



Safety in the Heat: A Comprehensive Program for Prevention of Heat Illness Among Workers in Abu Dhabi, United Arab Emirates

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The Safety in the Heat program was developed in response to the extreme heat stress conditions experienced by workers in the United Arab Emirates and other Middle Eastern countries each summer, where ambient air temperatures often reach 45°C (135°F) and higher with 90% humidity. A comprehensive, multi-media, economical education and awareness program targeting companies in the region was developed; 465 companies employing 814 996 heat-exposed workers across 6254 work and labor residence sites were reached. Feedback from program participants indicated a high level of support and satisfaction. Results indicated a marked reduction in heat related illness over a period of 2 years (2008–2009) at 2 companies, one of which reported a combined 79.5% decrease in cases (15.3 vs 1.16 cases per 1000 workers) while the other experienced a 50% reduction in serious cases (0.08–0.04 cases per 100 000 work hours). (*Am J Public Health*. 2011;101:395–398. doi:10.2105/AJPH.2009.189563)

KEY FINDINGS

- Initial data suggests a high level of support, satisfaction, and uptake by participating target groups.
- Some evidence of a reduction in heat-related illness with a low per-capita investment per worker and worksite.
- It is effective to work with public and academic (e.g., universities) and private (e.g., media companies) partners to achieve a clear outcome.

OUTDOOR WORKERS IN

Abu Dhabi, United Arab Emirates (UAE), and other Middle Eastern countries are exposed to significant heat stress during the summer months (Figure 1). There is often a lack of practical awareness among employers, supervisors, and health, safety, and environment (HSE) personnel regarding the risk factors of heat stress and the precautions that protect workers from exposure, which can result in heat illness, heat stroke, and occasionally death. An attempt to address the problem was made by the UAE Ministry of Labor in 2007 by enforcing work stoppages in construction during July and August, 2 of the hottest summer months, between 12:30 PM and 3 PM;

however, this measure is purely a time-based approach and does not take into account the actual environmental exposure conditions (i.e., air temperature and movement, humidity levels, and workloads).

In response to the need to take a more sophisticated approach to the issue, the Health Authority of Abu Dhabi (HAAD) created the Safety in Heat program, which refined and validated a novel heat stress index, the Thermal Work Limit (TWL)¹ for use in the region. As part of the program, HAAD disseminated information regarding the prevention of heat stress by preparing simple, targeted materials for mass distribution to migrant workers who speak a wide range of languages. In addition, a practical toolkit was developed to educate supervisors, company HSE personnel, and employers and owners. All of these materials were developed based on research conducted in the UAE.² A media company was engaged to assist in the development of the final toolkit, which was then tested and distributed by HAAD. Promotional materials were mailed to 600 large companies (defined as those with more than 100 employees) in the UAE to encourage participation; a Web site in English and Arabic that

offered further information and the opportunity for companies to register was also developed and released to the public at the launch of the program.

PHASED APPROACH

A staged approach was used for the project, with an initial 2-year research phase focused on the refinement and validation of key elements, including the TWL index. Final development and implementation were completed through 5 additional phases (Table 1).

RESOURCE DEVELOPMENT AND DISSEMINATION

During the implementation phases of the program, 4 main groups were targeted: workers, supervisors, HSE personnel, and employers and owners. The final materials and resources that were provided are described in Table 2, which also enumerates the amount of materials distributed during the initial program and provides more information regarding target groups, languages available, and key messages and intent.

The program received widespread media coverage over the summer of 2008, with 4 mentions during television news



Location of Abu Dhabi Emirate, United Arab Emirates.

Source: Wikipedia. Both the globe and the map were adapted from Wikimedia Commons, a freely licensed media file repository. Available at http://en.wikipedia.org/wiki/File:Blank_globe.svg and http://en.wikipedia.org/wiki/File:United_Arab_Emirates_location_map.svg. Accessed January 26, 2011.

programs, 2 segments in current affairs programs, and 13 newspaper articles about the program, all of which helped increase awareness and company registrations.

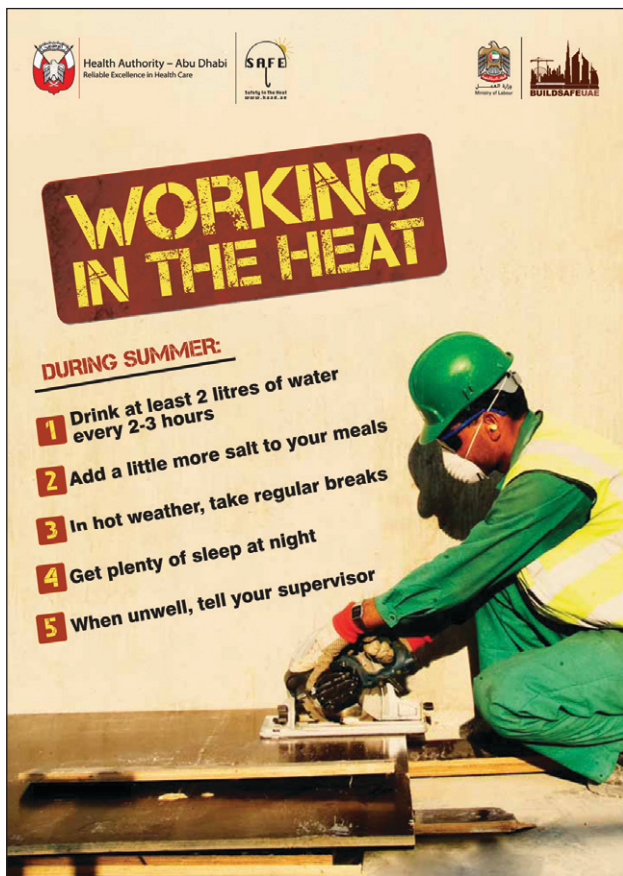
DATA COLLECTION

Program evaluation was based on input metrics (dissemination of materials), process metrics (company registrations, and an online survey for companies and HSE personnel), and health outcomes of workers, provided by 2 large participating companies that maintained occupational health-related statistics.

RESULTS AND DISCUSSION

Uptake was high, with 465 companies registering (mainly in the construction field, n = 285; 61%), all of which in total employed 815 000 workers across 4460 worksites and 1794 labor residences. The majority of registered companies were from Abu Dhabi (n = 354; 76%), 18% were from other emirates in the UAE (n = 85) and .5% were from other Middle Eastern countries (n = 12).

Two large companies in Abu Dhabi that were able to provide internal occupational health statistics indicated a significant decrease in heat-related cases in



Example of Awareness Poster Developed in Multiple Languages.

Source. Health Authority of Abu Dhabi Safety in the Heat program.



Example of Hydration Awareness Materials Developed in Multiple Languages.

Source. Health Authority of Abu Dhabi Safety in the Heat program.

2009 compared with 2008: 1 company, with 1371 workers, experienced a 79.5% decrease in heat-related treatment and emergency cases (15.3 vs 1.16 cases per 1000 workers) while the other, with 51 million man hours worked in 2009, had a 50% reduction in serious cases (0.08–0.04 cases per 100 000 work hours).

Company representatives and HSE personnel (n = 142; 30% response rate) showed high satisfaction with the program, with 79.6% rating it as “very good” or “excellent,” and 76% satisfied they had “received adequate materials for their needs.” In addition, the majority of responding HSE personnel rated the response of management, safety officers, and workers to the program as 93.9%, 95.5% and 93.8% in the “good to excellent” range, respectively. The top 3 awareness materials rated “helpful to very helpful” were posters (97.4%), illustrated workers pamphlet (89.5%), and the urine explain posters (87.7%), which explain how urine color can be used to monitor personal hydration levels. No feedback on recall and awareness was elicited directly from workers. Program evaluation was undertaken 6 months

TABLE 3—Research, Development, and Implementation Expenditures for the Safety in Heat Program

Item	US \$
Research	194 495
Health promotion materials	224 515
Launch function and pilot testing phase	17 872
Total	436 882

TABLE 1—Phases of Final Development and Implementation for the Safety in Heat Program

Phase	Element	Timeline
1	Development of draft health promotion materials	December 2008–January 2009
2	Pilot of implementation in 2 large companies (1 oil and gas, 1 construction), plus evaluation	February 1–12, 2009
3	Evaluation of media and health promotion materials from phase 1; refinement for next phase; program launch	March–May 2009
4	Full implementation across identified heat stress priority sectors (including oil and gas, construction, agriculture, manufacturing, and transport)	May 20–October 15, 2009
5	Final program evaluation (online survey)	October 2009

TABLE 2—Resources and Materials Provided for the Safety in Heat Program

Item	Target Group Involved	Key Messages/Intent	Languages	Items Disseminated
Posters	Workers	Increase fluid intake, increase salt intake, take regular breaks, notify supervisor, get plenty of rest	English, Arabic, Hindi, Urdu, Malayalam	13 250
Illustrated pamphlets	Workers	As above plus check urine color, eat well	English, Arabic, Hindi, Urdu, Malayalam	36 370
Awareness video (DVD)	Workers	General awareness of heat hazard, symptoms, precautions, and emergency measures	English, Arabic Hindi, Urdu, Malayalam	640
Pamphlets	Supervisors	General awareness of heat hazard, symptoms, precautions, and emergency measures	English, Arabic, Hindi, Urdu, Malayalam	27 150
Technical information pack (procedure and training manual, technical information sheets, training and awareness video [DVD])	Supervisors, HSE personnel	Technical information on environmental evaluation, factors in heat stress and illness, TWL index details, resources, etc	English, Arabic	640
Roll-up banners	Employers	Create and maintain awareness of key issues as per posters	English, Arabic	102
Web sites	Employers, HSE personnel	Registration into program, information and resource provision	English, Arabic	NA
Branded cooler for small companies ^a	Employers	Encouragement for small companies to register in program	English, Arabic labels	92
Mailing	Employers	Encouragement for large companies to register in program	English, Arabic	> 600

Note. TWL = Thermal Work Limit, HSE = health, safety, and environment; NA = not applicable.

^aLess than 50 employees.



Example of Use of Awareness Posters in Multiple Languages at Construction Site in Abu Dhabi.
Photograph by Darren Joubert.

after the launch, which coincided with the end of the summer months in Abu Dhabi.

Table 3 provides a breakdown of the expenditures of the program. Although a formal cost effectiveness study was not completed, the cost of interventions was low (< US\$ 0.50 per person covered or US\$ 69.85 per workplace or labor residence facility), and employers incurred no direct costs.

The program was intended to limit heat-related illnesses through the widespread implementation of a novel approach to evaluating heat stress: the TWL. A practical toolkit was created for use in all sectors, although time constraints for development

meant that only construction images were used in the materials, potentially limiting uptake in other sectors. This issue will be addressed in future versions. In addition, program evaluation was limited by a lack of systematic baseline data on heat-related illness; this issue will also be addressed going forward in Abu Dhabi with the implementation (in 2011) of an injury surveillance system within hospitals.

NEXT STEPS

The campaign will be repeated annually in preparation for the summer; subsequent campaigns will maintain the core content, but evolve the materials. For

example, the 2010 campaign will include: (1) TWL training for supervisors and HSE personnel, and promotion of the online TWL calculator (available at <http://www.haad-safe.ae>); (2) increased efforts to engage companies across additional sectors, especially small businesses; (3) additional languages for worker materials and redesign of some items; and (4) monitoring of program effectiveness through a hospital-based injury surveillance system. ■

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Contributors

D. Joubert led the writing and submission of the article. J. Thomsen and O. Harrison provided materials for the drafts as well as additional review and revision of materials for resubmission. All authors jointly helped to conceptualize the ideas, develop the project, interpret findings, write the first draft of the article, and review subsequent revisions of the article.

Acknowledgments

This work is supported by the Health Authority—Abu Dhabi. All educational, training and awareness materials are accessible for free download after registration online at <http://www.haad-safe.ae>. These materials can be freely distributed and used with acknowledgment to the Health Authority—Abu Dhabi.

The authors wish to acknowledge the research work of Graham Bates, PhD, and Veronica Miller, PhD, from Curtin University of Technology, Perth, Australia, and John Schneider, MD, from UAE University, Al Ain, UAE, for their work in developing the components of the applied research work that formed the basis for the awareness and training components of the Health Authority—Abu Dhabi Safety in the Heat program and the validation of the Thermal Work Limit heat stress index.

Human Participant Protection

No protocol approval was required for this public health activity.

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