RESEARCH COMMUNICATION

Sun Protection Behavior and Individual Risk Factors of Turkish Primary School Students Associated with Skin Cancer: A Questionnaire-based Study

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Abstract

Aim: To determine the Turkish primary school students' sun protection behaviors and their individual risk factors associated with skin cancer. Methods: The sample of this descriptive study consisted of 6th-8th graders (11-14 age group) from a primary school in the western part of Turkey. A self-report questionnaire was administered. The response rate was 86.0 %. Results: The mean age of students was 12.8 years (SD =0.73). It was determined that the male students in the age group of 13-14 had more risks associated with skin cancer when compared to the female students in the same age group. In terms of the knowledge of the most dangerous hours of the sun and how to protect from their harmful effects, no significant difference was evident between females and males or across age groups. The average score of the students' frequency of use of sun protection methods is 3.40±0.67 out of 5. The most frequent methods used for sun protection were found to be seeking shade during periods of peak ultraviolet radiation and wearing light-colored clothing. The average frequency score for sun-protective behavior of the 11-12 age group was significantly high ($p<0.05$). Conclusion: It was determined that the students did not practise sun protection behavior frequently enough.

Keywords: Turkish primary school students - sun protection behaviour - skin cancer risk factors

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Introduction

The incidence of skin cancer has increased dramatically worldwide in the last decade, establishing malignant melanoma and non-melanoma skin cancer as major public health concerns (WHO Fact Sheet, 2001; Glanz et al., 2009). Between two and three million incidents of non-melanoma skin cancer and approximately 132 000 malignant melanomas occur globally each year. With a sustained 10% decrease in stratospheric ozone, an additional 300.000 non-melanoma and 4.500 melanoma skin cancers could be expected world-wide, and skin cancer incidences will not begin to fall until about 2060, according to UNEP estimates (WHO Fact Sheet, 2001; Unep, 2002). The primary risk factors for the development of skin malignancies includes an overexposure to ultraviolet radiation (UVR), phenotypic factors (red and blonde hair, light eye color, fair skin color, presence of nevi), sensitivity to the sun, family history of skin cancer (Gandini et al., 2005a; 2005b; Wright et al., 2008). Moreover, excessive and unprotected exposure to the sun can result in premature aging and undesirable changes in skin texture (Hall et al., 2001a; Roberts and Black, 2009; Nikolaou et al., 2009).

Morbidity and mortality for these skin cancers are substantial. Despite decreases in the mortality rates of cancer overall, deaths from melanoma have increased (Unep, 2002). Further, both melanoma and nonmelanoma skin cancers have serious psychosocial consequences, including disfigurement from surgical removal, emotional distress, and financial burdens (Roberts and Black, 2009). Children are more sensitive to ultraviolet (UV) radiation damage than adults, and sunburn during childhood increases the risk of skin cancer and eye damage (particularly cataracts) later in life, and suppresses the immune system (WHO Fact Sheet, 2001). During the first 18 years of life, when much of the lifetime UV radiation exposure is received, a significant proportion of time is spent at school or participating in school-based activities, such as camps or school sports (WHO, 2003). School children are also especially susceptible to fashion trends, suggesting that a suntan is healthy, and skills-based health education can help them to resist peer pressure (WHO, 2002). Children can be exposed to intense sunlight on the balcony at home, on weekend trips or a visit to the zoo, during breaks at kindergarten or school, and during outdoor sporting activities (UNEP, 2002)

It is important to target children's attitudes and behavior at a young age, particularly at primary school, when children tend to be most receptive to the need for sun protection. Individuals who develop such life skills at a young age are more likely to adopt and sustain a

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healthy lifestyle during schooling and for the rest of their lives (Davis et al. 2002; WHO, 2003,). By the age of 14 years, routine use of sun protection is 50% less than that in 10-year-olds (Coogen et al., 2001). Sun protection is not only necessary on the beach or at the swimming pool but applies to all outdoor settings. In many situations sunburn arises because people do not realize the need for protection (UNEP, 2002). Behavioral recommendations for the prevention of skin cancer aim to reduce exposure to ultraviolet radiation by limiting time spent in the sun, seeking shade particularly during periods of peak ultraviolet radiation, using sunscreen with a sun-protection factor of 15 or higher, wearing protective clothing (hat, shirt, pants) and sunglasses, and making sun safety a regular habit (WHO 2002; WHO 2003; O'Riordan et al., 2009).

It has been largely documented that a history of sunburn in early life nearly doubles the risk of developing malignant melanoma in adulthood (Naldi et al., 2000; Gandini et al., 2005a; Naldi et al., 2007). In most epidemiological studies, the number of melanocytic nevi represents the strongest risk predictor for developing malignant melanoma and it has been established that the density of melanocytic nevi in childhood is in turn influenced by sun exposure and sunburn in early infancy (Darlington et al., 2002; Naldi et al., 2007)

The consequences of chronic UVR exposure are potentially preventable with public education and behavioral modification. Several studies have been performed to measure sunscreen use and skin protection behavior, especially in the US, New Zealand and Australia (Morris et al., 1998; Stanton et al., 2004; O'Riordan et al., 2009). During the last decade, dermatologists worldwide have made major efforts to raise skin cancer awareness and to inform the public about preventive measures (Nikolaou et al., 2009; Mahon, 2003).

Although other reasons may also play a role, UVR exposure may be the main cause of the increasing trends in skin cancer and melanoma in many countries (Ceylan et al., 2003; Stanton et al., 2004; Tas et al., 2006). Turkey is a country where the population is constantly submitted to a high level of ambient UVR throughout the year. According to the reports from the Ministry of Health of Turkey Cancer Control Department, the estimated incidence rate of skin melanoma in 2004-2006 is 1.5%0,00, while the rate of other skin cancer types is 23.2/%0.00. In 2002-2006, nonmelanoma skin cancers were ranked the 4th most common cancer type. These cancer types were ranked 3rd in males while they were ranked 2nd in women (The Ministry of Health of Turkey, Department of Cancer Control, 2010).

In our country, 26% of whose population is made up of children aged 0-14 (Turkish Statistical Institute, 2009), the preventive measures to be taken against skin cancer are essential in decreasing the incidence rate in adulthood. Skin protection is important and necessary to decrease the morbidity and mortality associated with all skin cancers. The school environment is a potentially effective venue for delivering sun-safety interventions, but it is uncommon in Turkey. At present, little is known about the experience of sun burn and sun protection behavior amongst primary and secondary school children in Turkey.

The aim of this study was to determine the Turkish primary school students' sun protection behaviors and their individual risk factors associated with skin cancer.

Materials and Methods

Design and Sample

This descriptive research was carried out at a primary school, located in the western part of Turkey in 2008. The population of the research consisted of 6th -7th-8th graders (11-14 age group) receiving education at one of the primary schools with the highest number of students in the center. A sample selection was not made. All the 6th -7th-8th graders were included within the scope of the research (n=320). Interviews were conducted with volunteers. 86.0% of the students were reached (n=274).

Data Collection

For data collection, a self-report questionnaire, which was prepared according to an analysis of the literature (WHO Fact Sheet, 2001), was administered. The questionnaire comprises of three parts. The first part includes 9 sociodemographic questions, while the second part includes 10 questions on the students knowledge of the harmful effects of the sun and individual risk factors (hair color, eye color, sunburn history, presence of nevi, family history of skin cancer), and the third part includes the assessment of the frequency of students' sun protection behavior (SPB) conducted with 9 Likert type questions. In this section, the students' responses were scored using 1-5 scale ranging from "always", "very often", "sometimes", "seldom" to "never". The SPB is scored by calculating the arithmetic mean across all items, for a total score that ranges from one to five. In general, higher scores indicated a higher level of sun protection behavior. The reliability coefficient of the form (Cronbach Alpha) is 0.71.

Data Analysis

The data were analyzed using the SPSS for Windows, version 16.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were used to describe students' demographic characteristics, while T test, one-way variance analysis and chi square test were used for the comparison of variables.

Ethical Considerations

Ethical approval for the research was obtained from the ethical committee of the Ege University School of Nursing. Consent was obtained from the City Provincial Directorate for National Education for the conduct of the research. In addition, verbal approval was also received from the students by making a detailed explanation on the research.

Results

Participant characteristics

Of the students, 44.5% were female and 52.6% were male. While 39.1% were aged 11-12, 60.9% were aged 13-14 and the mean age was 12.75 years (SD =0.73). Of the students, 44.5% were 6th graders, while 43.1% were

Table 1. Distribution of Students' Risk Factors According to Age and Sex

Factors	Gender					Age				
	Boys		Girls		X^2	11-12		13-14		X^2
Hair										
Light	41	44.6	51	55.4	0.06	39	42.4	53	57.6	0.42
Dark	103	56.6	79	43.4		68	37.4	114	42.6	
Eye										
Light	41	51.9	38	48.1	0.89	31	39.2	48	60.8	0.97
Dark	103	52.8	92	47.2		76	39.0	119	61.0	
Presence of moles on upper limbs										
Yes	38	62.3	23	37.7	0.08	21	34.4	40	65.6	0.40
No	106	49.8	107	50.2		86	40.4	127	59.6	
A history of sunburns										
Yes	46	62.2	28	37.8	0.05	21	28.4	53	71.6	0.02*
No	98	49.0	102	51.0		86	43.0	114	57.0	
History of skin cancer in family										
Yes	2	100.0	-	-	0.12	1	50.0	1	50.0	0.75
No	142	52.2	130	47.8		106	39.0	166	61.0	
Sun exposure in risky hours in spring/summer (hours/day)										
< 1h	29	46.8	33	53.2	0.31	33	53.2	29	46.8	0.03*
1-2 h	71	51.4	67	48.6		50	36.2	88	63.8	
>2 h	44	59.5	30	40.5		24	32.4	50	67.6	

*p<0.05

7th and 12.4% were 8th graders.

The Relation of Students' Risk Factors and Knowledge of the Harmful Effect of the Sun with Sex and Age

In Table 1, the relation of students' risk factors with age and sex are given. The majority (55.4%) of the students with fair hair are female. More than half of the students with light eye color (51.9%), presence of moles on upper limbs (62.3%), a history of sunburns (62.2%), and who expressed that that they were exposed to sun during risky hours for more than two hours a day (59.5%) were male. However, these differences are not statistically significant (p>0.05). Only two male students had family history of cancer. As for the distribution of the students' risk factors according to age groups; the majority of those who had a history of sunburns (71.6%) and who expressed that they were exposed to sun during risky hours for more than two hours a day (67.6%) were in the age group of 13-14. This difference among the age groups is also statistically significant (p<0.05).

When asked whether they had any knowledge of sun protection, 90.9% of the students responded positively. They expressed that they acquired this knowledge via their families (36.9%), school (38.0%) television (20.8%), and internet (24.1%) respectively. Of the students, 96.0% stated that the sun was most harmful at midday. In terms of the knowledge of the most harmful hours of the sun and protection from these rays, there is no difference between male and female students (p>0.05), and among age groups (p>0.05).

Students' sun protection behavior (SPB)

When the frequency of the students' sun protection behaviors was evaluated; it was seen that 58.3%'were "always" and "very often" careful about not being outside at midday, 18.6% were "seldom" or "never" careful. One of every five students would go swimming at risky midday hours (22.6%) and/or take a sunbathe (20.1%). Of the students, 41.4% stated that they "always-very often" wore hat outside, while 26.6% "sometimes" did. Of the students, 23.4% did not wear sunglasses, and similarly, 24.1% did not use a sunscreen while swimming or at the beach. Only 26.3% "always" or "very often" pay attention to using a sunscreen when they are outside at midday. A great majority of the students preferred being in the shade (89.4%) and wearing light-colored clothes (76%) when they were outside. As a result of the scoring made according to the frequency of the students' sun protection behaviors, the average score for frequency of SPB was found to be 3.40±0.67 out of 5. This score indicated that SPB was "sometimes" practised (Table 2).

The relation of SPB scores with independent variables

When the relation of students' SPB frequency scores with certain variables are evaluated (Table 3), it is seen that there is not a statistical difference between the average SPB scores of male and female students (t=0.35, p>0.05); however, a difference of score is observed since girls practised these behaviors more frequently. The SPB frequency scores of the younger age group (11-12 year old) (t=2.71, p<0.01), accordingly those who were at relatively junior grades (6th graders) were significantly higher (F=6.30, p<0.01). When the students' individual risk factors and SPB scores are compared, it was found that the SPB frequency of those with fair hair and light eye color was not different from the others (p>0.05), the average scores indicating the similarity that these behaviors were "sometimes" practised. There is a significant difference between the students' duration of exposure to sun during risky hours and their average SPB scores (F= 19.08,

Table 2. Students' Frequency of Sun Protection Behaviors (SPB) (No and %)

Sun protection behavior	Always		Very often		Sometimes		Seldom		Never	
Careful about not being outside at midday hours	70	25.5	90	32.8	63	23.0	35	12.8	16	5.8
Careful about not swimming at midday hours	55	20.1	53	19.3	55	20.1	49	17.9	62	22.6
Careful about not sunbathing at midday hours	77	28.1	46	16.8	52	19.0	44	16.1	55	20.1
Careful about wearing a hat outside at midday hours	59	21.5	56	20.4	73	26.6	47	17.2	39	14.2
Careful about wearing protective sunglasses	41	15.0	66	24.2	45	16.4	58	21.2	64	23.4
Careful about using sunscreen with a sun-protection factor of 15 or higher	44	16.1	28	10.2	45	16.4	56	20.4	101	36.9
Careful about using sunscreen at the beach or while swimming every half an hour	50	18.2	61	22.3	50	18.2	47	17.2	66	24.1
Careful about seeking shade outside	165	60.2	80	29.2	17	6.2	10	3.6	2	0.7
Careful about wearing light-colored clothes	121	44.2	87	31.8	42	15.3	18	6.6	6	2.2
General Mean Score					3.40±0.67					

Table 3. Relations of SPB scores with Independent Variables

Variable		n	X(S)	t	p
Sex	Male	144	3.38 (0.69)	0.35	0.72
	Female	130	3.41 (0.64)		
Age Group	11-12	107	3.53 (0.63)	2.71	0.00*
	13-14	167	3.31 (0.67)		
GradeF	6th	122	3.53 (0.65)	6.30	0.00*
	7th	118	3.34 (0.63)		
	8th	34	3.11 (0.75)		
Hair	Light	92	3.45 (0.66)	0.75	0.45
	Dark	182	3.38 (0.67)		
Eye	Light	79	3.39 (0.66)	0.98	0.96
	Dark	195	3.40 (0.67)		
Sunburn history	Yes	74	3.35 (0.70)	0.71	0.47
	No	200	3.42 (0.65)		
Sun exposure	< 1h	62	3.79 (0.66)	19.1	0.00*
	1-2 h	138	3.38 (0.61)		
	> 2 h	74	3.12 (0.63)		

*p<0.01; Sun exposure in risky hours in spring/summer (hours/day)

p<0,01); as the students' duration of exposure to sun increases, the average SPB frequency score decreases. Post hoc analyses using the Scheffe test indicated that the SPB scores of students were significantly higher in students who were exposed to sun during risky hours (for more than an hour) [< 1h /d (3.79 ± 0.66)] compared with those who were exposed to sun for 1 to 2 hours [1-2 h/d (3.38 ± 0.61)] and for more than 2 hours [> 2 h (3.12± 0.63)].

Discussion

Generally, genetic, environmental factors and habits are the major determinants of the development of skin cancer. Those with fair skin color, the elderly and men have a higher risk of developing malign melanoma compared to the black, young and women. Fair skin color and the phenotypes which have a tendency to sunburn, and especially the excessive exposure to the sun in the early periods of life are high risk factors for the disease (Naldi et al., 2000; Davis et al.; 2002, Fehér et al., 2010). As a result of the clinical observations, it was determined that children are exposed to UVB three times more than that of adults annually, and a significant part of this exposure occurred during summer months and the peak hours of the sun's rays (UNEP 2002; Gandini etal., 2005b, Balato et al., 2007; Naldi et al., 2007). The majority of the students in the research group who had constitutional characteristics of skin cancer such as light eye color, moles on upper limbs, family history of cancer and a history of sunburn were male. The students who had a history of sunburn and who expressed that that they were exposed to sun during risky hours for more than two hours were of an older age group. In the study conducted by Hall et al. (2001b), it was found that sunburn was more common among children who were older, had sun-sensitive skin, blue eyes, or spent more time outdoors than among children who were younger, had darker eyes, or spent less time outdoors. In their study, Fehér et al. (2010) also pointed out that constitutional characteristics such as fair complexion, presence of freckles and older age were factors predicting sunburns. In accordance with all this literature, it could be concluded that the male students in the research group who were aged 13-14 had more risks associated with skin cancer when compared to the girls.

Skin cancer rates have been rising at an alarming rate in all fair-skinned populations. Much of this rise is behaviorally driven, and four out of five cases of skin cancer are preventable by sensible behavior, especially during childhood (WHO Fact Sheet, 2001; Stanton et al., 2004; WHO 2003). As a result of the studies conducted in our country, it was determined that sun protection behaviors were generally inadequate in individuals, especially children and adolescents (Baz et al., 2003; Dallı et al., 2004; Uslu et al., 2009).

In the research, it was found that the most frequent methods used by students for sun protection were seeking shade during periods of peak ultraviolet radiation and wearing light-colored clothing. Wearing sunglasses and using a sunscreen were the least frequently used methods. In the study conducted by Uysal et al. (2004) it was also found that children's use of sunscreen was low. On the other hand, a study in a Mediterranean population found that wearing sunglasses was the most commonly used sun-protection measure (83.4%) (Nikolaou, 2009).

As for the studies conducted in New Zealand (Morris et al., 1998), Australia (Stanton et al, 2004) and Italy (Balato et al., 2007) it was found that children's use of sunscreen was higher. Geography (e.g. latitude), culture, and economy may all contribute to these differences, with economy and different cultural backgrounds possibly being key influential factors. In the research group, almost all the students expressed that they possessed the knowledge concerning sun protection; however, the average SPB frequency score (3.40±0.67) indicates that SPB are not practised adequately. In other words, it is seen that students are not able to utilize their knowledge of sun protection and transform it into an adequate level of SPB practice. In many studies, younger adolescents (<14 years) are reported to have more positive sun-protective attitudes and behaviors when compared with older adolescents (Morris et al. 1998; Hall et al., 2001a; Stanton et al., 2004). Similarly, the average SPB scores of the 12-13 age group are significantly high in the research group as well. In parallel with the students' age, the average scores of 6th graders are higher than the other graders as expected. Although the majority of researches demonstrate that the SPB frequency of girls are higher than boys (Cheng et al., 2010; Dallı 2004, Uysal 2004, Turgay 2005, Stanton 2004), in this study, similar to that of Stanton et al. (2004), no consistent differences between girls and boys were found in sun protective behaviors.

Although the skin cancer risk of those with fair hair and light eye color and a history of sunburn is higher, their SPB frequency was found to be inadequate. The fact that the students with the highest SPB frequency score were of the group who were exposed to sun for less than an hour is an indicator of the group's sensitivity. However, the inverse relation between the duration of exposure to sun and the average SPB score implies that the risk of harmful effects on those who are exposed to sun for more than an

hour increases.

In conclusion, similar to earlier studies, we found that as children get older, they experience more sunburns. Older children generally engage in less sun protection than younger children. This study showed that although almost all the students possessed the knowledge of sun protection methods, sun protection behaviors were generally inadequate in Turkish primary school students. Educational approaches to sun safety in primary school may be effective for improving children's sun safety. So, an efficient policy of education on the effective use of sun protection methods beginning in childhood and adolescence should be developed to prevent skin cancer. School nurses are ideally positioned to enlist the help and support of administrators, teachers, and other school personnel to educate school-age children and families, and to influence school policies that promote sun-safe behaviors.

The limitations of this study included its use of self-reported measures. However, previous studies have shown that children are reasonably good at self-reporting, including their usual sun-related behavior.

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