

Increasing public knowledge and Skill in Emergency Response to enhance proficiency in handling emergencies at home

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Abstract. Medical emergencies are not limited to hospitals, roads, or public facilities but frequently arise within households and families. Typical emergencies in residential and nearby settings include physical injuries, loss of consciousness, toxic substance exposure, and open wounds. According to the 2019 poisoning case report, incidents of poisoning that transpire within residential settings constitute Indonesia's second most prevalent form of poisoning cases across diverse categories of poisoning incidents. The prevalence of emergency incidents in such households underscores the significance of leveraging alertness and caution. Furthermore, fast and accurate handling is also requisite. Acquiring knowledge of first aid within the community is imperative for effectively managing emergencies that may arise in a domestic setting. Acquiring emergency first aid knowledge is crucial for the community as unanticipated emergencies can occur indiscriminately and anywhere. An intervention was implemented via community service at PCPM Ngaglik Sleman to address the issue mentioned earlier. The community service was being executed to impart knowledge on emergency management through a two-pronged strategy. The initial phase involved imparting knowledge on emergency medical care for conditions such as injuries, syncope, nosebleeds, toxic exposure, and open wounds. During the second phase, a Forum Group Discussion was conducted to simulate managing injuries, syncope, and open wounds. One or two instructors facilitated each group. The efficacy of education was evaluated by administering pre-test and post-test assessments utilizing the quizz.com platform. The simulation's efficacy was evaluated using a rubric to make observations. The outcome of this community service initiative led to a noticeable augmentation in the participants' comprehension of emergency response procedures. The study observed that the average pre-test and post-test scores of the 26 participants increased. Additionally, the proportion of participants who demonstrated good knowledge increased from 11.5% to 50%. Furthermore, there was an observed improvement in the participants' ability to handle emergencies. In assessing this approach, it was imperative to incorporate the time duration for stage 2 activities, specifically the emergency handling simulation. Furthermore, the intended collaborators aspire for this undertaking to be conducted regularly.

1 Introduction

The term "critical" refers to a situation that poses an immediate threat to an individual's life, whereas an "emergency" denotes the imperative need for prompt medical

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attention or intervention to mitigate the risk to the individual's well-being. An emergency is a critical circumstance that risks an individual's life and requires prompt action to prevent harm or fatality¹. Emergency incidents, including poisoning and other unforeseen events, are not limited to hospitals, public facilities, and highways but frequently transpire within households and familial settings. The 2019 poisoning case reports analysis revealed that most incidents occurred in unspecified locations, as indicated by the "other" category, which accounted for 3142 cases. According to recent data, residences have reported 2505 cases of poisoning incidents, positioning them as the second most common location for such occurrences in Indonesia. Other common locations for poisoning incidents rate are entertainment venues with 509 cases, offices with 33 cases, and hospitals with 16 cases. The visual representation of the data distribution is depicted in the following image ².

According to epidemiological data provided by the American Association of Poisons Control Center in 2018 ³, there is an incidence of poisoning every 15 seconds in the United States. Drug and household cleaning fluid ingestion is the community's primary aetiologies of poisoning incidents. The demographic group most affected by poisoning, as evidenced by numerous reported cases, is children under five. In Indonesia, the leading causes of national poisoning cases in 2019 were attributed to animals (47.34%), drinks (13.19%), drugs (9.92%), food (7.63%), and chemicals (7.01%) ².

Due to the significant frequency of emergency events, it is imperative to exercise vigilance and caution. Additionally, proficiency in managing such incidents is crucial. An emergency that is not effectively managed may result in incapacitation and risk one's survival. Acquiring knowledge and skills in first aid is imperative to manage emergencies effectively. Every community needs to possess knowledge of first aid, as emergencies can arise unexpectedly and affect anyone, regardless of location. Such situations may occur within one's immediate surroundings or even within the perimeters of one's own home, thereby leading to the need for individuals to be equipped with the necessary skills to administer first aid.

Initiatives aimed at averting and managing incidents of poisoning and emergencies promptly and effectively ought to commence at the domestic level. One potential approach to implementation involves the provision of educational resources and the use of role-playing exercises to engage members of the community. An achievement in implementing education is using interactive methods with the community to enhance public knowledge ^{4,5}. A commonly used method for evaluating an individual's knowledge level is administering a questionnaire. By analysing the responses obtained from the questionnaire, an assessment can be made regarding the extent of knowledge deficiency, adequacy, or proficiency. Larew and Lessans (2016)⁶ conducted a study in the field of Nursing, as cited by Karya and Kediri, 2023 ⁷, which revealed that the simulation method could potentially enhance students' clinical performance and academic knowledge. Furthermore, Cordeau's (2013)⁸ research, as mentioned by Karya and Kediri (2023)⁷, indicates that simulation is essential for improving students' cognitive, affective, and psychomotor abilities. Specifically, the simulation method effectively enhanced students' problem-solving skills and decision-making capabilities.

2 Methodology

Preceding the program's implementation, the community service team surveyed target partners regarding the subject matter necessary for the target to enhance community health and welfare. This community service initiative focused on the Muhammadiyah Youth organization (Pemuda Muhammadiyah), specifically the Ngaglik Branch, which will be referred to as PCPM Ngaglik throughout the text. The survey revealed that several emergency topics, including post-accident injuries, fainting, nosebleeds, and poisoning, frequently

transpire in the target partners' vicinity. The program involved the participation of service target partners who provide the necessary infrastructure and facilitate the involvement of members from PCPM Ngaglik as service participants. The methodology of implementation was clarified in the subsequent section.

The activity methodology was presented in two distinct stages. The initial phase of endeavours designed to enhance the awareness of the intended stakeholders regarding emergency prevention and management involves providing instruction via presentations utilizing power point technology, which was subsequently followed by discourse ⁹. The duration of lectures and discussions was 60 minutes. The efficacy of education was evaluated by administering a questionnaire assessing proficiency in emergency care, administered twice, namely before and following instruction, referred to as the pre-test and post-test, respectively. The pre-test was directly administered before the lecture's commencement, with a designated duration of 10 minutes.

Conversely, the post-test was immediately administered following the lecture, with a designated duration of 10 minutes. The quizizz.com platform was utilized for the post-test, as it was deemed more appealing to the participants being served. The effectiveness of a program was determined by observing an increase in scores between the pre-test and post-test data. According to Octavia's (2021)¹⁰ findings, implementing emergency education yielded a statistically significant increase in knowledge among 41 participants engaged in community service, as evidenced by a p-value of 0.001.

The subsequent stage of the activity aims to enhance the participants' soft skills. To this end, the community service team administered simulations utilizing props during the Forum group discussion (FGD). Four groups of forum group discussions (FGDs) were conducted, with each group facilitated by one or two instructors who assisted the participants' emergency response simulation. The simulations encompassed the management of injuries through the application of bandages and splints, the management of fainting episodes, and the management of open wounds. The simulation's temporal extent was 30 minutes. The efficacy of this simulation technique was evaluated by implementing a rubric evaluation. The efficacy of simulation training was gauged by the extent of improvement in the scoring of the rubric observation.

3 Results and Discussion

The community service initiative was conducted in May 2023 in collaboration with the Muhammadiyah Youth Organization at Ngaglik Branch (PCPM Ngaglik), serving as the designated partner. The majority of the events mentioned above were participated in by individuals affiliated with the Muhammadiyah Youth organization, Muhammadiyah members, Muhammadiyah young women organization, Muhammadiyah Philanthropist, and Muhammadiyah Ambulance Service at the Ngaglik sub-district level, located in the Sleman District of the Yogyakarta Special Region Province. The aggregate number of individuals involved in the study was 26. This service aimed to enhance service recipients' competencies and expertise in managing common household emergencies. To enhance the knowledge of service participants, they received educational instruction through the lecture method facilitated by knowledgeable individuals, followed by discussions and a question-and-answer session. A simulation method was administered via forum group discussions (FGD) to enhance the participants' skills.

Before providing emergency preparedness training to the participants, the Community Service Team administered a survey documenting common emergency incidents within the home or nearby surroundings. The bar chart below depicts emergency events that frequently transpire, regarding the three most frequently occurring incidents: accidents,

injuries, and nosebleeds. Additional emergency incidents encountered by the community include but are not limited to syncope, toxicosis, persistent diarrhoea, closed wound injuries such as contusions, envenomation from animals, and seizures.

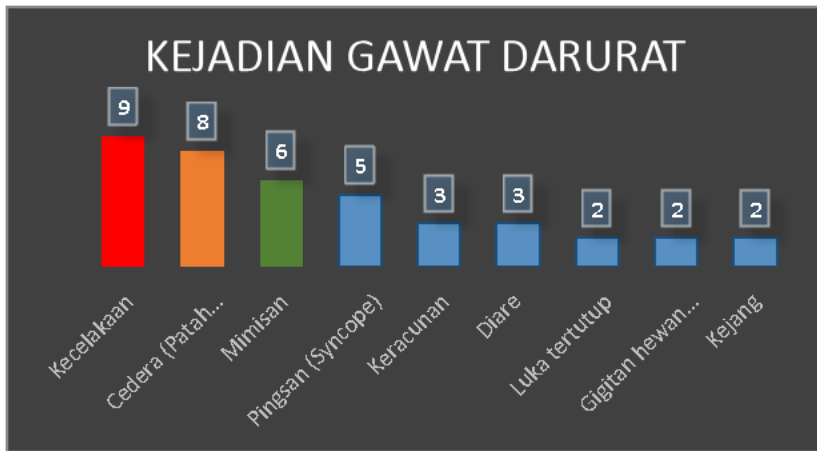


Figure 1. Emergency incidents that often occur in community service target partners

The aforementioned common incidents align with the information presented by the speaker, who imparted knowledge on managing various cases commonly encountered within the community. The Community Service Team established a protocol that restricts emergency education to a maximum of five cases, including injuries resulting in broken bones, syncopal episodes, poisoning from food and drugs, open wounds, and nosebleeds.

Table 1. Questionnaire to assess the level of knowledge of community service partners about handling emergency events

Emergency Case	Question
Injury (Broken Bone)	<ol style="list-style-type: none"> 1. Emergencies that need the application of bandages 2. Emergencies that need the application of prostheses
Fainting (Syncope)	<ol style="list-style-type: none"> 1. Emergency incidents when the patient's legs need to be elevated above their body and head 2. The proper response when someone faints
Poisoning	<ol style="list-style-type: none"> 1. Preventing dehydration is the first defence against vomiting caused by food poisoning 2. First aid for individuals with drug poisoning
Nosebleed	<ol style="list-style-type: none"> 1. Inappropriate management of nosebleeds 2. children's nosebleeds duration that needs medical attention
Open Wound	<ol style="list-style-type: none"> 1. Head bleeding or open wound first aid 2. Initial care for minor burns

This community service comprised two distinct activities. The initial engagement involved a lecture that spanned an hour, aimed at enhancing participants' comprehension of the management of the five emergency scenarios highlighted earlier. Expert speakers facilitated the session. To evaluate the efficacy of educational efforts for designated partners, the service team administered pre-test and post-test questionnaires for 10 minutes each. The administration of the Pre-Test Questionnaire occurred during participant registration and before the dissemination of lecture activities, which were presented through paper-based worksheets. The Post-Test was administered after the lecture activities via the online platform quizz.com. The distributed questionnaires were designed with multiple choice questions (MCQs) and consisted of 10 questions. In each set of questionnaires, there were two questions

about a specific case of emergency management. The questionnaire content was derived from various academic sources, including journals and guidelines ^{11,12}. Table 1 displays the questionnaire provided.

The study involved 26 participants who engaged in the community service activity. Subsequently, data analysis was conducted by processing pre-test and post-test data. Table 2 displays the outcomes of the data processing. Following the educational intervention, the participants' knowledge of emergency case management exhibited a discernible improvement, as evidenced by multiple indicators, including a rise in the number of accurately answered questionnaires and an increase in the mean score to 7.31. One area of emergency case knowledge that did not exhibit an increase pertains to nosebleeds, as indicated in the second question. This issue is associated with the duration of the nosebleed, which necessitates medical attention. These findings are consistent with prior research by scholars¹³, which revealed that healthcare professionals were inadequate in administering initial treatment for acute nosebleeds. Additionally, another study conducted by researchers¹⁴ on a sample of 530 teachers demonstrated inadequate knowledge and skills in managing nosebleeds.

Epistaxis, commonly known as nosebleeds, is considered a medical emergency within the field of Otolaryngology. Previous studies estimated that approximately 60% of the populace has encountered epistaxis, with only 6% of those affected seeking medical assistance. The management of epistaxis is guided by three fundamental principles: cessation of bleeding, mitigation of potential complications, and prevention of future episodes of epistaxis. Haemostasis can be achieved by applying direct pressure on the ala nasi¹⁵. The case represents the initial medical assistance provided during the abovementioned community service. The recommended measures entail maintaining composure and refraining from exhibiting signs of distress, assuming an upright seated position, and slightly inclining the head forward while half-gazing downwards. It is advised to avoid leaning or tilting the head backward as this may result in the ingestion of blood flowing into the throat. It is recommended to inhale through the oral cavity and apply slight pressure to the nasal openings using a tissue or hygienic fabric for approximately ten minutes to stop the nosebleeds. It is advisable to avoid abrupt cessation of the nosebleed, as it may result in a recurrence of bleeding. Before taking a break, waiting until the nosebleed has wholly subsided is recommended. Additionally, it is crucial to refrain from picking, rubbing, or forcefully blowing the nose, as these actions may exacerbate the condition ².

Table 2. Partners' level of knowledge about handling emergency events before and after education

Emergency Case	Questionnaire	Pre-Test		Post-Test		Gap
		Correct Answer	%	Correct Answer	%	
Injury	P1	19	73,02	23	88,46	4
	P2	14	53,84	17	65,38	3
Syncope (Fainting)	P1	9	30,60	17	65,38	8
	P2	20	76,92	22	84,62	2
Poisoning	P1	18	69,23	26	100	8
	P2	13	50	21	80,77	8
Nosebleed	P1	10	38,46	18	69,23	8
	P2	14	53,84	13	50	-1
Open Wound	P1	5	19,23	12	46,15	7
	P2	17	65,38	23	88,46	6

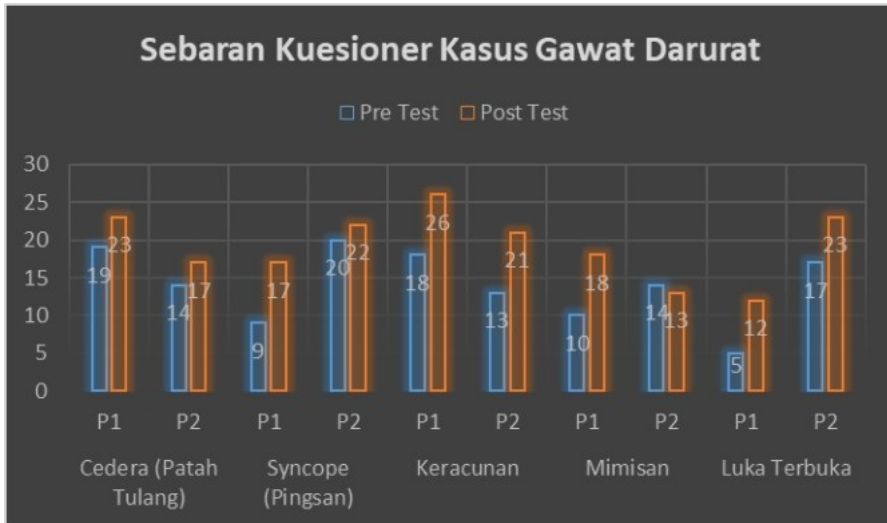


Figure 2. Pre-test and post-test questionnaire results from 26 participants

The pre and post-test responses were categorized based on Arikunto's knowledge level classification (2012)¹⁶. Before the data were classified based on Arikunto's suggestion, data first tabulated and displayed the outcomes of the classification process. The participant's knowledge level significantly improved after the educational intervention, with 50% achieving good knowledge. Moreover, participants who lacked knowledge decreased substantially from 61.5% to 15.4%.

Table 3. Results of Knowledge Level of Community Service Participants

Level of Knowledge	Pre-Test	Post-Test
Good (76-100%)	11,5%	50%
Fair (56-75%)	26,9%	34,6%
Poor (≤55%)	61,5%	15,4%
Average	5,15	7,31

Following the education provision, the community service team conducted a Forum group discussion (FGD) as the second activity. The forum group discussion (FGD) was conducted to enhance the attendees' competencies in managing three critical scenarios: applying bandaging and splinting techniques for fractures, handling syncope, and managing open wounds. The utilization of simulation methodology has the potential to enhance the clinical performance of students. According to Karya and Kediri (2023)⁷, the implementation of simulation methods in Nursing education has been shown to enhance students' problem-solving skills in decision-making, as evidenced by the research conducted by Larew and Lessons (2016)⁶. According to Cordeau's (2013)⁸ research in the field of Nursing, as cited by Karya and Kediri (2023), using simulation methods is essential for enhancing learners' cognitive, affective, and psychomotor skills.

The assertion that the employment of simulation methodology can enhance students' self-assurance is reinforced by the findings of Sleeper and Thompson's (2015)¹⁷ prior investigation, as cited by Karya and Kediri (2023). The present study employed a simulation

approach utilizing forum group discussions (FGDs), which were organized into four distinct groups, each comprising 6-7 participants. One or two instructors, who have undergone training, and are Drug Assistance Team students of the Pharmacy Department Universitas Muhammadiyah Yogyakarta, facilitate each group. The simulation commenced with an illustration of the execution of the three techniques referenced earlier, utilizing the equipment and resources arranged beforehand. Following the instructor's assignment of a role-play, each participant was instructed to re-exhibit the three handling techniques. The assessment rubric illustrated in Tables 4, 5, and 6 evaluates participants' emergency response abilities. There is one observation rubric for each skill technique.

Table 4. Observation Rubric in Bandaging and Splinting Techniques

No	Criteria	Score		
		Convenient n (%)	Inconvenient n (%)	Not Done n (%)
1.	Examine the injured body part			
	Inspection	20 (76,92)	6 (23,07)	0 (0)
	Palpation	13 (50)	13 (50)	0 (0)
2.	Choose the type & size of the band/splint	20 (76,92)	6 (23,08)	0 (0)
3.	Perform pre-bandaging & tool preparation	26 (100)	0 (0)	0 (0)
4.	The process of applying a band or splint	26 (100)	0 (0)	0 (0)
5.	The outcome of band or splint application			
	Easily removable	19 (73,07)	7 (26,93)	0 (0)
	Impairment of blood flow	26 (100)	0 (0)	0 (0)
	Cause more pain	26 (100)	0 (0)	0 (0)

Injuries, including bleeding, sprains, and fractures, can occur due to accidents or trauma. Accidental injuries often occur in the musculoskeletal system and must be treated swiftly and effectively. If not, it will create more severe damage and even produce bleeding. Another hit, this injury might result in bone abnormalities or incapacity and even death. Splints are essential to prevent injury to the musculoskeletal system. The first aid for wounds that can be done first is to do a bandage. The principle of wrapping is to hold something so it does not move from its spot. In any accident with a hard impact, the danger of fracture must be considered. Even if in dispute, the patient must still be treated as a fracture patient. One of the ways to deal with shattered bones is via splinting. It does not rule out that emergencies can arise in regions difficult to reach by health staff. So in these settings, the community's duty to support patients before being treated by health experts becomes very crucial. Any

trained individual can perform splint dressing release. If efforts can be made in the next generation, everyone at the scene of an accident or in an acute illness will be more able to preserve lives until the arrival of the help of the health team as professionals¹⁸⁻²⁰.

One of the tasks completed as part of this community service is teaching participants first aid skills for bandaging and splinting utilizing the simulation method. The observation rubric Table 4 shows the outcomes of this skills training. Most participants already possessed good skills, but 6 participants still lacked accuracy when performing inspections and selecting the type and size of dressings and splints, some participants still lacked accuracy when performing palpation, and 7 participants still easily released bandages and splints.

The inspection process is an integral component of the dressing and splinting technique, with the primary objective of visually examining various body parts to ascertain the presence of normal or abnormal physiological conditions in an individual. Inspection can be conducted through both direct and indirect means, with the latter involving the use of specialized tools. The process of direct inspection involves observing and assessing the state of the patient, regardless of their level of consciousness. The inspection includes identifying any irregularities on the patient's body, such as the positioning of their hands, which should ideally be straight. An unconscious patient's breathing can be assessed through auditory means. Palpation is a physical examination technique that involves touching the body and is typically performed with inspection. Palpation is a manual examination technique involving the utilization of the palms, fingers, and fingertips without any additional tools or instruments. The objective is to assess the tenderness, rigidity, weight, temperature, location, dimensions, velocity, and calibre of peripheral pulses throughout the body.

The pre-rescue assessment is conducted to ascertain the patient's condition before the commencement of rescue operations, thereby ensuring the appropriateness of the rescue intervention. Palpation is a manual technique that involves the application of pressure by using the palm to assess the physical state of an individual's injury. The selection of bandages and splints in terms of type and size by the six participants was deemed inappropriate. The dimensions of the open wound significantly impact the selection of wound dressing, as each wound exhibits unique width and size characteristics. When dealing with open wounds of significant size, it is imperative that the dressing utilized adequately covers the wound without being smaller than the wound itself, and vice versa.

Table 5. Observation Rubric in Handling Fainting

No	Criteria	Score		
		Convenient n (%)	Inconvenient n (%)	Not Done n (%)
1.	Examine the condition			
	Pulse	26 (100)	0 (0)	0 (0)
	Breath	19 (73,07)	0 (0)	7 (26,93)
	Response	26 (100)	0 (0)	0 (0)
2.	Condition the patient to a safe place	19 (73,07)	7 (26,93)	0 (0)
3.	Condition the patient's breath	26 (100)	0 (0)	0 (0)
4.	Position the patient's feet higher than their head	26 (100)	0 (0)	0 (0)

5.	Administer oxygen if accessible (optional)	19 (73,07)	0 (0)	7 (26,93)
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The second skill activity provided was syncope or fainting. Syncope, also known as fainting, is a transient state of unconsciousness that occurs abruptly due to cerebral hypoperfusion resulting from inadequate blood flow and oxygen supply to the brain ⁷. The aetiology of the condition is attributed to a combination of factors such as elevated temperature concomitant with dehydration, emotional distress, abrupt changes in body position, including transitioning from squatting to a standing position, prolonged standing, haemorrhage, dysuria, specific pharmacological agents, diminished glycaemic levels (hypoglycaemia), and cardiac pathologies ^{7,21}. Out of the total of 26 participants who conducted the simulation, a majority of them demonstrated appropriate handling techniques. However, a subset of seven participants failed to assess the patient's breath thoroughly, another seven did not relocate the patient to a secure location, and another seven failed to administer oxygen in response to a critical medical event.

Table 6. Observation Rubric in Handling Open Wounds

No	Criteria	Score		
		Convenient n (%)	Inconvenient n (%)	Not Done n (%)
1.	Condition the wounded body part			
	Clean the wound	26 (100)	0 (0)	0 (0)
	Apply antiseptic fluid to the wound	19 (73,07)	0 (0)	7 (26,93)
2.	Choose the type and size of bands for the wound	20 (76,92)	6 (23,08)	0 (0)
3	How to do a bandage on a wound	26 (100)	0 (0)	0 (0)
4.	The result of the dressing application on the wound			
	Easy to remove	19 (73,07)	7 (26,93)	0 (0)
	Causes more pain	26 (100)	0 (0)	0 (0)

The third simulation activity conducted pertained to the management of open wounds. Wounds may be defined as a disruption or discontinuity in the integumentary tissue, accompanied by perturbations in the anatomical and physiological structures of the human body. Injuries frequently result in concomitant impairment of neural tissue and laceration of vascular structures, leading to bleeding within the wound. Without proper monitoring, injuries can potentially disturb the body's state of equilibrium, also known as homeostasis. The prompt and precise execution of initial wound care is crucial in preventing the afflicted individual from experiencing severe haemorrhaging, preserving their vitality, mitigating discomfort, anxiety, and pain, and ensuring their overall stability²². In a simulation involving 26 participants, 10 of whom successfully administered the appropriate treatment, the majority of individuals demonstrated proficiency in this task. During the simulation, it was observed that 7 participants failed to administer antiseptic fluids, 6 participants exhibited an incorrect selection of bandage type and size, and 7 participants demonstrated improper placement of bandages resulting in easy dislodgement. The dimensions of the open wound significantly

impact the selection of wound dressing, as each wound exhibits unique width and size characteristics. In cases where the open wound is of significant size, it is imperative that the dressing employed adequately covers the wound without being smaller in dimensions than the wound itself, and vice versa.



Figures 2 and 3. Educational activities on handling emergencies by speakers



Figures 4 and 5. Forum group discussion (FGD) Simulation activities for handling emergencies



Figure 6. Appreciation from LPM UMY to the Leaders of the Muhammadiyah Youth Organization Ngaglik Branch (PCPM)

4 Conclusions

The findings of this Community Service initiative indicate a notable improvement in the emergency response proficiency of the service participants. The improvement included their ability to manage various emergencies, such as injuries, fainting, poisoning, nosebleeds, and open wounds. Through the simulation technique utilizing Forum Group Discussion (FGD), the participants could replicate the application of splint dressings, management of fainting episodes, and treatment of open wounds, as evidenced by the outcomes of rubric-

based assessments. Regarding assessing this service process, participants express a desire for its repetition to address emergencies that frequently arise in domestic settings and for simulation activities. Additionally, participants request an extended time to enhance their proficiency in handling emergency cases.

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