Skin cancer risk behaviours among adolescents in a Sydney metropolitan school

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Introduction

Sun protection is an important community health issue and should be a high priority for health professionals and public health policymakers, as well as teachers. Skin cancer is the most common yet most preventable cancer in Australia and our incidence rates are the highest in the world,[1-4] with 280,000 new cases of skin cancer each year from which 1,300 people die.[5] We focus on adolescents, since high exposure to the sun between ages 10 to 24 is a major risk factor for the development of superficial spreading melanomas,[6] and up to 70% of secondary school children in New South Wales (NSW) are not using adequate protection when in the sun.[7]

Up to 80% of risk factors can be prevented through knowledgeable behaviour.[8] Overexposure to sunlight, particularly ultraviolet radiation (UVR), is the largest environmental risk factor,[9,10] with annual UVR exposure increasing the risk of melanoma and cumulative exposure increasing risk of non-melanocytic skin cancer,[11] implying need for decreases in both episodic and cumulative exposure.[12,13] This is particularly important for young people, since severe childhood sunburns double the likelihood of malignant melanoma,[14,15] and because they spend more time in the sun[16] receiving three times more UVR.[17] Eighty per cent of lifetime sun exposure occurs by age 21,[14] and regular use of sunscreen with a 15+ sun protection factor before age 18 can reduce the likelihood of developing adult non-melanocytic cancer by 78%.[14,18,19] Since staying indoors is the most effective (but not the most practical) method of sun protection, UVR exposure should be limited by staying in the shade along with other methods of protection.[22] The Australian School Students' Alcohol

Abstract

Issues addressed: The study investigated methods of sun protection used and preferred by Australian adolescents at secondary school, across grades 7 to 12.

Method: A questionnaire assessed sun-protective behaviours and preferences for participants from a government co-educational Sydney metropolitan high school (n=277).

Results: We found little evidence for differences across secondary school grades, implying that future intervention efforts may not need to be geared to different age groups. Frequent gender differences suggest the need for gender-specific emphases in campaigns targeting both sexes.

Conclusion: Our study assessed gender and grade effects on sun-protective behaviours and preferences, suggesting directions for areas of focus in future health initiatives. Gendered behaviours were reflected in adolescents' preferences for use of sun-protective methods, with females preferring to use sunscreen and sunglasses, and males preferring to wear hats or using no protection. Average frequency for use of sun-protective methods fell below 'usually' for both males and females on all behaviours. This is of concern, given the harsh Australian climate and risks associated with adolescent sunburn exposure.

Keywords: Sun protection, behaviours, preferences, adolescents, health promotion.

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So what?

Adolescents reported infrequent use of sun-protective methods and high incidence of previous sunburn experience, indicating a cause for continued concern. Findings of gender differences in behaviours and preferences provide direction for targeting sun-protective risk behaviours among adolescents. Since preferences were reflected in behaviours, we suggest that efforts to change adolescents' attitudes should transfer to their actual sun-protective behaviours.

and Drugs (ASSAD) survey in 1993 and again in 1996[21] was the first time The Cancer Council NSW included a section for self-reported sun-protective behaviours. We included some of their questions about sun-protective behaviours with a similar age-group spanning grades 7 to 12, but also incorporated questions about relative preference for each sun-protective behaviour. We examined age and sex differences to determine at what stage and for what groups instructional input may be needed for health promotion campaigns to be inclusive of all groups.

Method

Participants

Classes spanning grades 7 to 12 were randomly selected from a government co-educational north-western Sydney metropolitan secondary school. 'Roll-call' classes were sampled, where students were grouped based on alphabetisation of surname, avoiding clustering effects. All students were invited and agreed to participate (n=277), including similar numbers from each grade (58% male [n=160], 42% female [n=117]).

Materials and procedure

Questionnaires assessed behaviours and preferences for sun protection based on the 1996 ASSAD survey (see Table 1).[21] Frequency for various methods of sun protection was measured by Likert-type scales ranging from 5 (always) to 1 (never). Sunburn experience was assessed by two yes/no items. Rankings measured relative preference for six methods of sun protection, and a checked box assessed most often worn type of hat. Table 1 shows which items were based on the ASSAD survey and those we additionally developed. Surveys were administered during regular class-time in mid-autumn.

Analyses

MANOVA examined grade and gender effects for frequency of use for sun protection methods. Mann-Whitney tests examined gender differences for whether students had experienced sunburn last summer, whether they had ever had blistering sunburn, and ranked preferences for various methods of sun protection. Kruskal-Wallis tests examined grade effects for these three items. Chi-square tested for age and gender effects for most often worn type of hat. Statistical significance was set at $p<0.05$ in view of the sample size.

Results

Sun-protective behaviours

Multivariate gender ($F(7,259)=15.36$) and grade effects ($F(35,1315)=1.74$) occurred for use of sun-protective methods. These included hats, sunglasses, maximum protection sunscreen,

Table 1: Items assessing student sun-protective behaviours.

Preface	Stem	Anchor	Source
Thinking about sunny days in summer, when you are out in the sun for an hour or more during the middle of the day, how often would you...	wear a hat?	5 (always) – 1 (never)	ASSAD survey
	wear sunglasses?	5 (always) – 1 (never)	
	wear maximum protection sunscreen (SPF 15+ or SPF 30+)?	5 (always) – 1 (never)	
	wear clothes covering most of the body (including arms and legs)?	5 (always) – 1 (never)	
	deliberately wear less or briefer clothing so as to get some sun on your skin?	5 (never) – 1 (always)	
	stay mainly in the shade?	5 (always) – 1 (never)	
	choose to use no method of sun protection at all?	5 (never) – 1 (always)	new
	Last summer, did you get sunburn which was sore or tender the next day?	1 (yes) or 0 (no)	ASSAD survey
	Have you ever had severe sunburn which has blistered?	1 (yes) or 0 (no)	ASSAD survey
My order of preference for sun protection is:	• hat • sunscreen • protective clothing • sunglasses • don't go outside • use no protection	6 (least important) – 1 (most important)	new
What type of hat do you most often wear on a sunny day in summer?	• none • wide brimmed hat • narrow brimmed hat • legionnaire hat • cap • sun visor • other	Select one only	ASSAD survey

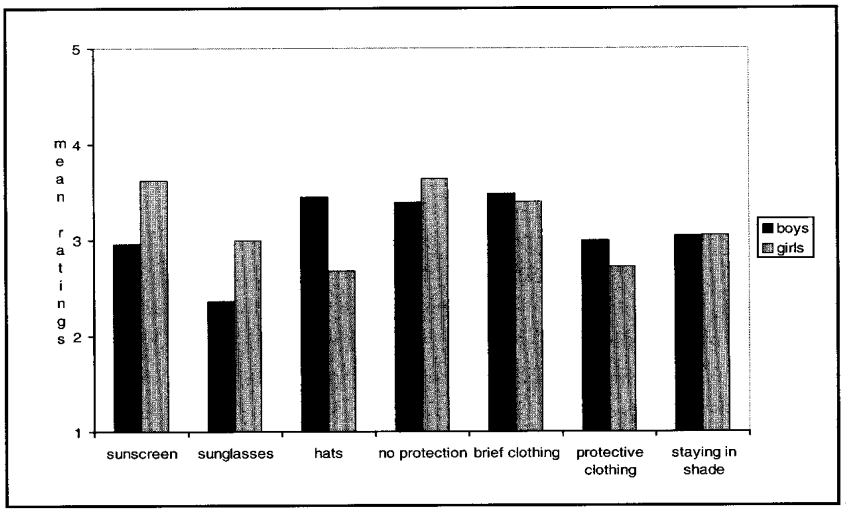

Figure 1: Boys' and girls' reported frequency of use for methods of sun protection.

Note: All methods except 'no protection' and 'brief clothing' were scored from 1 (never) through to 5 (always). 'No protection' and 'brief clothing' were scored from 1 (always) to 5 (never).

staying in the shade, wearing clothes covering most of the body, and absence of sun protection through wearing fewer clothes to get sun, and using no protection. There were no multivariate or univariate interaction effects of gender by grade, showing gendered patterns were similar across grades. Univariate gender differences favoured girls for use of sunscreen ($F(1,265)=35.53$) and wearing sunglasses ($F(1,265)=23.27$). Boys were higher in wearing hats ($F(1,265)=25.19$) and using no protection ($F(1,265)=5.17$). Both genders reported similar frequency for wearing brief clothing, protective clothing and staying in the shade (see Figure 1 and Table 3).

Univariate grade effects occurred for wearing hats ($F(5,265)=2.59$), brief clothing ($F(5,265)=2.51$) and using no protection ($F(5,265)=2.95$), but post-hoc tests (Tukey's HSD) showed no two grade levels were significantly different. Grades 8 versus 11 in wearing brief clothing approached significance ($p=0.06$, mean difference 0.59), with grade 11 students more likely to wear brief clothing, as did grades 7 versus 12 for using no protection ($p=0.05$, mean difference 0.58), with grade 12 students more likely to use none. Sun-protective behaviours appear unrelated to grade, although there is some suggestion of a trend for older students to exhibit increased risk behaviours.

Table 2: Male and female most often worn type of hat.

Type of hat worn	Males % (n)	Females % (n)
Cap	71.9 (115)	35.0 (41)
None	22.5 (36)	46.1 (54)
Narrow brimmed	2.5 (4)	6.8 (8)
Wide brimmed	2.5 (4)	10.3 (12)
Legionnaire	0.6 (1)	0.9 (1)
Other	0.0 (0)	0.0 (0)
Sun visor	0.0 (0)	0.9 (1)

Sunburn experience

Girls were more likely to have experienced sunburn the previous summer that was sore or tender the next day ($U=7178.00$ $z=-3.83$, 66% girls, 43% boys), but there was no effect of grade. Twenty-eight per cent of students reported having had sunburn that blistered, with no significant gender or grade differences.

Sun-protective preferences

As anticipated, usage of sun-protective methods was reflected in student preferences. Significant gender differences in preferences occurred for hats ($U=7349.00$, $z=-3.15$), sunscreen ($U=6786.50$, $z=-4.23$) and sunglasses ($U=6694.50$, $z=-4.31$). Sunscreen was the most popular method for both genders, although more girls than boys ranked this first (39.4% boys, 65.0% girls). Next was protective clothing (23.1% boys, 19.7% girls) with no significant gender difference, followed by hats which were significantly more preferred by boys (20.0% boys, 7.7% girls). The remaining gender effect was for sunglasses, which were preferred by girls, but few students ranked this first (3.8% boys, 0.9% girls). Small proportions of students ranked staying indoors (9.4% boys, 6.0% girls) or using no protection first (4.4% boys, 0.9% girls). There was a significant grade effect for preferring hats ($\chi^2=16.81$, $df=5$) with younger students ranking this higher than older students (mean ranks 107.64, 122.18, 143.53, 142.48, 139.09, 174.52 grades 7 through 12). Other sun-protective preferences were unrelated to grade.

Type of hat

There was a significant gender effect ($\chi^2=38.82$, $df=5$) for most often worn type of hat, but no effect of grade. Inspection of Table 2, listing proportions of girls and boys selecting each of seven types of hats that they most often wear, shows boys tend to wear caps (72%) while most girls wear no hat (46%), although caps are the most frequently worn type of hat for girls who do wear hats (35%).

Discussion

Our findings generally reflect those from the ASSAD survey for student behaviours and previous sunburn experience, although we also relate behavioural data to adolescents' preferences for different sun-protective methods. Boys and girls differed in their usage of sun-protective methods, which was reflected in their preferences. Boys used their preferred method of hats more often, and girls used their preferred methods of sunscreen and sunglasses more often. Sunscreen was ranked first for both groups, but with a sizeable difference between girls and boys. Protective clothing was the second-most preferred method, followed by hats, with other methods rarely ranked first.

Hats were broken down into type of hat, with caps being most popular for males, and no hat most popular for females, although the second most popular female choice was caps. Popularity of the cap reflects previous findings[22] and means adolescents are not reducing UVR by up to 70% as they would be if they wore wide-brimmed hats.[22] Future research should assess reasons for preferences about types of hats so that targeted interventions can be designed, which would differ depending on whether hat choices were based on activities or fashion trends, for example.

Sunglasses were worn more by females, which may reflect fashion customs. Sunglasses that meet the Australian Standard (AS1067) can offer 99% protection from UVR,[23] but our study showed they were both not frequently worn and not highly preferred. Related findings from an ACT study were that 11% of females and 22% of males never wear sunglasses.[22] In contrast to the ASSAD survey data, we found more females than males reported experiencing sunburn that was sore or tender the next day the previous summer, although this may be entirely due to local differences. Similarly to the ASSAD survey, we found no gender differences for having had sunburn that blistered, although it is of concern that 28% of participants reported experiencing this degree of sunburn.

Average frequency for use of methods of sun protection fell below 4 on the 5-point scale for both males and females for all behaviours. This means that for both genders, these sun-protective behaviours were adopted less often than 'usually'. For some behaviours the mean fell below 3, meaning adolescents adopt these behaviours less often than 'sometimes'. This is of concern, given the harsh Australian climate and risks associated with adolescent sunburn exposure.

Findings of gendered behaviours and preferences provide direction for targeting sun-protective risk behaviours among adolescents. Boys need to be encouraged to wear sunscreen, while girls need to be encouraged to wear hats, although it needs to be emphasised to all students that a cap affords little sun protection. Other sun-protective behaviours need to be stressed with all students. Encouragingly, preferences are reflected in behaviours, and so efforts to change adolescents' attitudes should transfer to their behaviours. Scant evidence for grade effects implies interventions do not need to be geared separately towards different age groups. The limitations of our study stem from the fact that we sampled students from only one school. Our findings may therefore not be representative of the wider Australian or even NSW adolescent population, and generalisability would need to be assessed by subsequent

Table 3: Boys' and girls' reported frequency of use for methods of sun protection.

Method	Self-reported frequency				
	Always	Usually	Sometimes	Rarely	Never
Sunscreen					
Male %	6.9	26.9	37.5	21.2	7.5
Female %	3.4	8.6	24.8	48.7	14.5
Sunglasses					
Male %	23.8	35.0	27.5	9.3	4.4
Female %	7.7	24.8	35.9	23.9	7.7
Hats					
Male %	10.0	16.3	21.2	23.8	28.7
Female %	12.8	30.8	35.9	16.2	4.3
No protection					
Male %	4.4	16.9	28.1	36.9	13.7
Female %	0.9	10.2	32.5	36.7	19.7
Brief clothing					
Male %	2.5	15.6	33.1	28.8	20.0
Female %	3.4	12.0	42.7	24.8	17.1
Protective clothing					
Male %	8.1	25.6	31.3	28.8	6.2
Female %	11.1	32.5	32.5	21.3	2.6
Staying in shade					
Male %	1.9	20.0	53.7	20.6	3.8
Female %	0.0	21.4	55.5	19.7	3.4

research investigating adolescents' sun-protective behaviours and preferences across a broader sample.

References

1. Armstrong BK. The epidemiology and prevention of cancer in Australia. *Aust N Z J Surg* 1988;58:179-87.
2. Brooks J. Threat of skin cancer changing the way Australians live. *Can Med Assoc J* 1993;148:2027-9.
3. Giles GG, Marks R, Foley P. Incidence of non-melanocytic skin cancer treated in Australia. *Br Med J* 1988;296:13-7.
4. Green A, MacLennan R. Monitoring and surveillance of skin cancer. In: Sir Refshauge W, editor. *Transactions of the Menzies Foundation*, vol 5. Melbourne: The Menzies Foundation; 1989. p. 193-9.
5. NSW Cancer Council. *Developing Sun Protection Policy and Plans*. Sydney: NSW Cancer Council; 2001.
6. Cockburn J, Hennrikus D, Scott R, Sanson-Fisher R. Adolescent use of sun protection measures. *Med J Aust* 1989;151:136-40.
7. Borland R, Hill D, Noy S. Being sunsmart: Changes in community awareness and reported behaviour following a primary prevention program for skin cancer control. *Behav Change* 1990;7(3):126-35.
8. Stern RS, Weinstein MC, Baker SC. Risk reduction for non-melanoma skin cancer with childhood sunscreen use. *Arch Dermatol* 1986;122:537-45.
9. Bennetts K, Borland R, Swerissen H. Sun protection behaviour of children and their parents at the beach. *Psychol Health* 1991;5:279-87.
10. Marks R. Skin cancer and the ozone hole – When is not enough likely to be too much? *Med J Aust* 1995;163:578-9.
11. Marks R, Jolley D, Lectsas S, Foley P. The role of childhood exposure to sunlight in the development of solar keratoses and non-melanocytic skin cancer. *Med J Aust* 1990;152:62-6.
12. Lowe JB, Balanda KP, Gillespie AM, Del Mar CB, Gentle AF. Sun-related attitudes and beliefs among Queensland school children: the role of gender and age. *Aust J Public Health* 1993;17(3):202-8.
13. Wakefield M, Bonett A. Preventing skin cancer in Australia. *Med J Aust* 1990;152:60-1.
14. Banks BA, Silverman RA, Schwartz RH, Tunnessen WW. Attitudes of teenagers toward sun exposure and sunscreen use. *Pediatrics* 1992;89(1):40-2.
15. Hughes BR, Altman DG, Newton JA. Melanoma and skin cancer: evaluation of a health education programme for secondary schools. *Br J Dermatol* 1993;128:412-7.
16. Broadstock M, Borland R, Hill D. Knowledge, attitudes and reported behaviours relevant to sun protection and sunning in adolescents. *Psychol Health* 1996;11:527-39.
17. Hurwitz S. The sun and sunscreen protection: recommendations for children. *J Dermatol Surg Oncol* 1988;14:657-60.
18. Foot G, Girgis A, Boyle CA, Sanson-Fisher RW. Solar protection behaviours: a study of beachgoers. *Aust J Public Health* 1993;17(3):209-14.
19. Stern RS, Weinstein MC, Baker SC. Risk reduction for non-melanoma skin cancer with childhood sunscreen use. *Arch Dermatol* 1986;122:537-45.
20. Lowe JB, Balanda KP, Gillespie AM, Del Mar CB, Gentle AF. Sun-related attitudes and beliefs among Queensland school children: the role of gender and age. *Aust J Public Health* 1993;17(3):202-8.
21. Schofield WN, Lovelace KS, McKenzie JE. Self reported behaviours of NSW secondary school students – sun protection, physical activity, injury and eating patterns. *The 1996 Australian School Students' Alcohol and Drugs Survey*. Sydney: NSW Cancer Council and NSW Health Department; 1998.
22. Phung H, Bodilsen G, Webb A, Briscoe N. *Results from the 1996 ACT Secondary School Students' Survey: Health Series No. 15*. ACT: Epidemiology Unit, ACT Department of Health and Community Care; 1998.
23. NSW Cancer Council. *Be Wise for Your Eyes*. Sydney: NSW Cancer Council; 1995.

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