Factors affecting perceived heat stress and impact on workplace safety among hospital food service workers

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Introduction and Aims

With the advent of rising temperatures brought about by climate change, occupational heat stress is a growing concern, especially in countries with hot and humid climates. Apart from outdoor workers, it is also important to study the effects of perceived heat stress among indoor workers who may also be subjected to increased heat stress.

A particular group of indoor workers who may be at increased risk of heat stress are food service workers as a result of heat generated from cooking activities. Apart from heat stress, food service workers are exposed to a variety of workplace hazards in their daily work such as cuts and burns[1,2]. Perceived heat stress has been shown to be correlated to physical discomfort, fatigue and occupational injuries in various occupational settings[3,4]. However, there has been limited literature on the impact of heat stress among hospital food services workers (HFSWs). As such, this study aims to investigate the factors influencing perceived heat stress in hospital kitchens and to explore the impact of perceived heat stress on workplace safety among HFSWs.

Methodology

This study employed a cross-sectional study design comprising of a self-administered questionnaire distributed to all HFSWs employed by Singapore General Hospital, over a period of 4 weeks from 16th January 2023 to 10th February 2023.

The study modified an existing validated questionnaire to assess perceived heat stress, i.e. Heat Strain Score Index, to measure perceived heat stress among HFSWs[5]. A workplace assessment was subsequently conducted to develop questions on work processes in hospital kitchens as well as the prevalence of workplace injuries for use in the questionnaire.

Results

The response rate was 96% (n=122/127). There were more males (66.4%) as compared to females. A large proportion of the study population were Chinese (82.0%). The largest group of study participants comprised of chefs (35.9%), followed by dietary attendants (17.2%).

Perceived Heat Stress

Using the scoring matrix as described in the Heat Strain Score Index[5], the participants were allocated into two groups. A higher heat strain score corresponds with higher perceived heat stress. The group in the lowest score tertile was designated as having normal levels of heat stress and the group with the middle and highest tertile were designated as having high heat stress.

Table 1: Demographic characteristics and perceived heat stress

	Prevalence of staff with high perceived heat stress , % (n)	P-value	Heat Stress Index regression coefficient
Gender			
Male	77.8 (63)	0.09	(ref)
Female	63.4 (26)		1.00 (-0.23 – 2.25)
Age			
20 - 29	70.1 (12)	0.02*	(ref)
30 - 39	82.8 (24)		0.47 (-1.28 – 2.23)
40 - 49	66.7 (16)		-0.49 (-2.40 – 1.41)
50 - 59	91.0 (20)		0.92 (-1.03 – 2.89)
60 - 69	65.2 (15)		-0.32 (-2.35 – 1.70)
>69	28.6 (2)		-1.08 (-3.95 – 1.77)
Ethnicity			
Chinese	77.0 (77)	<0.01*	(ref)
Malay	14.3 (1)		-2.26 (-4.76 – 0.24)
Indian	66.7 (8)		-1.47 (-3.23 – 0.29)
Others	100.0 (3)		1.58 (-1.98 – 5.15)
Job Title			
Chef	84.4 (38)	0.01*	(ref)
Dietary Asst	61.9 (13)		-1.93 (-3.70 – -0.19)*
Dishwasher	80.0 (12)		0.43 (-1.46 – 2.32)
Cleaner	92.3 (12)		0.29 (-1.65 – 2.22)
Management	52.6 (10)		-3.09 (-4.67 – -1.44)*
Administration	33.3 (2)		-3.08 (-4.73 – -1.43)*
Plater	66.7 (2)		-0.43 (-4.39 – 3.53)
Years Worked			
0 - 5 years	77.2 (44)	0.32	(ref)
≥ 5 years	69.2 (45)		-0.06 (-1.27 – 1.14)
BMI			
<23	66.7 (34)	0.41	(ref)
23 - 27.4	77.0 (40)		1.39 (0.23 – 2.55)*
≥ 27.5	79.0 (15)		0.98 (-0.56 – 2.51)
Workplace Injury			
No	67.1 (53)	0.05*	(ref)
Yes	83.7 (36)		0.77 (-0.32 – 1.86)

As shown in **Table 1**, the prevalence of staff with high perceived heat stress was highest among chefs compared to other food service workers (p<0.01). Food service workers with a history of a workplace injury had a higher prevalence of high perceived heat stress at 83.7%, compared to food service workers with lower perceived heat stress at 63.7% (p=0.048). A regression model was constructed to investigate the combined effects of demographics factors on perceived heat stress. Job Title was the main predictor for high perceived heat stress. Persons with Body Mass Index (BMI) ≥ 23 were also noted to have higher levels of perceived heat stress.

Discussion and Conclusion

This study highlighted the differing levels of heat stress experienced by various groups of staff in hospital food services, with Chefs being most at risk for heat stress. Using the Asian BMI cut-offs, persons who are overweight (i.e. BMI ≥ 23) also experienced higher levels of heat stress. This is likely due to physiologic changes in obese persons that result in decreased heat loss from the body. In conclusion, this study raises awareness of the factors affecting perceived heat stress among food service workers and suggests that perceived heat stress could be associated with workplace safety issues such as an increased prevalence of workplace injuries. This highlights the importance of addressing factors affecting perceived heat stress in order to promote employee wellbeing and ensure a safe workplace environment.

References

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