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Photoaging Photography: Mothers' Attitudes Toward Adopting Skin-Protective Measures Pre- and Post-Viewing Photoaged Images of Their and Their Child's Facial Sun Damage

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Abstract

One of the major sources for children to gain knowledge of skin-protective measures is from their parents. Therefore, an imperative exists for parents to model and reinforce the sun-safety practices they want their children to adopt. Although Australian mothers have been the recipients of two extensive sun-safety public health campaigns, little is known about their attitudes, behaviors, and application of health promotion knowledge toward their and their child's ultraviolet (UV) sun exposure. Ten mothers with children aged 4 to 12 years were asked a series of questions about their sun-safety practices, both pre- and post-viewing an UV photoaged photograph of their and their child's face. Interpretive Phenomenological Analysis identified four themes and 12 subthemes. The findings reveal that mothers expressed divergent views on skin protection pre- and post-inspecting their and their child's photoaged photographs. At one end of the viewing spectrum, mothers expressed an opinion that some degree of skin damage was an inevitable reality in Australia's sunny climate, and on the other end of the viewing spectrum mothers expressed their desire to keep themselves and their child out of the sun. Mothers in the mid-range of the spectrum stated that their parenting task was one of transferring the responsibility for adopting skin-protective measures from themselves to their preteen children. The combination of mothers viewing their own photos as well as their child's photograph serves to enhance the difference seen in photoaging damage, which in turn provides greater impetus for mothers to be concerned about photoaging in general.

Keywords

health psychology, skin-protection, photoaging, photoaged photography, sun-damage, ultraviolet radiation, mothers' attitudes, health promotion, sun-safety campaigns, skin cancer risk factors

Introduction

Despite having an awareness of the cancer risks associated with unprotected sun exposure, school-aged children's use of skin-protective measures is generally categorized as being unsatisfactory/abysmal (see Livingston, White, Hayman, & Dobbins, 2007; Suppa, Cazzaniga, Fagnoli, Naldi, & Peris, 2013). Moreover, since a considerable amount of ultraviolet radiation (UVR) exposure occurs before the age of 21, the poor uptake of skin-protective measures by children has long been an issue of global concern (Buller, Buller, Beach, & Ertl, 1996; Glanz, Saraiya, & Wechsler, 2002; Klostermann & Bolte, 2014; Milne et al., 2000).

As childhood is the time period in which approximately half of a person's lifetime UVR exposure occurs (Glanz et al., 2002), it is somewhat surprising that so little is known about parents' attitudes toward sun-tanning or their

adoption of skin-protective measures. While several studies have suggested public health campaigns be specifically targeted at improving parents' UVR exposure knowledge and skin-protective practices, to our knowledge there have not been any skin-protection interventions that have specifically included a skin-protection message aimed at parents and their children. Hence, this study's use of pre-post ultraviolet (UV) photoaged photography is both pertinent and timely.

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Sun Exposure and Cancer Risk

Glanz and colleagues (2002) suggest that UVR is the cause of 65% to 90% of melanomas. Australians are four times more likely to develop skin cancer than any other type of cancer (Australian Institute of Health and Welfare & Australian Association of Cancer Registries [AIHWAACR, 2010]). As over/unprotected UVR exposure is recognized as being a risk factor for skin cancer (Eastabrook, Chang, & Taylor, 2016; Suppa et al., 2013; Tripp, Diamond, et al., 2013), the International Agency for Research on Cancer has designated UVR exposure to be a carcinogen (El Ghissassi et al., 2009). Moreover, as recent research has highlighted the cancer risks associated with intermittent UVR exposure, skin protection is becoming an issue of growing global concern (Anderson, Jackson, Egger, Chapman, & Rock, 2014).

Due to its hot climate and outdoor lifestyle, Australia has one of the highest incident rates of skin cancer in the world. Indeed, 60% of its entire population will be diagnosed with some form of skin cancer before they reach the age of 70 (Staples et al., 2006). Chronic sun exposure and severe sunburns during childhood/adolescence are considered to be major risk factors for developing melanoma (Gandini et al., 2005; Harrison, MacLennan, & Buettner, 2008). Indeed, children and adolescents who experience multiple blistering sunburns are twice as likely to develop melanoma in later life than are their unburnt age mates (Glanz et al., 2002). Moreover, even though melanoma cancers are rarer than non-melanoma skin cancers (which generally develop slowly and have a low mortality rate) because of their aggressive spread around the body, melanomas account for the majority of all Australian skin-cancer mortalities (Narayanan, Saladi, & Fox, 2010; Soehnge, Ouhtit, & Ananthaswamy, 1997). Despite being less common than non-melanoma cancers, melanoma ranks among the top five most diagnosed cancers within Australia (AIHWAACR, 2010).

Photoaging

In addition to a heightened melanoma risk, UVR exposure is also known to contribute to photoaging (i.e., the premature aging of the skin caused by repeated exposure to sunlight). In contrast to the normal aging process (i.e., the slow deterioration of the body's organs), the premature photoaging process is accelerated by cumulative unprotected UVR exposure (Antoniou, Kosmadaki, Stratigos, & Katsambas, 2010; Berneburg, Plettenberg, & Krutmann, 2000). Indeed, accelerated photoaging accounts for most of the age-related changes in the appearance of people's skin (e.g., wrinkles, freckles, and sunspots; Antoniou et al., 2010; Yaar & Gilchrist, 2007).

Although a considerable amount of photoaging-related skin damage is thought to occur prior to the age of 21 years, the visualization of that damage does not typically occur until mid-late adulthood (Berneburg et al., 2000). Hence, it is

reasoned that because the skin-damage effects of photoaging appear later in life, a need exists for public health sun-safety campaigns to specifically target parents, for they are the generation of adults responsible for limiting early UVR exposure in the upcoming generation (Berneburg et al., 2000). UVR sun damage can be seen using UV photography as the damage is readily visible.

Sun-Safety Campaigns

In an effort to decrease skin-cancer rates, two major Australian public health campaigns (i.e., *Slip-Slop-Slap* and *Sun-Smart*) were launched to increase public awareness of the practical measures that can be taken to limit UVR skin damage (Sinclair & Foley, 2009; Taylor, Westbrook, & Chang, 2016). The first *Slip-Slop-Slap* campaign aimed to inform Australians of three basic UVR skin-protective measures, namely *slipping on a shirt*, *slopping on sunscreen*, and *slapping on a hat* (Montague, Borland, & Sinclair, 2001). While the campaign was somewhat effective in achieving this goal, it was limited nationally in terms of the availability of its resources. In time it was augmented by a second *Sun-Smart* campaign, which aimed to increase public awareness of additional skin-protective measures they could take to protect their skin (e.g., *re/applying a 30+ SPF sunscreen*, *wearing a wide-brimmed hat*, *seeking shade when outdoors*, *wearing sunglasses*, and *limiting the length of time spent outdoors during peak UVR hours*). The second campaign additionally used graphic cancer images to discourage skin exposure (Montague et al., 2001; Taylor et al., 2016).

These two campaigns have been credited with leveling Australia's incidence rates of melanoma and other forms of skin cancers (Walker, 2012). Although, the results of the second campaign are encouraging, it has been noted that increased sun-awareness knowledge does not necessarily translate into increased adoption of skin-protective measure. A phenomenon particularly evident among adolescents who as an age cohort rarely demonstrate appropriate skin-protective measures (Livingston et al., 2007; Sinclair & Foley, 2009).

School-Based UV Radiation Reduction Intervention Initiatives

Recognizing a need to improve young people's adherence to their *Sun-Smart* campaigns, Australia instituted in the 1990s a number of school-based interventions which aimed to limit students' exposure to UV radiation through improving their skin-protective behaviors (Taylor et al., 2016). An evaluation of one such school-based intervention program (Kidskin) was conducted by Giles-Corti and colleagues in 2004 and involved 1,776 children aged 5 to 6 years who attended 33 Western Australian primary schools. The intervention was comprised of two aspects. The first aspect being the introduction of a "no hat, no play outside" school recess policy, and the second the encouragement of students when outside

to utilize the available shaded recreational areas. Their results revealed while there was a 75+% uptake of the “no hat no play outside” policy among the schools, the issue of providing and encouraging student use of shade was not as successful. In part this was due to the school principals’ concerns about the cost impost of constructing shade (cloth) areas and the potential for such shade cloths to be vandalized.

It would seem that comparatively little progress has been made in terms of the implementation of childhood skin-protection intervention in Australia since the Giles-Corti study. A circumstance identified by Dudley and colleagues (2015) a decade later when they claimed that their study would be the “*first* objective analysis of sun-safe behaviours leading to a policy driven intervention . . . in schools” (p. 15). The need for such policy-driven skin-protection interventions has also been recently raised by other researchers (see Glenn et al., 2015; Miller et al., 2015).

Parental Influence Over Children’s Sun-Safety Practices

One of the major sources for children to gain knowledge of sun-safety practices is from their parents (Bylund, Baxter, Imes, & Wolf, 2010). Therefore, an imperative exists for parents to model and reinforce the sun-safety practices they want their children to adopt (Gritz et al., 2005; Klostermann & Bolte, 2014; Tripp, Vernon, Gritz, Diamond, & Mullen, 2013). While parents are generally aware of the skin-protective *Sun-Smart* campaign message, Tripp and colleagues note that a number of practical adoption barriers continue to exist. For example, these barriers include but are not limited to a parental shortage of time to apply sunscreen, forgetting to take sunscreen on family outings, sunscreen being too expensive for routine use, the climate being too hot to wear full-length protective clothing, protective clothing being considered unfashionable, shade sometimes being hard to find, and the scheduling of children’s sport/leisure outdoor activities in non-peak UVR hours being logistically impracticable because of the competing use demands for access to community facilities (e.g., outdoor swimming pools, ovals, parks). Thus, interventions aimed at helping parents to overcome such sun-safety practice barriers are considered essential to promoting skin-protective behaviors and in reducing the risk of skin cancer in both the present and future generations (Bandi, Cokkinides, Weinstock, & Ward, 2010; Behrens, Thorgaard, Philip, & Bentzen, 2013; Walker, 2012).

Gendered Use of Sunscreen Among Adults

Recent research into adult use of facial sunscreen reveals that just 14.3% of men and 29.9% of women regularly use sunscreen, and additionally that it is more common for men never to apply sunscreen to their face (43.8%) or their

exposed skin (42.1%) than it is for women never to apply sunscreen to their face (27%) or their exposed skin (26.8%; Holeman et al., 2015). While no equivalent breakdown is available in terms of parents’ application of sunscreen to their children, anecdotal evidence points to fathers being less likely to be concerned about the application of sunscreen to their children’s face and exposed areas than are mothers (Robinson, 2016).

Given that UV photography makes visible sun damage to the skin which is not visible in non-UV photographs, this research will help address the current lack of understanding of mothers’ behavioral responses to UVR skin protection.

Method

Research Design

The present study employed a phenomenological research design. This idiographic method is embedded in social constructivism. It allows for the exploration of people’s daily experiences within a given context and for the interpretation of how people make sense of their experiences (Smith, Flowers, & Larkin, 2009). The strength of this design is that it involves a process of double interpretation as each participant initially interprets their own experience and subsequently the researcher uses their interpretive skills to analyze the participants’ experiences across multiple data sets. The design of this study is also innovative as it utilizes a UV photograph appearance-based intervention to illicit mothers’ responses to the skin damage already done to their and their child’s face (Lo Presti, Chang, & Taylor, 2014).

Sample

Given the higher usage and awareness of the importance of sunscreen application among females, this research focuses on investigating mothers’ responses to viewing their and their child’s UV photoaged facial photographs. In this regard, the sample comprised 10 mother–child dyads residing in low, medium, and high SES (socio-economic status) areas of Perth, the state capital city of Western Australia. The mothers were aged between 28 and 41 years and the 10 children were aged between 4 and 12 years (five males, five females). A 4- to 12-year-old child age range was selected because it is the developmental period during which children attend school, experience daily protracted periods of independence from their parents, engage in regular outdoor play, and have had sufficient UVR time exposure to register signs of sun damage in photoaged photographs.

Procedure

Following approval from the Human Research Ethics Committee of the administrating institution, a semi-structured interview schedule was developed (see Table 1). It was

Table 1. Interview Schedule.

Q#	Questions
Questions asked of parents prior to viewing their and their child's photographs	
1	How often do you spend protracted periods of time in high sun-related areas? Probe: Why is that?
2	Have you ever deliberately exposed your skin to artificial sources of ultraviolet light? Probe: Why?
3	What are your views on sun-tanning?
4	Do you believe people who have suntans are more healthy or attractive than those without? Probe: Why is that?
5	What are your views on children and suntans and do you believe it looks healthy for children to have a tan? Probe: Why is that?
6	What skin-protection practices do you use?
7	What skin-protective practices do you use for your child?
Questions asked of parents after viewing their and their child's photographs	
8	How do you feel after viewing the sun damage that has already occurred to your face?
9	After viewing the differences in the amount of sun damage visible in your and your child's UV photoaged photograph, why do you think these differences exist?
10	Now that you have seen your and your child's UV photoaged photographs, how has this altered your views on sun-tanning and your future use of skin-protective practices?
11	Do you believe you have sufficient sun-safety knowledge to protect yourself and your child from future skin damage? Probe: Why is that?
12	In what ways have your views on children sun-tanning changed after seeing your and your child's UV photoaged photographs? Probe: Why is that?

Note. UV = ultraviolet.

purposely constructive in a conversational format so as to encourage participant disclosure.

Recruitment flyers were posted on message boards both within the administrating institution, and in public libraries and community centers. Prospective flyer participants were checked to determine whether they met the study's selection criteria (i.e., they were a parent of a child aged 4-12 years). Once eligibility had been established, a mutually agreed time and place to meet was organized (e.g., the administrating institution, the child's school, or family home). On arrival at the prearranged venue, respondents were asked to read an information sheet outlining the purpose of the study. At this juncture they were informed of their participatory rights and their permission was obtained to proceed with the interview and to audio-record their

responses. Upon obtaining these permissions, participants were informed they could withdraw from the study at any time without penalty, however none chose to do so. No participation inducement was offered.

After signing a consent form, the interviews commenced and the participants were asked seven questions pertaining to their tanning and sun-safety practices (see Table 1). Next, four black and white photographs (i.e., one UV and one non-UV photograph for the parent and the child) were taken with a Canfield Science UV Reflec camera using Polaroid film. The photographs self-developed in 2 min and were then displayed side by side for the parents to view. Participants were informed that dark or freckled areas in the UV photograph were indicative of skin damage. After viewing the photographs, the participants were asked the remaining five interview questions (see Table 1). At no stage during the interview did the interviewee view any other mother's or any other child's photographs.

Although the focus of the study was on determining whether mothers' knowledge of the health consequences of sun exposure (i.e., skin cancer) derived from two highly publicized nationwide skin-protection "sun-safety" health promotion campaigns was influencing their current attitudes and behaviors toward their and their child's UV skin protection, the UV photoaged photographs were additionally used as a visual education tool. At the completion of each interview, every mother was given an opportunity to ask questions of the interviewer. At this juncture, the interviewer explained the link between the visible damage evident in the UV photoaged photographs and the future potential for skin cancers to occur. The need for diligence in applying skin-protection measures and the importance of regular skin checks were also reinforced. Mothers were additionally offered a summary of the research findings and recommendations on the completion of the study.

Data Analysis

The interview audio-recordings were transcribed verbatim and their transcription accuracy was independently checked. Thereafter, Miles and Huberman's (1994) four-stage conceptual framework (i.e., data reduction, data display, data conclusion drawing, and data verifying) guided the analysis. Interpretative Phenomenological Analysis (IPA) was used to discern repetitive themes (Braun & Clarke, 2006; Groenewald, 2004; Miles & Huberman, 1994). In the first instance, this iterative process involved writing descriptive, linguistic, and conceptual memo notes in the margins of the transcripts (Smith et al., 2009). In the next stage, these notes were reduced in their complexity through the dual processes of constant comparison and abstraction. This abstraction process continued until themes and subthemes emerged (Liamputtong & Eddy, 2005).

Issues of credibility and transparency were addressed by having a non-analyzing researcher independently validate the two analyzing researchers' sub/themes and act as an

Table 2. Examples of Parents' Descriptions of Their and Their Child's Sun Exposure.

Parents' childhood exposure to the sun	Parents' exposure to artificial tanning	Parents' current exposure to the sun	Children's current exposure to the sun	Family's current beach going practices	Family's park/sport venue going practices
As a child I was always in the sun . . . we were outside the whole day	None	Now, I don't go in the sun very much because I've a family history of sun cancer	They'd spend about an hour and a half in the sun (each day)	We're home bodies . . . we sometimes go to the beach . . . not for long . . . usually in the afternoons	We take the dog for a walk and the kids to the playground . . . normally in the afternoons
I had two bad sunburns when I was probably about 19	Only twice from artificial sources of light	I'd say for me I'd have a good 8 to 10 hr (sun exposure) a week	The kids would have about 20 hr (of sun exposure) a week	We spend quite a bit out in the sun . . . at the beach . . . even in winter because we only live 5 min away	We're usually at the park most days for about 30 min
I don't really remember being aware of the sun and its effects . . . I don't remember there being much enforcement	I don't (use artificial tanning devices) I get spray on fake tans	I've a large backyard and lots of animals so probably I'd spend about 24 hr (a week) outside	He has a period of time each day when he's outside	We don't like going to the beach	Most of my weekend is spent outside. I run about 2.1 km (daily)
I grew up in that time when the <i>Slip-Slop-Slap</i> campaigns were prominent so mum was quite conscious of it	None that I recall or remember	I'd say about 2 (hours per day)	I'd say roughly about 8 hr throughout the week overall I'd guess	We tend not to go to the beach much—we're kind of not beachy, but we do like to go to the lookouts in the hills	Days out at the football tend to be long . . . we do good outdoor stuff like gardening which the kids help with
Mum and dad always put coca oil on . . . everyone would be trying to get a tan that's why we spent half the time at the beach	Nah don't do that . . . I don't stand up that well to light. I use tanning cream rather than the saloon stuff	Probably about 3 hr in the morning and . . . maybe 2 in the afternoon	My daughter probably less . . . compared with me and the boys	We go to the beach a lot in summer and we're at the local pool and mum and dad's pool when we visit	On the weekends we've all got sports . . . so there'll be a lot more (sun exposure) on the weekends

adjudicator in instances of thematic disagreement. This helped to increase the reliability of the research by restricting any occurrence of analytic bias (Creswell, 2007; Hayes, 2000; Miles & Huberman, 1994). Finally, participant anonymity was ensured by not ascribing tracking identifiers (e.g., pseudonym, numeral, or initial) to the participants' quotes.

Findings and Interpretations

A total of four themes and 12 subthemes emerged from the analysis and are expanded upon below.

Theme 1: Underpinnings of Mothers' Current Attitudes Toward Skin-Protective Behaviors

Subtheme 1: Mum and dad, they just didn't emphasize sun safety. As can be seen from Table 2, the study's mothers had different historical experiences of sun exposure and

current sun-exposure practices both for themselves and their children.

Some older mothers explained that they had grown up in an era when their own parents had little-to-no knowledge of what today are termed "sun-safety practices." Hence, throughout their childhood mothers recalled that only minimal importance had been placed on protecting their childhood skin from UVR exposure. While in instances where their own parents had provided them as children with sunscreen, mothers remembered that it was typically applied at the start of the day:

When I was growing up we rarely ever used sunscreen . . . because we didn't have good knowledge . . . back then we had a swimming pool and we were outside the whole day or we'd go to the beach and be out in the sun the whole day . . . As a kid lathering ourselves up [with sunscreen] 20 times a day wasn't really that high on our list of priorities.

As a child I was always in the sun . . . We'd put sunscreen on at the beginning of the day and then go to the beach all day . . . I don't really remember them [parents] sort of saying: "You should reapply it [sunscreen] for it to continue working" . . . You were out there doing your thing and it [sunscreen] just wasn't in your head!

In contrast, younger mothers stated they had grown up in an era where zinc oxide pastes were in common usage but were mainly applied to the face:

I guess when I was brought up, we put lots of zinc on . . . at the time everyone wore zinc so we had a lot of coverage on our faces, but the rest of our bodies, well we didn't really worry about that.

Subtheme 2: Slip-Slop-Slap, I do remember that!

Both the older and younger mothers commonly recalled a couple of the skin-protective messages emanating out of the *Slip-Slop-Slap* public health campaign and its later augmentation, the *Sun-Smart* program:

I really don't remember there being much education about sun-safety in primary or high school . . . it was only sort of through the advertising from the sun council . . . and the *Slip-Slop-Slap* program that I knew what to do (wear a hat and apply sun-screen).

While mothers revealed they had gleaned most of their knowledge on the dangers of sun exposure from one or both of these campaigns; however, they generally assessed their sun-safety knowledge as only being "average" at best. In terms of their children's knowledge, they reasoned that just as they were better informed than their parents' generation, so too are their children better informed than they were at the same age. Moreover, mothers reckoned that the overriding benefit they had from being exposed to the *Slip-Slop-Slap* and *Sun-Smart* campaigns was that sun safety is now etched into the Australian psyche:

You're taught it [sun-safety] more now, it's just everywhere. It's in all the magazines and when it comes around to summertime it's always there on TV, and like everywhere you go . . . so I think that the people who did the *Slip-Slop-Slap* campaign have probably succeeded as it's now a part of our culture . . . we're all certainly very aware of it. It's something that we talk about quite a lot . . . applying screen . . . I mean if you go out the door you make sure you put on your sunscreen and your hat.

Subtheme 3: I don't go in the sun much because there's a history of skin cancer in my family. Mothers stated that while they found the mass media *Slip-Slop-Slap* and *Sun-Smart* campaigns informative in terms of heightening their awareness of the need to apply sunscreen, to wear protective clothing, and to avoid exposing their body to the sun during peak UVR periods, they also revealed that the more recent highly

confronting and graphic campaigns had made them re-evaluate the cancer risks associated with skin exposure:

Now they show pictures of people having skin cancers cut out . . . and you see ads about people who died because they didn't look after themselves in the sun . . . and that's confronting for someone like me. I see these ads and I think, well hopefully the things I'm doing will prevent us from ever having to deal with that. I do believe though there's a lot of people out there who do need to be that confronted so they realize this can happen to you . . . if anything it needs to be more confronting and shown at a younger age.

The following comments reveal skin cancer was not an abstract concept for most mothers, as nearly all of them had had a family member diagnosed with skin cancer or who had had cancerous cells removed or who had died from melanoma:

My partner had a basal-cell carcinoma which he had to get cut out.

My mum has had to have something removed from her face and my granddad has had quite a few skin cancers.

My step-father is currently very sick with melanoma and it's now gone through his entire body. We don't have very long with him. It's awful watching him go through that.

Having a family history of skin cancer typically produced two diametrically opposed responses. For on the one hand, some mothers stated that as they had a family history of skin cancers they were more aware of the risks involved and so were diligent about having both their own and their child's skin checked on a regular basis:

My own dad ended up passing away from melanoma so we've all been having the checks . . . and yeah, so really, it's just made me more aware.

On the other hand, mothers were resigned to the cancer risk associated with skin exposure and indicated having a somewhat lackadaisical approach to securing regular skin checks:

In my adult life I'm not as strict with myself . . . I don't know why that is . . . I think it's just a mum thing you know.

Subtheme 4: Tanning is for the younger generations so now I say fake it all the way. Mothers revealed that sun-tanning had been an integral part of their adolescent and early adult years, mainly because at that time they were trying to emulate the iconic "bronzed-skinned bleached-blond surfer look" that was widely portrayed as being desirable within the Australian media. Now they were parents, they maintained they had little desire or time to spend perfecting and maintaining the

iconic “Aussie” (Australian) image. Also now they had a better understanding of the cancer risks involved in exposing their skin to the sun; mothers stated they now considered prolonged bouts of sunbathing to be an act of folly:

So for about 10-15 years when I was younger I thought having a tan looked good . . . and I’d purposely go out in the sun to change color . . . but now I think that’s stupid. Now I think tanning is just sun damage. Before, I’d see it (sun-tanning) as something positive, but now I see it as definitely something negative.

Mothers with pale complexions revealed that although sunbathing was not an activity they regularly engaged in anymore, they still preferred to look tanned than to appear “white.” As such, they sometimes “faked” the bronzed look by applying a tanning cream/lotion to their exposed skin. Indeed, mothers considered their faking sun-tanning practice to be indicative of how their sun awareness had matured:

I’m one of these people who don’t generally tan. My natural color seems to be either white or red . . . there’s no middle ground. Sometimes I use the cream stuff so I don’t have to use the sun . . . I’ve grown up and as you get older you get a bit wiser.

None of the mothers, including the three who had engaged in indoor tanning in their youth (see Table 2), intended to use a solarium in the future out of a fear that solarium tanning would increase their cancer risk:

I’ve learned everything about the dangers of solariums, such as skin cancer and stuff . . . Honestly, when I did it, it was just like sitting in a coffin. When you came out you could just feel yourself burning. So now I just avoid them if possible. I was told that solariums produce equal or more amounts of UV than the sun and so they’re equally or more bad for you . . . I’ve chosen to stay away.

Subtheme 5: I don’t think it’s good for children to look too pale. While mothers ruled out intentional sunbathing or visiting a solarium, some supported the notion of gradual tanning for both themselves and their child. For they maintained a “light” tan acquired through intermittent everyday sun exposure was acceptable as it enhanced the skin’s appearance and gave it a healthy glow:

I guess a little tan, like a nice tan is okay . . . because like a normal healthy tan means you’ve been outdoors and you look active and stuff and that is like okay.

Mothers also expressed the belief that a slight tan on a child was similarly indicative of a healthy and active lifestyle:

I’ve seen kids start their swimming school lessons like very white and by the end of two weeks they’re really quite tanned and yeah, more olive complexion. I think that just shows good outside activity.

Conversely a pale complexion was perceived to be indicative the child was ill or was leading an unhealthy lifestyle:

I don’t think it looks good for children to look too pale . . . Some children probably don’t get any exposure to the sun because they’re inside too much playing video games and watching TV and stuff like that. I’ve a niece and nephew who are completely pale, because they don’t go outdoors much and, even when they are inside, my sister has all the blinds closed.

Theme 2: Mothers’ Assessment of Their UV Photoaged Photograph

Subtheme 6: I’m not surprised at the amount of damage done to my skin, it probably was inevitable. The mothers’ responses to their UV photoaged photograph were also polarized. For instance, one group of mothers viewed their photoaged image with a degree of resigned acceptance. They surmised that considering their current age, their fair-skin, Australia’s hot climatic conditions, the amount of time they spent out in the sun as a child without skin protection, their adolescent/early adult sun-tanning behaviors, and their current inconsistent adult application of sunscreen, then a certain degree of sun damage was not only to be expected, but was in their estimation inevitable:

I’m 34 now, so I think I’ve had a lot of sun time on my face. I mean I realistically would have expected that! I grew up here so I’m sure that my damage was mostly done when I was a child. Also, because I haven’t worn a hat as much as I think I should have . . . So the lines on my face and the coloration on my face are where I thought it would’ve been.

Such mothers appeared unperturbed by the damage and tended to classify their visible skin damage as “just normal UV damage.” Indeed, they voiced their expectation that the damage to their skin on their arms and legs would actually be more pronounced than that on their face, for their limbs had received the least protection.

Subtheme 7: I’m shocked I wouldn’t have expected so much damage to my skin. Upon inspecting their UV photoaged photograph, mothers at the other end of the viewing response spectrum proclaimed their shocked horror at the amount of skin-damage visible in their facial image. In particular, they expressed their surprise at the amount of damage as they had expected their skin to be far less blemished in their teen/young adult years given they had adopted some *Slip-Slop-Slap* and *Sun-Smart* skin-protective measures:

It looks horrible . . . old and haggard . . . It appears quite scary to me because I’ve always used sunscreen in my foundation . . . and so I’m quite shocked at the degree of damage. I wouldn’t have expected so much damage because of the practices we’re using . . . I would’ve expected less damage than this!

Theme 3: Mothers' Assessment of Their Child's UV Photoaged Photograph

Subtheme 8: *I'm really worried my child will have skin like mine.* Upon viewing their child's UV photoaged photograph, mothers were yet again polarized. Some mothers raised concerns over the amount of skin damage already manifest on their child's photoaged facial photograph, while other mothers voiced their relief that in comparison to their own photoaged facial photograph, relatively little damage was evident in their child's photograph. In this regard, mothers who were concerned about their child's skin damage generally commented on the location of the damage and the type of damage. Moreover, they voiced their fear that their child was now at a heightened risk of skin cancer. Also that in the future when their child reaches their present age, then their child's skin will be as damaged, or even more damaged, than their skin is now:

It worries me a bit . . . you know about the whole skin cancer thing and the aging badly thing . . . I can see that on my son's photo there's a darkened area around his mouth . . . and there's a lot of quite prominent freckles that I didn't notice before. Certainly a lot more spots across his nose and upper cheeks and on his chin too! It worries me that there are that many spots and freckles across his nose as well . . . I mean you'd expect there to be some, but I didn't expect there'd be some around his chin . . . so that worries me as he'll probably have more damage.

Subtheme 9: *There is nothing to be alarmed about, I'd expected far worse.* Mothers who were more accepting of the damage visible in their own photograph generally tended to be accepting of the skin damage in their child's UV photoaged photograph as well. Their acceptance was framed upon an expectancy that a greater amount of skin damage would have been visible in their child's photograph due to the hot climate, their child's fair complexion, and the amount of time that their child spent playing outdoors. Typically, such mothers assessed their child's skin damage in the following terms:

I'm obviously very happy to see that it (damage) is a lot less than mine . . . Yeah, it's better than I thought it might be and I'm glad there is nothing glaringly obvious. I'm not really worried about it. If she'd more damage, then I'd absolutely be more worried.

Theme 4: Mothers' Attitudes Toward Changing Their Sun-Safety Practices

Subtheme 10: *I'll continue what I'm doing now and see if we can get into a skin-protection routine.* While most mothers stated that they would take a few basic steps toward protecting their own skin from further UV damage (e.g., wearing a hat more often, or using a moisturizer with an inbuilt sunscreen), they were generally unwilling to adopt all of the *Slip-Stop-Slap* and *Sun-Smart* skin-protective measures:

Just sitting here opposite you if I said: "I'm going to change everything." That would be an outright lie because there's a part of me that is thinking that it's too late for me. I mean I couldn't put my hand on my heart and say I'll do it for myself, but I can put my hand on my heart and say I'll do it for my son.

This notion of being more persistent in the future with their enforcement of skin-protective measures (e.g., wearing a wide-brimmed hat and application of 30+ sunscreen) with their child was advocated by mothers with children at both ends of the viewing spectrum:

I'll just continue to do what we're doing, spraying and stuff like that . . . and make sure they use sunscreen on a daily basis and not just when I'm concerned that they might get burnt . . . I'll just make sure they're using sunscreen all the time now . . . I'll also always ensure there's a hat on the kids head at the very minimum.

A few mothers indicated they would take steps to reduce the number of hours their child spent outdoors. Specifically, by encouraging the children to play indoors during the peak UV sun hours:

We're in the sun quite a bit so . . . although I wouldn't go to the extreme of not letting them out . . . maybe there'll be a bit more indoor play during the hottest part of the day.

However, for some other mothers, the act of restricting their child's outdoor activities was considered a last resort option:

I've always thought it very healthy for kids to be outdoors . . . if it's (child's skin) that bad I don't know where else we can go other than maybe not letting her out of the house!

Subtheme 11: *I think with my kids I'll start to really educate them more.* Those mothers with preteens acknowledged that when their child had been small they had been able to model, monitor, and enforce some of the basic skin-protective measures, but now their child was older and more independent they conceded that their ability to govern their child's sun exposure was diminishing. As such, they now saw their role as being one of educating their child about their need to be responsible for their own skin protection:

I think she's getting to the age where she needs to do it herself, because she's not with me all the time. So now I'll be teaching her how to put sunscreen on properly herself, because she doesn't put it on properly . . . When she was little I could do it for her because she was under my supervision, but now she's off more doing her own thing.

I reckon that I did more damage in my teenage years because I simply didn't know to do it (protect skin), and that's why I'll teach her to do it . . . In a perfect world . . . she'd have to do

nothing, but we live in Australia! I think it's only through education and knowledge that you can really change things.

Subtheme 12: I think it's a matter of getting a balance. While limiting their children's sun exposure and educating their children on the need to adopt skin-protective measures was their stated ideal, some mothers also recognized that the real danger they and their children faced in the months and years ahead was that they would either become complacent about their child's skin protection or that they would become an overly protective parent. Mothers concluded that the best approach parents could take was to strike a balance between complacency and over-protection:

Stopping it (sun damage) completely is obviously out of question. So I think it's a matter of getting a balance . . . I mean I would rather her be active having fun outside and then getting a few wrinkles and sunspots, rather than being cooped up inside on the couch all day.

Discussion

Increasing the general public's understanding of the cancer risks associated with unprotected UVR exposure during childhood is a growing global health priority (Klostermann & Bolte, 2014). Given that parents set the foundations for children's lifelong health practices, there is a growing awareness of the need to inform parents not only of the skin-protective measures they need to model for their children, but also of the critically important role they fulfill in establishing their children's lifelong sun-safety practices (Bandi et al., 2010; Kyle, Nicoll, Forbat, & Hubbard, 2013; Walker, 2012). However, informing parents of the dangers of UVR exposure is not necessarily sufficient on its own to prevent them from engaging in and modeling unhealthy sun-tanning behaviors (Bandi et al., 2010). Indeed, the visualization of photoaging damage can in some instances backfire. For example, in the present study some mothers, upon viewing the extent of their own facial skin damage, adopted a somewhat fatalistic approach to skin protection as they concluded that as their own skin is already damaged and as this damage is irreversible, there was no longer an imperative to adopt sun-safety practices for themselves. Skin protection now was "too late" to make much of a difference. This fatalism was reflected in this study's mothers' unwillingness to adopt more than the most nominal skin-protective measures of applying sunscreen and possibly wearing a hat.

Another fatalistic response arising out of seeing their own child's photographic evidence of skin damage was that it raised in some mothers' minds the belief that UVR skin damage is a predictable outcome for any child growing up in Australia's hot climate. A third unanticipated maternal response was that the visualization of the facial skin damage made some so protective of their children they stated that they would in the future keep their child indoors during the

peak afternoon UVR period. The difficulty with such mothers adopting this "no outdoors play during the afternoon UVR peak period" is that this time period coincides with organized sport/recreational extramural activities and restricting participation could have implications for child fitness and obesity rates. Another issue arising out of the current study is that once a child enters their preteen developmental stage, mothers indicate that they have less capacity to monitor and influence their skin-protective behaviors. Research has shown that such reductions in parental influence occur partly because adolescence is the developmental period when young people differentiate their actions from those of their parents, spend increasingly longer periods of time outside of the family home, engage in acts of age-appropriate risk-taking, focus on their appearance/sexual attractiveness, and are influenced by peers/media idols (Bylund et al., 2010; Eastabrook et al., 2016; Wright, Reeder, Gray, & Cox, 2008). Aware of these pending developmental changes, mothers of preteens concluded that their parenting task was now one of transferring the responsibility for implementing skin-protective measures away from themselves and toward their preteen in the hope that their preteen would then continue to apply these practices during adolescence. While laudable, research is now needed to empirically evaluate the efficacy of this suggestion.

If the parental instructive option is determined to be limited in terms of instilling skin-protective measures in adolescence, there may well be a default need for governments to enhance the sun safeness of community facilities where adolescents congregate, if the incidence rate of skin cancer in this age cohort is to be reduced (see Anderson et al., 2014). This interventional need would appear to be pressing given that an Australian study by Potente, Anderson, and Karim (2011) determined half of all skate parks, beaches, and sports grounds and one quarter of all swimming pools (i.e., venues commonly frequented by adolescents) had insufficient shade facilities to protect them from UVR exposure. Such results are particularly concerning as seeking shade is one of the skin-protective measures which have been promoted in the Australian Government's second *Sun-Smart* public health campaign.

Limitations

While there are no set numbers of participants needed for qualitative research, this study's sample size of 10 is considered sufficient to achieve saturation (i.e., the data gathering point where no new data is being generated; Liamputtong, 2009). However, the relatively small size of this study's sample means that the findings should be viewed with caution until replicated in other domains. A second limitation of the study is that the mothers who volunteered for this study are likely to have been those that were already interested in sun-related issues and thus their responses may not be reflective of the behaviors of mothers who are not motivated to take

part in UV skin-protection research. Finally, a third limitation of the study is that it is conceivable that the themes and subthemes which emerged from the study are reflective to some degree of the questions asked of the participants.

Conclusion

Prior to viewing their and their child's photoaged photographs, mothers had a good understanding of the cancer risks associated with sun exposure. However, they exhibited a much lower understanding of the damage that unprotected UVR exposure causes to skin and held the belief that a healthy appearance is a tanned appearance. This lack of understanding needs to be addressed because the sun-safety practices that parents model are generally the ones their children replicate as they grow older. Therefore, it is important that public health sun-safety interventions be targeted at the parents of very young children, for if their beliefs and skin-protective practices are informed by the latest research then it is likely that they can be progressively updated. By modeling better skin-protective behaviors, parents have the capacity to improve the sun-safety practices of their young children, and in doing so help reduce their cancer risk (Behrens et al., 2013; Walker, 2012).

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