Jurnal Panjar: Pengabdian Bidang Pembelajaran
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Promoting Safety and Injury Prevention in Movement and Sport Environments

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Abstract
The high risk of injury in Physical Education activities in primary schools is an important issue that requires special attention, especially since most teachers do not have adequate training in dealing with emergencies such as physical injuries, heart attacks or other risky situations. This problem is reinforced by the lack of integration of safety protocols in learning and the absence of standardized safety policies in many schools. This community service activity aims to increase the capacity of Physical Education teachers through first aid and school safety training. The methods used include coordination with stakeholders, preparation of materials, pretest, theoretical and practical training, posttest, and evaluation of results. The training is delivered through lectures, demonstrations, case studies, and field simulations designed to match the real situation in the school environment. The results showed significant improvements in teachers' understanding of basic life support (100%), integration of classroom safety protocols (95%), and ability to handle student injuries (95%). The training also improved teachers' preparedness in using AEDs and implementing emergency evacuation procedures. In conclusion, systematic and contextualized training proved effective in improving the competence of PJOK teachers in safety and emergency response aspects. In the future, sustainable training programs and integrated school safety policies are needed to ensure a safe, inclusive and responsive learning environment to the risks that may occur during physical activities at school.

Keywords: safety, injury prevention, sport environments

INTRODUCTION

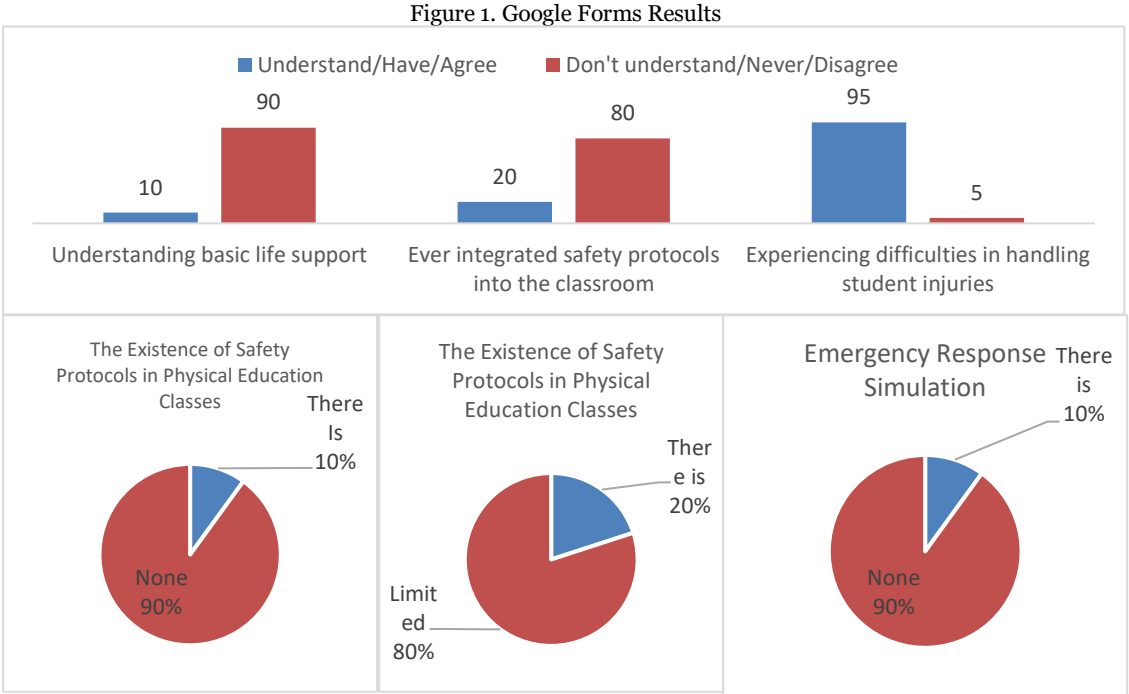
The risk of injury in physical learning environments is very high due to several interrelated factors. First, the type of sports and activities, as well as the distribution of the curriculum load, significantly influence the risk of injury. For example, activities such as gymnastics, team ball sports, and track and field have higher injury rates, particularly among female students and those in their first year of study, due to increased exposure and the challenges of adapting to new physical demands (Adi et al., 2020; Barendrecht et al., 2022). Additionally, the severity of injuries can have long-term impacts on academic performance, as seen in young people hospitalized due to injuries. These individuals are at higher risk of failing to meet national academic standards and are more likely to drop out of high school, indicating that injuries can disrupt physical and cognitive development (Firmansyah et al., 2024; Mitchell et al., 2021). Furthermore, traditional injury prevention programs often fail to address real-world dynamics, as they rely on static exercises that do not mimic the unpredictable nature of sports environments. This gap highlights the need for exercises that combine complex motor control and real-world scenarios to effectively reduce injury risk (Benjaminse, 2022; Purba et al., 2024). This project aims to address this issue by developing context-specific, engaging, and dynamic injury prevention routines that align with the training objectives of physical educators and sports coaches, thereby enhancing the uptake and effectiveness of these programs (de Jong, 2022). Additionally,

individual movement patterns, particularly in response to fatigue, can influence athletes' susceptibility to injury, as seen in soccer players where unsupervised learning techniques have been used to identify risky movement strategies (Adi et al., 2023; Strutzenberger et al., 2025). Physical activities in Physical Education, such as team sports, gymnastics, and traditional games, often pose injury risks. Studies show that injury rates in Physical Education activities at school are quite high, which can impact students' self-confidence and the effectiveness of learning. Therefore, teachers need to have a deep understanding of injury prevention and management techniques.

The decline in learning and the implementation of student safety policies can be attributed to several interrelated factors. First, there is a significant gap in empirical research focusing on school safety policies as independent or dependent variables, which limits the development of effective evidence-based policies. This gap is highlighted by the lack of integration between school safety research and policies proposing new theoretical models to address this issue (Adi S, Tommy Soenyoto, et al., 2025; Astor & Benbenishty, 2022). Additionally, the proliferation of school safety measures, such as armed security and metal detectors, has been shown to negatively impact perceptions of safety, indicating that more policies do not always equate to better outcomes (Artazila & Adi, 2024; Rauk et al., 2023). Furthermore, the emphasis on creating “safe” classrooms can sometimes hinder learning, particularly in subjects that require engagement with challenging topics. This highlights the need for a balance between safety and academic inquiry (Al Mukharom et al., 2024; Williams & and Quaid, 2024). Finally, the lack of research on practices that contribute to student safety and well-being further complicates the implementation of effective safety policies that emphasize the importance of ethical practices in schools (Graham et al., 2022; Soenyoto et al., 2024). Many schools do not yet have standard policies or procedures for handling emergency incidents in Physical Education classes. Some teachers rely solely on instinct or personal experience in handling injuries, without a strong scientific foundation. The development of science-based safety policies is urgently needed to create a safer learning environment.

The issues were identified based on Google Forms, information collection, and interview results, yielding the following problems:

Figure 1. Google Forms Results



METHOD

1. Permits and coordination with the Korsatpen Kec. Gunungpati
2. Socialization with physical education teachers
3. Preparation of materials by the community service team in coordination with the Korsatpen Kec. Gunungpati
4. Pre-test of activities
5. Implementation of activities by the community service team
6. Post-test
7. Evaluation and dissemination of community service activities.

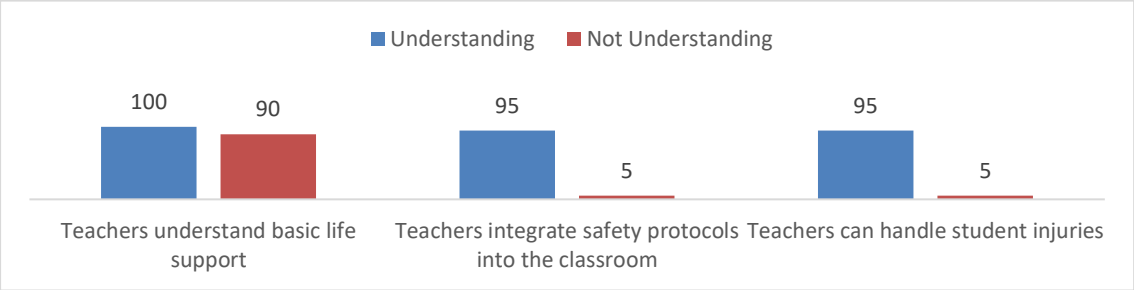
The data collection instrument is a questionnaire to measure the understanding and knowledge of physical education teachers in community service activities. The target audience for this community service is physical education teachers. This instrument will be sent via Google Forms.

Materials and delivery methods:

1. Classroom Training: This method allows instructors to provide instruction and presentations on the basics of Basic Life Support (BLS): CPR concepts, AED use, and first aid techniques. Injury Management in Physical Education: Identification of minor to severe injuries, prevention, and management. The Importance of Safety Protocols in Schools: Safety regulations and policies in physical education activities. Risk Simulation in the Classroom: Identification of potential hazards in the physical education environment and mitigation strategies.
2. Demonstration Training: Instructors will demonstrate proper safety and first aid procedures. This includes how to identify danger signs and address environmental risks. CPR Technique Demonstration and AED Use: Steps for performing cardiopulmonary resuscitation and using an automated external defibrillator. Injury Management Practice: Demonstration of first aid for muscle injuries, fractures, and sprains. Classroom Safety Protocol Simulation: Practice using safety equipment and applying standard operating procedures in sports activities. Emergency Evacuation Demonstration: How to evacuate students who are injured during physical activities.
3. Case-Based Learning: Teachers can study case studies of past events or disasters. They will be asked to analyze the situation and develop appropriate environmental risk management and safety plans. Analysis of School Injury Cases: Real-life case studies of injury incidents in physical education classes and how they were handled. Injury Prevention Strategies: Identification of risk factors and mitigation strategies that can be applied in physical activities. Classroom Safety Evaluation: Assessing the readiness of school facilities to handle emergencies and making recommendations for improvements. Interactive Discussion: Simulation of sports accident scenarios and the actions that teachers should take.
4. Field Practice Training: This approach involves simulating emergency situations in a real-world environment. Teachers will practice disaster mitigation techniques, rescue management, and environmental risk mitigation. Field Emergency Response Simulation: Practicing student rescue in real-life situations such as fainting, broken bones, or physical exhaustion. Safety Protocol Implementation Training: Teachers apply safety SOPs when teaching physical education. Evacuation and Crowd Management: Practice safely moving students during incidents in a sports environment. Safety Equipment Testing: Teachers try out the use of AEDs, stretchers, and other first aid equipment.

Result and Discussion

Figure 2. Teachers Understanding



The importance of safety in physical education is multifaceted, encompassing both physical and emotional dimensions. Ensuring physical safety is crucial, as evidenced by the large number of injuries that occur in school settings, such as the more than one million reported annually in Japan. This highlights the need for effective safety education programs, such as a photovoice-based injury prevention curriculum, which empowers students to identify and reduce risks, thereby promoting a safer school environment (Oono et al., 2022). Beyond physical safety, creating an emotionally safe space is equally important, especially for students experiencing trauma or toxic stress. Trauma-informed practices in physical education, such as fostering positive relationships and promoting self-regulation, can help build trust and resilience among students, enabling them to have positive and inclusive experiences (Adi et al., 2021; Genari et al., 2022). Additionally, the role of athletic trainers in implementing health and safety policies is crucial in managing athletic-related injuries, ensuring timely and effective care, and maintaining a safe environment for physical activity (Arbanisa & Adi, 2025; Ellison & Walton-Fisette, 2022). Collectively, these aspects underscore the comprehensive approach needed to ensure safety in physical education, addressing students' physical and

emotional well-being. Physical education is a subject that involves various physical activities that carry a risk of injury, both minor and severe. Therefore, physical education teachers need to have a good understanding of classroom safety, including injury prevention procedures, injury management, and Basic Life Support (BLS).

Low injury management competence in physical education learning is a multifaceted issue involving an understanding of the role of physical activity, injury prevention, and the educational framework. Physical education (PE) aims to empower students to engage in physical activities that improve health, requiring a competency-based approach to ensure students are equipped with the necessary skills and knowledge (Adi S, Soenyoto, et al., 2025; Rosenstiel et al., 2021). However, sports injuries are a significant barrier to sustained participation in physical activity, often leading to reduced engagement and withdrawal from sports and physical education programs. This highlights the need for effective injury prevention strategies that are context-specific and aligned with the training objectives of educators and coaches (de Jong, 2022). In the context of campus sports, such as soccer, a lack of safety awareness and injury prevention education has been identified as a primary cause of injuries, underscoring the importance of integrating injury management into the PE curriculum (Liu et al., 2022). Additionally, muscle injuries combined with low physical activity can significantly impair function and metabolism, indicating that injury management should also focus on maintaining physical activity levels to enhance muscle recovery and metabolic health (Adi et al., 2025; de Sousa Neto et al., 2023). Competency-based education (CBE) offers a promising framework for addressing these challenges by ensuring that PE programs are designed to meet community health needs and that educators are equipped to deliver high-quality and safe instruction. CBE emphasizes the demonstration of competencies, which can help standardize injury management practices and improve outcomes in PE settings (Septian & Adi, 2025; Timmerberg et al., 2022). Overall, improving injury management competencies in physical education learning requires a comprehensive approach that integrates injury prevention, active participation, and competency-based education strategies. Based on research and field observations, many physical education teachers still lack the skills to provide first aid to students who experience accidents in class. The lack of training related to Basic Life Support and injury management results in suboptimal injury management, which has the potential to worsen the condition of the victim.

Preschool teachers need to be equipped with first aid skills to manage such incidents effectively (Salim et al., 2022). Additionally, the lack of standardized trauma education in medical schools has left junior doctors feeling unprepared to manage trauma cases, underscoring the need for better educational strategies that can be reflected in teacher training programs (Large et al., 2023) (Large et al., 2023). Readiness to handle emergencies not only enhances student safety but also boosts teachers' confidence in managing classrooms more effectively.

Student safety significantly impacts the quality of learning, as evidenced by various studies exploring different dimensions of safety in educational settings. Psychological safety, which involves students feeling secure enough to take interpersonal risks, is crucial for fostering collaboration and positive learning experiences, particularly in clinical settings where it enhances educational outcomes and patient care (Hardie et al., 2022; Kuroma & Adi, 2025). In digital learning environments, psychological safety has been shown to positively predict engagement and academic performance, highlighting its importance in online education (Tatiana et al., 2022). Conversely, perceptions of an unsafe environment can lead to detrimental consequences for students, affecting their mental, physical, and academic well-being, as seen in high-crime areas where students' perceptions of safety are compromised (Cobbina et al., 2020). Therefore, strengthening teachers' competencies in safety and injury management will have a positive impact on the quality of learning and students' overall health.

CONCLUSION

The safety and first aid training program for physical education teachers successfully improved their understanding, skills, and preparedness in dealing with emergency situations in the school environment. Evaluation results showed a significant increase in teachers' understanding of basic life support (BLS), their ability to integrate safety protocols into their teaching, and their skills in handling student injuries. The training, which included theoretical approaches, demonstrations, case-based learning, and field practice, proved effective in strengthening teachers' capacity as guardians of student safety. In addition to boosting confidence, the activity also promoted awareness of the importance of policy-based risk management in schools. These findings suggest that such training should be made a regular, structured program supported by institutional policies. Thus, physical education teachers are not only able to manage physical activities optimally but also play a strategic role in creating a safe, responsive, and sustainable learning environment.

ACKNOWLEDGMENTS

None

DECLARATION OF CONFLICTING INTERESTS

None

FUNDING

This community service is funded by the Rector's Decree of Semarang State University Number T/424/UN37/HK.02/2025 concerning the Appointment of Research and Community Service Implementers from the Budget Implementation List (DPA) of the Research and Community Service Institute of Semarang State University for the Year 2025.

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