





Knowledge and behavior of Lebanese parents regarding melanoma prevention in public and private school children

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Aim: Assess the knowledge and behavior of Lebanese parents when it comes to melanoma and its prevention in children. **Methods:** A survey, to be completed by parents, was sent through children from three schools. **Results:** During sun exposure only 23.5% of 1012 respondents were always covering enough areas of their children's skin and 74.1% did not always apply sunscreen to their children. Parents of private school children were three times more likely to apply sunscreen to their children when exposed to sun, four times more likely to reapply sunscreen every 2–3 h and 21 times more likely to use a higher sun protection factor. **Conclusion:** Sun protection in children is insufficient and sunburns are frequent, illustrating the need for melanoma awareness campaigns.

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Melanoma is the deadliest type of skin cancer, and its incidence is increasing worldwide [1]. Mumbai's cancer registry demonstrates the highest age-standardized incidence rate (ASIR), at 127.4, in individuals between the ages of 0 and 59 years old, followed by Beijing (70.7) and Australia (20.3), compared with Western registries and the remaining Asian cancer registries, which show considerably lower ASIRs for the same age group [2]. In the case of Lebanon, according to the latest national cancer registry of the Lebanese Ministry of Public Health in 2016, individuals between the ages of 0 and 59 had an increased ASIR compared with previous years. For example, melanoma ASIRs for males and females were 1.4 and 1.6, respectively, in 2015 and 2.1 and 1.6, respectively, in 2016 [3].

Although melanoma predominantly affects the adult population, with only 0.4% of all cases occurring in patients younger than 20 years [4], the majority of available evidence reveals an increase in melanoma incidence trends in the pediatric population [5]. The surge in melanoma incidence in children and adolescents cannot be due solely to genetic factors. Other reasons behind this rising emergence may be changes in the climate as well as the population's sun-related behaviors leading to increased sun exposure [6,7]. Moreover, sunburn during childhood damages the skin's structure and function, causing chronic alterations later in life and increasing the risk of melanoma in adults. Therefore, addressing sun protection early in life is important [8].

Furthermore, it is well established that, as in many other cancers, prevention and early detection are the most effective instruments for reducing the incidence of and mortality related to melanoma [9]. To achieve this objective, it is crucial to increase public awareness, especially at an early age and via parents in particular, of the most effective preventive measures. In fact, parents can play a major role in the prevention of melanoma by supervising their children's daily activities and employing simple measures (e.g., sunscreen before sun exposure), as children are mainly dependent upon their parents in this matter.

This study aimed primarily to assess the knowledge and behavior of Lebanese parents when it comes to melanoma prevention in schooled children because, to date, no study has been conducted in this regard. It also compared findings among both private and public school parents.

Methods

Participants

From September 2018 to June 2019, a cross-sectional survey was conducted of a random sample of parents of children aged 6–10 years selected from three different schools (one private school, with 561 surveys distributed, and two public schools, with 491 surveys distributed). Similar to most Lebanese private schools, the private school that participated in this study is an average- to high-tuition school located in the city and receives mostly children of middle- to high-income families. The two public schools are located in the suburbs and, similar to the majority of Lebanese public schools, are not well equipped and receive children from low- to middle-income families.

Before launching the survey, each school administration was approached through an introductory meeting and was invited to participate in this study via a letter describing the objective of the study. Once the school accepted to participate, a set of printed self-administered anonymous questionnaires in Arabic (the native language of the country) and an envelope for returning the questionnaires were sent. The cover letter of the questionnaire was used to obtain parent consent to process personal data and to clarify the voluntary nature of participation.

Instrumentation

Each school representative distributed the questionnaires to their students, aged 6–10 years, asking that one parent fill it out and return it with their child to the principal. Siblings were given only one questionnaire. The questionnaire was developed, tested and improved by the authors' team; however, no formal pilot testing was done. The questionnaire was divided into three sections: demographics, knowledge and behavior. The demographic section collected information about profession, number of children and amount of time the respondent parent spent caring for them. The knowledge section assessed familiarity with melanoma, family history of melanoma and knowledge regarding the main risk factors and peak time of sun exposure with highest risk of sunburn. The behavior section consisted of questions measuring parents' attitudes regarding protecting children during sun exposure, such as the total time of sun exposure permitted, application of sunscreen and clothes worn during sun exposure, frequency of sunscreen application when exposed and sun protection factor (SPF) used. The last question studied the reasons for not protecting children with sunscreen during sun exposure.

Statistical analysis

The collected data were entered into a database in the form of numeric codes of one or more digits, corresponding to the information collected on the sample. Before the statistical analysis, quality control of the data entered into the database was carried out. Statistical analysis of the data was performed using SPSS Statistics 27 software (IBM Corporation, NY, USA). Univariate and bivariate analyses were conducted. All inferential tests were performed through the execution of a bilateral hypothesis test, with significant statistical levels set at $p \leq 0.05$, using a chi-square test. The results were stratified by type of school (private vs public).

Results

Of the 1052 questionnaires distributed to all schools included in the study, 18 were missing and 22 were sent back blank, leading to a response rate of 96.2% (1012 of 1052).

Demographics

Most questionnaires were completed by the mother (80.3%), and 10.4% of all respondents were in the medical field. Half of the respondent parents had three or more children. Approximately three-fourths (72.6%) of the respondents were the parent who was most in charge of the child's care. A total of 94.3% of respondents had no family history of melanoma. [Table 1](#) illustrates the demographic characteristics of the respondents.

Knowledge

Almost half (43.9%) of the parents had never heard about melanoma, and more than half (58.5%) were not aware that sun exposure is a risk factor for melanoma. A total of 49% of respondents considered the most dangerous time of sun exposure to be between 12 and 3 p.m. [Table 2](#) illustrates the knowledge of the respondents.

Table 1. Demographics of the study population.

Characteristics	n (%)
Sex	
Male	195 (19.3)
Female	813 (80.7)
Medical field profession	
Yes	105 (10.2)
No	903 (87.3)
Respondent caring for child/children	
Most of the time	735 (72.6)
Often	223 (22.0)
Sometimes	49 (4.8)
Never	5 (0.5)
Family history of melanoma	
Yes	53 (5.3)
No	942 (94.3)

Table 2. Knowledge of the study population.

Question asked	n (%)
Have you already heard about melanoma?	
Yes	568 (56.1)
No	445 (43.9)
Are sunburns a major risk factor for melanoma?	
Yes	421 (41.4)
No	590 (58.5)
What is the most dangerous period of time of sun exposure?	
12 pm – 3 pm	492 (49.0)
Other	472 (46.9)
Unknown	41 (4.1)

Behavior

With regard to parents' behaviors around melanoma prevention, 6.1% allowed their children to be exposed to the sun for more than 5 h per day, whereas 40.5% did not allow exposure for more than 1 h per day. A total of 9.4% of parents had at least one child who had experienced multiple sunburns (more than two). Approximately a quarter (25.9%) of the respondents always applied sunscreen to their children during sun exposure. These 25.9% were asked about the circumstances surrounding sunscreen application using a multiple choice question: 86.8% of parents applied it to their children when at the beach, 17.6% when in the mountains, 7.1% when in the garden, 47% when skiing and only 13.7% when playing outside. Approximately two-thirds of parents who were informed about melanoma applied sunscreen to their children every 3 h, and almost half of the parents used an SPF index of 50+. A total of 24.9% of the respondents never applied sunscreen to their children. These respondents were asked about the reasons for not using it through a multiple choice question: 64.7% answered that their children did not like sunscreen, 47.4% considered it to be expensive, 27.7% thought it diminished the vitamin D benefits of the sun, 24.1% were not aware of its efficacy and 6.8% believed that sunscreen can cause cancer.

Differences between private & public school parents

The major differences between private and public school respondents are summarized in [Table 3](#). Twice as many private school parents had heard of melanoma, and approximately 50% more public school parents did not consider the sun to be a risk factor for the disease. Although respondent parents of both public and private schools were equally involved in the care of their children, parents of private school children were three times more likely to apply sunscreen to their children when exposed to the sun, four times more likely to reapply the sunscreen every 2–3 h of sun exposure and 21 times more likely to use a higher SPF (50+) compared with parents of children in public schools.

Discussion

The authors' study showed that almost half of all parents surveyed had never heard about melanoma and that more than half were not aware that sunburns are a risk factor for melanoma. This illustrates the lack of knowledge regarding the major cause of this disease. Although parents of private school children were more knowledgeable

Table 3. Results of bivariate analysis illustrating differences between public and private school respondents.

Variable	Private school respondents, n (%)	Public school respondents, n (%)	p-value
Believe sun is not a risk factor	266 (47.4)	338 (71.6)	< 0.001
Have heard of melanoma	385 (68.8)	182 (40.3)	< 0.001
Have had >2 prior skin burns	27 (4.9)	67 (15.2)	< 0.001
Use sunscreen	191 (34.2)	69 (15.5)	< 0.001
Apply sunscreen every 3h	258 (46.4)	39 (11.4)	< 0.001
Use SPF 50+	454 (81.5)	14 (3.9)	< 0.001
Have major involvement in care of the children	389 (69.5)	345 (76.5)	< 0.001

SPF: Sun protection factor.

and proactive regarding melanoma and its prevention, there was an overall knowledge and behavioral gap in all respondents. Wearing clothes that cover exposed parts of the body and applying sunscreen during sun exposure are particularly important preventive measures for children. However, only a quarter of all parents always applied sunscreen to their children, and one-third of the respondents did not make them wear long sleeve shirts to cover their exposed skin.

This survey was conducted in three different schools, two of which were public schools. To put this study in context, public schools in Lebanon are tuition-free, whereas private schools have a tuition that often varies between 3000 and 10,000 USD per year per child depending on the grade and school. The private school in the authors' study is considered an average- to high-tuition school and often receives students from middle- to high-income families. This private school is therefore an adequate representation of most private schools in the country. The same applies to the two public schools selected for this study. The majority of Lebanese public schools are not well equipped and are not able to receive a high number of students. They usually lack essentials such as well-maintained desks, electronic boards, computer rooms, libraries and other basic materials needed for a high-quality education. Some public schools have no heating and no permanent power supply to provide students with decent learning conditions. Moreover, given their lower income, in addition to the need to provide for their families, parents of public school children may have difficulties abiding by sun safety routines. For instance, they may spend an increased amount of time commuting to work, finding affordable food and caring for other family members. Although respondent parents in both public and private schools were equally involved in the care of their children, the parents of public school children were behind with regard to the appropriate prevention routine.

The authors' study revealed that, in contrast to public school parents, private school parents had acceptable habits in terms of prevention, correctly applying sunscreen, reapplying it frequently and applying sunscreen with an adequate SPF. The findings of this study suggested that Lebanese parents, especially those with children in public schools, need to be more alert and educated when it comes to melanoma prevention in their children. The identified beliefs and attitudes detected in the authors' study can be leveraged by school personnel to inform interventions aimed at improving sun-safe behaviors in young children who reside in both Lebanon and other countries. Two cross-sectional studies conducted in the Middle East, one in Iran and one in Turkey, assessing sun exposure and health safety practices showed similar results compared with the authors' study, suggesting the need for increasing students' awareness regarding sun protection [10,11].

The incidence of melanoma has been increasing worldwide, especially over the last 15 years [12]. A study published in 2015 indicated that melanoma's incidence is estimated to grow exponentially over the next 10 years [13]. This sheds light on the urgent need to raise awareness of melanoma and its prevention in parents and the rest of the population. Educational and behavioral interventions that promote skin cancer prevention awareness, such as the Colorado Kids Sun Care Program, are recommended by the US Community Preventive Services Task Force for students in primary and middle schools [14]. These programs improve sun-protective behaviors and reduce UV exposure, severe and non-severe sunburns and evolution of new moles in children [15]. A study published in the US in 2018 showed that there was a significant increase in parents' and children's knowledge, perceived risk and engagement in melanoma preventive behaviors after implementation of a novel educational intervention targeting parents with a history of melanoma [16]. Adapting similar programs to make them culturally relevant in Lebanon, especially in schools, may be one way to improve sun protection in community settings. Raising awareness can be accomplished in different and inexpensive ways, such as distributing school flyers, holding school conferences for parents, conducting social media campaigns and encouraging pediatric and primary care visits for skin assessment.

This study is the first of its kind and provides relevant information and insights regarding the knowledge and behavior of Lebanese parents when it comes to melanoma and its prevention in children. In addition, to date, no study in the medical literature has compared the knowledge and behavior of Lebanese private school parents with that of public school parents with regard to melanoma and its prevention. Some of the limitations of the authors' study are the limited sample size and number of schools included as well as the lack of proper pilot testing for the questionnaire. Comparable studies that include additional schools for better representation need to be conducted with the aim of offering clear data and a window of opportunity for targeted efforts in future public health campaigns and interventions.

Conclusion

Overall, this study provides information about the beliefs that underpin parents' decisions regarding their young children's sun-protective behaviors. Lebanese parents, especially those with children in public schools, need to be more alert and educated when it comes to melanoma prevention in their children. Educational interventions need to be tailored to the specific population's knowledge and behavior.

Summary points

- Almost half of the parents had never heard about melanoma.
- Almost 60% of parents were not aware that sun exposure is a risk factor for melanoma.
- Sun protection in children was insufficient and sunburns were frequent in all children.
- The most common reason parents gave for not applying sunscreen was that their children did not like it.
- Private school parents had acceptable habits in terms of prevention, correctly applying sunscreen, reapplying it frequently and applying sunscreen with adequate sun protection factor.
- Parents of private school children had significantly more knowledge and better preventive behaviors regarding melanoma compared with parents of public school children.
- There was still an overall knowledge and behavioral gap in melanoma prevention in all respondents.
- Raising awareness of melanoma and best preventive practices is particularly important in the entire Lebanese population.

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Ethical conduct of research

The cover letter of the questionnaire was used to obtain parent consent to process personal data and to clarify the voluntary nature of participation. Ethical approval for this study was obtained from the ethics committee of Saint Joseph University of Beirut, which thoroughly reviewed the study proposal and questionnaire before providing clearance.

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