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Self-reported Emergency Skills Competence among Pre-hospital Emergency Personnel in a Rural Area of Indonesia

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ABSTRACT

Background: Pre-hospital emergency medical services (EMS) personnel are responsible for providing intervention outside of the hospital setting. Consequently, the pre-hospital emergency personnel demand high capability of the personnel to perform emergency aid at the scene and during transport to the hospital. Objective: The purpose of this study is to explore emergency skills competence among pre-hospital emergency personnel in the area on the north coast of Java. Method: This study used the Essential Knowledge and Skills Questionnaire (EKSQ) as the instrument. There was 42 pre-hospital emergency personnel participated in this study. Results: This study revealed that most pre-hospital emergency personnel are nurses (93%). Most respondents reported not having sufficient competency in resuscitation (2,78 of 5 points) and giving medication (2,81 of 5 points). Age and experience were significantly correlated with pre-hospital emergency personnel's competence. Conclusion: This study concluded that there was a lack of competence in resuscitation. Hence, continuous professional-development courses are necessary to maintain pre-hospital emergency personnel's professional proficiency.

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1. INTRODUCTION

Emergencies can occur anywhere and at any time, bringing injuries and illnesses with them. Therefore, pre-hospital emergency services are necessary. Pre-hospital emergency services are provided to victims who have not been brought to the hospital (Nurumal, et al., 2014). Emergency cases must be handled immediately, quickly, and precisely. Hence, knowledge and skills about emergencies are essential when assisting and providing emergency pre-hospital treatment.

In Indonesia, a Public Safety Center (PSC) 119 was developed to improve the quality of integrated emergency services. The regulation of the Minister of Health of the Republic of Indonesia, Number 19 of 2016, concerning the Integrated Emergency Management System, requires every Province and City/Regency to provide PSC 119, which delivers health services when an emergency or life-threatening occurs (Kemenkes,

2016). In addition, a guideline in the form of an Integrated Emergency Management System (SPGDT) was finally compiled to fulfill emergency pre-hospital services. The regulation of the Minister of Health of the Republic of Indonesia, Number 47 of 2018 concerning emergency services, also states that the Integrated Emergency Management System (SPGDT) is necessary to manage emergency cases (Depkes, 2018).

PSC 119 is now at the forefront of pre-hospital emergency services in Indonesia. Therefore, PSC 119 personnel must be competent in providing emergency assistance. Every pre-hospital emergency service officer must be competent, fast, skilled, and ready at all times to accomplish emergency duties (Puspitasari, Widjajanto, & Rini, 2015). Said Nurumal et al. (2014) found that the problem that arises in handling pre-hospital emergencies related to the competence of officers is the inefficiency of performance in responding to emergencies. The community and family members often intervene when handling emergencies at the scene so that pre-hospital emergency personnel may not be able to perform their best. A phenomenological study by Jannah et al. Jannah, Ratnawati, and Haedar (2015) found that ambulance nurses were less competent in handling pre-hospital emergency cases. Ambulance nurses experience deficiencies in the skills to take action, initial assessment and administer cardiac medication. The competence of nurses in taking action, initial assessment, and administering drugs to patients is significantly related to the level of education, skills, and clinical experience that has been obtained (Aloyce, Leshabari, & Brysiewicz, 2014).

Ambulance personnel feels incapable and less confident since emergency cases have complex conditions for each patient (Abelsson & Lindwall, 2012). The lack of competence of ambulance personnel can hinder handling emergency cases and may increase the risk of disability or death (Aloyce et al., 2014). The dangers of their work may be hampered and affect ambulance personnel's workload, which influences emergency service quality (Muskananfola & Ahsan, 2019). Therefore, this study aims to identify emergency skill competence among pre-hospital emergency personnel.

2. RESEARCH METHOD

This study surveyed all pre-hospital emergency personnel of PSC 119 in three regions on the north coast of Java. This study involved 42 respondents from three different regions of the north coast of Java. The first region was PSC 119 Batang which had 27 personnel; the second region was PSC 119 Pekalongan which had just been established in 2020, with four personnel; and the third was PSC 119 Tegal which had 11 personnel.

The instrument in this study used The Essential Knowledge and Skills Questionnaire (EKSQ), with a total of 58 items to measure the competence of pre-hospital emergency personnel (Nurumal et al., 2014). This questionnaire was developed by WHO in 2005 about the Pre-hospital Trauma Care System. Each item ESKQ was divided into five Likert Scale categories based on the theory of Patricia Benner (Benner, 1984), encompassing (1) Novice, (2) Advanced beginner, (3) Competent, (4) Proficient, and (5) Expert. Data were analyzed using SPSS version 20. Spearman rho was used as a statistical test to correlate each categorical variable, including age, workplace, work experiences, and emergency skill competence. Ethical permission was approved by Research and Development Planning Agency (BAPPEDA) in Batang No. 073/81/2020; in Pekalongan No. 070/207/VI/2020; and Tegal No. 800/1682/VII/2020.

3. RESULT AND DISCUSSIONS

3.1. Result

This study involved 42 respondents. The majority of the educational background of PSC 119 was nurses, including Vocational Nurses (3 years of nursing education), as many as 21 (50%), Registered Nurses (5 years of nursing education), as many as 14 (33%), and 4 (10%) were Nurses (4 years nursing education). Only 1 (2%) was a Midwife (3 years of midwifery education), and others (Law & Engineering) were 2 (4%). Overall, PSC 119 personnel evaluate themselves about emergency skills and competence are almost equal. The PSC 119 personnel consider themselves advanced beginners at 33.3 %, competent at 31% and proficient at 35.7%. Neither participant thinks of a novice nor an expert in the aspect of emergency skills competence.

Table 1. Self-assess of Emergency Skills Competence among Pre-hospital Emergency Personnel of PSC 119

Competence	N	%
Advanced Beginner	14	33.3
competent	13	31.0
Proficient	15	35.7

This study found that age and work experience correlate significantly with competence with a *p-value* < 0.05. The detail of the result is explained in the table below. In the context of emergency skills, PSC 119 personnel considered themselves competent in the aspect of "wound and burned" management and "Circulation,

hypothermia and shock." Surprisingly, in the aspect of "Resuscitation" and "Medicines (with medical direction)," the average PSC 119 personnel thought that they were in advance beginner. These may be caused by some PSC 119 personnel still thinking they were novices in ACLS. It must be admitted that PSC 119 in rural areas still lacks emergency equipment such as AED. Hence, some PSC 119 personnel may not be able to operate the AED. In the context of emergency medicine, no physician works at PSC 119 who can instruct ambulance personnel. Also, rules do not allow ambulance nurses in Indonesia to give emergency medicine. Therefore, several PSC 119 personnel thought they were still a novice in administering narcotics and ACLS drugs. The detail of 58 emergency skills provided in table 3.

Table 2. Statistical test results between age, sex, workplace, work experience, and Emergency skill competence.

	Emergency Skills Competence			
Variables	Advanced Beginner	competent	Proficient	p-value
Age (year)				.022*
20-25	3	2	8	
26-30	6	7	6	
31-35	3	2	1	
>36	2	2	0	
Sex				.994
Male	13	12	14	
Female	1	1	1	
Workplace				.113
PSC 119 Kab. Batang	11	9	7	
PSC 119 Kota Pekalongan	0	1	3	
PSC 119 Kota Tegal	3	3	5	
Work experiences (year)				.048*
0-1	0	2	3	
2-4	11	11	11	
>5	3	0	1	

3.2 Discussion

Nursing theory from Novice to Expert was developed by Patricia Benner. It was adapted from the Dreyfus Model proposed by Hubert Dreyfus and Stuart Dreyfus. This theory explains five levels/stages of how nurses acquire nursing knowledge – one could gain knowledge and skills ("knowing how") without ever learning the theory ("knowing that"). This stage includes Novice, Advanced Beginner, Competent, Proficient, and Expert. This study revealed that one-third of pre-hospital emergency personnel in rural Indonesia is in the advanced beginner stage. Abelson et al. Abelsson and Lindwall (2012) stated that pre-hospital emergency personnel is insufficient in theoretical, practical, and ethical training for trauma care. On the other hand, Shakeri et al. Shakeri, Fallahi-Khoshknab, Khankeh, Hosseini, and Heidari (2018) stated that pre-hospital emergency trauma care personnel have good skills (62.4%) but insufficient in immobilizing the spine of a sitting patient and using a traction splint.

Concerning emergency skills, pre-hospital emergency personnel in Malaysia had a similar problem: a lack of emergency medicine administration. On the contrary, pre-hospital emergency personnel in Malaysia have sound resuscitation skills (Nurumal et al., 2014). A qualitative study of six ambulance nurses in Kalimantan-Indonesia concluded a similar finding that ambulance nurses thought they lacked the competence to administer emergency medicine (Jannah et al., 2015).

This study showed that variable experiences are highly correlated with competence. The experience of pre-hospital emergency personnel is essential in making the right decisions. Decisions made by novice personnel will be different from decisions made by experienced personnel. Experienced personnel often feel overconfident and are not interested in consulting with others, so in the end, no relationship between professionals collaborate in handling emergency cases (Jannah et al., 2015; N et al., 2014).

Another factor affecting emergency pre-hospital services is the variation of emergency case scenarios. An emergency case where they don't know what kind of accident will happen may cause the pre-hospital emergency personnel to experience mental stress. Officers feel worried when they have to be responsible for every single action and the time that must be fast and precise when taking life-saving actions (Abelsson &

Lindwall, 2012; Aloyce et al., 2014; Jannah et al., 2015; N et al., 2014). Therefore, routine emergency training is necessary to improve pre-hospital emergency personnel. As a result, the quality of pre-hospital emergency services will be enhanced

In the context of emergency skills competence, ambulance nurses in this study lacked confidence in resuscitation skills and emergency medication administration. This may be caused most of the ambulance nurses in this study only had Basic Trauma Cardiac Life Support (BTCLS) certification, and none had Advanced Cardiac Life Support (ACLS) certification. In addition, the lack of emergency equipment in ambulances of PSC 119 might make nurses hesitate to answer confidently on the item questionnaire. Suryanto et al.Suryanto, Plummer, and Boyle (2018) revealed that hospital ambulance nurses had higher knowledge levels than pre-hospital ambulance nurses because pre-hospital ambulance nurses seldom manage complicated cases. Nandasena and Abeysena (2018) also found that emergency medical staff in pre-hospital care who arrived at the National Hospital of Sri Lanka had a lack of knowledge about basic life support as well as a lack of skills in terms of intubation and defibrillation.

An emergency situation demands emergency competencies, including physical assessment, complex caring interventions and rapid actions, which are considered a fundamental aspect of ambulance nurses' competence (Sjölin et al., 2020; Wihlborg, 2018). This study highlighted the need for education among ambulance nurses in the rural area. No formal education program is required for trained nurses to work as ambulance nurses in Indonesia. Additionally, the pre-hospital emergency system in Indonesia's rural areas was far from standard, with things like inadequate ambulance staffing, inadequate emergency supplies, and inadequate emergency call system. All prehospital emergency professionals should therefore receive an annual emergency course to improve their emergency skills.

Table 3. Skills Competence of Pre-hospital Emergency Services PSC 119 Personnel, the area of North Coast of Java

No	Item	Novice (1)	Advanced Beginner (2)	Competent (3)	Proficient (4)	Expert (5)	Average
	Subscale 1: Alert						3,10
1.	Able to call for help around the scene	0	8	18	16	0	
2.	Able to call medical director (emergency physician) fot help	2	8	20	12	0	
	Subscale 2: Scene survey						3,06
3.	Assess scene safety (physical and environmental hazards)	1	8	17	16	0	
4.	Assess cause of injury or disease severity	5	7	14	16	0	
	Subscale 3: Provider safety						2,83
5.	Receive training in universal precaution	6	7	17	12	0	
	Subscale 4: Patient assessment						
	Initial assessment						3,06
6.	Evaluate adequacy of airway	4	8	14	16	0	
7.	Evaluate adequacy of breathing	3	8	18	13	0	
8.	Evaluate adequacy of circulation	4	8	14	16	0	
9.	Recognize level of consciousness	2	10	14	16	0	
10.	Recognize presence of life threatening	2	7	16	17	0	
11.	Recognize when life threatening condition is not survivable	1	8	18	15	0	
12.	Establish riorities for immediate care	0	9	17	16	0	
	Detailed assessment						2,92
13.	Assess head injury	3	11	13	15	0	
14.	Assess spinal injury	6	9	14	13	0	
15.	Assess chest injury	5	9	17	11	0	
16.	Assess abdominal injury	5	10	15	12	0	
17.	Assess upper/lower extremity	2	10	15	15	0	

No	Item	Novice (1)	Advanced Beginner (2)	Competent (3)	Proficient (4)	Expert (5)	Average
	injury						
18.	Assess neurological function	7	9	16	10	0	
19.	Evaluate level of discomfort	3	7	16	16	0	
20.	Recognize hypothermia	2	9	15	16	0	
21.	Assess evidence of shock	0	10	15	17	0	
22.	Assess degree of burns (depth and extent)	6	9	15	12	0	
	Subscale 5: Intervention						
	Airway and breathing						2,86
23.	Remove foreign bodies from airway	11	6	16	9	0	
24.	Restore open airway using manual manoeuvres (e.g., head-tilt, chin lift,)	7	8	17	10	0	
25.	Restore open airway using recovery position	3	9	16	14	0	
26.	Provide respiratory support (mouth-to-mouth resuscitation)	6	5	15	16	0	
27.	Use suction device	3	7	16	16	0	
28.	Insert airways	5	11	10	16	0	
29.	Assist ventilation using bag–valve–mask device (BVM)	6	9	12	15	0	
30.	Administer oxygen	1	8	13	20	0	
31.	Perform cricothyroidotomy	11	8	14	9	0	
	Circulation, hypothermia and shock						3,14
32.	Control external haemorrhage	1	9	16	16	0	
33.	Elevate victim's legs if there is evidence of shock	3	7	15	17	0	
34.	Immobilize the patient to ease pain, and reduce bleeding	1	7	14	20	0	
35.	Splint fracture for hemorrhage and pain Control	0	7	14	21	0	
36.	Prevent heat loss with blankets	1	8	15	18	0	
37.	Monitor body temperature	1	7	13	21	0	
38.	Monitor glucose level	2	6	11	23	0	
39.	Established intravenous access	4	7	13	18	0	
40.	Administer intravenous fluid replacement	3	8	11	20	0	
41.	Established intraosseouss access for Children	9	12	10	11	0	
	Wounds and Burns						3,17
42.	Nonsurgical management of wounds (e.g., dressings)	2	8	15	17	0	
43.	Cool the burn area with water	1	8	16	17	0	
44.	Cover the skin with clean dressings	1	7	15	19	0	
	Injuries extremities, head & spinal						3,06
45.	Use basic immobilization for fractured extremities	3	7	14	18	0	
46.	Use available material for splint	1	9	14	18	0	
47.	Use head immobolizer	7	8	10	17	0	
48.	Use cervical collar	3	9	13	17	0	
49.	Use spine board	2	10	12	18	0	

No	Item	Novice (1)	Advanced Beginner (2)	Competent (3)	Proficient (4)	Expert (5)	Average
50.	Use spinal precaution when moving patients	3	9	14	16	0	
	Resuscitation						2,78
51.	Perform CPR	6	7	12	17	0	
52.	Perform ACLS	10	7	11	14	0	
53.	Perform Trauma Care	7	8	12	15	0	
54.	Apply AED	10	9	9	14	0	
	Medicines (with medical direction)						2,81
55.	Manage pain with non-narcotic analgesics	5	9	12	16	0	
56.	Manage pain with narcotic analgesics	11	6	10	15	0	
57.	Administer other medicine that relevant to disease	3	11	12	16	0	
58.	Administer medicine that requires during CPR/ACLS/Trauma Care	11	5	14	12	0	

4. CONCLUSION

Unlike Emergency Medical Technicians (EMTs) in the developed country known as paramedics, the majority of the pre-hospital emergency services PSC 119 in this study are nurses. In Indonesia, educating non-healthcare education background about medical emergencies is more challenging. Hence, the government of Indonesia chooses nurses to be ambulance nurses to provide pre-hospital emergency services. The findings suggest that PSC 119 personnel, especially in rural areas, need continuous emergency training such as Advance Cardiac Life Support (ACLS). By joining ACLS training, PSC 119 personnel may improve their competence in resuscitation and emergency drug administration. As a result, the quality of pre-hospital emergency services may improve even in rural area.

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