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# Enrolment of Schools Teachers in Heat Stress Management Plan Targeting Vulnerable Dubai Schooling Kids, An Exercise in Community Engagement, Empowerment and Mobilization

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## Abstract

**Background:** Dubai has well recognized hot and humid weather during the period extended from May up to October (6) months out of each the year. Which put the entire population at the risk of exposure to heat stress when they are practicing outdoor activities during their routine work at their workplaces every day? Furthermore, the kids are most fragile segment of population borne to develop heat stress incidents if measures to avoid such exposure have not been put in place properly

**Objectives:** To assess the capacity building module on heat stress among Dubai school's teachers, to study assess the extent of trainee's response to heat stress at their facilities.

**Methodology:** Enrolment and follow up of trainee's cohort from Dubai schools within capacity building module on heat stress management at workplace has been carried out on a total of 57 teachers and nurses working at Dubai private school's physical education teachers and science teachers a long with school nurses. Well-developed capacity building module has been prepared and accredited by School Health department and public health department included theoretical part on heat stress and its related sequences in terms of mortalities and morbidities, as well as an approach to prevention and control, followed by practical demonstration and on life training sessions on steps of managements and levels of response. One full day training coverage along with initial written and verbal assessment and final written and verbal assessment based on scoring and scaling measurements. The training exercise has been standardized with the best practice training modules applied worldwide.

**Results:** The study reflected that about 50.8% of the total contributors to the heat stress capacity building module were school's teachers whom having direct supervision responsibilities with outdoor student's activities, and 15%

of the trainees were teachers of physical education, in total of 65% of the trainees were school teachers. The study showed that about 22% of the enrolment in capacity building was other school staff including administrators and other schools operating staff, the grant total of the trainees was 87.8%. The current study concludes that 7% of the total participant who are not ever limits outdoor activities which is in the coolest part of the day associated towards before capacity building program and 35.1% of the participants never carrying out a heat stress awareness program in your school, about 33.3% were un able to recognize and never seen a child with signs and symptoms of Heat stress in school. About 29.9% never received any training or awareness on heat stress, 5.3% never applied preventive measures/procedures against heat stress in their schools.68.4% they were in favour of giving cold soda drinks to prevent heat and 61.4% were in favour of giving hot tea/coffee to prevent heat stress. The study showed improvement in heat stress management score among the participant in relation to (When children are playing outside in hot and humid weather the recommended drink to give). (I would call 999, if I see the child's body is recognition of high air temperature. If a child gets unconscious while playing outside, immediately give cold water) and recognition of signs of heat stress adequately).

**Conclusion:** Workers have been suffering from illness related to heat because increasing heat exposure is becoming the challenges to them. However, the extreme hot environments are very dangerous to workers, who exposed to extreme heat. They are at high risk of the heat stress. The workers are unknown about heat exposure from the workplace and high influence of heat, so they are suffered from the underreporting of heat illnesses. Meanwhile, the lack of awareness about heat exposure associated with increase the risk of work-related injuries.

**Recommendations:** As heat stress can be lethal and it is 100% preventable using common sense, thus developing competent school based heat stress prevention and management capacity building module at school's

facilities is very vital and highly and high returns initiative with affordable cost.

**Keywords:** Heat stress; Capacity building; Schools; Teachers; Dubai

## Introduction

Dubai has well recognized hot and humid weather during the period extended from May up to October 06, months out of each the year. This put the entire population at the risk of exposure to heat stress when they are practicing outdoor activities during their routine work at their workplaces every day, Furthermore the kids are most fragile segment of population borne to develop heat stress incidents if measures to avoid such exposure have not been put in place properly. Whenever, the temperatures and humidity are high, that is associated to increase the risk of Heat stroke increase the chance of 1. Difficulty in intake of fluid 2. Decrease in the respiration rate as well. So, there is need to give attention in sports environment while playing under the blazing sun or in closed gymnasiums. The workers or players should take sufficient fluid that result in the replacing losing salt in the body. Additionally, If the patient with impaired consciousness, so immediately should take care of that patient by giving emergency medical treatment with heat stroke, heart disease, and cranial nerve dysfunction in mind.

Extremely hot weather contributes to excess morbidity and mortality in the community [1]. Most of the extreme heat-related research has traditionally focused on vulnerable populations including the elderly, children and patients with chronic diseases and those on certain medications [2]. Extremely hot weather also associated to many types of indoor and outdoor manual workers at increasing risk of illness related to the heat and injuries [3,4].

The prediction by the casualty doctors are 1. The incidence of heat-related illnesses in the UAE, where temperatures increases more than 50°C in summer, are comparatively lower than countries experiencing a heatwave at 41°C or lower. 2. There are so many factors required for the low incidence including the people who are mainly have indoor lifestyle with air-conditioning. So, if they are meet some gradual changes in temperature, their body required some time to adjust and the protection is important getting to the workers in the summer because of mid-day breaks [5,6].

Warm thermal conditions inside or outside school classrooms during heating periods, it is come to know that, if the temperature is increased inside the classroom, the productivity of the learning children are going to decrease [7,8]. The thermal conditions inside a building are determined by the interactions between the external climate and the building, the building shell and the internal space and the internal space and the occupants

Consequently, regarding the parameter of increasing temperature that influence the risk which is associated to overheating in buildings are:

The outdoor environmental conditions, i.e., Air temperature; Rainfall; Relative humidity; Solar radiation; Wind velocity.

The microclimatic profile i.e., the local scale climate which influence to the nearby surfaces (Albedo, Thermal capacity); Topography; Vegetation; Soil structure and urban form (Industrial processes, Transportation, Buildings, Human metabolism) [9].

The building structures, i.e., the geometric relations (Envelope area to volume ratio, building height) which determine the building's exposure to solar radiation and the ambient air [10].

The building fabric properties, i.e., the thermo-physical properties of its construction materials (U-values, G-values, Thermal capacity).

Internal gains, i.e., the sensible and latent heat produced by human bodies, lighting, computing and office equipment, electric motors and appliances [11].

## Objectives

To assess the capacity building module on heat stress among Dubai school's teachers, to study assess the extent of trainee's response to heat stress at their facilities

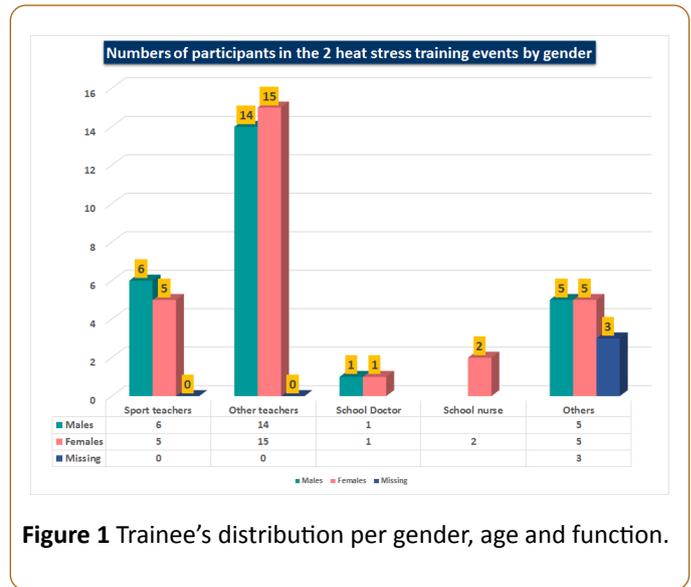
## Materials and Methods

Enrolment and follow up of trainee's cohort from Dubai schools within capacity building module on heat stress management at workplace has been carried out on a total of 57 teacher and nurses working at Dubai private school's physical education teachers and science teachers a long with school nurses. Well-developed capacity building module has been prepared and accredited by School Health department and public health department included theoretical part on heat stress and its related sequences in terms of mortalities and morbidities, as well as an approach to prevention and control, followed by practical demonstration and on life training sessions on steps of managements and levels of response. one full day training coverage along with initial written and verbal assessment and final written and verbal assessment based on scoring and scaling measurements. The training exercise has been standardized with the best practice training modules applied worldwide.

## Results

The study reflected that about 50.8% of the total contributors to the heat stress capacity building module were school's teachers whom having direct supervision responsibilities with outdoor student's activities, and 15% of the trainees were teachers of physical education, in total of 65% of the trainees were school teachers as shown by **Figure 1**. The study showed that about 22% of the enrolment in capacity building was other school staff including administrators and other schools operating staff, the grant total of the trainees was 87.8%. The study findings showed

that about 7% of the total participant never limits outdoor activities to the coolest part of the day before capacity building program and 35.1% of the participants never carrying out a heat stress awareness program in your school, about 33.3% were un able to recognize and never seen a child with signs and symptoms of Heat stress in school. About 29.9% never received any training or awareness on heat stress, 5.3% never applied preventive measures/procedures against heat stress in their schools.68.4% they were in favour of giving cold soda drinks to prevent heat and 61.4% were in favour of giving hot tea/coffee to prevent heat stress as shown by **Table 1**. The study showed improvement in heat stress management score among the participant in relation to (when children are playing outside in hot and humid weather the recommended drink to give). (I would call 999 if I see the child's body recognition of High air temperature if a child gets unconscious while playing outside, immediately give recognition of Signs of heat stress adequately) (**Figure 2 and Table 2**).



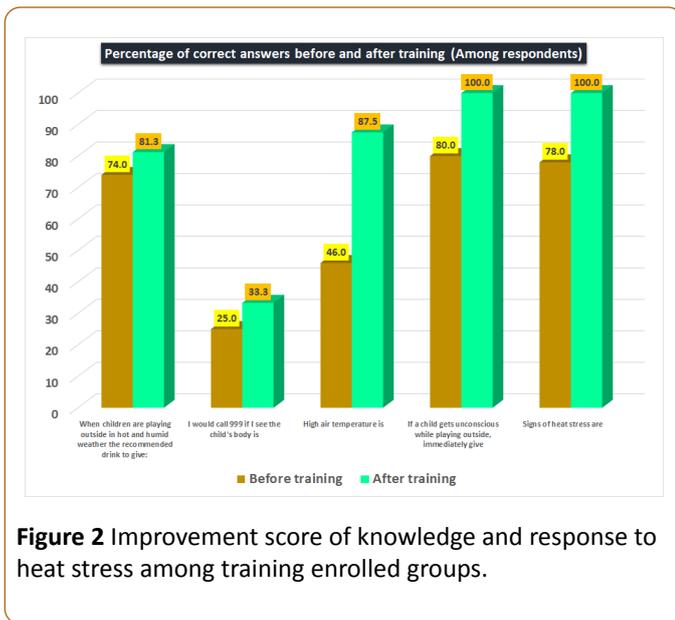
**Figure 1** Trainee’s distribution per gender, age and function.

**Table 1** Knowledge status of trainees on health stress management at school’s facilities in Dubai.

Questions	Percentage %		
	Always	Sometimes	Never
Do you promote regular intake of water especially during outdoor activities?	96.5	3.5	--
Do you limit outdoor activities to the coolest part of the day?	42.1	49.1	7.0
Do you have shaded covered areas for children playing outdoors?	63.2	35.1	--
Do you educate and inform children about sun protection and safety in the sun?	70.2	28.1	--
Do you educate and inform children about sun protection and safety in the sun?	19.3	42.1	35.1
Do you educate and inform children about sun protection and safety in the sun?	8.8	56.1	33.3
Do you educate and inform children about sun protection and safety in the sun?	15.8	49.1	29.8
Are there preventive measures/procedures against heat stress in your school?	43.9	43.9	5.3
Do you offer breaks in between when children are playing outdoor?	80.7	14.0	--
Are you in favour of giving cold soda drinks to prevent heat stress?	5.3	19.3	68.4
Are you in favour of giving hot tea/coffee to prevent heat stress?		5.3	61.4

**Table 2** Score of trainee’s assessment pre and post training sessions.

Correct response to heat stress statements by trainees	Before	After
When children are playing outside in hot and humid weather the recommended drink to give:	74.0	81.3
I would call 999 if I see the child's body is	25.0	33.3
High air temperature is	46.0	87.5
If a child gets unconscious while playing outside, immediately give	80.0	100.0
Signs of heat stress are	78.0	100.0



**Figure 2** Improvement score of knowledge and response to heat stress among training enrolled groups.

## Discussion

The study showed that, enrolment of teachers in heat stress management plan at school atmosphere has significant impact on management outcomes in terms of effectiveness, cost, time and effort saving, this has been approved in similar studies carried out in Japan, as per the statistics result of Japan Sport Council (NAASH), 133 cases of accidental death because of heat stroke occurred in Japan, under school supervision between 1975 and 2009. Most of the cases were related to baseball, followed by rugby, football, judo, kendo, mountaineering, and track and field, showing that indoor sporting events also require cautions [12]. On June 13, 2003, a hot, humid day, a member of a junior high school sumo wrestling club in Akita Prefecture died of heat stroke during training at indoor facilities. In gymnasiums, however the convection flow is relatively small, so there is need of the especial care to take while playing table tennis, care associated to close the doors and windows while playing badminton, and kendo and fencing. The player should wear protective gear so it avoids their facial expressions from being seen clearly. Meanwhile, doors and windows need to be opened for not only official matches but also outdoor sporting to enhance ventilation. Trainer should be case care of time of playing in early morning and evening that can be hot and humid with no breeze. Because, heat stroke can be occurred very frequently with the conditions associated to temperatures and humidity are high. So, that creates a demanding situation to patient 1. The patient is not possible to take fluid 2. Respiration rate is also going to decrease. So, there is need to take care while jogging under a blazing sun (baseball, football, etc.), at that is what the teachers enrolled in this study already gained during training courses, also need to take care not only on the sunny days with no wind for the activities on the ocean but also activities of sports in closed gymnasiums (kendo, judo, table tennis, badminton, etc.). Take immediate action while suspecting heat stroke. The person feels to suspected heat stroke that time he is fully conscious, so that time should be

given chilly water to decrease temperature of their body and should be rested in a cool in well-ventilated place where, under shade of a tree. One can should sprayed cool water on the face using an atomizer until they begin to shiver so that decreases in generating insensible perspiration. The human body can adjust low temperatures but not going to tolerate elevated temperatures. So, should keep, wet towels and ice packs on head that associated to characteristic of sending cool blood to the brain should be placed against the person's head to cool the internal carotid arteries leading to the brain. As well-known cause that difficulty in taking of fluid consciousness level is unstable, active treatment such as intravenous drips are necessary. So, the person should be transported to a casualty by ambulance. The person should take rest for the several days to recovery. He can do light exercise in a cool place with increasing load of exercise gradually. There are so may chance of reoccurrence of heat stroke to the person who experienced before. However, symptomatically it is very difficult to distinguish heat stroke from other conditions, such as hyperventilation syndrome. So, the person presents with impaired consciousness, in this case the patient should be transported to hospital for emergency medical treatment as quickly as possible with heat stroke, heart disease (arrhythmia) [13-18].

Here, the current study showed that the trainees enrolled came to recognize and utilized sufficient amounts of water, should to decrease the intake of caffeine like tea and coffee, sports drinks, should brought towels, mobiles and telephones to the venues of sports are being played. If the sports are played for long time so on these locations should use of devices such as heat stroke risk monitors and thermometers. The sports people are recommended Consuming Fluids in Hot Environments If the body desires fluids, no limitations should be set. If 2% of body weight is lost (1 kg for a person weighing 50 kg), the person should be made to consume fluids, even if they resist. Drinking copious amounts of water is not a problem, seen clearly. Except for official matches, doors and windows need to be opened to enhance ventilation. For outdoor sporting events, too, training should be concentrated in the early mornings and evenings after dusk on days that are hot and humid with no breeze. Heat stroke occurs easily under conditions where temperatures and humidity are high, fluid intake is difficult, and there is no movement of air. So, there is special need to take care while jogging under a blazing sun (baseball, football, etc.) and not only activities on the ocean on sunny days with no wind but also sporting activities in closed gymnasiums (kendo, judo, table tennis, badminton, etc.).

## Conclusion

Injuries and heat-related illnesses is becoming challenge to worker because of heat exposure. Manual workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. The potential impacts of workplace heat exposure are to some extent underestimated due to the underreporting of heat illnesses and the lack of awareness that heat exposure can increase the risk of work-related injuries.

## Recommendations

As Heat stress can be lethal and it is 100 per cent preventable using common sense, thus developing competent school based health stress prevention and management capacity building module at school's facilities is very vital and highly and high returns initiative with affordable cost a module including "enhancing knowledge, upgrading skills of teachers, investing in indoor activities at hot seasons, drinking cool and safe water could prevent people from being affected by heat stress. "Eating a salty cracker for breakfast can cut out the need to drink any electrolyte drink

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