore represent an early step toward safer routine practice, but it does not by itself demonstrate consistent life-jacket use, emergency preparedness, or compliance during actual voyages. This distinction is important because repeated exposure to risk without immediate adverse consequences can normalize unsafe behavior among experienced operators. Sustainable safety culture requires shared expectations, equipment availability, supervision, feedback, and visible institutional commitment.

The involvement of the Tambrauw Regency Transportation Agency is an important program strength. Inclusive maritime-planning literature emphasizes the participation of local authorities, fishers, and coastal communities in decisions affecting marine safety and access (Papageorgiou et al., 2024). In practical terms, institutional involvement creates opportunities for periodic refresher training, referral to formal maritime technical education, safety campaigns before high-risk seasons, and coordinated equipment checks. These activities could help transform a one-time counseling program into a continuing local safety mechanism.

Several methodological limitations should be considered. The program documentation states that the 20-item questionnaire underwent product-moment validity testing and Cronbach's alpha reliability testing, but the corresponding coefficients and acceptance criteria were not available. The cut-points used to define low, moderate, and high knowledge were also not documented. These omissions limit assessment of instrument quality and reproducibility. Future program reporting should therefore include the number of valid items, item-correlation criterion, Cronbach's alpha value, scoring range, and knowledge-category thresholds.

The paired-samples t-test also requires cautious interpretation. The available program records did not include the distribution of paired differences, normality assessment, outlier review, or participant-level scores. Consequently, the assumptions underlying the test could not be independently evaluated. The reported t statistic and degrees of freedom were retained, and $p = 0.000$ is appropriately reported as $p < .001$. Additional effect sizes or confidence intervals should be reported only when they can be calculated from the original participant-level dataset.

Future evaluation should use a staged outcome framework. Immediate measures can include knowledge and observed demonstration skills. Outcomes assessed after one to three months could include life-jacket use, safety-checklist adoption, emergency-procedure recall, and participation in formal training. Six- to twelve-month follow-up could document routine compliance, near-miss reporting, safety violations, and local coordination activities. Where feasible, a delayed-intervention or non-equivalent comparison group would strengthen causal

interpretation and reduce the risk of attributing all pretest-posttest change to the counseling session alone.

The Tambrau model may be transferable to other remote coastal communities because it relies on relatively low-complexity educational methods, practical demonstrations, and local institutional partnership rather than equipment-intensive simulation facilities. Replication should nevertheless begin with a local needs assessment because vessel types, trip duration, weather exposure, passenger patterns, and available emergency resources vary substantially across settings. Standardized documentation of participant characteristics, baseline knowledge, practical performance, follow-up behavior, and institutional actions would strengthen accountability and the evidence base for community maritime-safety programs.

CONCLUSION

Maritime safety counseling in Tambrau Regency was followed by a substantial immediate improvement in knowledge among 22 maritime actors. The mean score increased from 45.0 (SD 7.15) to 80.0 (SD 5.28), and 73% of participants reached the high-knowledge category after the program. The paired-samples analysis showed a statistically significant pretest-posttest difference, $t(21) = -26.22$, $p < .001$. The combination of counseling, participatory discussion, practical demonstration, and local-government involvement provides a feasible model for community-based maritime safety education. However, the single-group design, incomplete reporting of instrument validity and reliability, and absence of behavioral or long-term follow-up mean that the findings should be interpreted as immediate knowledge improvement rather than evidence of sustained safety-culture change or reduced maritime accidents.

RECOMMENDATIONS

Within the next 3-6 months, the Tambrau Regency Transportation Agency and local maritime leaders should conduct refresher counseling and practical drills and document correct life-jacket use, emergency-response performance, and navigation-safety knowledge using standardized checklists. Formal maritime training opportunities should be communicated regularly to fishermen and motorboat operators. Future program cycles should retain participant-level pretest-posttest data, report instrument validity and reliability coefficients, define knowledge-category thresholds, and, where feasible, include a comparison or delayed-intervention group. Six- to twelve-month monitoring should track routine safety-equipment use, near-miss reporting, safety violations, and local coordination activities.

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