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Sun-related risks and risk reduction practices in Irish outdoor workers

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Background	Ultraviolet radiation (UVR) is an occupational hazard for outdoor workers.
Aims	This descriptive study aimed to describe the solar UVR risk, and explore associations between demographic characteristics and sun-safety knowledge, risks and practices, in golf-course maintenance workers on the island of Ireland.
Methods	A survey, designed to collect demographic and occupational information, measures of skin cancer knowledge and sun protection practices, was completed by 154 male outdoor workers in the golf-course maintenance industry. Statistical analysis included tests of association and non-parametric tests.
Results	Less than 10% of this mainly male worker group had received education/training on solar UVR risks (sun safety) and two-thirds were more concerned about workplace injury. While a majority used routine precautionary measures, those with greater knowledge of skin cancer, senior grades and workers under 45 years were significantly more likely to use sunscreen and/or sunglasses.
Conclusions	Findings indicate that these workers were a high risk group for skin cancer, with good knowledge of the risk, but limited training or education in risk reduction. While the prevalence of sunscreen and sunglasses use is relatively good, it was better among younger workers and those in senior grades, and could be improved if they were routinely provided as a control measure by the employer.
Key words	Outdoor workers; solar ultraviolet radiation; sun protection; sun safety.

Introduction

Ultraviolet radiation (UVR) is classified as a human carcinogen due to its association with skin cancer [1]. Incidence of skin cancer is increasing globally, especially in Caucasian populations [2]. Outdoor workers [3] exposed to UVR are particularly vulnerable with an increased skin cancer risk compared with indoor workers [4]. The Republic of Ireland and Northern Ireland rank fourth and fifth for the highest number of golf courses per capita worldwide, with one golf course per 14 127 and 14 353 people, respectively [5]; however, little data on golf-course workers' UVR exposure or sun-safety practices exist. This 2012 study describes Irish golf-course maintenance workers' socio-demographic profile and explores associations between sun-safety knowledge, risks and practices.

Methods

The study population comprised 400 golf-course maintenance worker members, aged ≥18 years, of the all-Ireland professional association. An anonymous questionnaire was designed, including, with permission, selected questions from surveys undertaken in Britain [3] and New Zealand [6].

The proposed study was granted exemption from full ethical approval from University College Dublin Human Research Ethics Committee (REERN LS-E-12-25). Following pilot testing, the survey and supporting documentation was mailed to eligible members. Statistical Package for the Social Sciences software (SPSS v20, Inc., Chicago, USA) was used for analysis. Group demographic features and risk factors were described. Skin cancer knowledge and sunscreen use scores were created

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using methods used by McCool *et al.* [6]. Descriptive statistics, χ^2, *t*-tests, Kruskal–Wallis and Spearman rank correlation were used to describe the risk and to explore associations between sun-safety practices and personal protective measures usage. All tests were considered significant at $P < 0.05$.

Results

After 6 weeks, and following three reminders, responses totalled 156 (39%). The sample was reasonably representative of the population, with 53% of respondents in superintendent roles compared with 47% in operational grades; the 99% male response accurately reflected the membership gender profile. Nearly two-thirds (64%) of workers were aged under 45 years (Table 1). Superintendent grades were evenly distributed across age groups above and below 45 years. Mean years worked in the industry was 17 years (±10), and mean weekly outdoor hours worked was 36 (±8), with no significant difference in mean work hours by age (above or below 45 years) or professional (superintendent or operational grades) seniority.

A quarter (26%) self-assessed as Fitzpatrick's [7] skin types 1–2 (white, very fair or fair), and two-thirds (67%) as types 3–4 (cream white or brown), but 68% were more concerned about work injuries than about sunburn. Less than 10% reported receiving education/training on the risks of working in the sun, but the mean skin cancer knowledge score was 8 (±2) from a maximum score of 12, with significantly higher scores for superintendent grades (mean 8.5, $P \leq 0.001$) and those aged under 45 years (mean 8.4, $P < 0.05$). The score was not differentiated by skin type.

Employer-provided risk reduction measures included sunscreen (58%), protective clothing, e.g. hat (54%), equipment sunshade (24%) and sunglasses (22%); sunglasses were more likely to be provided to superintendent grades ($P < 0.05$) (Table 1).

Predominant (>50%) protective and precautionary measures used by workers included: drinking water (78%) and wearing peaked caps (73%), with no age- or grade-related differences. Sunscreen (76%) and sunglasses (58%) were significantly more likely to be used by younger (aged <45 years) workers (sunscreen 82%, $P < 0.05$; sunglasses 64%, $P < 0.05$) and superintendent grades (sunscreen 84%, $P < 0.01$; sunglasses 66%, $P < 0.05$). Sunscreen use correlated positively with workers' knowledge about skin cancer ($r_s = 0.345$, $P < 0.001$), but there was no difference in usage patterns based on whether or not the employer provided sunscreen; however, sunglasses use was significantly more likely ($P < 0.001$) when the employer provided them (Table 1).

Discussion

The Irish golf-course maintenance profession is at high risk of UVR-related sun damage and skin cancer; a risk compounded by a quarter reporting sensitive skin types, and the fact that only 10% reported receiving education or training on the risks.

The key study weakness is a response rate lower than the recommended sample for representativeness, but not uncommon in outdoor worker studies [3]. Study strengths include being the first Irish study on this topic, and specifically on golf-course maintenance workers, highlighting the risks to this profession and other sports ground or outdoor facility maintenance personnel. In general, occupational groups most often surveyed in this context are agricultural and construction workers [8]

Table 1. Distribution of protective and precautionary measures among outdoor workers

Characteristics	All, *n* (%)	Age 18–44, *n* (%)	Age 45+, *n* (%)	Superintendent grades, *n* (%)	Operational grades, *n* (%)
Skin type					
1: White, very fair	7 (5)	5 (5)	2 (4)	5 (6)	2 (3)
2: White, fair	32 (21)	15 (15)	17 (31)	17 (21)	15 (21)
3: Cream white	63 (41)	50 (51)	15 (27)	33 (41)	32 (44)
4: Brown	39 (26)	21 (21)	18 (33)	21 (26)	18 (25)
5–6: Dark brown/ black	11 (7)	8 (8)	3 (6)	5 (6)	6 (8)
Protective and precautionary measures normally used by >50%					
Drinking water	121 (78)	79 (79)	42 (75)	67 (82)	54 (73)
Sunscreen	118 (76)	82 (82)*	36 (64)	69 (84)**	49 (66)
Peaked caps	113 (73)	71 (72)	42 (75)	63 (77)	50 (69)
Sunglasses	90 (58)	64 (64)*	26 (46)	54 (66)*	36 (49)
Protective and precautionary measures provided by employers					
Sunscreen	91 (58)	63 (63)	28 (50)	50 (61)	41 (55)
Clothing	84 (54)	55 (55)	29 (52)	84 (62)	33 (45)
Sunglasses	34 (22)	25 (25)	9 (16)	25 (31)	9 (12)

χ^2 *P*-values: *$P < 0.05$, **$P < 0.001$.

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and some studies have accessed larger and/or multiple occupational groups allowing greater potential for analysis and cross-occupation comparison [8,9].

Those aged over 45 years and operational grades were at highest risk of not using key protective measures of sunscreen and sunglasses. A systematic review [8] found the vast majority of agricultural and construction workers rarely or never using sunglasses or sunscreen, while outdoor workers working near water or in high mountains were more likely to. There are no Irish golf courses in high mountains and data were not collected on the water features of golf courses, but, in a small island with many lakes, it is possible that water proximity was an unmeasured but important confounding variable. The same review [8] found that sunglasses were the most used protection measure, albeit for avoiding glare. In contrast, in this study, while use of sunscreen (76%) was more prevalent than sunglasses (58%), in both cases overall usage was relatively high. While employers are legally obliged to provide personal protective measures, a significant minority of employees provided their own protection. It is possible that in a country with a temperate climate, some employers do not recognize the risk.

There is a growing body of research on outdoor worker solar UVR risks, but most focus on agricultural and construction workers [8]. There is scope for further research in the sports and landscape-maintenance industries, from both health (cancer risks) and safety (employer and employee knowledge and practices) perspectives. In particular, education/training is essential, but provision of sunscreen and sunglasses by all employers could potentially reduce the risk for workers who do not normally use these measures and increase usage among those who use them, but bear the financial cost themselves.

Key points

- Older and operational grade outdoor golf-course maintenance workers had lower knowledge of skin cancer and were less likely to use sunscreen and sunglasses.
- Usage patterns for sunscreen and sunglasses suggest that workers were self-motivated in risk reduction, with many providing their own.
- This paper will be of interest to anyone with responsibility for the occupational health and/or safety of outdoor workers in grounds maintenance contexts.

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Competing interests

None declared.

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