Chapter 10

Triathletes' sun protection in Victoria, 1999

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Introduction

The risk of skin cancer is promoted by six key factors relating to sun-protective behaviour. These include predisposition, social norm, physical environment and resources, activity demands, and weather (temperature, cloud cover). Genetic factors share both behavioural and non-behavioural risk components, for example skin type may mediate sun-protective behaviour and protection from ultraviolet (UV) radiation. UV radiation is the main non-behavioural cause of skin cancer (Hill & Boulter 1996).

The Australian climate has a wealth of warm weather promoting a culture that embraces an outdoor lifestyle and recreation. The sun-loving population in Australia are often exposed to sunlight during the highest UV radiation times—between 11 am and 3 pm—with or without sunscreen and other forms of sun protection. Younger populations are most at risk of sunburn resulting from sun exposure due to lifestyle factors including long periods of engagement in outdoor activities (Hill et al. 1993). It has been suggested that young people may be using sunscreen to prolong sun exposure (Autier et al. 1999). It has been found that the incidence of sunburn is higher for Victorian men than women (Hill & Boulter 1996). These studies suggest that men are less likely than women to seek out protective environments and behaviours. Thus it is not surprising that men have a higher incidence and mortality of skin cancer (Staples, Marks & Giles 1998; Thursfield, Giles & Staples 1995).

Other Australians take sun exposure seriously and plan their lifestyle around minimising sun exposure or employing sun-protective behaviours. Some behaviours people adopt to maximise sun protection include planning outdoor activities when UVA and UVB are minimal, wearing clothing that reduces sun exposure, such as long pants, long-sleeved shirts, hats and sunglasses, and applying sunscreen (15+) to exposed skin. When required to be out in the sun between 11 am and 3 pm, 'sun blockers' seek out shade or stay indoors where possible (Hill et al. 1993; Dobbinson, Borland & Anderson 1999; Hill, Rassaby & Gardner 1984; Hoegh, Davis & Manthe 1999). Sun-protective behaviours have also been found to increase with age (Hoegh, Davis & Manthe 1999) and individuals over the age of 55 are most particular about minimising skin exposure (Hill et al. 1993). These people endorse the use of sunscreen, shade, protective clothing, hats and sunglasses. Generally, women tend to be more 'vigilant' than men with their sun-protective behaviour (Eiser et al. 1995). Victorian men have been shown to be less likely than women to use sunscreen, seek shade or stay inside between 11 am and 3 pm to avoid sun exposure (Dobbinson & Borland 1999).

Key reasons for minimising sun exposure include avoiding sunburn, minimising risk of skin cancer and preventing ageing (Pincus et al. 1991). A portion of the population chooses to minimise sun exposure because of a personal or family history of skin cancer, and/or knowing people who have had skin cancer (Hourani & LaFleur 1995; Murphy 1995). Some individuals are aware that they have sensitive or fair skin that burns rapidly. People with sensitive skin types are generally pro-active in their sun-protective behaviours, however are more likely to suffer from sunburn (Hill & Boulter 1996). They tend to have a desire to prevent

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sunburn and the associated risk of skin cancer. For these reasons these individuals are also likely to have a negative attitude to tanning. Others wanting to preserve their youth recognise that minimising sun exposure also minimises premature ageing (Pincus et al. 1991; Leary & Jones 1993; Vail-Smith & Felts 1993). This is expressed as a positive attitude to sun protection, having a healthy level of sunscreen product knowledge (SPF and reapplication) and employing various forms of sun protection, including wearing protective clothing (Hourani & LaFleur 1995; McGregor & Young 1996; Whiteman et al. 1997).

The attitudes and beliefs that lead to minimal sun-protective behaviours or behaviours that maximise sun exposure have been highlighted by numerous studies. A motivational factor for seeking a suntan appears to be the belief that a suntan is attractive when mediated by the perception of being at low risk of skin cancer (Vail-Smith & Felts 1993). Gender differences have been highlighted: females are more knowledgable about and have a positive attitude towards sun protection, and curiously are more inclined to work on a tan (Broadstock, Borland & Hill 1996). Autier et al. (1999) have suggested that length of time exposed to the sun seems to increase respective to SPF of sunscreen. This suggests that people who rely on the use of sunscreens do so for the specific purpose of decreasing their risk of sunburn rather than to reduce their risk of skin cancer. Deliberate tanning behaviour also extends to using solariums and has been the topic of a recent SunSmart campaign. The campaign raised awareness that solariums are not a safe method of tanning, and increase the risk of developing skin cancer (Baglot 1999).

In Australia there is generally a positive attitude towards sun protection although there is less consistent protective behaviour (Bennetts, Borland & Swerissen 1991). A Melbourne study reporting trends in Victorians' usual summer sun protection over the last decade found significant improvement in hat wearing, seeking shade, and wearing protective clothing; however no significant change was found in sunscreen use (Dobbinson & Borland 1999). In contrast a cross-sectional study of Melbourne residents' weekend sun-protective behaviours from 1988 to 1995 found a significant increase in the use of sunscreen, hat wearing and avoiding the sun during peak UV radiation periods (Hill & Boulter 1996).

Hats, particularly those with broad brims, provide UV radiation protection to the face and back of neck (Diffey & Cheeseman 1992). Hill, Rassaby & Gardner (1984) found intentions to wear a hat regularly in summer were associated with the belief that they prevent sunburn and skin cancer, shade the face from the sun, and prevent squinting and eyestrain. Behavioural beliefs contributing to non-hat use included that hats were expensive, inconvenient, uncomfortable and sweaty, and problematic when playing sport (Hill, Rassaby & Gardner 1984). Regular hat wearing was more prevalent in men compared to women, and younger people were less likely than older people to wear hats (Dobbinson & Borland 1999).

In addition to hats, protective clothing includes long pants, long-sleeved shirts and other clothing that minimises skin exposure to the sun. Dobbinson and Borland (1999) found 47% of Victorians in 1998 usually wore protective clothing when outside in peak UV radiation times during summer. Men and women were equally likely to wear protective clothing. Younger people were less likely to wear protective clothing compared to older people. However in warmer weather, when UV radiation is most dangerous, these forms of clothing are not the preferred choice. For example, barriers to wearing long-sleeved shirts are the heat and general discomfort in the heat. For a person seeking a tan, a long-sleeved shirt, while protecting from sunburn, also prevents a tan (Hill, Rassaby & Gardner 1984).

Sunscreen is not considered an effective form of sun protection when used alone. Its limitations in providing adequate protection include a need for regular reapplication, difficulty with proper application, and the limitation of sunscreen to effectively block all UV rays (NHMRC 1996). Nevertheless, when used in conjunction with natural forms of sun protection such as shade and protective clothing, or when alternatives are unavailable or impractical, it is an important form of sun protection.

People may not be educated in application of sunscreen, or the need for reapplication, or understand sun protection factors (SPF) (Diffey 1996). Sixty-one per cent of Queensland beachgoers have been found

to reapply sunscreen after swimming Pincus et al (1991) found that Queensland beachgoers commonly neglected their back, chest and abdomen, neck, arms, ears, and parts of legs when applying sunscreen.

Other sporting activities are also known to render sunscreen less effective. A marketing study by an Australian sunscreen manufacturer in 1997 found that their consumers' main activities involving sunscreen application were during sport (27%), surfing (18%), use every day (16%), at the beach or sunbaking (16%), swimming (9%), and walking or running (6%). Consumers applied sunscreen before going out into the sun (82%), when arriving in the sun (38%), during sport (38%), after being in water (34%), and after sport (8%) (personal communication, 13 December 1999). Frequently reported attitudinal shortcomings of sunscreen products include sunscreen is a nuisance, expensive, greasy/smelly, forgetfulness, it's not masculine, uncool (Hill, Rassaby & Gardner 1984; Vail-Smith & Felts 1993; Baade, Balanda & Lowe 1996). Some studies have reported gender differences in application of sunscreen with more women reporting applying and reapplying sunscreen than men (Dobbinson & Borland 1999; Pincus et al. 1991; Hill et al. 1992; Pruim, Wright & Green1999).

Recreation, sporting activities and beach or water activities increase the risk of sun exposure associated with the incidence of burning (Hill et al. 1992; McGee et al. 1995).

This study relates specifically to triathletes' attitudes and behaviours towards sun protection. Triathletes are considered to be a sporting group at risk of skin cancer. Triathalons are predominantly a summer sport and the nature of the sport demands many hours of outdoor training, combining swimming, cycling and running. The sport commonly requires minimal clothing when competing. Moreover, triathletes are predominantly male and therefore they may have more relaxed attitudes and behaviours regarding sun protection (Arthey & Clarke 1995).

The Victorian Health Promotion Foundation (VicHealth) provides funding to the sponsorship component of SunSmart's Sports Program. SunSmart sponsorship uses a health promotion model to encourage behavioural and attitudinal change in specific sectors of the at-risk community. This broadly consists of strategies that promote supportive environments for sun protection in both resources and social norms and ensuring this is ongoing via promoting policy development and structural change within these organisations (Sinclair et al. 1994). Evidence for the success of the sponsorship strategy in promoting change was illustrated in the successful sun protection outcomes with Victorian lifesavers (Dobbinson, Borland & Anderson 1999).

From 1997 to 1999 SunSmart provided sponsorship funds to Triathlon Victoria for their regional series of annual triathlons. The key objective of SunSmart triathlons was to promote sun protection and awareness to the wider community, including spectators, senior and junior competitors, and event officials. Strategies used to achieve these goals were to incorporate sun protection education for competitors via pre-event material, to provide role modelling by officials and SunSmart branding at events. Sun-protective behaviours that these triathletes were encouraged to endorse as SunSmart role models included wearing sunscreen, sunglasses, hats and other protective clothing, and training indoors or seeking shade (SunSmart 1997; SunSmart 1998).

There is scant research available focusing on triathletes and sun exposure. The current study investigates triathletes' attitudes towards tanning, their training regimes and sun-protective behaviours during training.

Method

Sample and procedure

Data provided in this study are the result of cross-sectional surveys conducted at three SunSmart triathalons in January and March 1999. These events were held at the Melbourne beach side suburbs of St Kilda,

Frankston and Mordialloc in the early mornings. The events were open to amateur and first-time triathletes and professional, full-time athletes.

Three interviewers conducted face-to-face interviews at each triathlon. All participating triathletes were informed that following the race a SunSmart interviewer might approach them. Approximately every third triathlete crossing the finish line was recruited for interview shortly after they completed the race. The interview was not compulsory; two males and three females refused to participate in the survey.

If a participant had been interviewed at a previous SunSmart triathlon (n=13) they were excluded from the study on that day.

Materials

A purpose-designed questionnaire consisted of 13 questions, taking five minutes to complete. The structured interview investigated three key areas: training schedules, sun protection while training, and attitude towards tanning. Age, gender and participation in the current season of triathlons were also recorded. Interviewers observed triathletes' level of tan at the Frankston and Mordialloc triathlons only.

Analysis

The questionnaire included both continuous and categorical data. Simple univariate statistics were used to describe triathletes' sun-protective behaviour. Comparison by age was made using t-tests and by gender using the Likelihood ratio chi-square statistics. P-values less than .05 were considered significant. Missing data varied for each item at a maximum of 15% and was excluded from the denominator in percentages reported.

A composite sun protection score was calculated to describe a desirable standard of sun protection while training. This variable considered the combined use of a set of sun protection measures. The set included 'usually/always' using a maximum protection sunscreen (15+) and sunglasses or glasses with a UV radiation filter, and when running wearing a hat, additionally when training, wearing a shirt with a minimum protection of short sleeves.

Results

Triathletes' participation at SunSmart events

A total of 206 triathletes' were interviewed, 75 at St Kilda (36%), 43 at Frankston (21%) and 88 at Mordialloc (43%). Triathletes' ages ranged from 15 to 61 years, with a mean age of 32 (sd =8.8). Seventy-five per cent were male and 25% were female. Triathletes reported participating in a mean of 2.1 (sd = 1.6, range = 0-12) SunSmart events and a mean of 5.7 (sd=3.8, range = 1-20) triathlons over the past summer. Of those participating in the final event at Mordialloc, 3% participated in all three SunSmart events, 15% participated at St Kilda and Mordialloc, 11% participated at Frankston and Mordialloc, and 71% participated at Mordialloc only. Of those interviewed at Frankston, only 5% had participated at St Kilda.

Attitude to tanning

Fifty-four per cent of respondents reported they liked to get a tan, and 46% did not like to get a tan. For those who did like to get a tan (n=111), 61% preferred a 'moderate tan', 16% a 'light tan', 14% a 'dark tan', and 4% a 'very dark tan', while 5% of those who liked a tan could not say how deep a tan they liked. There was no significant difference between age and preferred depth of tan (F= 0.9, df = 3, p= .470) or gender and preferred depth of tan (X^2=4.2, df=3, p=.245). Preferred tan was significantly correlated with observed tan (Pearson r =0.52, p<.001).

Training

Individual training regimes were explored between 9 am and 5 pm in a typical week, and further into training on work and leisure days. The number of days per week spent training ranged from zero to seven, with a mean of four days per week (sd=2.4). On average triathletes spent 2.6 workdays per week (sd=2.1) training. Training on these days consisted of a mean of 91 minutes (sd=91.6) and ranged from zero to 450 minutes. On average triathletes spent 1.5 leisure days training (sd=.85). The number of leisure days spent training ranged from zero to six days, the number of minutes training was between zero and 480 minutes with a mean of 158.4 minutes (sd=107.3). These data suggest that triathletes are a group regularly exposed to UV radiation for long periods of time.

Triathletes were also asked about their training during the peak UV radiation period of the day. While most triathletes trained at least one day per week between 9 am and 5 pm, it appears that triathletes were less likely to train between 11 am and 3 pm (see Table 10.1). On average triathletes spent two days per week (SD=1.9) training outside between 11 am and 3 pm compared to four days per week (SD=2.4) between 9 am and 5 pm.

Table 10.1 Triathletes' training regime

		Average time training: work days	Average time training: leisure days
Training at least one day per week between 9 am and 5 pm	92%	91 minutes SD = 91.6	158.4 minutes SD = 107.3
Training at least one day per weekbetween 11 am and 3 pm	71%	–	–

Sun-protective behaviours while training

This study investigated triathletes sun protection while training. Triathletes were asked about sunscreen use, the type of bathers worn when doing swimming training outdoors, style of top worn when training outside excluding swimming, their hat wearing while running and use of sunglasses. Triathletes were also asked whether they warmed-up and cooled-down after training indoors, in the shade or in the sun.

Sunscreen

Triathletes were asked, 'when you train outside between 9am and 5pm how often do you wear a maximum protection sunscreen?' Eight triathletes reported they did not usually train outside between 9 am and 5 pm and they were excluded from reports of the frequency they used sunscreen while training between 9 am and 5 pm. Sixty-one per cent of triathletes reported using a maximum sunscreen (SPF 15 or 15+) usually/always, while training, 10% use sunscreen half the time and a further 10% sometimes while 19% never/rarely wear sunscreen. Age was found to be significantly related to use of sunscreen ($t= 2.32$, $df = 196$, $p=.021$). Triathletes who regularly used sunscreen were on average younger (30.7 years, sd=8.3) compared to those who used sunscreen less often (33.6 years, sd=9.3). No significant gender difference was found in the use of sunscreen ($X^2 =0.15$, $df =1$, $p=.696$).

Bathers

Although triathletes most commonly wear brief bathers when doing swimming training (75%), 17% reported they only swim indoors. A further 8% reported they wore more protective bathers, at least covering the back. Only 3% wore styles covering the back, arms and legs.

Tops

While a small group of triathletes reported not wearing any shirt when training (2%), singlets were the most popular top worn by triathletes (49%), the second most popular top worn by triathletes was T-shirts (34%). Additionally some triathletes reported they wore different styles of top dependent on whether they were cycling or running (14%), with more protective styles of shirt worn when cycling.

Hats

When running triathletes most commonly wore caps (71%). Twenty-eight per cent reported they did not wear a hat when running. Few participants reported wearing wide-brimmed hats (.5%) or other styles of hat (.5%). Males were more likely to wear a hat than were females (76% compared to 61% $X^2 = 4.41$, df=1, p=.036). Age was not a significant factor influencing hat wearing (t= -1.19, df =202, p=.236).

UV-protective glasses

Triathletes were asked 'when you train outside between 9 and 5 how often do you wear sunglasses or ordinary glasses with UV filters to reduce the sun's rays?' Eight triathletes reported they did not usually train outside between 9 am and 5 pm and they were excluded from reports of the frequency they wore sunglasses while training between 9 am and 5 pm.

Wearing protective sunglasses with UV radiation filters for eye protection is a popular protective behaviour. When training, 77% of triathletes usually/always wore glasses, 5% wore glasses half the time, 10% sometimes, and 8% rarely/never. A significant difference was not found for age and wearing glasses (t=1.1, df 196, p= .273) or for sex and wearing glasses ($X^2 = 0.77$, df =1, p= .381).

Combined sun-protective behaviours

Fourteen per cent of triathletes reached the desired standard of sun protection when cycling or running, specifically combining the use of sunscreen, glasses, a hat and a protective shirt. Compared to female triathletes, male triathletes were more likely to wear the minimum desirable standard of sun protection ($X^2 = 4.05$, df =1, p= .044). Triathletes' age did not appear to impact on their choice of protective clothing, (t=-.647, df = 204, p = .518). As previously mentioned, when training indoors or wearing protective bathers at least covering the back, 26% of triathletes met a high standard of sun protection during swimming training. In contrast to sun protection when cycling or running, females were more likely to wear protective swimwear or swim indoors than males ($X^2 = 13.4$, df = 1, p<.001). Age was not significantly associated with sun protection while swimming (t = -.660, df = 202, p=.510).

Warm-up and cool-down

Most people tended to warm-up and cool-down either in the shade (49%) or indoors (23%) where possible. Twenty-six per cent preferred to warm-up and cool-down in the sun. Three per cent indicated they warmed-up and cooled-down either indoors or in the shade, two triathletes did not specifically choose where they warmed-up or cooled-down.

Discussion

The principle aim of this study was to identify triathletes' attitudes and behaviours towards sun protection, a topic that historically has had scarce research attention. The survey results represent responses of 206 triathletes competing in at least one of three SunSmart Triathlons held in Melbourne Australia from January to March 1999. Representation of males and females in the survey reflected this population, with males (75%)

being proportionately more represented than females (25%). Triathletes were of varied age. As a group, triathletes are at high risk of sun exposure.

The data available from this study suggests that triathletes are a group at risk of sun exposure due to the many hours spent training outdoors between 9 am and 5 pm. Training outdoors between 9 am and 5 pm occurs on average four days per week and most people train for an average 91 minutes on any given training day. Although over half of the triathletes preferred to get a tan, they generally preferred a moderate tan. Furthermore, the results suggest that exposure to peak UV radiation is minimised because athletes predominantly train outside of the hours of 11 am and 3 pm. On average triathletes spend two days training between 11 am and 3 pm compared to four days training between 9 am and 5 pm. It is promising that alternatives such as seeking shade (49%) or staying indoors (23%) for warm-up and cool-down is widely endorsed by this group of individuals, further reducing triathletes' UV radiation exposure and consequential risk.

Sun-protective behaviours when training incorporates the use of sunscreen, protective clothing (bathers, tops, hats), and protective UV radiation filtered glasses. Significant findings relating to these sun-protective behaviours suggest regular sunscreen use was more common among younger triathletes, that males were more likely to wear a hat than females, and males were more likely to wear the minimum desirable standard of sun protection.

Lack of protective clothing enhances sun exposure risk in the triathlete population. This study highlights the lack of protective clothing worn by this group of people. The ideal protective clothing for a triathlete when swimming outside in peak UV radiation periods would be a full body solar suit. Adequate protection when cycling and running would comprise a shirt with a collar and at least short sleeves, a hat that shades the neck, UV radiation filtered sunglasses, and sunscreen on any remaining exposed areas of skin (hands, face, ears, and back of neck). During swimming the triathletes commonly wore brief bathers. Nevertheless, female triathletes were more likely to train indoors or use covering bathers than males. Brief styles for males are more commonly available and acceptable. For females a covering style is more practical than brief styles for swimming. In this study few triathletes wore styles that protected their back, arms and legs. It is possible that these styles are more expensive, less fashionable or less practical than brief styles. Approximately half of the triathletes wore inadequate clothing protection when running or cycling, wearing either no shirt or a singlet.

This study and past literature do concede that there are barriers to wearing protective clothing, for example long-sleeved shirts can be hot and uncomfortable (Hill, Rassaby & Gardner 1984). Moreover, few triathletes wore protective style hats while training, most wore caps and 28% did not wear a hat. While caps are not as protective as wide-brimmed hats, a cap worn with peak facing forward will shade the face. In contrast the majority frequently utilised UV radiation protective glasses and sunscreen during training. In this study, wearing sunglasses or UV radiation protected glasses is the most common protective behaviour of triathletes worn by 77% of respondents. These results may reflect the protective influence of sunglasses for reducing squint and eyestrain (Hill, Rassaby & Gardner 1984). Furthermore, sunglasses are a competitively marketed fashion accessory and sporting accessory. The use of UV radiation protective goggles was not investigated in this study but would be a useful component of triathlete sportswear to investigate.

Sunscreen (15+) was usually/always used by 61% of participants when training outside between 9 am and 5 pm. This suggests that triathletes more commonly use sunscreen when compared to Victorians overall. Forty-three per cent of Victorians reported they usually/always used 15+ sunscreen during peak UV radiation periods over the 1997–98 summer (Dobbinson & Borland 1999). This suggests triathletes have a high dependency or over-reliance on sunscreen for protection rather than alternatives such as protective clothing.

Sunscreen has limitations and shortcomings when combined with sport. For example, water and perspiration reduce the effectiveness of sunscreen. The high dependence on sunscreen as a key form of sun protection may suggest limited product knowledge in the triathlete population. Triathletes should have knowledge of the

need for regular reapplication of sunscreen, difficulties of effective application, and limitations in its ability to effectively block all UV radiation. This study asked triathletes whether they wear sunscreen with SPF 15+; it did not gather data relating to reapplication of sunscreen or knowledge of sunscreen use. Future studies might consider studying sunscreen product knowledge and reapplication in the Australian sporting population. Additionally, campaigns might focus on education of general product knowledge and emphasise the importance of alternate forms of protection such as protective clothing.

Conclusions

This study suggests a sun protection climate exists in the Australian triathlete realm. In this study, the main sun-protective behaviours were wearing sunscreen, sunglasses, and caps, and for women swimming indoors or wearing bathers that at least cover the back. This study illustrates that non-protective clothing is preferred; male triathletes had a preference for brief bathers and short-sleeved shirts. What appears to be a trend in protective behaviours may in fact be an archetype of behavioural change more directly related to an existing commercial culture for fashionable accessories: sunscreen, sunglasses and caps. This provides insight into the complementary nature of health promotion and commercial ventures in changing and promoting protective attitudes and behaviours.

Australia has a strong outdoors and sporting culture. While it is encouraging to see such commitment to skin protection via the use of sunscreen, there appears to be a need for education in product knowledge of sunscreen and its protective shortcomings. SunSmart needs to continue to educate athletes about using sun protection during training. Further education is needed on the relative benefits of using different forms of sun protection. Choosing training times that avoid peak UV radiation, training indoors and using hats and more covering styles of clothing should be encouraged. Less emphasis should be given to using sunscreen alone as a form of protection. Its limitations should be highlighted and other forms of sun protection promoted. Moreover, SunSmart needs to develop further links with manufacturers of sports clothing to encourage them to provide low cost, light-weight, practical, comfortable sun-protective clothing and accessories for athletes.

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