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The pre-hospital and healthcare system in Malang, Indonesia

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Review

The pre-hospital and healthcare system in Malang, Indonesia

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Abstract

Introduction

Malang is the second largest city in East Java and consists of three districts: Malang Regency, Malang City and Batu City. Malang has the most advanced emergency care education in East Java, and possibly Indonesia. The recent launch of the 119 Emergency Medical Service may influence pre-hospital care in Malang and assist in developing a more organised emergency medical system in the area.

Objective

This paper describes the pre-hospital care and healthcare structure in Malang and focuses on the health facilities, pre-hospital care service and healthcare providers.

Discussion

There are two major types of healthcare facilities in Malang, hospitals and primary healthcare centres called 'puskesmas'. Ambulance service provision in Malang is either hospital-based or puskesmas-based. There is no organised emergency medical system in Malang. In the case of an emergency, the patient or bystander calls the hospital emergency department or puskesmas. The use of ambulances in Malang is low due to the perceived prohibitive cost of the service. Ambulance service fees for emergency cases outside of the hospital or puskesmas are not covered by the universal health insurance in the country. There is no specific pre-hospital trained staff in Malang. Nurses are responsible for staffing the ambulance, and there is no formal pre-hospital care education for those nurses working in an ambulance.

Keywords:

healthcare; health system; prehospital; ambulance; nurse; developing country; Indonesia

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Introduction

Malang is the second largest city in East Java Province, the second most populated province in Indonesia after West Java Province (1). East Java Province covers a 47,799.75 km² wide area consisting of more than 60 islands and a population of 41,437,769 people in 2014 spread over 38 districts: 29 regencies and nine cities. These districts are further divided into 662 sub-districts which consist of 782 urban villages and 7,741 rural villages (2,3). The majority of people in the province are from the Java tribe and are Muslim (3). Even though the population of East Java Province is the second largest after West Java province, the number of healthcare providers in East Java Province is the greatest at 108,220 health workers including 31,099 non-health workers (4). Those healthcare providers are distributed in two major health facilities, the hospitals and the primary healthcare centres called puskesmas.

The Malang area, commonly called Malang Raya (The Greater Malang) is one of the largest areas in East Java Province and consists of three districts: Malang Regency, Malang City and Batu City. Batu City was previously part of Malang Regency, as one of the sub-districts, however, since 2001, based on the Republic of Indonesia Law No. 11 of 2001, it has become an independent district under the East Java Province (5). Malang City and Batu City cover less than 10% of the Greater Malang, which is mostly made up of Malang Regency. Malang City and Batu City have a more rapidly developing economy than Malang Regency, thus people tend to live in the urban areas for lifestyle and employment reasons. The economic development in the area also influences the healthcare services where more hospitals with specialty services are available in Malang City (6-8), hence, healthcare workers in the Malang City area account for a higher number compared to the other two areas (9).

Previously (around the year 2000), there was an ambulance system known as 118 Emergency Ambulance Service, which was functional in 18 Indonesian cities including Jakarta, Palembang, Yogyakarta, Surabaya, Makassar, Denpasar and Malang (10). The system was terminated within 5 years due to a lack of funding support from the government (10). A breakthrough followed 10 years later in the Indonesian pre-hospital care system with the launch of the 119 Emergency Medical Service by the Ministry of Health of Indonesia in July 2016 (11). The launch of the new pre-hospital care system may enhance the pre-hospital care services in the area as Malang has the most advanced emergency care education in East Java (and possibly Indonesia) and an emergency medicine specialist medical program and Master of Nursing program majoring in emergency nursing (12).

Methods

The information and data in this paper are mostly obtained from the grey literature including the website of the Indonesian Ministry of Health both at a national level and provincial level. Google Scholar, MEDLINE, EMBASE and CINAHL were used to obtain the latest research on pre-hospital care in Malang and the development of pre-hospital care in other countries.

Discussion

Health facilities

There are 315 hospitals in East Java Province consisting of 233 general hospitals and 82 specialty hospitals (13). General and specialty hospitals are classified in Indonesia from Class A to Class D, with Class A the highest hospital class and Class D the lowest. This classification is based on the health services provided by the hospital (14). Most of the hospitals in East Java Province are Class C hospitals (116 hospitals), 55 hospitals are Class D hospitals, 41 are Class B hospitals, and five are Class A hospitals, with 98 hospitals not yet certified by the Ministry of Health (13).

The geographic distribution in Malang has an effect on the health facilities in the area. As for other areas in Indonesia, there are two major types of healthcare facilities in Malang, the hospitals and puskesmas. Based on urban development, compared to the other two districts, there are more hospitals in Malang City. There are 25 hospitals in Malang City, 17 hospitals in Malang Regency and three hospitals in Batu City (6-8). On the other hand, due to the large less-urban areas in Malang Regency, it has more puskesmas available. There are 39 puskesmas in Malang Regency, 15 puskesmas in Malang City, and five puskesmas in Batu City (15). Batu City was the area with the least number of healthcare facilities due to the city previously being a sub-district of Malang Regency. Furthermore, there were more Class C hospitals and specialty hospitals in Malang City, plus a quantity of general hospitals. Crossing the boundaries to seek healthcare occurs with most of the people in Malang Regency and Batu City tending to go to Malang City hospitals for specialty services.

Although there were more puskesmas in Malang Regency, the ratio of puskesmas to the population in Malang Regency was the lowest, 1.4 per 100,000 people. Surprisingly, Batu City, with the least number of puskesmas has the highest ratio, 2.5 per 100,000 people. Malang City, with the highest number of hospitals, has the highest ratio of hospitals to population, 2.9 per 100,000 people. The detail of ratio of healthcare facilities in the three districts is shown in Table 1.

Table 1. Ratio of healthcare facilities in Malang (9)

Characteristics	Malang Regency*	Malang City*	Batu City*
Hospitals	0.6	2.9	1.5
Puskesmas	1.4	1.7	2.5

*per 100,000 people

The ambulance service in Indonesia is either puskesmas-based or hospital-based. Not all emergency departments (ED) of a puskesmas or hospital can provide emergency care, which includes an ambulance service. Based on the Indonesian Ministry of Health Law No. 856 of 2009, there are four levels of ED in Indonesia. Level I ED is the lowest ED level and Level IV ED is the highest level (16). The Level IV ED includes the availability of a ventilator, high care units, resuscitation ward and intensive care unit; the availability of an on-call service for all sub-specialties and on-site for four major specialist doctors (surgeon, obstetrician, paediatrician and internist). On the other hand, a Level I ED provides only stabilising and evacuating of patients with no specialist doctor services available (16). Level IV ED is the minimum standard for a Class A hospital, Level III ED is the minimum standard for a Class B hospital, Level II ED is the minimum standard for a Class C hospital, and Level I ED is the minimum standard for a Class D hospital (17).

More than 80% of hospitals in East Java, including 223 (89.4%) general hospitals and 98 (86.7%) specialty hospitals in East Java Province are able to provide Level I emergency care

(Table 2) (17). Importantly, 469 (91.4%) of the puskesmas are also able to provide Level I emergency care (15). There is no published data about the number of hospitals and puskesmas with Level II to IV emergency care in East Java Province.

The annual report on health of East Java Province shows a distribution of health facilities in Malang compared to those elsewhere in East Java (15). All general hospitals and in-patient puskesmas both in Malang Regency and Malang City are able to provide emergency care services, but one out of three hospitals and all puskesmas in Batu City are unable to provide these services (15). The majority of specialty hospitals cannot provide emergency care services in those three districts, only two out of 22 specialty hospitals are able to provide the emergency services (Table 3).

Pre-hospital care setting

Currently, there is no organised emergency medical system in Malang. The previous emergency medical system for the Malang area was the implementation of the 118 service that was operational in around 2000. Malang was one of the seven cities that implemented the 118 service, others included Jakarta, Palembang, Yogyakarta, Surabaya, Makassar and Denpasar (10). The ambulance service in Malang is either hospital-based or puskesmas-based. In the case of an emergency, the patient or bystander would call the hospital ED or puskesmas where they want to be admitted. Then, depending on the availability of an ambulance, the patient may be picked-up by an ambulance, but in most cases the patient tends to use a private vehicle instead of using an ambulance.

Table 2. Healthcare facilities with Level I emergency care in East Java Province (15,17)

Health facilities	Quantity	Availability of Level I ED	
		n	%
General hospitals	258	223	86.4
Specialty hospitals	113	98	86.7
Puskesmas with in-patient facility	513	469	91.4
Other health facilities	224	19	8.5

Table 3. Health facilities in Malang providing emergency care (15)

Districts	General hospitals		Specialty hospitals		Puskesmas with in-patient facility	
	n	Providing emergency care	n	Providing emergency care	n	Providing emergency care
Malang Regency	15	15 (100%)	6	1 (16.7%)	27	27 (100%)
Malang City	9	9 (100%)	14	0 (0%)	4	4 (100%)
Batu City	3	2 (66.7%)	2	1 (50%)	3	0 (0%)

Compared to other lower-middle income countries, Indonesia is not the only country that does not have an organised EMS system. Other countries include India, Morocco, Vietnam, Armenia, Nigeria, Ghana and Sri Lanka (18). The establishment of the Tulungagung Emergency Medical Service (TEMS) initiated the launch of the current 119 Emergency Medical Service in Indonesia. The 119 service has been implemented in 27 locations in the country, mostly on Java Island (11). Similarly, India initiated the establishment of an EMS system in 2002 (19) with the system then adopted in the nine states of India in 2011 (20). In Nigeria, initially, there were seven ambulance stations during the piloting of an EMS system in the country in 2004 and within 10 years, the system was available in every district in Nigeria (21). There is no published data about the coverage target of the 119 service in Indonesia.

The launch of the 119 service was in conjunction with the establishment of the National Command Centre (NCC) in Jakarta and Public Safety Centres (PSCs) in the 27 locations involved in the system (11). The 27 locations involved in the pilot project were chosen because the areas have national government hospitals (22). Based on the Indonesian government regulation, PSCs must be available gradually in every district/city in Indonesia and function as the centre of emergency care services in the area (22). Currently, the PSCs utilise a local phone number and it is projected that the PSCs will have an integrated service with the police and fire department in every district (23). With the current EMS system, emergency calls are received by the NCC in Jakarta and then transferred to the PSC in the district closest to the incident. The PSC then deploy an ambulance from either a puskesmas or hospital to the scene. The system does not only manage the ambulance services but also provides the information regarding the availability of emergency units and in-patient rooms in the hospitals. Several challenges in implementing the system include the lack of infrastructure and resources (24), the delay in responding to the calls due to a lack of staff available in the NCC, and the delay in transferring calls from the NCC to PSC (11).

The TEMS was established in November 2015 in Tulungagung, East Java Province and integrates the ambulance service with police, army, fire and the disaster management department (25). With the use of the Global Positioning System ('GPS'), the TEMS coordinates the ambulances both from the puskesmas and hospital EDs in Tulungagung (27). The TEMS has become a blueprint model for the 119 service in Indonesia (28). However, due to a lack of information provided to the community, especially the call centre number, the TEMS service is under-utilised (27). Therefore, enhancing public awareness of pre-hospital care is one of the essential keys in developing the pre-hospital system.

As the largest hospital in the Malang area, Saiful Anwar Hospital, which is located in the Malang City area, received 72-73 emergency ambulance calls per month in 2011 (29). With the population of more than 800,000 people in Malang City (30), the numbers show the low utilisation rate of ambulance services in the area. Only 11% (3,160) of patients were transported by ambulance to the Saiful Anwar Hospital ED, 89% (9,758) of pre-hospital patients were brought in by other vehicles (31). As Saiful Anwar Hospital is the largest hospital in the area, the other hospitals may have lower numbers of ambulance utilisation. The implementation of the universal health insurance in Indonesian called Badan Penyelenggara Jaminan Sosial (BPJS), which commenced in January 2014, may also influence the use of an ambulance by the people. By the end of 2015, more than half of the Indonesian population of 157 million people were covered by the new universal health insurance (32). The BPJS covers the ambulance service. The premium fee paid each month includes the ambulance service but this covers services for referral purposes only and not emergency pre-hospital care services. The ambulance service covered includes a condition that both originating and destination health institutions must have a funding agreement with the BPJS (33). Currently, there are 19,969 health institutions that have a funding agreement with the BPJS as primary health facilities, including the puskesmas, general practitioner clinics and medical clinics. There are 1,847 health institutions classified as advanced health facilities including both government and private hospitals (32). Unfortunately, in the case of an emergency outside the hospital or puskesmas, such as traffic accident or heart attack, or any referral between health institutions which have no funding agreement with the BPJS, the ambulance service cost is not covered with the monthly premium fee (33) and hence the patient must pay for ambulance services or use other transport.

Traffic accidents have become one of the major pre-hospital concerns in Malang. There were 623 traffic accident cases in Malang Regency in 2012, which resulted in 140 deaths and 796 minor injuries (34). There were 13,383 out of 26,907 (49.7%) trauma cases managed by the Saiful Anwar Hospital ED in 2007, with 72.9% (9,758) being male patients and a 2.8% mortality rate (31). Motorcycle accidents accounted for the highest incidence of traffic accidents in Malang. In 2012, there were 771 motorcycle injuries in the city (34). Unfortunately, most of motorcycle accident patients admitted to the Saiful Anwar Hospital ED with open fractures did not have a driver's licence. Those who did have a licence mostly had never undergone a driving licence test (35) as they had obtained a licence illegally. The most recent traffic accident study in Malang found accidents involving 263 motorcyclists showed that human factors had a significant contribution to a traffic accident. The main causes of the accident included carelessness, drowsiness, drunkenness, fatigue, unskilled rider and indiscipline and speeding (34).

The study also showed that vehicle factors such as brake or headlamp malfunction had no significant contribution to the accidents, but environmental factors including road cornering and rainfall did have a significant contribution (34). Interestingly, road conditions, including slippery or damaged roads, did not significantly contribute to accidents, which were more likely caused by human factors.

Human resources

Even though the population of East Java Province is the

second largest in Indonesia (1), the number of healthcare providers in East Java Province is the greatest at 108,220 health workers, plus 31,099 allied health workers (4). As Malang City has the largest number of advanced health facilities, the number of healthcare providers in Malang City was also the highest compared to the other two districts. In 2014 there were 6,179 healthcare providers in Malang City, 4,340 in Malang Regency, and 910 in Batu City (9). The details of healthcare providers in those three districts can be seen in Table 4.

Table 4. Healthcare providers in Malang (9,36)

Healthcare providers	Malang Regency		Malang City		Batu City		East Java Province		Indonesia	
	n	Ratio*	n	Ratio*	n	Ratio*	n	Ratio*	n	Ratio*
Specialist doctors	183	6.6	618	70.9	58	29.1	5,144	13.3	47,849	18.7
General practitioners	251	9.1	196	22.5	64	32	4,496	11.6	41,026	16.1
Dentists	25	0.9	85	9.7	19	9.5	1,683	4.4	11,686	4.6
Nurses	1,107	40.1	2,032	233.6	271	135.5	32,828	85.1	223,910	87.6
Midwives	772	27.9	388	44.5	84	41.9	15,548	40.1	111,736	43.7
Pharmacists	188	6.8	290	33.3	38	18.9	6,227	16.1	30,329	11.9
Other healthcare Providers	422	15.3	426	48.9	92	45.9	11,195	28.9	179,580	70.3
Total	2,948	N/A	4,035	N/A	626	N/A	77,121	N/A	646,116	N/A

*per 100,000 people

Based on Table 4, Malang City has the highest number of healthcare providers. Compared with the population of the three districts, Malang City had the highest ratio of healthcare providers among the districts, except for the ratio of general practitioners (GPs) to population. Batu City has the highest ratio of GPs to population, 32 per 100,000 people. Even though Malang Regency has the highest number of GPs and midwives, the ratio of both healthcare providers in the district was the lowest compared with the other two districts.

Similar to other areas in Indonesia, there is no specific pre-hospital-trained staff in Malang. Nurses are responsible for staffing the ambulance for both hospital-based and puskesmas-based ambulances. However, there is no formal pre-hospital care education for those nurses working in an ambulance. As the largest hospital in Malang, Saiful Anwar Hospital provides some pre-hospital education for pre-hospital providers including advanced trauma life support, basic trauma life support and ambulance protocol. A study showed that the education had a significant contribution to the differences of pre-hospital treatment, ambulance transportation and communication between field attendance and the trauma centre in Malang (37). The study used a pre-post test design involving both nurses and medical doctors working in the pre-hospital care system in Malang and was conducted over two periods, April to July 1999 (n=1,839) and April to July 2003 (n=1,408). The study revealed that pre-hospital education had

a positive outcome for patients where there were significant differences in pre-hospital treatment for patients before and after the study such as intravenous therapy, splinting, medication and wound healing.

As not all nurses working in the ambulance had an education in pre-hospital care management, the latest qualitative study involving six puskesmas-based nurses in Malang demonstrates that nurses had a feeling of powerlessness, and had an emotional response to the process of change when caring for victims of traffic accidents (38). Those feelings indicated a lack of knowledge about treating traffic accident patients. Participants also expressed that they felt worried about endangering the patient due to a lack of knowledge about pre-hospital trauma management. The worry was compounded by a lack of facilities in the puskesmas, a lack of authority and a fear of a lawsuit.

Prasetya et.al investigated the nurses' experience in pre-hospital trauma care involving six hospital-based ambulance nurses in Malang found that there were several obstacles that the nurses faced while working on the ambulance. These included the people's culture, environmental safety issues, difficulties in patient fetching and interprofessional collaboration issues (25). The study highlighted a need for special education in pre-hospital care for nurses working in ambulances and the need of an organised EMS in the area.

In order to enhance the competency of ambulance nurses in Malang, two projects funded by the Australian Department of Foreign Affairs and Trade through the Australia Indonesia Institute have been implemented (24). The projects involved staff from Monash University, Griffith University and Brawijaya University. The sharing of knowledge and experience by Australian university staff about aspects of pre-hospital care has been received by Brawijaya University staff during the pilot project of the Ambulance Nurse Course involving ambulance nurses from both the puskesmas and hospital EDs in Malang and will also be used as part of the nurse specialist program (Emergency Nursing) at Brawijaya University (24). With great anticipation, the course is expected to be delivered by Brawijaya University with a broader range of participants in the future. The signing of a Memorandum of Understanding (MoU) between Brawijaya University and Monash University was undertaken in December 2016. The MoU will maintain the collaborative work between the two universities in pre-hospital education and other health-related education and research. There is an opportunity to enhance the collaboration with the Griffith University for further development of pre-hospital care education in Indonesia.

Even though there is no formal pre-hospital care education for healthcare providers working in an ambulance in Indonesia, emergency care education is developing in the country and Malang is the only city in Indonesia that has advanced education in emergency care for both doctors and nurses. Malang has an emergency medicine specialist program, the only one in Indonesia, and has a Master of Nursing program with a major in emergency nursing, the first of two such programs in Indonesia. The two emergency care education programs were implemented by the Brawijaya University, one of the largest universities in Malang, in conjunction with the Saiful Anwar Hospital. The programs were established with assistance from the Singapore International Foundation which provided voluntary emergency doctors and nurses to improve the emergency care in Malang (39), including the setting up of an EMS system in Malang (40). The assistance program initially focused on traumatology, which was an 8 year assistance program starting in 1996 and ceasing in 2004. Following 2004, it was revised to a general emergency program which included extensive informal training for medical and nursing staff both in-hospital and for pre-hospital emergency services (39). Both doctors and nurses from Saiful Anwar Hospital and Brawijaya University were involved in the training.

The initial management of emergency healthcare education in Malang was assisted by the Singapore International Foundation and the Rotary Club of Malang (12). As the primary focus of the program was traumatology, the committee established the Malang Trauma Service Centre. The committee implemented several preparation courses

for traumatology and emergency care including the Basic Cardiac Life Support, Basic Trauma Life Support, ECG and Resuscitation, Triage Officer, Ambulance Protocol, and Trauma Nursing Care. These courses were supported by the SIF who provided the educational staff (12). To enhance the program, doctors and nurses from Malang were sent to Singapore for clinical experience at the Singapore General Hospital, National University Hospital, Tan Tockeng Hospital and Kandang Kerbau Hospital in October 1999 (12). As a result, the Emergency Medicine Specialist Program was established in 2003. The Master of Nursing program majoring in emergency care was established in 2011. Using the results of the project supported by the Australian government as a blueprint of pre-hospital care education in Indonesia, the specialist program of Emergency Nursing at Brawijaya University is now under preparation.

Conclusion

Malang, one of the most populated cities in Indonesia has a developed emergency and trauma care service resulting from significant development of an Emergency Medicine Specialist program and Master of Nursing majoring in emergency care program. However, the 119 Emergency Medical Service has not yet been implemented in Malang, thereby continuing the limited pre-hospital care services for the people. The national health insurance scheme does not cover the pre-hospital ambulance service for urgent and acute incidents therefore it is not surprising that a majority of people use private vehicles for transporting patients to hospital. Even though there is no formal pre-hospital care education for ambulance staff, it is believed that the project supported by the Australian government may initiate the establishment of pre-hospital education for nurses working in ambulances in Malang.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement. Malcolm Boyle is Editor of the *Australasian Journal of Paramedicine*.

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