

Madgwick, P., Houdmont, J., & Randall, R. (2011). Sun safety measures among construction workers in Britain. *Occupational Medicine*, 61, 430-433.

## **ABSTRACT**

**Background** Relative to other occupational groups in Britain, construction workers have a high incidence of skin cancer attributable to sun exposure. The importance of sun safety measures to minimize the risk of skin cancer is recognized in the literature; however, little is known about the factors associated with their use by construction workers. Knowledge in this area could help inform interventions to encourage sun safety behaviour within the sector.

**Aims** To investigate socio-demographic and occupational characteristics associated with the use of sun safety measures among construction workers in Britain.

**Methods** Data collection was by means of a self-administered questionnaire, which was sent to 360 construction workers. Information collected included socio-demographic and occupational characteristics and the use of sun safety measures.

**Results** Participants worked outdoors for an average of 6.6 h/day. Three specific sun safety measures were used by the majority of respondents. Logistic regression analyses showed that certain socio-demographic and occupational factors were associated with the use of sun safety measures. In particular, receipt of sun safety training was positively associated with the wearing of long sleeved, loose fitting tops and trousers (OR, 1.69; 95% CI, 1.02–2.80) and sunglasses (OR, 1.85; 95% CI, 1.10–3.13).

**Conclusions** The results highlight the importance of employer-led sun safety interventions in the British construction industry. Interventions that take account of demographic and occupational characteristics are likely to have a positive impact in terms of improving workers' use of sun safety measures.

## **Introduction**

The British construction industry has a high incidence of skin cancer attributable to sun exposure relative to other occupational groups. In 2005, an estimated 58% of occupational cancer deaths and 55% of occupational cancer registrations attributed to sun exposure involved construction workers [1].

Despite this high incidence attributable to sun exposure, little is known about the use of protective and precautionary measures (sun safety measures) among construction workers in the UK. Such measures include the protection of skin against sun exposure, the limitation of direct exposure to sunlight, detection behaviours (i.e. checking skin for unusual changes) and heat stress prevention strategies (e.g. plentiful water intake). Existing literature derives entirely from regions that experience more intense and prolonged periods of sunshine than is the case in Britain and where attitudes towards sun protection might differ (e.g. Southern California, USA [2]; New Zealand [3]; Australia [4] and Georgia, USA [5]). This study aimed to evaluate the socio-demographic and occupational characteristics associated with the use of sun safety measures among construction workers in Britain and thereby help inform sector-specific interventions concerned with encouraging workers' adoption of sun safety measures.

## **Methods**

As per previous studies [2,6], a convenience sampling technique was used to secure the participation of construction workers. Questionnaires were distributed to workers in small, medium and large construction companies with whom the first author had professional links. The companies were not representative of the sector in respect to its proportional composition of small, medium and large companies. The study was approved by the Research Committee of the Institute of Work, Health & Organisations.

Information collected included socio-demographic characteristics, occupational characteristics and use of sun safety measures. Item design was informed by the existing literature on the use of sun safety measures among outdoor workers [4,7,8]. The questionnaire was piloted to ensure its face validity prior to full administration. Socio-demographic data collected included information on sex, age, personal experience of skin cancer, close friend/family experience of skin cancer, desire for a suntan and use of sunscreen on holiday. Occupational characteristics comprised information on the average number of hours spent working outside per day, training received on the risks of sun exposure at work, job title and tenure. Use of 10 sun safety measures previously identified as the primary measures available to outdoor workers [8] was explored (see Table 1).

Sun safety measures were ranked in terms of their overall frequency of usage. Bivariate correlations were calculated to assess associations between socio-demographic and work characteristics in relation to the use of sun safety measures. Odds ratios (OR) and 95% confidence intervals (CIs) were calculated using logistic regression for each of the sun safety measures that was significantly correlated ( $P < 0.05$ ) with one or more socio-demographic or occupational characteristic.

## **Results**

Questionnaires were returned by 360 construction workers, who reported that they worked outdoors (37% response rate). The diversity of job types was captured through the inclusion of workers engaged in 11 construction trades.

All participants were male and age ranged from 18 to 66 years [mean (M), 41.1; SD, 11.8]. Two per cent of participants had personal experience of skin cancer and 7% had experience of either a close friend or family member with skin cancer. Seventy-three per cent expressed a desire to have a suntan and 90% reported using sunscreen when on holiday. Job

tenure ranged from 1 month to 51 years (M, 17.1; SD, 12.3), and 78% of participants reported having received sun safety training. The number of hours worked outside per day ranged from 0.5 to 13 (M, 6.6; SD, 2.8).

Table 1 presents the sun safety measures used; the three most common measures reported were plentiful water intake (89%), sunscreen application (60%) and the wearing of long sleeved, loose fitting tops and trousers (51%).

Correlations between socio-demographic and occupational characteristics in relation to the use of sun safety measures are shown in Table 2. Of note, in relation to demographic characteristics, plentiful water intake (OR, 0.97; 95% CI, 0.94–1.00) was negatively associated with age; wearing long sleeved loose fitting tops and trousers (OR, 1.03; 95% CI, 1.01–1.05) was positively associated with age; wearing long sleeved loose fitting tops and trousers (OR, 0.47; 95% CI, 0.29–0.76) was negatively associated with desire for a suntan; plentiful water intake (OR, 2.60; 95% CI, 1.09–6.18) and sunscreen application (OR, 9.60; 95% CI, 3.89–23.7) were positively associated with sunscreen use on holiday; checking the ultraviolet (UV) index for the day (OR, 2.40; 95% CI, 1.01–5.71) was positively associated with personal or close friend/family experience of skin cancer.

In terms of occupational characteristics, the wearing of long sleeved, loose fitting tops and trousers (OR, 1.69; 95% CI, 1.02–2.80) and the use of sunglasses (OR, 1.85; 95% CI, 1.10–3.13) was positively associated with receipt of sun safety training: sunscreen application (OR, 1.12; 95% CI, 1.03–1.21); wearing long sleeved, loose fitting tops and trousers (OR, 1.10; 95% CI, 1.02–1.18); regular checking of skin for moles or unusual changes (OR, 1.13; 95% CI, 1.05–1.23); wearing wide brimmed hats with neck protection (OR, 1.16; 95% CI, 1.05–1.28) and checking the UV index for the day (OR, 1.16; 95% CI, 1.02–1.31) was positively associated with hours worked outdoors.

## **Discussion**

Associations were found between a series of socio-demographic and occupational characteristics and the use of sun safety measures. Consistent with studies conducted elsewhere [4], this study found that receipt of sun safety training was associated with use of certain sun safety measures, suggesting an important role for employer-led interventions.

Caution must be exercised in the interpretation of these findings due to its use of a non-probability sampling method. Steps were taken to mirror the make-up of the sector (in terms of organizational size) by ensuring the involvement of small, medium and large companies. However, these were not randomly selected, and it is possible that characteristics of participating organizations differed from non-participating organizations, limiting the generalizability of the findings to the sector. Furthermore, in the absence of information on the characteristics of non-responders, the possibility of response bias cannot be ruled out.

In conclusion, this study highlights an important role for employer-led sun safety interventions in the British construction industry. Interventions that take account of key demographic and occupational characteristics are likely to have a positive impact in terms of improving workers' use of sun safety measures. Despite its limitations, this study constitutes an important first step in research focused on the development of knowledge and understanding concerning sun safety issues in the British construction industry.

## References

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Table 1. Frequency of sun safety behaviours used, ranked from highest to lowest

Sun safety behaviours	Frequency (%)
Plentiful water intake	321 (89.2)
Sunscreen application	216 (60.0)
Wearing long sleeved, loose fitting tops and trousers	185 (51.4)
Regular checking of skin for moles or unusual changes	172 (47.8)
Wearing sunglasses	158 (43.9)
Minimization of direct sunlight in middle of day	126 (35.0)
Wearing wide brimmed hats with neck protection	82 (22.8)
Job rotation to minimize direct sunlight	82 (22.8)
Erection of a cover to shade the work area	68 (18.9)
Check the UV index for the day	48 (13.3)

Table 2. Correlations between variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Age																
2.Tenure	.69**															
3. Preference for a suntan	-.13*	-.09														
4.Use on sunscreen on holiday	-.07	-.02	0.6													
5. Personal or close friend/family experience of skin cancer	-.04	-.08	.04	-.02												
6. Sun safety training received	.09	.08	-.03	-.05	-.02											
7. Hours worked outdoors	.09	.04	.02	-.06	-.02	.20**										
8. Plentiful water intake	-.12*	-.04	.05	.12*	-.02	.09	.03									
9. Sunscreen application	-.09	-.08	.09	.30**	-.02	.08	.15**	.28**								
10. Wearing long sleeved, loose fitting tops and trousers	.15**	.08	-.16**	.04	.05	.11*	.13*	.13*	.15**							
11. Regular checking of skin for moles or unusual changes	.08	.05	-.08	.10*	.09	.06	.17**	.15**	.23**	.41**						
12. Wearing sunglasses	.03	.03	.04	.04	-.00	.12*	.05	.16**	.28**	.12*	.14**					
13. Minimization of direct sunlight in middle of day	-.11*	-.07	-.02	.07	.07	.10*	.05	.17**	.13*	.26**	.16**	.20**				
14. Wearing wide brimmed hats with neck protection	.03	.05	-.08	.05	.04	.08	.15**	.13*	.15**	.33**	.26**	.17**	.35**			
15. Job rotation to minimize direct sunlight	.01	-.01	-.01	.08	-.03	.08	-.06	.15**	.21**	.22**	.20**	.21*	.40**	.27**		
16. Erection of a cover to shade the work area	.04	-.01	-.02	.08	.14**	.01	-.12*	.14**	.12*	.25**	.31**	.13*	.35**	.28**	.49**	
17. Check the UV index for the day	.03	-.01	.00	.05	.11*	.07	.12*	.11*	.24**	.20**	.31**	.20**	.27**	.33**	.31**	.26**

\* $p < 0.05$ . \*\* $p < 0.01$

## **Key Points**

- Construction workers have a high incidence of skin cancer attributable to sun exposure relative to other occupational groups in Britain.
- Construction workers reported an average of 6.6 hours outdoor work per day and three quarters of respondents reported having received sun safety training. Receipt of sun safety training, hours worked outdoors, and several socio-demographic characteristics were associated with the use of sun safety measures.
- The results highlight the importance of employer-led sun safety training provision in the British construction industry, and suggest that training initiatives which take into account demographic and occupational characteristics are likely to have a positive impact in terms of improving construction workers' use of sun safety measures.