

How do patients come to the Accident and Emergency Department of RIPAS Hospital?

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ABSTRACT

Introduction: The mode and speed of transportation to the Accident and Emergency Department (AED) of hospitals is very important for critically ill patients. This study looked at the mode of transportation to the AED at the Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital. **Materials and Methods:** Three different time periods: *Period A* from 15th May to 31st May 2004, (17 days, n=2,170 without prioritising), *Period B* from 1st January 2004 to 31st July 2006 (31 months, n=235 dead on arrival and resuscitation cases), and *Period C* from 20th to 26th November 2006 (7 days, all Priority Cases 1 to 3) were reviewed. Data on mode of transportation and triage categories were extracted from the ambulance response sheets. **Results:** During *Period A*, the main mode of transportation to the AED was private vehicles (90.7%) followed by ambulance (7.9%), and other transportation (1.4%). During study *Period B*, the main mode of transportation was also private transports (50.2%) followed closely by ambulance (48.5%) and other transportation (1.3%). During *Period C*, Priority 1 cases (life-threatening conditions, n=7), most were transported with private transport (71.4%) followed by ambulance (28.6%); Priority 2 (n=232) cases, majority were transported with private transport (89.2%), followed by ambulance (10.3%), and one case used police transportation; and in Priority 3 cases (non-life threatening conditions, n=1,010), almost all were transported with private transport (98.7%), followed by police (0.9%) and ambulance (0.4%) respectively. **Conclusion:** Utilisation of designated emergency transportation is low especially for the moderate to seriously ill (Priority 1 and 2) patients when compared to other well developed countries. More needs to be done to improve the usage of emergency transportations especially for the seriously ill cases.

Keywords: Emergency, transportation, ambulance services, resource utilisations

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INTRODUCTION

The mode of transportation to hospitals is very important for the critically ill or seriously injured patients as it can affect outcome. ¹

²Emergency ambulances either land or air are designed and equipped with equipment and trained medical personnel who can provide pre-hospital acute medical care to stabilise a patient's condition on site or while en-route to the hospital.

Brunei Darussalam is a developing Southeast nation with an area of 5,765 km² and population of 410,000 (2010 estimate, Economic and Development Planning Unit, Ministry of Finance). The Brunei-muara district is the smallest district (571 km²) but has the largest population (264,700). The Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital is the only tertiary level government hospital situated in the capital, Bandar Seri Begawan. When emergency transportation is required, an ambulance is dispatched from the Accident and Emergency Department (AED) of RIPAS Hospital. Apart from ambulances, vehicles from the other government agencies such as the Police, and Fire and Rescue services are also occasionally used to transport patients. However, such vehicles are not equipped to provide pre-hospital acute medical care. Private transportation is also frequently used for transportation by the public.

As previously reported, we are also seeing increasing annual attendance to the

AED of RIPAS Hospital. ³ This study assessed the mode of transportation to the AED of RIPAS hospital and to assess utility of the ambulance service in Brunei Darussalam.

MATERIALS AND METHODS

Three different periods were assessed looking at the mode of transportation of different priority cases. Data on mode of transportations and triage categories were collected from the ambulance response sheets and AED triage sheets. The three periods were categorised into *Study Periods A, B and C* (Table 1). These three periods assessed different patients' priority category.

Response and triage sheets with missing or incomplete details were excluded from analyses; 1,389 from *Period A*, two from *Period B* and 137 from *Period C* were excluded.

The data were entered and analysed using WordExcel programme. The data are presented as frequency and percentages.

RESULTS

In *Period A*, the main mode of transportation was by private vehicles (90.7%) followed by ambulances while transports belonging to other government services accounted for the remaining small proportion (Table 2).

Table 1: Study periods and the definitions of the various categories.

Period A: 17 days (15 th to 31 st May 2004), all categories of patients attending AE included without prioritising the seriousness of their illness.
Period B: 2 years and 7 months (1 st January 2004 to 31 st July 2006) included only patients who were categorised as dead on arrival and patients with near cardiac or respiratory arrest.
Period C: Seven days (20 th to 26 th November 2006) and all patients who attended the AED were included but were categorised according to the seriousness of their illness. Priority 1 consisted of urgent and life threatening cases who need immediate treatment (major trauma, myocardial infarction, respiratory failure, severe acute asthma, septicaemia, hypotension etc..), Priority 2 consisted of semi-urgent cases who need early attention but are not life-threatening and Priority 3 consisted of non-urgent cases who can walk and not serious (minor trauma, cough and cold, musculoskeletal pain etc....).

In *Period B* looking at patients who were dead on arrival or patients with near cardiac or respiratory arrest (Priority 1), both private vehicles and ambulances accounted for almost equal proportions of transportations used (Table 3).

In *Period C*, only 28.6% of Priority 1 cases had used ambulance with the majority using private transportation. Among Priority 2 and 3 cases, similar findings were seen but progressively fewer cases using ambulances compared to Priority 1 cases (Table 4).

DISCUSSION

The mode of transportation to the AED is important particularly for ill patients (Priority 1 and 2 cases). In general, patients requiring urgent medical attention should be transported preferably using emergency ambulances where paramedics or medical personnel can immediately provide medical attention. Apart from this, safety and speed of transportation are also important. Hence, although less preferable, patients can also be transported in other mode of transportation as long as they arrive safely to the AED without delay. Therefore, in some situations, transportation using private vehicles is acceptable.

In our study, we found that the most

Table 2: Mode of transportations for Study Period A (all categories)

Mode of transport	n (%)
Ambulance	172 (7.9)
Private vehicles	1,969 (90.7)
Search and rescue	2 (0.1)
Helicopter	2 (0.1)
Army ambulance/transport	8 (0.4)
Police transport	17 (0.8)
TOTAL	2,170 (100)

Table 3: Mode of transportations for Study Period B (all categories)

Mode of transport	n (%)
Ambulance	114 (48.5)
Private vehicles	118 (50.2)
Other means of transport	3 (1.3)
TOTAL	235 (100)

common mode of transportation to the AED was with private vehicles in all the three study periods. In study *Periods A* and *C*, that looked at all priority categories, private vehicles transportations accounted for 90.7% and 96.8% respectively, followed by ambulance with 7.9% and 2.4% respectively. Interestingly, in *Period B* which had looked specifically at Priority 1 cases and those brought in dead, private vehicles transportation accounted for 50.2% followed by ambulances with 48.5%. For this category, one would have expected the use of emergency transportation to be higher. The reasons for this is not exactly

Table 4: Mode of transportations for Study Period C (all categories).

Triage Category	Mode of Transport		
	Ambulance	Private Vehicles	Police Transport
	n (%)	n (%)	n (%)
Priority 1 (n=7)	2 (28.6)	5 (71.4)	0 (0)
Priority 2 (n=232)	24 (10.3)	207 (89.2)	1 (0.4)
Priority 3 (n=1,010)	4 (0.4)	997 (98.7)	9 (0.9)
Total (1,249)	30 (2.4)	1,209 (96.8)	10 (0.8)

known but will require further study.

Generally, our rates of ambulance utilisation were lower than what have been reported in the literature.⁵⁻⁷ Seow *et al.* showed that in Singapore, 12.4% of patients arrived to the AED using ambulance and 98.5% of ambulance arrivals were emergencies, Priority 1 or 2.⁵ Rates reported from the United States range between 11% to 16% depending on health insurance status.^{6, 7} whereas those reported from the United Kingdom and Australia were 10 and 15% respectively. Studies for other priority cases such as acute myocardial infarctions have also reported similar findings.⁸ Possible explanations include more established healthcare system and emergency services or better public awareness. In our setting, it is possible that there is the perception that it is faster to transport the patients using personal private transportation rather than waiting for the ambulance.

Factors reported to influence the utilisation of emergency services include monthly household incomes, locations of patients, age, time of the day, insurance status and perception of illness.^{5-7, 9, 10} Low income, being less or uninsured, elderly, living in lower social urbanised areas, minority ethnicities and being less educated were factors that increase utilisation of ambulance services. In one study, ambulance usage was the highest at night between 2100 to 2300 hour compared to peak "walk-in" between 1000 to 1200 hour.⁵ Limitation from the healthcare provision perspective such as location of ambulances is also important. During the study periods, the ambulance services were still based in the RIPAS Hospital. After the imple-

mentation of the Emergency Medical Ambulance Service (EMAS) in 2009, ambulances are also strategically located in the outpatients' clinics. Currently, ambulances are stationed at the Muara and Sengkurong Clinics but only operate during office hours (7.45 am to 4.30 pm).

From our study, there are two areas that require further attentions. In *Period C*, four (13.3%) out of 30 ambulance utilisations were for Priority 3 cases. While this number is low, it is still inappropriate use of emergency services. Inappropriate use of the limited ambulance resource is a major problem worldwide.¹¹⁻¹³ However, of major concern is the low utilisation of ambulance service for Priority 1 and some of the Priority 2 cases. The exact reasons for this is not known and will require further study. Further expansion of the decentralised ambulance services to other locations, extending operating hours and public education may help to improve appropriate ambulance utilisation especially for the seriously ill.

There are several limitations with our study. First the data were collected retrospectively and incomplete data is always problematic. Second, the study had looked at three separate time periods and did not assess all the three priorities making direct comparisons of the three study periods difficult. Furthermore, between the study intervals, there may have been changes in the utilisation of transportation to the AED. However, any changes were likely to be minor. Major changes in the ambulance service, in particular the EMAS was not implemented until 2009. It would also have been interesting to study the peak utilisation of the ambulance services to

assess the impact of traffic congestion and availability of private transportation during working hours.

In conclusion, our study showed that use of the emergency ambulance services in our local setting remains low even for the Priority 1 cases. Given that patients' outcomes are influenced by the speed of transportation and timely medical attention, utilisation of the emergency services for sick patients needs to be improved. It will also be interesting to assess the impact of the implementation of EMAS. Future assessment will provide useful information on the future direction in the expansion and improvement of the emergency ambulance service.

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