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The knowledge, attitude and confidence on first aid response among childcare providers following FAT4CP© training in Negeri Sembilan, Malaysia

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ABSTRACT

Children daycare centres have nowadays become a necessity due to the guardians' job constraint in this modern globalization era. Increasing demand of daycare centres showed ramification on unintentional injuries at the childcare settings. The incidence is becoming more common and this may lead to a lawsuit for negligence. Failure to provide proper first aid response is one of the issues faced by the caregivers. To the best of our knowledge, this is the first study investigating the effects of first aid training and certification on knowledge, attitude and confidence (KAC) among childcare providers in Negeri Sembilan, Malaysia. A self-administered questionnaire was given to 54 Negeri Sembilan childcare providers before and after they received a comprehensive module on the first aid training. The training comprised of three major components; basic life support, trauma injuries and non-trauma injuries. Throughout the training, participants were given a series of lectures, hands-on practicals and small group discussion on specified topics from the module. Overall results showed a significant increase in knowledge, attitude and confidence (p<0.001) after the respondents' had received the FAT4CP© training. The first aid training provided to the childcare providers was found effective and had successfully improved their knowledge by 12.5% and their confidence to perform first aid increased by 20.0%. They are now more prepared and efficient at handling any emergency situations at childcare centres. Our results suggested that FAT4CP© training programme was able to increase knowledge, attitude and confidence of childcare providers in Negeri Sembilan to handle emergency cases. Therefore, the programme is suggested to be implemented at all childcare centres in order to improve and sustain the providers' abilities in handling emergency situations.

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INTRODUCTION

Early childhood spans the age range between newborn stages and early years of primary education. This stage requires meticulous attention encompassing multitudinous areas of early stim-

ulation, health, safety, mental and physical welfare (Anderson *et al.*, 2003). Childcare providers play a vital role in ensuring children's development as they are highly sought after due to the guardians' job constraint and hectic schedule in present times. According to a report by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2015, the childcare gross enrolment ratio in Malaysia has increased from 55% to 80% in the past two decades. Following this increasing demand for childcare centres, unintentional injuries and emergency incidence are becoming more common and may subsequently lead to legal actions. Hence, it is essential and important that childcare providers are fully equipped with knowledge, attitude and confidence at handling any kind of emergency situations (Copeland *et al.*, 2005).

First aid is the assistance given to a person suffering from sudden illness or injury, to preserve life, prevent the condition from worsening, and reducing the severity of injuries (Helsloot and Ruitenberg, 2004). The 2015 International Liaison Committee on Resuscitation (ILCOR) Consensus on Science and Treatment Recommendations and reviews by Red Cross Red Crescent National Societies reported a significant increase in survival rates and reduced time to resolution of symptoms for ill or injured persons after a comprehensive first aid training (Singletary *et al.*, 2015; Kim *et al.*, 2017). Children are more vulnerable to unintentional injuries due to the fact that they are less acquainted of themselves and environmental dangers. They also are often being active, have smaller body mass, more vulnerable skin and narrower airways (Amram *et al.*, 2001; Leonard *et al.*, 2014). It was reported that injuries in children caused more deaths than all other diseases combined (Brown, 2010).

The common injuries that seldom occur at daycare centres include fall-related injuries, shock (due to choking and anaphylactic shock), trauma (due to cuts and burns) and non-trauma such as seizures, asthmatic attack, high fever, diarrhoea, hyperthermia, hypothermia, epistaxis and many more. A study done by (Li *et al.*, 2012) reported that children with acute burn injuries who were given first aid attention prior to hospitalization showed a significant reduction in re-epithelialization time. The study also reported that there was a positive correlation between the correct use of first aid and good clinical outcomes (Ammirati *et al.*, 2014; Li *et al.*, 2012). This shows that there is a need for public awareness of proper first-aid, especially at child care centres. The knowledge and practices on first aid among childcare providers are often reported as poor and disintegrated because they are usually only focused on preventing injuries but not post-injury situations. To date, their post-injury knowledge and practices remain vague (Thein *et al.*, 2005).

First aid trainings are comprised of basic life support skills such as cardiopulmonary resuscitation (CPR) and Heimlich maneuver to treat choking, management of various injuries such as bleeding, shock, fractures and burns, as well as understanding the use of automated external defibrillator (AED) and other rescuer machineries (Zideman *et al.*, 2015) . Many studies have reported the efficacy of first aid training on improving positive clinical outcomes and survival rates (Ingram *et al.*, 2006). Hence, first aid training should be made mandatory especially at all the centres and schools involving children. Many kinds of research have also converged upon a set of quality characteristics that promote children's development across various domains which do not solely include health and education, but also their safety, safe and stimulating physical environment, effective teacher-child interactions, qualified staff with pedagogical knowledge, and a comprehensive curriculum approach (Yoshikawa *et al.*, 2015). Hence, by providing first aid training to all childcare providers will indirectly contribute to promoting children's development. This is the first study in Malaysia that aims to determine the effects of First Aid Training and Certification for Childcare Providers (FAT4CP©) programme on the knowledge, attitude and confidence among childcare providers in Negeri Sembilan, Malaysia.

MATERIALS AND METHODS

This is a cross-sectional study carried out among childcare providers in Negeri Sembilan. Ten childcare centres volunteered to be part of the FAT4CP© programme where each of the centres enrolled five to six of their permanent staffs as participants. Inclusion criteria include childcare providers in registered childcare centres in Negeri Sembilan, have never received any training on first aid or cardiopulmonary resuscitation (CPR), level of comprehension of at least secondary school, and have at least one year experience as a childcare provider. Exclusion criteria include those with any heart conditions or diagnosed with any terminal diseases. A standardised self-administered KAC questionnaire was given to all participants prior to starting and after receiving the programme to assess the effectiveness of the programme.

Table 1: Number of participants with good knowledge for each tested first aid items

No	Knowledge Questions(For each of the item below, the answer is either True or False)	Participants with correct knowledge (%) Pre-test *n*=54	Post-test *n*=54	$\chi 2$	-value
1	The main cause of epistasis in children is caused by tumour/cancer in the nasal cavity.	48 (92.2)	47 (92.1)	29.6	<0.001*
2	Usage of ear digger is recommended to clean dirt in the ear hole.	31 (63.4)	42 (83.0)	15.2	<0.001*
3	Adults are more prone to hypothermia than children.	34 (66.2)	46 (82.2)	2.6	0.106
4	All snakebites are poisonous.	40 (82.2)	42 (83.3)	13.3	<0.001*
5	'Jaw thrust' technique should be performed if the child's respiration is blocked during head injury rescue.	38 (76.8)	37 (73.5)	6.5	0.01*
6	Urinating less than normal is a sign of dehydration in children suffering diarrhoea.	43 (81.9)	44 (83.7)	18.6	<0.001*
7	Seizures can occur even in normal body temperature.	28 (55.4)	34 (76.2)	9.2	0.002*
8	Drinking water is safe for heat strokes victim.**	18 (35.2)	14 (24.2)	12.3	<0.001*
9	Victim who got electrocuted is at risk for bone fracture.	24 (46.1)	36 (70.0)	5.4	0.02*
10	Body temperature of dengue patient is normal during the critical phase.	20 (36.1)	29 (58.9)	5.8	0.02*
11	In case of an open wound, tightening the wound area is needed to stop bleeding of the wound.	27 (51.2)	42 (78.7)	6.9	0.009*
12	Cold water is used for sponging in children with hot fever to reduce their body temperature.	18 (27.2)	33 (60.7)	11.5	0.001*
13	Standing under the hot sun may cause fainting in children.	39 (91.2)	52 (98.0)	4.1	0.04*
14	Allergic to certain substance may cause shortness of breath.	45 (86.7)	49 (93.3)	7.5	0.006*
15	Flowing tap water on burnt wound can reduce injuries and pain at the area.	48 (84.6)	53 (98.6)	8.2	0.004*
16	The compression: ventilation ratio is 30:2 for one rescuer in children/infant CPR. **	34 (58.8)	19 (25.5)	5.7	0.02*
17	Rescue breathing for children/infant with a pulse of more than 60 beats/ minute is 12–20 breaths per minute. **	27 (43.6)	18 (30.0)	3.9	0.04*
18	Heimlich manoeuvre should be performed to all choking victims.	16 (31.4)	32 (65.7)	4.6	0.03*
19	Check for a pulse after complete 5 cycles of CPR.	25 (43.1)	31 (58.9)	17.8	<0.001*
20	Swollen wrists due to fall should be wrapped with warm towels to reduce the swelling.	17 (38.6)	37 (78.2)	2.2	0.14

*Pearson X^2 squared test significant to the level of $p<0.05$.
**Items that resulted inlower post-training scores compared to pre-training.

Table 2: Number of participants with a good attitude for each tested first aid items

No	Attitude Question(For each of the item below, the answer is either Agree or Disagree)	Participants with a good attitude (%) Pre-test *n*=54	Post-test *n*=54	$\chi 2$	-value
1	I will bring children under my care immediately to the hospital if they experienced vomiting after falling off from the cradle.	54 (100)	53 (97.6)	51	<0.001*
2	Children suffering from severe diarrhoea should be taken to the hospital.	52 (94.6)	52 (93.7)	0.1	0.78
3	I think children are at high risk to get heat stroke based on climate and weather in Malaysia.	43 (76.5)	39 (75.2)	20.1	<0.001*
4	Maintenance of electrical appliances is essential to avoid accidental electric shock.	53 (98.9)	52 (96.2)	26.5	<0.001*
5	When a child experiences convulsions, I will insert the object into his/her mouth to avoid the child from biting his/her own tongue.	15 (27.8)	38 (70.4)	7.5	0.006*
6	All child caregivers need to be trained to handle children with fever.	53 (98.9)	53 (98.9)	26.5	<0.001*
7	All child caregivers need to understand the cause of fainting among children.	54 (100.0)	52 (96.2)	-	-
8	I will bring the child to the hospital immediately in the incidence of genital area burnt.	53 (98.0)	51 (92.2)	17.3	<0.001*
9	All childcare providers need to know how to do CPR and respond to emergency situations.	54 (100.0)	54 (100.0)	-	-
10	Early treatment can only be done at the health centre.	19 (30.5)	39 (22.7)	16.4	<0.001*
11	I will give an asthma reliever called metered dose inhaler if the child has an asthma attack.	38 (76.2)	48 (82.0)	18.1	<0.001*
12	I think the case of hyperthermia can be managed at the nurseries without referring to healthcare centres.	12 (24.2)	13 (24.6)	9.9	0.002*
13	I need to have a clear knowledge of handling snake bite cases.	53 (98.0)	52 (96.0)	17.3	<0.001*
14	I think all child caregivers need to know about the risks, complications and emergency treatments for an ear injury.	52 (98.9)	53 (99.0)	26.5	<0.001*
15	I need to know the cause and prevention measure for hypothermia.	54 (100.0)	54 (100.0)	-	-

*McNemar's X^2squared test significant to the level of p <0.05

Training and certification of first aid are based on the readily available FAT4CP© module that was developed and copyrighted by a group of specialists from the Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (Juliana *et al.*, 2018). The module involves a three-day training; the first day focuses on CPR and choking for adult and paediatric victims, the second day is designed for first aid response on trauma cases, while the third-day training is focused on non-trauma cases. Certification for the childcare providers was given based on the result of standard practical and theory examinations after completion of the programme.

The KAC questionnaire was prepared and validated to be a standard tool to assess KAC of participants in the FAT4CP© programme. The questionnaire assesses KAC of the three major training areas which are CPR, first aid on trauma, and first aid on non-trauma cases. The validity of the questionnaire was determined via a pilot study conducted among the same population prior to starting the FAT4CP© courses. Appropriate amendments were made to the initial questionnaires to ensure the childcare providers received optimum comprehension on the questionnaire provided. The Cronbach's alpha of knowledge (α: 0.78); attitude (α: 0.89); confidence (α: 0.94) showed good internal consistency.

The categorical data obtained from each question were analysed using McNemar's chi-squared test (χ^2). Each domain was further cumulatively scored based on the full score of each domain; Knowledge is 20, Attitude is 15 and Confidence is 10. The Wilcoxon-signed Rank test was used to determine the difference of median score and percentage for each domain before and after FAT4CP© training. The significance was set at p<0.05. Data analyses were performed using the IBM Statistical Package for the Social Sciences (SPSS) software version 24.0 (USA).

RESULTS AND DISCUSSION

Ten childcare centres governed by the Negeri Sembilan Childcare Centre Association took part in the FAT4CP© programme conducted from April until August 2017. 54 caregivers that met the inclusion and exclusion criteria participated and completed all parts of the programme. Each childcare giver attended three compulsory courses to be eligible for CPR examination and post-KAC questionnaire.

Table 1 represents the responses of participants who tested their knowledge before and after the training. Our results indicated 17 knowledge items improved after the training, however, three knowledge items received contrary result with post-training scores lower than pre-training. Post-FAT4CP© training also produces a conspicuous rise of good attitude and confidence among the childcare providers as demonstrated in Table 2 and Table 3.

The total score of KAC results significantly differ prior to starting the programme and after completion of the programme (p<0.05) in the knowledge and confidence domains (Table 4). There is a 12.5% increase for the participants' knowledge which subsequently results in a 20% increase in their confidence to conduct first aid during emergency situations. The childcare providers' attitude remained indifferent which shows their good attitude towards first aid response in spite of their knowledge and training provided.

Children are prone to unintentional injuries which may result in death. Thus, childcare personnel is responsible for a very challenging task to provide a safe environment for children under their care and should be competent in managing any situations of emergencies. Reports since the 1980s have suggested that incidence of injuries at childcare centres are preventable and manageable by appropriate training and/or education on first aid management (Waibel and Misra, 2003; Ulione and Dooling, 1997; Chang *et al.*, 1989). Several trainings were made compulsory for them which varies based on the requirements of each country (Baker *et al.*, 2008). Training includes health and safety, fire safety, infection control and early children education. Currently, in Malaysia, the training to instil knowledge and practice of first aid response among childcare providers have not yet been made compulsory. The increasing trend and variety of injuries among children at childcare centres is an alarm to identify the capability of caregivers in managing such a situation (Blau and Currie, 2006).

Based on our initial KAC result prior to the FAT4CP© programme, all childcare providers reflected moderate knowledge, attitude and confidence on first aid response. Studies from other Asian countries such as China and Australia also demonstrated inadequate knowledge among childcare providers on first aid response in cases of emergency at childcare centres (Waibel and Misra, 2003; Soo and Tan, 2014). The prevalence of children caregivers in Singapore that received formal training on first aid response are low; 80% of them did not attend any first aid courses (Thein *et al.*, 2005). The initial state of knowledge among our subjects revealed that the baseline trainings received by the caregivers do not effectively address proper first aid management. Thus, the situation may impair the efforts on reducing the incidence of child injury that leads to mor-

Table 3: Number of participants with good confidence for each tested first aid items

No	Confidence Questions (For each of the item below, the answer is either Agree or Disagree)	Participants with confidence (%)		X2	-value
1	I am confident that I can give early emergency treatment if a child has a nose bleed.	51 (94.4)	51 (94.4)	22.6	<0.001*
2	I am confident to handle the situation of snake bite against children.	27 (50.0)	37 (68.5)	2.2	0.14
3	I am confident that I can handle the situation of a child having seizures.	34 (63.0)	42 (77.5)	5.8	0.02*
4	I am confident to do CPR if an electrical shock victim is unconscious and does not breathe.	29 (53.7)	35 (64.8)	3.4	0.07*
5	I am confident that I can provide accurate emergency first aid for neck injury cases.	29 (53.7)	43 (79.6)	7.0	0.008*
6	I am confident to handle a situation when a child fainted.	43 (79.6)	46 (85.2)	26.1	<0.001*
7	I am confident to handle children suspected with dengue fever.	36 (66.7)	43 (79.6)	14.6	<0.001*
8	I am confident that I can give metered dose inhalers to children with asthma attacks.	45 (81.5)	51 (94.4)	4.9	0.03*
9	I believe that I can handle children who suffered from burns caused by hot water.	45 (81.5)	53 (98.1)	4.5	0.03*
10	I am confident to perform the Heimlich manoeuvre.	31 (57.4)	44 (81.5)	7.0	0.008*

*McNemar's X^2 squared test significant to the level of p <0.05

Table 4: Total scores of knowledge, attitude and confidence on first aid response among the childcare providers.

	Pre-Intervention Median (IqR)	Post-Intervention Median (IqR)	Z-Stats	p-value
Knowledge				
Total score	11.5 (4.0)	14.0 (3.3)	-4.6	<0.001*
Percentage score	57.5 (20.0)	70.0 (16.3)	-4.6	<0.001*
Attitude				
Total score	12.0 (1.0)	12.0 (1.3)	-3.3	0.001*
Percentage score	80.0 (6.7)	80.0 (7.8)	-2.998	0.003*
Confidence				
Total score	7.0 (4.3)	9.0 (3.0)	-3.6	<0.001*
Percentage score	70.0 (42.5)	90.0 (30.0)	-3.6	<0.001*

Wilcoxon - signed Rank *significant to level of p <0.05.

bidity or mortality.

Approximately 20% of the caregivers who underwent the FAT4CP© programme experienced emergency situations involving children under their care. Among the common emergencies include asthmatic attack, nose bleed, falls, choking and sudden spike of temperature due to fever. Based on the common emergencies reported, it is concerning that their initial response to items 12 and 18 reflect their common practice in handling children with fever and choking may cause unintentional hazards to the victims. (Olympia, 2005) described that children are always exposed to multiple types of injuries or emergencies at childcare centres and schools regardless of the prevention measures taken. Realising this fact, American Academy of Paediatrics and the American Heart Association has published guidelines emphasising the need for schools to establish emergency-response plans to deal with life-threatening medical emergencies among children (Sj *et al.*, 2002). However, most of the policies focus only on implementing first aid education at school while first aid education at the childcare centre is still inexplicit.

Results of post-FAT4CP© training showed a significant increase in all domains of the KAC, the most conspicuous being their confidence to perform first aid response. Increased in confidence is a positive sign for a successful immediate response during any emergencies since life-threatening incidence can occur in any centres at any time. The caregivers should be able to establish emergency response before receiving proper treatment in hospitals (Hazinski *et al.*, 2004). The three-day training programme has also successfully increased their knowledge on first aid response from 57.5% to 70.0%. Despite the significant increase, it has not reached the recommended level of the American Academy of Pediatrics of at least 80% for knowledge on pediatric first aid (Başer *et al.*, 2007). This may have resulted from the three months gap between the programme to the post-training KAC test. Knowledge of water consumption in response to heat strokes and CPR procedures are part of the knowledge that was not retained after three months of post-FAT4CP© training. The common sense of a layman without any medical background is that it's best to give water to those having any problems related to heat without realising the harmful implications. CPR, on the other hand, is an intricate procedure with two distinct components; paediatric and adult CPR. Realising the complexity to perform a CPR procedure especially by a layman, recent guidelines recommend the maintenance of quality chest compression. This is important because sufficient first aid response is required in the event of out-of-hospital cardiac arrest (Brady *et al.*, 2017). Based on these findings, future FAT4CP© training will take into account the specific areas that must be emphasised. In addition to the guideline, this study is in agreement with suggestions by (Singer *et al.*, 2004) that knowledge on first aid must be refreshed from time to time. Furthermore, it will be beneficial that information on first aid response is made readily available and visible at all childcare centres at all times.

CONCLUSIONS

There is an urge to implement first aid training programmes such as FAT4CP© as part of the compulsory courses for all caregivers. This study has shown that FAT4CP© programme successfully provided a platform to increase knowledge, attitude and confidence of childcare providers in dealing with cases of emergencies at their centres. Maintenance of knowledge on the other hand also requires refresher courses to be conducted periodically.

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