

**AWARENESS OF FIRST AIDS IN BURN INJURIES:
A SURVEY IN THE POPULATION OF EAST
COAST AND CENTRAL OF MALAYSIA**

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ABSTRAK

Pengenalan: Luka terbakar adalah masalah kesihatan awam yang mengakibatkan kehilangan sebanyak 10 juta 'disability-adjusted life-years' di negara yang berpendapatan rendah dan sederhana. Kesedaran penjagaan luka terbakar di kalangan masyarakat akan menjejaskan kelaziman, insiden, kesan dan komplikasi kebakaran dan oleh itu tindakan awal dan rawatan berikutnya adalah amat penting. Peningkatan pengetahuan tindakan awal dalam luka terbakar boleh mengurangkan morbiditi dan kematian. Objektif kajian ini adalah untuk menilai pengetahuan dan kesedaran tentang pertolongan cemas dalam kecederaan terbakar dalam 3 kumpulan penduduk Malaysia dan membantu dalam perancangan pelan pendidikan di seluruh negara. Amalan pertolongan cemas yang betul boleh menyebabkan penyembuhan luka yang lebih cepat, mengurangkan kedalaman luka terbakar, dan mengurangkan keperluan untuk pembedahan penampalan kulit.

Metodologi: Kami telah menjalankan kajian soal selidik secara keratan rentas dari Januari 2018 sehingga Disember 2018 yang melibatkan sejumlah 672 peserta di mana 232 (34.5%) adalah kakitangan perubatan, 221 (32.8%) komuniti awam dan 219 (32.6%) pelajar sekolah menengah.

Keputusan: Sebanyak 68.5% (n = 460) peserta mengalirkan air pada luka terbakar, 14.1% (n = 95) tidak mengalirkan air dan 17.4% (n = 117) tidak pasti. 511 peserta telah menjawab soalan tentang tempoh mengalir air pada luka bakar. Kebanyakan peserta (23.2%, n = 156) mengalirkan air selama 5 hingga 10 minit. Hanya 14.3% (n = 96) melalukan air lebih daripada 20 minit. Ubat tradisional yang paling biasa disapukan pada luka terbakar adalah ubat gigi (43.3%). Kakitangan perubatan mempunyai pengetahuan yang lebih baik dalam pertolongan cemas kecederaan luka bakar

berbanding dengan kumpulan pelajar sekolah menengah. Peserta yang pernah mengalamiluka terbakar dan peserta yang pernah menerima maklumat mengenai tindakan awal dalam luka terbakar mempunyai pengetahuan yang lebih baik dalam amalan pertolongan cemas.

Kesimpulan: Kakitangan perubatan dan peserta yang pernah menerima maklumat mengenai tindakan awal dalam luka terbakar mempunyai pengetahuan yang lebih baik dalam amalan pertolongan cemas.Oleh itu, kempen kesedaran tindakan awal luka terbakar perlu diwajibkan untuk meningkatkan pengetahuan komuniti tentang amalan tindakan awal.Pelan pendidikan mengenai pertolongan cemas kecederaan pembakaran perlu dirancang dengan kerjasama dari Kementerian Kesihatan Malaysia, Jabatan Bomba dan Keselamatan, serta media sosial.

ABSTRACT

Introduction: Burns is a devastating public health problem which result in 10 million disability-adjusted life-years lost in low- and middle-income countries. Awareness is warranted in the community about the prevalence, incidents, impacts and complications of burns and hence the importance of its first aid and subsequent treatment. Adequacy of first aid for burn injuries reduces morbidity and mortality. The objective of this study is to assess the knowledge and awareness of first aid in burn injuries in 3 groups of Malaysian population and to develop a nationwide education plan. Correct first aid practices is associated with faster healing, reduction in wound depth, and a decrease in the requirements of skin grafting

Methodology: We have conducted a cross sectional study between January 2018 until December 2018 using a validated questionnaires which involved a total of 672 subjects which include 232 (34.5%) medical personnel, 221 (32.8%) public population and 219 (32.6%) secondary school students. Questionnaires include 4 categories which include patient's demography, previous history of burn injuries, burn prevention measures and also nine compulsory questions to assess the knowledge of respondents on first aid measures in burn injuries

Results: There are 68.5% (n = 460) participants practising running burn wound under tap water, 14.1% (n = 95) chose not to run with the tap water and 17.4% (n = 117) are not sure. 511 of them responded on the duration of running tap water over the burn wound. Most of them (23.2%, n = 156) do water lavage for 5 to 10 minutes. Only 14.3% (n = 96) will do this for more than 20 minutes. Most commonly used traditional remedies applied were toothpaste (43.3%). Medical personnel has better knowledge in first aid of burn injury as compared to public and secondary school students group.

Those who had history of burn injury and those who received information on first aid in burn injury has better knowledge in first aid practices.

Conclusion: Medical personnel and those who had received information on correct first aid practices have better knowledge in first aid practices. Therefore, it is justifiable to increase first aid courses and burn awareness campaigns to improve outcomes for the community as a whole. An education plan on first aid of burn injuries should be developed with the cooperation of the Ministry of Health, the Fire and Rescue department, as well as social media.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Burn injury is a devastating public health problem which result in the estimated death of 180 000 annually. It is the fourth most common type of trauma worldwide which result in 10million disability-adjusted life-years (DALYs) lost in low- and middle-income countries.[1] Non-fatal burn injuries resulted in prolonged hospitalization, disability and other morbidities which is often with resulting stigmata and rejection.

The East Coast is a part of Peninsular Malaysia which includes states of Kelantan, Terengganu and Pahang. Hospital Universiti Sains Malaysia is located in Kota Bharu, Kelantan. The Burns Unit of Hospital Universiti Sains Malaysia (HUSM) was instated on September 9th 2004 to cater for burn patients within the eastcoast region. Whereas Hospital Kuala Lumpur (HKL) is located in the central of Malaysia which has a Burns Unit which started its service since September 1998.

There is lack of data in the epidemiology of burn cases in Malaysia. According to Somasundaram et al., there was an increasing trend for patients admitted to the Burns Units of Hospital UKM between October 1999 and November 2001. He concluded that a need for better preventive measures by the authority to prevent burns related accident and the expansion of the service provided by the Burns Unit. [2] Hasni et al. in 2003 has reported that burns represent 5.6% of all domestic injuries in Malaysia.[3]

One of the oldest recorded methods of treating burns is still recommended today, namely prompt cooling of the injured part, usually in cold water. Such therapy was recommended by Galen (AD 129-199) and Rhazes (AD 852-923) Earle (1799) and by Sorensen (1967). World health organisation stated that prevention is the key of reducing burn injuries. First aids recommended is to stop the burning process and then

use cool running water to reduce the temperature of burn, then cover the wound with clean cloth before visiting the nearest medical care facility.[4]

In year 1982, Davies et al. [5] studied the effects of first aid. He found that prompt cooling of burned areas had beneficial effects by reducing the tissue temperature which reduce the severity of burn, helps in reducing oedema by limits the release of histamine by mast cells and also suppressing pain by reduce the tissue temperature to below the level of cutaneous pain. WHO recommends to cool the burned area by running under tap water for at least 20 minutes. Adequacy of first aid treatment for burn injuries reduces morbidity and mortality. Besides that, deep partial thickness burn treated which had first aid applied using cool tap water at 15 degree Celsius for 20 minutes had better outcome in terms of reepithelization, scar histology and scar appearance.[6]

Generally, the rate of proper first aid practices in other countries is ranging 12-22%. [1, 7] Many burned patients referred to burn unit in both HUSM and HKL practices wrong steps of first aid. Patients applied different types of traditional remedies which worsen the burn injury. A five-year retrospective audit was performed on database from year 2012 to 2016 of Burn Unit of Hospital Universiti Sains Malaysia (HUSM, Kelantan which involved 485 patients within east coast region of Malaysia. Mean age of the patients is 17.3 years old. The audit on first aid practices for burn injury showed poor practice where out of 485 burned patients, 261 patients (53.8%) claimed that they are practicing first aid but only 24 out of 485 patients (5%) practice the correct way with 222 patients receiving no first aid and 2 missing data. The mean age of patients practicing first aid is 15.6 years old. Out of the 261 patients who practices first aid, 167 (64%) run their wound under cool tap water followed by other traditional remedies such as application of 'minyak gamat' (6.5%) which is a type of traditional ointment, soy sauce (5.5%), other ointment (3.6%), milk (1.8%), eggs (0.7%), and honey, butter and

cooking oil 0.4% each. 201 patients practicing running cool tap water and cool shower on their burn wound, only 11.9% (24 out of 201 patients) receiving cooling tap water for more than 20minutes. [8]

Ghosh et. al have highlighted the strategy for awareness creation regarding burns prevention and first aid and its impact in and around the steel-producing city of Jamshedpur, India which was a joint venture of the Burns Centre and the Medico Social Welfare Unit of the Tata Main Hospital, Jamshedpur in collaboration with the Social Service Division of Tata Steel and city schools. “Community Awareness Programmes” and “School Education Programmes” were organized for targeted group for 5 years duration. The growing awareness about burns prevention among school children and community members, and steady increase in the number of patients who use water as first aid, speak about the success of the strategies.[9]

Kattan et al. have presented a report on the knowledge and practices of the Saudi population with regard to burn first aid and the application of traditional remedies in year 2016. A total of 2758 individuals responded to the survey. Although the majority of the respondents were university graduates (51.1 %), knowledge and implementation of burn first aid was very poor. Major healthcare agencies should review and promote a consistent guideline for burn first aid in an effort to tackle and minimize the effect of this grave injury.[10]

Since year 2008, medical personnel from HUSM who are involving in treating burn patients has formed a team and organizing burn awareness campaign to educate primary and secondary school students with the age ranging 10 – 17 years old regarding first aids of burn injuries and treatment provided by medical facilities. However, there is no proper assessment of the knowledge of first aid injuries in Malaysian population and the school children.

In general, the appropriate first aid practices among general population in low to middle-income countries ranging 12-22%. [1, 7] and up to 39% for population in high income countries such as Australia. As for health care worker, burn first aid knowledge was fair but overall knowledge very poor.[11]

As first aid is extremely important in burn injury, the practice of correct first aid steps can reduce the severity of burn wound and better wound healing process, shorter length of hospital stay and causing less morbidity in burn injuries. [12] The purpose of this study is to assess the adequacy of knowledge of Malaysian population on first aid.

Previous history of burn in a patient might trigger the patient to search for the correct first aid steps therefore practice the correct first aid steps. Social media regarding first aid, burn campaign and knowledge of the populations might increase the percentage of populations that practices the correct first aid steps.

CHAPTER 2

OBJECTIVES OF STUDY

2.1 GENERAL OBJECTIVE

To assess the adequacy of knowledge of first aid in burn injuries in the population of east coast and central of Malaysia.

2.2 SPECIFIC OBJECTIVES

- 2.2.1 To describe first aid knowledge and practices for burn injuries among 3 groups of Malaysian population which is public with and without history of burn injuries, secondary school students who have attended burn awareness campaign and those who have never attended any burn awareness campaign, and medical personnels (doctors, nurses and medical assistance) who have no experience in treating burn patients and have never work in burn unit and plastic surgery unit.
- 2.2.2 To describe percentage of correct first aid steps among publics, secondary school students and medical personnel who are not trained in treating burn injuries clinically and never work in burn unit and plastic surgery unit.
- 2.2.3 To compare knowledge of first aid in burn injuries among school children who had attended burn awareness campaign and those who have never attended any burn awareness campaign.

CHAPTER 3

MANUSCRIPT

3.1 TITLE PAGE

**TITLE: AWARENESS OF FIRST AIDS IN BURN INJURIES :A SURVEY IN
THE POPULATION OF EAST COAST AND CENTRAL OF MALAYSIA**

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3.2 ABSTRACT

Introduction: Burns is a devastating public health problem and awareness is warranted in the community about the prevalence, incidents, impacts and complications of burns and hence the importance of its first aid and subsequent treatment. We have assessed the knowledge of first aid in burn injuries in Malaysian population. This help in developing a nationwide education plan in future.

Methodology: We have conducted a questionnaire-based cross sectional study between January until December 2018 which involved 672 subjects which 232 (34.5%) are medical personnel, 221 (32.8%) public population and 219 (32.6%) secondary school students. Demographic details, history of burn, burn prevention measures were studied and knowledge on first aid in burn injuries were assessed.

Results: There are 68.5% (n = 460) participants cooling burn wound with tap water, 14.1% (n = 95) chose not to run with water and 17.4% (n = 117) are not sure. 511 of them responded on the duration of running tap water. Only 14.3% (n = 96) will do this for more than 20 minutes. Most commonly used traditional remedies were toothpaste (43.3%). Medical personnel have better knowledge as compared to public and secondary school students. Those who had history of burn injury and received information on first aid in burn injury has better knowledge in first aid practices.

Conclusion: Therefore, it is justifiable to increase first aid courses and burn awareness campaigns with the cooperation of the Ministry of Health, the Fire and Rescue department, as well as social media to improve outcomes for the community as a whole.

Key words: Burns, First aid, First aid for burn injuries

3.3 INTRODUCTION

Burn injury is a devastating public health problem which result in the estimated death of 180 000 annually. It is the fourth most common type of trauma worldwide which result in 10million disability-adjusted life-years (DALYs) lost in low- and middle-income countries.[1] Non-fatal burn injuries resulted in prolonged hospitalization, disability and other morbidities which is often with resulting stigmata and rejection.

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In year 1982, Davies et al. [5] studied the effects of first aid. He found that prompt cooling of burned areas had beneficial effects by reducing the tissue temperature which reduce the severity of burn, helps in reducing oedema by limits the release of histamine by mast cells and also supressing pain by reduce the tissue temperature to below the level of cutaneous pain. WHO recommends to cool the burned area by running under tap water for at least 20minutes. Adequacy of first aid treatment for burn injuries reduces morbidity and mortality. Besides that, deep partial thickness burn treated which had first aid applied using cool tap water at 15 degree Celsius for 20minutes had better outcome in terms of reepithelization, scar histology and scar appearance.[6]

As "running under the cool water" is one of the imperial management in first aid of burns, however, the package of first aid may include more measures, which may need further emphasis. The other measures which are equally essential may include stopping the burning process by removing clothing and irrigating the burns, extinguish flames through rolling on the ground, applying blanket, removing the agent and etc. Failing in performing above mentioned measures may contribute to harm or morbidity to patients. Generally, the rate of proper first aid practices in other countries is ranging 12-22%. [1, 7]Many burned patients referred to burn unit in both HUSM and HKL practices wrong steps of first aid. Patients applied different types of traditional remedies which worsen the burn injury. A five-year retrospective audit was performed on database from year 2012 to 2016 of Burn Unit of Hospital Universiti Sains Malaysia (HUSM, Kelantan which involved 485 patients within east coast region of Malaysia. Mean age of the patients is 17.3 years old. The audit on first aid practices for burn injury showed poor practice where out of 485 burned patients, 261 patients (53.8%) claimed that they are practicing first aid but only 24 out of 485 patients (5%) practice the correct way with 222 patients receiving no first aid and 2 missing data. The mean age of patients

practicing first aid is 15.6years old. Out of the 261 patients who practices first aid, 167 (64%) run their wound under cool tap water followed by other traditional remedies such as application of ‘minyak gamat’ (6.5%) which is a type of traditional ointment, soy sauce (5.5%), other ointment (3.6%), milk (1.8%), eggs (0.7%), and honey, butter and cooking oil 0.4% each. 201 patients practicing running cool tap water and cool shower on their burn wound, only 11.9% (24 out of 201 patients) receiving cooling tap water for more than 20minutes. [8]

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Since year 2008, medical personnel from HUSM who are involving in treating burn patients has formed a team and organizing burn awareness campaign to educate primary and secondary school students with the age ranging 10 – 17 years old regarding first aids of burn injuries and treatment provided by medical facilities. However, there is

no proper assessment of the knowledge of first aid injuries in Malaysian population and the school children.

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In general, the appropriate first aid practices among general population in low to middle-income countries ranging 12-22%. [1, 7] and up to 39% for population in high income countries such as Australia. As for health care worker, burn first aid knowledge was fair but overall knowledge very poor.[11]

As First aid is extremely important in burn injury, the practice of correct first aid steps can reduce the severity of burn wound and better wound healing process, shorter length of hospital stay and causing less morbidity in burn injuries. [12]

Previous history of burn in a patient might trigger the patient to search for the correct first aid steps therefore practice the correct first aid steps. Social media regarding first aid, burn campaign and knowledge of the populations might increase the percentage of populations that practices the correct first aid steps.

The purpose of this study is to assess the adequacy of knowledge of Malaysian population on first aid. Prevention is always better than cure. Correct first aid practices is associated with faster healing, reduction in wound depth, and a decrease in the requirements of skin grafting.[13] Therefore, the result of this research can help in

raising the alertness of Kementerian Kesihatan Malaysia in developing an education plan on first aid in burn injuries for the whole nation.

3.4 METHODS

This is a questionnaire-based cross sectional study performed between January 2018 until December 2018 in HUSM, HKL and secondary schools in Terengganu which had burn awareness campaign previously.

The study population involving the following 3 groups:

1. Population aged 18 and above with and without history of burn injuries.
2. Secondary school students aged 13-17 years old who have attended and who have never involved in burn awareness campaign.
3. Medical personnel who are not trained in treating burn injuries

Questionnaires developed after the discussion of authors and validated by a panel of plastic surgeons for expert validation. It was piloted on 45 participants (15 participants respectively from public population, students and medical personnel) for face validation which includes the clarity of questions and time consumed. The survey was made in Malay language. It is either in the form of hardcopy or web-based questionnaires designed using Google Form which consist of 4 categories including (A) participants' biodata such as demographic and socioeconomic variables, (B) history on burn awareness campaign, (C) nine questions which are compulsory to be answered to assess the knowledge of respondents on first aid measures in burn injuries and (D) burn prevention measures.

As for the general population group and medical personnel group of participants, subjects recruited by convenience sampling on visitors, clinic attendees and medical personnel in HUSM and HKL. Whereas for the subjects in schools, all students will be

recruited after the school being selected using simple random sampling method on the list of schools which was Sekolah Menengah Kebangsaan Pelagat, Terengganu.

Data obtained from this research was analyzed using a statistical package for social sciences, SPSS version 25.0. In brief, a descriptive statistics of the socio-demographic characteristics were initially done to evaluate the distribution and normality of data. Frequency and percentage was reported for distribution of categorical variables and Pearson Chi Square Test was used to determine differences between groups. Continuous variables were reported as Mean \pm Standard Deviation (SD) and One-way ANOVA followed by Post Hoc test and Independent t Test was used to determine mean differences between the >2 groups and 2 groups, respectively. Any significant difference found was considered when p-value <0.05.

To assess the knowledge on first aid in burn injuries among the participants, we compare the mean score of the nine questions which are compulsory to be answered in the questionnaires among 3 groups of participants. Correct answer will be given 1 mark and no mark will be given for incorrect answer or not sure.

3.5 RESULTS

A total of 672 subjects willingly participated in this study where 232 (34.5%) of them are medical personnel, 221 (32.8%) are public population and 219 (32.6%) secondary school students. There were 419 (62.4%) female participants and 253 (37.6%) male participants. Among those who are employed, 59.2% has monthly income of more than RM3000. Most of the participants are from east coast of Malaysia (75.4% , n = 491) which including Kelantan and Terengganu, 16.1% (n = 105) from capital of malaysia which is Kuala Lumpur and Selangor, 5.4% (n = 35) from Northern Malaysia which is

Perlis, Kedah, Penang and Perak, 2.6% (n = 17) from Southern Malaysia which is Pahang, Melaka and Johor whereas 0.5% (n = 3) from West Malaysia which includes Sabah and Sarawak. 60.6% (n = 407) of participants received information regarding first aids in burn injury whereas 39.4% (n = 265) of participants had never receive the information.

The source of information on proper first aid steps are mostly from burn awareness campaign, workshop and forum (42.3%, n = 177), followed by magazines (15.6%, n = 65), television (14.1% , n = 59), newspaper (12.4%, n = 52), and the rest are from internet and social media. Out of 672 participants, 60.6% (n = 407) of them received the information of proper first aid steps in burn injuries. As for medical personnel group, 64.7% has received the information. 51.6% of public population and 65.3% of secondary school students have recieved information on first aid in burn injuries respectively. This has improved the knowledge of proper first aid steps among the group who have received these information.

Only 27.5% (n = 184) of participants or their family members had burn injuries before. 65 (35.5%) of them were participants themselves that involved in burn injuries, 115 (62.5%) of them had family members involved in burn injuries previously and 4 (2%) participants did not answer the given questions either they themselves or their family members had burn injuries. 59.8% (n = 110) had burn injuries in less than 5 years, 17.9% (n = 33) of them had burn injuries within 5 to 10 years ago and more than 10 years respectively whereas 4.3% (n = 8) did not respond to the question. There are 129 (70.1%) of them seek for medical treatment after burn injuries.

As for the first aid practices among the participants, there are 68.5% (n = 460) of them that will run their burn wound under tap water, 14.1% (n = 95) chose not to run with the tap water and 17.4% (n = 117) are not sure. Among those who are not sure and

those who will run their burn wound with tap water, 511 of them responded on the duration of running tap water over the burn wound. Most of them (23.2%, n = 156) will run the burn wound under tap water for 5 to 10 minutes. 11.2% (n = 75) will run under tap water for less than 5 minutes, 12.8% (n = 86) will run for 10-15 minutes, 14.6% (n = 98) for 15-20 minutes and 14.3% (n = 96) for more than 20 minutes. [Figure 1]

We have studied the first aid practices on burn injuries which is running the burn wound under tap water, duration of running the wound with tap water, whether to remove cloth and jewelery over burn area, cover burn wound with clean cloth and the traditional remedies used over burn wound. Among all participants, 81.4% (n = 547) will remove their cloth over the burn area, 73.5% (n = 494) will remove jewellery over burn wound, 71.4% (n = 480) will cover the burn wound with clean cloth. As for those who practiced traditional remedies practiced among the participants, 55.7% (n = 374) of them will apply ointment over their burn wound, 33.3% (n = 224) will not apply any ointment and 10.9% (n = 73) were not sure. Among those who using traditional remedies as first aid (n=473), the most common traditional remedies applied were toothpaste (43.3%), followed by soy sauce (26.6%), minyak gamat (21.4%), butter (2.5%), cooking oil (1.7%), honey (0.2%) and other remedies (4.2%) such as aloe vera, toothpaste, cooking oil, tapioca powder and butter. [Figure 2]

Out of the 221 public participants, there are 77 (35%) of them had history of burn injuries and 143 (65%) of them without history of burn. One of them did not respond to the question. There is no significant difference on the practices of first aid in burn injuries between public participants with and without history of burn injuries[Table I]. As for secondary school students (n = 219), those who received information on first aid in burn injuries (n = 143, 65.3%) practice running with tap water on burn wound which was found significant difference (p = 0.002) as compared

to those who have never receive information on first aid in burn injuries (n = 76, 34.7%). However, there is no significant difference in other first aid practices among secondary school students who received and never receive information on first aid in burn injuries. As for medical personnel (n = 232), the practice of running burn wound under tap water (p = 0.02) and remove jewellery over burn area (p = 0.033) was found significant difference between the group of receiving information on first aid in burn injuries (n = 150, 64.6%) as compared to those who did not receive the information (n = 82, 35.3%). [Table II]

Medical personnel has better knowledge in first aid of burn injury where their mean score is 5.0 ± 1.36 , followed by public population 4.74 ± 1.53 and secondary school student which has a mean score of 4.41 ± 1.70 . The difference in knowledge on first aid in burn injuries was found be significant among the 3 subject groups ($p < 0.001$). However, the most significant difference lies between group of medical personnel and secondary school students by average mean of 0.59 ($p < 0.001$).

The knowledge of first aid in burn injuries among those who had history of burn injury and those who received information on first aid is higher as compared to without history of burn injury and did not receive any information on first aid in burn injuries ($p < 0.05$). [Table III]

3.6 DISCUSSION

In year 1982, Davies et al. [5]studied the effects of first aid. He found that prompt cooling of burned areas had beneficial effects by reducing the tissue temperature which reduce the severity of burn, helps in reducing oedema by limits the release of histamine by mast cells and also supressing pain by reduce the tissue temperature to

below the level of cutaneous pain. WHO recommends to cool the burned area by running under tap water for at least 20 minutes. Adequacy of first aid treatment for burn injuries reduces morbidity and mortality. Efficient first aid treatment for burn injuries reduces morbidity and mortality. Cuttle et al. demonstrated reducing subdermal temperature when applying first aid with cold water over burn wound for 10, 20, 30 minutes and 1 hour duration in animal studies. After 20 minutes, the wound started to return to normal temperature. Deep partial thickness burns which undergo first aid using cool tap water at 15 degrees Celsius for 20 minutes have better outcomes in terms of reepithelization, scar histology and scar appearance. [6, 14] A cohort study done by Harish et al. showed that adequate first aid with 20 minutes of running water over the burn wound is associated with faster healing, reduction in wound depth, and a decrease in the requirements of skin grafting. [13] The benefit of cooling the burn wound with water persists despite delayed cooling. The mechanism by which it benefits is poorly understood and is not purely due to thermal energy removal, reduction in edema, or histamine release. [15]

A five-year retrospective audit was performed on database from year 2012 to 2016 of Burn Unit of Hospital Universiti Malaysia, Kelantan which involved 485 patients within east coast region of Malaysia showed poor understanding of proper first aid practice where 261 of 485 patients (53.8%) thought that they practiced first aid for burn injuries. However, only 24 out of 485 patients (5%) practiced the correct way. [8]

As compared to the rate of proper first aid practices in other countries which is ranging 12-22%, [1, 7] the population of east coast of peninsular Malaysia has poor knowledge. However, from this research, we noticed that 68.5% (n = 460) of participants will run their burn wound under tap water. Out of 511 participants who responded to the duration of running wound under tap water, most of them (23.2%, n =

156) will run under tap water for only 5 to 10 minutes. 14.3% (n = 96) will do this for more than 20 minutes. As compared to the audit of SN Seow et al. as mentioned above, the rate of proper first aid practices is within the range as other countries. This can be due to previous study only involved part of the region in Malaysia but the current research involved all the states in Malaysia with larger sample size.

Many remedies used by lay people vary from bland to unsafe such as milk which provide cooling but no other benefit, soap and soap powder, greasy materials such as butter, margarine and Vaseline. The use of ink, popular in the Asian community, arises from a century ago when ink production was based on oak galls and tannic acid which might cause poisoning.[16]

Among those who using traditional remedies as first aid (n=473), the most common traditional remedies applied were toothpaste (43.3%) as compared to the study of population in east coast of peninsular Malaysia which is 'Minyak Gamat'. Traditional remedies administered for childhood burns in Ashanti Region of Ghana are such as mud, burned snail shell, beaten eggs, leaves and a mixture of urine, mud and cow dung.[17]

Medical personnel has better knowledge in first aid of burn injury as most of them are trained from medical / nursing school. Although they are not involved in the treatment of burn injury currently, they should have learned and remembered the practices of first aid. Fifty percent of patients experiencing inappropriate first aid, had this delivered by his or her primary health care contact, either at an emergency department, nursing post or by a general practitioner. [11]

Those who had history of burn injury has better knowledge in first aid of burn injuries. This can be due to the education given when patient admitted to burn unit or patient themselves took initiative to study more on this after they had burn injury. From our research, those who received information on first aid in burn injury has better

knowledge in first aid practices. There were multiple studies shown that multi-media public awareness campaign successfully improved the knowledge of first aid among publics[12, 18], students[19, 20] and even health care workers[11]and the first aid practices in burn injuries which subsequently reduce inpatient admissions and surgical procedures[11, 12, 18].There is no significant difference ($p=0.165$) in the knowledge of first aid among publics who have received information on first aid in burn injuries as compared to medical personnel where the mean score are 4.8 and 5.0 respectively. Therefore, it is justifiable to increase first aid courses and burn awareness campaigns to improve outcomes for the community as a whole.

There is limitation on this research where medical personnel group should be assessed further on the clinical application of their knowledge. Medical personnel usually attended patients after a certain duration they had burn injuries and transferred to the hospital. Although medical personnel group has higher mean score of 5.0 but they fail to practice first aids on burn patients by assuming patients should have done adequate first aids before arriving the hospital. Detailed questions should be added into the questionnaires for medical personnel group. Another limitation is that this is a cross sectional study to assess the knowledge of the 3 subgroups of Malaysian population in east coast and central region but this research unable to study whether burn awareness campaign successfully reduce the degree of burn, inpatient admission and the requirements of split skin graft surgery as shown in other clinical studies such as by king et al. and skinner et al.

A bigger population-based survey must be conducted in the whole Malaysia to assess the knowledge and awareness of first aid in burn injuries.To educate the public, a collaboration between the Ministry of Health, Fire and Rescue department, and social media must be formed.An education plan need to be developed for the general

Malaysian public such as planning for nationwide burn awareness campaigns or publishing articles and videos on first aid of burn injuries through social media.

CONCLUSION

Those who had history of burn injuries and those who received information on first aid in burn injury has better knowledge in first aid practices. It has been shown that good first aid improves the outcome of the burn patient. Awareness is warranted in the community about the prevalence, incidents, impacts and complications of burns and hence the importance of its first aid and subsequent treatment. An education plan on first aid of burn injuries should be developed with the cooperation of the Ministry of Health, the Fire and Rescue department, as well as social media. Burn awareness campaign and training on first aid in burn injuries should be made as a compulsory event in schools as well as community to improve the practices of first aid in burn injuries.

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CONFLICT OF INTEREST

The authors hereby certify that the work which is reported herein has not received financial support from any pharmaceutical company or other commercial source

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