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ORIGINAL ARTICLE

Knowledge, attitudes, and behaviors regarding sun protection, effects of the sun, and skin cancer among Turkish high school students and teachers

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ABSTRACT

Background/objective: The incidence of skin cancer has increased dramatically worldwide over the past decades, and adolescents are prone to exposing themselves to the harmful effects of the sun. Although there are plenty of studies assessing the knowledge level and behavior of adolescents regarding sun protection and skin cancer, to the best of our knowledge, this is the first study evaluating both adolescents and their teachers. This study aimed to evaluate high school students' and teachers' knowledge, attitudes, and behaviors regarding sun protection and skin cancer.
Methods: A total of 396 students and 139 teachers from two high schools in Ankara, the capital of Turkey, were enrolled in the study. An anonymous questionnaire form was used to obtain the required data for our cross-sectional and nonrandomized study.
Results: Male students stayed significantly longer in the sun than female students ($p < 0.001$). Only 41.8% of the students stated that they used a sunscreen when outside only in summer. This percentage was 81.9% for the teachers and is statistically higher than for the students ($p < 0.001$). We found no difference with regard to sex, however, a female predominance in sunscreen usage has been reported in the literature.
Conclusion: Major information sources should be used more effectively to increase the knowledge level of the students.

Introduction

Solar ultraviolet radiation (UVR) is the most common environmental cause of the vast majority of skin disorders including skin cancer. Epidemiological studies have disclosed a strong association between solar UVR and all major types of skin cancer.[1] Although many factors such as advanced age, low Fitzpatrick skin types, and male sex have been associated with an increased risk of developing skin cancer, unprotected UVR exposure has been reported as the single most important environmental risk factor.[2] Many epidemiological studies in the literature suggest that UVR from sun exposure and sunburns at early ages are associated with skin cancers in adulthood.[3–5] It was reported that a history of sunburn in early life almost doubles the risk of developing melanoma in adulthood.[6–10] The incidence of skin cancer is increasing in the world, hence, sun protection education is becoming crucial.[11,12]

Ankara, the capital of Turkey, has a semiarid or steppe climate with hot, dry summers and cold, snowy winters. The average temperature is 23°C in summer (minimum temperature 4.7°C and maximum temperature 41.0°C).[13] The average UV index value was 8.6 in summer 2012 and 5.0 (minimum 0.4 and maximum 9.9) throughout the year.[14]

The aim of this study was to evaluate high school students' and teachers' knowledge, attitudes, and behaviors concerning sun protection and skin cancer.

Conflicts of interest: The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in this article.

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Materials and methods

Design of the study

A cross-sectional study was conducted between January 2011 and January 2012 in the capital city Ankara. The study population included 400 students and 150 teachers from two high schools located in the center of the city.

Study sampling

For our study, to determine the extent of the sampling, we used the formula $n = Nt^2pq/d^2(N-1) + t^2pq$, which can be used when we know the number of elements of the statistically accepted research universe, and the extent of sampling was calculated as 384 people/students (Table 1). It was determined that a sample with 384 students could represent statistically all high school students in Ankara with 95% confidence. Considering this sample size, it was decided that two high schools were adequate for sampling. However, because the inhomogeneity of rural schools did not match with the schools located in the center of the city, we used the stratified sampling method (*aka* grouped sampling), in which all the elements in the universe have an equal chance of being selected, instead of the simple random sampling method. The strata were created according to the socioeconomic status of the city regions. In the sampling methods used in our study, schools were divided into two subgroups (central and rural) considering the socioeconomic status, and only one random school was selected from each subgroup. A school was selected for each stratum. The samples were selected using the simple random sampling method in the layers. Our sample of 396 students was statistically large enough to be representative of the research universe and could be generalized to all high school students in Ankara (Table 1).

Questionnaire

The data were collected using an anonymous questionnaire that all participants were asked to complete during class time. Only the final core items, including 10 questions for adults and adolescents used by Glanz et al,[15] were used to obtain data to perform an objective evaluation. In the survey, both groups were asked 10 additional questions, in order to evaluate their detailed knowledge regarding sun protection, environmental factors, and the source of personal knowledge. In addition, we could compare the two groups using the additional questions. The study was performed after obtaining permission from the Governorate of Ankara and the Provincial Directorate of Education. Statistical analysis was performed using SPSS Version 16.0 statistical package program (SPSS, Inc., Chicago, IL, USA). The level of significance was $p = 0.05$ in our study, and we used Pearson's Chi-square, Fisher's exact, and Student t tests for the statistical analysis.

Table 1 Determination of sample size with 95% confidence level and extent of the sampling ($n = \frac{250000\times1.96^2\times0.5\times0.5}{0.05^2\times(250000-1)+1.96^2\times0.5\times0.5} \cong 384$).

Size of universe (person)	Accuracy (error can be tolerated)				
	±1%	±2%	±3%	±4%	±5%
1.000	[a]	[a]	[a]	375	278
2.000	[a]	[a]	696	462	322
3.000	[a]	1334	787	500	341
4.000	[a]	1500	842	522	350
5.000	[a]	1622	879	536	357
10.000	4899	1936	964	566	370
20.000	6489	2144	1013	583	377
50.000	8057	2291	1045	593	381
100.000	8763	2345	1056	597	383
500.000 to ∞	9423	2390	1065	600	**384**

The value in bold signifies 95% confidence level.
[a] In this case, >50% of the universe must be included in the sample.

Results

A total of 396 students [218 students from Class 9 (aged between 14 years and 15 years), 96 students from Class 10 (aged between 15 years and 16 years), 42 students from Class 11 (aged between 16 years and 17 years), and 40 students from Class 12 (aged between 17 years and 18 years)] and 139 teachers completed the survey. The mean age was 15.57 ± 1.1 years for the students and 37.27 ± 7.63 years for the teachers; 61% of the students and 62.6% of the teachers were female (Table 2).

Sun habits and sun protection behaviors

The most common time interval that the students were exposed to the sun was 2 h/d between 10 AM and 4 PM on weekdays in summer (45.6%). Male students stayed significantly longer in the sun than female students ($p < 0.001$). The most common time interval on weekdays was 30 minutes to 1 hour for the teachers' group, and there was no difference between sexes.

A history of sunburn at least once in the past 12 months was higher in the teachers' group than in the students' group (51.4% and 38.8%, $p = 0.023$ and $p = 0.035$, respectively). Only 41.8% of the students stated that they used a sunscreen when outside only in summer. This percentage was 81.9% for the teachers and statistically higher than that for the students ($p < 0.001$). There was no difference between sexes in students regarding the usage of sunscreen products. The percentage of the male teachers who never wore sunscreen products was significantly higher than the female teachers (68.6% and 89.7%, $p = 0.018$ and $p = 0.039$, respectively). The percentage of female students that never wore a hat for protection from sun exposure was significantly higher than the male students (67% and 33%, $p < 0.001$).

None of the participants had a history of skin cancer in both groups. A history of skin cancer in relatives (1st or 2nd degree) was present in 3.1% of the students and 8.1% of the teachers.

Regarding protection from sun, 74.2% of the students and 96.4% of the teachers declared that they found that sun protection was necessary ($p < 0.001$). Most male and female students never used an umbrella for protection from the sun (94.3% and 92.7%, respectively). The number and percentage of female teachers who used an umbrella to protect themselves from the sunlight were higher than those of the male teachers, male students, and female students (21.3% vs. 9.4%, 5.7%, and 7.3%, respectively; $p < 0.001$ for all groups). Forty-nine percent of the students and 80.3% of the teachers agreed that sunglasses should be used for sun protection, in order to protect the eyes from the sun ($p < 0.001$).

The majority of male and female students had never sunbathed (89.4% and 87.3%). The percentage of female teachers who spent time in the sun to induce tanning was statistically significantly higher than all the other groups (45.7% vs. 17.8%, 10.6%, and 12.7%, respectively; $p < 0.001$ for all groups).

Additional questions

To the first additional question regarding the sun protection factor (SPF) of sunscreen products, the majority of students answered that they did not know how much SPF was sufficient for sun protection (75.1% for males, 79.6% for females). Most of the teachers (50.8%) reported that an SPF of >30 could provide sufficient sun protection (Table 3).