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Understanding of Development Emergency Medical Services in Laos Emergency Medicine Residents

Korakot Apiratwarakul[1], Ismet Celebi[2], Somsak Tiamkao[3], Vajarabhongsa Bhudhisawasdi[1], Chatkhane Pearkao[4], Kamonwon Ienghong[1]*

[1]Department of Emergency Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand; [2]Department of Paramedic, Gazi University, Ankara, Turkey; [3]Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand; [4]Department of Adult Nursing, Faculty of Nursing, Khon Kaen University, Khon Kaen, Thailand

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***Correspondence:** Kamonwon Ienghong, Department of Emergency Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand.
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Abstract

BACKGROUND: Rising death tolls from traffic accidents are quickly becoming an inescapable problem in almost all countries around the world. That being said, the World Health Organization has launched an ambitious campaign aimed at reducing the death rate from traffic accidents by 50% in the next 10 years. Development of emergency medical services (EMSs) was the tool to success the goals, especially in low- to middle-income countries including Laos. However, no studies regard perspective of training EMS in Laos emergency medicine residents.

AIM: The aim of our work is to demonstrate the effect of EMS training for Laos emergency medicine residents to the development of the national policy in Lao's EMS.

METHODS: A cross-sectional study was conducted in two countries (Laos and Thailand) from January 2020. The project activities were establishment of a command-and-control center, development of EMS support system, and training for emergency care professionals.

RESULTS: The eight Laos emergency medicine residents were enrolled between January and March 2020. After practicing as a dispatcher and emergency medical consultant in Thailand at Khon Kaen University, the participants from Laos found that all personnel gained experience and improved their knowledge of technology in EMS and organization management. This had a direct impact on improving confidence in their return to practice in Laos.

CONCLUSIONS: The human resource development through international collaboration between Thailand and Laos is contributing the effective knowledge and expertise learning in Laos. Moreover, the result of this training may provide the most effective care system resulting in the much-needed drop in the mortality rate of traffic accidents in Laos.

Introduction

Road accidents still remain one of the leading causes of death worldwide [1], [2], [3]. According to the World Health Organization (WHO) data, it was found that in 2016, approximately 1.4 million people lost their lives due to road accidents and that number is likely to increase [4], [5], [6]. The WHO must set an agenda of safety practices for road accidents by focusing on member countries to reduce mortality from road accidents to 50% in the 2020–2030 [7]. Road traffic injuries are now the leading cause of death for children and young adults aged 5–29 years of age in low-income countries which account for about 10% of the world's population [7], [8], [9]. The countries in these group have small number of vehicles used (less than 1% of worldwide). However, the number of deaths from road accidents is as high as 15% in these countries, unlike in high-income countries which possess as high as 40% of the world's vehicles but find less than 10% result in deaths [10], [11], [12], [13]. Therefore, it can be concluded that the income of the population affects the death rate from the road accident [14], [15]. This may be due to many varieties of the road traffic injury factors including (1) unsafe driving behaviors such as non-used of motorcycle helmets, driving under the influence of alcohol or other substances used, (2) unsafe road infrastructure, (3) unsafe vehicles, and (4) inadequate post-crash care which is the pre-hospital care system. Thus, the low-income countries including Laos, which had 0.4% of the annual GDP growth in 2020 reported by the World Bank, faced with the high rate of road traffic injuries.

In Laos, it was found that the number of fatalities caused by road accidents has been on an upward trend since 2007 [16], [17], [18], [19]. One of the factor which make Laos had this upward trend is the no formal Emergency medical services system. Therefore, sustainable development focuses on technology utilization and management in EMSs, namely, to reduce the response time to reach those injured in road accidents. This will result in the assessment and treatment of the injured person as quickly as possible [20], [21], [22], [23].

From the current data, injured patients were not referred to the appropriate hospital immediately after the accident. This is due to three factors: First, EMSs in Laos use the telephone number in receiving notification differently which makes it confusing to report by telephone to the operating unit that is not in the area of responsibility causing delays in coordination. Second, there is a striking lack of resources for personnel with specific expertise. Non experienced or non certified Call takers and dispatchers in EMS are unable to properly assess the injury, likely due to the lack of a clear personnel training system, including technical documentation to support the operation. Third, the ambulance parking system. The right technology is not being used in determining the parking spot, including the fact that there is no ambulance tracking system from the scene to the hospital. For all these reasons, it is clear an effort to fix the process must be instated through international cooperation with the University of Health Sciences (Laos) and Khon Kaen University (Thailand). The aim of our work is to demonstrate the effect of EMS training for Laos emergency medicine residents to the development of the national policy in Lao's EMS.

Methods

Study design and setting

A cross-sectional study was conducted in two countries (Laos and Thailand) from January 2020. The target area of Laos was Vientiane city, the capital and largest city of Laos. It has a total population of nearly 1 million people and is the location of the University of Health Sciences. In Thailand, the main area of focus was Khon Kaen Province, located in the northeastern region, 450 km from Bangkok (the capital city of Thailand) and 190 km from Vientiane, Laos. It is the location of Srinagarind Hospital (the medical school). The advantage of both cities was their similar culture, sharing a spoken language that can be communicated without language barriers, and the climate, geography, and historical foundations are quite similar. As a result, the development concept and implementation are more likely.

Ethical considerations

Ethical approval was provided by the Khon Kaen University Ethics Committee for Human Research (HE641457). Requirement for informed consent was waived since confidentiality protection had been guaranteed, as participants were not identified by name, but by a unique study number.

Training for Laos emergency medicine residents

In the personnel development plan for emergency care professionals, the first phase focuses on developing personnel in two positions: Dispatcher and emergency medical consultant, which play important roles in the first phase of EMS operations.

A dispatcher is responsible for these steps: (1) Receiving phone calls, (2) asking about the initial symptoms following the offline protocols, (3) determine the type of the emergency condition, and (4) ordering an ambulance and is suitable for additional operations in the ambulance monitoring system. An emergency medical consultant is medical personnel (doctor or nurse) who provide advice on preliminary symptoms to the operating unit including treatment guidelines while in the ambulance. In addition, in the current coronavirus epidemic, an emergency medical consultant also has a duty to control and prevent infection of medical personnel as well. The representatives which include all eight Laos Emergency medicine residents from the University of Health Science will be given training in the use of technology and systematic management in EMS at Khon Kaen University, Thailand, for a period of 4 weeks at a time following the EMS training curriculum for Thai emergency physicians. During that time, the emergency medical consultant candidate will be observed through the standard checklists in terms of the EMS knowledge which including the organization of management, technology in EMS, disaster management, knowledge to resuscitate pre-hospital patients, medical oversight, and EMS system design in emergency departments, resuscitation rooms, and ambulance operations to confirm that the representatives can bring knowledge back to share with personnel in Laos.

Results

Onsite teaching at Laos for the EMS care system for road traffic accidents

The phase of human resource development requires the transfer of knowledge and experience from those with traffic accident response expertise. The instructors from Thailand traveled to Laos to convey guidelines for caring for injured persons for a period of 2 days. The content related to EMS of Thailand and Laos, human resource development at various levels, ultrasound of the chest and abdomen in patients injured in traffic accidents, procedures that can be performed on ambulances, and preparation for practice in Thailand (Figure 1).

Figure 1: Onsite teaching at Laos for the emergency medical services development

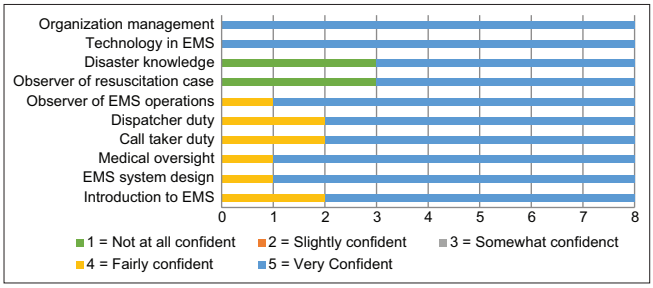
Training for emergency care professionals in Thailand

A total of eight medicine residents from Laos were enrolled between January and March 2020 (Table 1). The first two groups underwent 4 weeks of training, and the third group underwent 3 weeks due to the international medical affair policy for exchange students which need to go back to their country during the beginning of COVID pandemic in Thailand and Laos.

Table 1: Training time periods

Students	Periods in 2020	Duration
I, II	January 6–31	4 weeks
III, IV, and V	February 3–28	4 weeks
VI, VII, and VIII	March 2–20	3 weeks

After practicing as a dispatcher and emergency medical consultant in Thailand at Srinagarind Hospital, Khon Kaen University, the staff from Laos found that all personnel gained experience and improved their knowledge of technology in EMS and organization management. This had a direct impact on improving confidence in their return to practice in Laos. However, there was an activity (observer of resuscitation case and disaster knowledge) where doctors from Laos did not perform as three physicians (Graph 1).



Graph 1: Confidence in practice and benefits after experience in Thailand

Discussion

This study aims to develop a care system for traffic injuries through the EMS in Laos. We focus on transfer of knowledge, improved technology, and good management practices taken from proven policies in other countries.

Thailand's EMS categorized the personnel into four levels of operation:Paramedic, Advanced Emergency Medical Technicians (AEMTs), Emergency Medical Technicians (EMTs) and Emergency Medical Responders (EMRs) who each had a level capable of operating differently [24], [25], [26], [27], [28]. The command center is the heart of the EMS and receives information from the people and commands nearby and appropriate operating units [29], [30], [31], [32]. One of its key duties includes monitoring the patient transfer system until the information is forwarded to the destination hospital [33], [34], [35], [36]. In addition, the determination to have an emergency medical consultant as a supporting factor to command center has a big impact. They will be able to recommend initial symptom assessment, including procedures that can be done while waiting for the ambulance to arrive, for example, chest compressions in out-of-hospital cardiac arrest patients found to increase survival rates [37], [38], [39], [40], [41].

In the development of a post-crash care system for injured patients, three things must be developed simultaneously: The professional staff, the equipment, and the environment. This study gives the utmost importance to human resource development because it is something that can change quickly, especially awareness of the problem in that environment [42], [43]. This will drive the personnel to be determined and willing to solve such problems. Supporting devices to efficient operation of EMS using technology and proper management, it will expedite the solution process. It is the fastest and most efficient way currently available. Government policy plays an important role in changing the environment of traffic including the policy for establish safe road infrastructure and the policy to establish the effective post-crash care system to early and appropriate medical respond for traffic accident. The policy should included the process of improving safety on vehicles, establishing standardized roads, legislation to control speed, wearing a helmet on a motorcycle, wearing seat belts on cars, prohibiting the drinking of alcohol while driving [44], [45], [46], [47]. All of these things contribute to the development of both people and the environment which is the ultimate goal for a sustainable development society.

The results of this study show that three participants in the experience training in Thailand did not attend the course in its entirety (disaster knowledge and observer of resuscitation case) and only had 3 weeks of experience training which is different from the previous group that has participated in every activity and has a 4-week experience training period. This was due to the outbreak of the coronavirus that led to the closure of border measures between Thailand and Laos. Therefore, it is necessary to return the participants to Laos before the schedule expires. The host organizers cut back on the topics to suit the length of the training period. This exchanged students program provided

many advantages [48], [49], [50]. In terms of geography, Vientiane of Laos and Khon Kaen Province of Thailand are only 3 h away from each other by car or separated by roughly 200 km. Transportation along the route is convenient as buses are also available daily. In the cultural history, the two cities have a very similar. The Northeast of Thailand is similar to the dialect of Laos. No language barrier means that the focus is on learning and can achieve its objectives. Lifestyle and food were very similar. In addition, there were similar costs for living in the two cities. As a result, trainees were able to live a daily life close to the one in Laos and for these reasons, Khon Kaen Province is appropriate to be a training area for personnel from Laos.

International training programs for doctor or residency training have widely been proven to be beneficial to both learners and teachers [51], [52]. An obvious example, the use of mechanical chest compression devices in Thailand but not yet in Laos [53]. Therefore, coming to practice in Thailand exposes trainees to equipment they can request in the future in the event that there is a procurement budget. The new technology transfer of EMS was an ambulance. It is well known that most ambulances use vans, which can cause problems in reaching patients in cities with traffic congestion or small roads, therefore, the experience in Thailand with an ambulance in the form of an emergency motorcycle which has been studied previously demonstrated greater speed in reaching emergency patients in a city with traffic problems [54]. However, there are some medical limitations that need to be studied more for motorcycle ambulance model. Therefore, trainees are able to bring the model of motorcycle ambulance back with them to Laos. It is cheaper and does not cost much in additional equipment expenses.

Inspection applications are another example of important technological and management improvements needing to be made [55]. In the past, ambulance inspection was carried out every day using a paper report which is sometimes inconvenient for the operator, or there will lead to a delay in reporting resulting in unsafe ambulance conditions. In Thailand, reporting applications are used to reduce the time of daily ambulance checks, including reporting to those involved. They can be applied to increase safety both in the health-care providers and patients.

Use of social media is another form of technology transfer of EMS. In the event that EMS crews see symptoms that are uncertain in the diagnosis, they can use social media such as the LINE application in video recording or pictures and sounds can be sent to the consultant at command center. It has previously been found that using technology can increase the safety of the injured and increase the confidence of the operator as well as having only a small overhead cost [56], [57], [58]. However, some applications for transfer the patient information cannot guarantee the confidentiality of the patient information.

Through the cooperation between the two parties, Thailand and Laos are all committed to developing the quality of EMS through updated technology and effective management based on experience from experts in developing assistance to the injured in traffic accidents. The final objective being to lower the mortality rate which will result in more sustainable development not only in Laos but also in the world. The study also had limitations. Obvious major obstacles are the epidemic of coronavirus 2019 which makes travel between the countries difficult. In addition, the number of infected people in the three countries is still high. Therefore, attention to the development of the traffic accidents care system was reduced. Under restrictions, it may be a development challenge to determine a joint solution that will allow the work to continue. One model that was used under the limitation is online learning. It is an international conference composed of a panel of experts to suggest protocol for the patient in traffic accidents care to be presented online together monthly.

Conclusions

Development of EMS care system will be established to reduce the mortality rate of traffic injuries for sustainable development within the policy guidelines of the WHO to reduce the death rate from traffic accidents to 50%. International cooperation between the two sides of Thailand and Laos was an important link in the chain of development. The human resource development to have knowledge and expertise is all factors contributing to the most effective care system possible resulting in the much needed drop in the mortality rate of traffic accidents. The formal EMS training should be implemented in all level of Laos EMS personnel for the development of the effective EMS care system.

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