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ORIGINAL RESEARCH

Sun Protection Strategies of Young Children and their Parents: A Comparative, Cross-Sectional Study from Türkiye

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ABSTRACT

This study aimed to investigate the frequency of sun protection measures used by young children and their parents and evaluate the possible effect of parental knowledge and behavior on their children's sun safety practices. A sun safety awareness test and a self-reported questionnaire survey regarding sun protection strategies, reasons and barriers for using these methods were conducted on parents of children aged 3-5 years between June and December 2023. One hundred fourty parents [median age: 35 (27-49), female:male=113:27] were included. Parents who sought advice from their physicians [14.0 (0-19)] had a higher median awareness score than those who did not [12.0 (1-18)] ($p<0.05$). Although 57.9% (n=81) of children were claimed to sunbathe during summer, 85% (n=119) were reported to get tanned at the end of summer. Sunscreen was the most common sun protection strategy for both children (95%) and parents (85.7%). All measures except wearing sunglasses were utilized more frequently in children than in parents. A higher application rate was observed for each strategy in children whose parents applied the same strategy for themselves ($p<0.05$). Motivation to prevent sunburn (72.9%) was the main encouraging factor for using protective measures, whereas forgetfulness (41%) was the main barrier. Even though parents are well aware of the negative impact of sun exposure and the importance of sun protection strategies, they need to improve their children's sun safety practices, particularly regarding strategies other than sunscreen. Healthcare professionals, particularly physicians, should also be involved in interventions to improve parental behaviors concerning sun safety.

Keywords: Child. Parents. Sun protection strategies. Sunscreen.

Küçük Çocuk ve Ebeveynlerinin Güneşten Korunma Yöntemleri: Türkiye'den Karşılaştırmalı Kesitsel bir Çalışma

ÖZET

Bu çalışma; küçük çocuklar ve ebeveynleri tarafından kullanılan güneşten korunma yöntemlerinin sıklığını araştırmayı ve ebeveynlerin bilgi ve davranışlarının çocuklarının güneşten korunma uygulamaları üzerindeki olası etkisini değerlendirmeyi amaçlamaktadır. Haziran ve Aralık 2023 tarihleri arasında 3-5 yaş aralığındaki çocukların ebeveynlerine; güneşten korunma konusunda farkındalık testi ve güneşten korunma yöntemleri, bu yöntemleri kullanmayı teşvik eden ve engelleyen faktörlere ilişkin anket uygulanmıştır. Yüz kırk ebeveyn [ortanca yaş: 35 (27-49), kadın:erkek=113:27] çalışmaya dahil edildi. Hekimlerden tavsiye alan ebeveynlerin ortanca farkındalık puanı [14,0 (0-19)] almayanlara kıyasla [12,0 (1-18)] daha yüksekti ($p<0,05$). Çocukların %57,9'unun (n=81) yaz aylarında güneşlendiği iddia edilmesine rağmen, %85'inin (n=119) yaz sonunda bronzlaştığı belirtildi. Güneş kremi hem çocuklar (%95) hem de ebeveynler (%85,7) için en sık kullanılan güneşten korunma yöntemiydi. Güneş gözlüğü takmak dışındaki tüm önlemler çocuklarda ebeveynlere göre daha sık uygulanmaktaydı. Ebeveynleri aynı yöntemi kendileri için uygulayan çocuklarda her yöntem için daha yüksek bir uygulama oranı gözlendi ($p<0,05$). Güneş yanığını önleme isteği (%72,9) koruyucu önlemlerin uygulanmasını teşvik eden ana faktör iken, unutkanlık (%41) ana engeldi. Ebeveynler güneşe maruz kalmanın olumsuz etkileri ve güneşten korunma yöntemlerinin öneminin farkında olsalar da, özellikle güneş kremi dışındaki yöntemler konusunda çocuklarına yönelik güneşten korunma uygulamalarını geliştirmeleri gerekmektedir. Başta hekimler olmak üzere sağlık çalışanları da ebeveynlerin güneşten korunmaya ilişkin davranışlarını iyileştirmeye yönelik müdahalelere dahil olmalıdır.

Anahtar Kelimeler: Çocuk. Ebeveyn. Güneşten korunma yöntemleri. Güneş koruyucu.

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Childhood is a critical period during which individuals are exposed to higher levels of solar radiation compared to adulthood.[1,2] Intense and/or cumulative ultraviolet exposure in this age group is associated with the development of skin cancers, mainly melanoma and keratinocyte carcinomas.[2] Seeking shade and avoiding direct sun exposure, especially during peak hours, wearing sunglasses, wide-brimmed hats and protective textiles and applying sunscreen on uncovered skin, are major sun protection strategies.[1,3] These strategies should be used together to maximize their protective effect.[3]

Special attention must be given to young children, as they depend on their parents for sun protection.[1,4,5] Parents are also considered role models for their children regarding sun safety practices.[1] It is also important to note that childhood is a window of opportunity for individuals to adopt and pursue these strategies all life long.[5]

The aim of this study was to assess parents' knowledge of sun exposure and protection strategies, demonstrate the prevalence of sun protection measures among nursery children and their parents, and examine the impact of parents' behaviors on their children's sun safety practices.

Material and Method

In this comparative cross-sectional study, individuals who had at least one child aged between 3-5 years old were invited to complete a self-administered questionnaire survey between June and December 2023. The survey aimed to gather information about sun protection strategies used by parents and their children. Verbal and written informed consent were obtained from the participants. Participants with more than one child were requested to complete the survey based on their children in the nursery. The study was approved by the institutional ethical committee (approval number: 2023/03-12) and conducted in accordance with the Declaration of Helsinki.

The participants were randomly selected among adult patients admitted to the dermatology outpatient clinic of our tertiary referral center in the Western Türkiye region and parents of children attending our university's nursery.

The demographic features of participants (age, sex, educational background) and their children (age, sex), as well as their family history of skin cancer, were recorded. Skin phototype was assessed according to the descriptions (skin colour and tanning characteristics) and pictures representing the Fitzpatrick scale[6] presented to parents in a multiple choice question. A sun safety awareness test comprising 20 questions (constructed based on previous similar studies[2,3]) evaluating participants' knowledge of sun exposure-related side effects and sun protection strategies was administered (Table I). Correct answers were scored as "1 point," whereas incorrect or missing answers as "0". The total score was calculated for each participant between 0-20. The sun safety practices of parents and their children were compared in terms of sunburn history, sunbathing practices during summer, use of five main sun protection strategies [sunscreen, wide-brimmed hats, protective clothes (such as long-sleeved shirts and pants), seeking shade during peak hours, and sunglasses] and the details related to these measures [including sun protection factor (SPF), ultraviolet spectrum, water resistance, time for application, body areas applied, frequency of reapplication for sunscreen and ultraviolet filters for sunglasses]. The role of the child's request and reliance on physician's recommendations on sun safety practices were further evaluated. Finally, the factors encouraging and preventing sun protection strategies were questioned.

Statistical analysis

IBM SPSS® Statistics Version 28 was used to store and analyze the data. Shapiro-Wilk test was used to assess the normality of variable distribution. Descriptive statistics were calculated as mean ± standard deviation and median [minimum-maximum] values for continuous variables, and as frequency and percentage for categorical variables. The chi-square or Fisher's exact test was used to evaluate the difference in the distribution of categorical variables between two independent groups, whereas the McNemar's test was used to compare categorical variables between two dependent groups (herein parents and their children). The Mann-Whitney U test was used to compare non-normally distributed variables for two groups. The p-value less than 0.05 was considered statistically significant.

Results

One hundred fourty participants (parents) were included in the study. The demographic and clinical characteristics of children and their parents are summarized in Table II.

The mean score of parents on the sun safety awareness test was 12.4±3.9 (Table I). Most parents were knowledgeable about the impact of sun exposure on the development of skin cancer, photoaging and ophthalmic disorders and the importance of sun protection strategies for preventing these undesirable events (Table I). The median score of parents who indicated being guided by their physicians' recommendations [14.0 (0-19)] was significantly higher than that of those who did not seek advice from their physicians [12.0 (1-18)] (p=0.016).

Table I. Parents' answers to the sun safety awareness test*

	True n (%)	False n (%)	I do not know n (%)
There is a strong relationship between sun exposure and skin cancer.	**119 (85.0)**	5 (3.6)	16 (11.4)
Sun exposure increases the risk of eye disorders.	**109 (77.9)**	2 (1.4)	29 (20.7)
Skin cancer risk might be reduced through sun protection strategies.	**127 (90.7)**	2 (1.4)	11 (7.9)
Sunscreens prevent early skin aging.	**111 (79.3)**	6 (4.3)	23 (16.4)
There is no need for sun protection during winter/cloudy weather.	36 (25.7)	**76 (54.3)**	28 (20.0)
Tanning is a sign of skin damage.	**47 (33.6)**	32 (22.9)	61 (43.6)
Individuals with darker skin phototypes do not need sun protection.	3 (2.1)	**108 (77.1)**	29 (20.7)
It is sufficient to apply sunscreen only at the beach/pool.	8 (5.7)	**125 (89.3)**	7 (5.0)
Sunscreen alone is a sufficient strategy for sun protection.	7 (5.0)	**123 (87.9)**	10 (7.1)
Sunscreens block 100% of harmful ultraviolet rays.	9 (6.4)	**89 (63.6)**	42 (30.0)
If we do not sunbathe, we cannot maintain adequate vitamin D levels.	60 (42.9)	**52 (37.1)**	28 (20.0)
People can tan safely by using sunscreen.	79 (56.4)	**24 (17.1)**	37 (26.4)
It is sufficient to use sunscreen once a day.	13 (9.3)	**107 (76.4)**	20 (14.3)
It is possible to stay longer under the sun as long as sunscreen is applied.	18 (12.9)	**100 (71.4)**	22 (15.7)
The effect of sunscreen begins immediately following application.	24 (17.1)	**82 (58.6)**	34 (24.3)
Sun exposure should be avoided between 10 a.m. and 4 p.m.	**126 (90.0)**	6 (4.3)	8 (5.7)
Water-resistant sunscreens do not need to be reapplied even if we remain in water all day.	6 (4.3)	**108 (77.1)**	26 (18.6)
Sunglasses with dark lenses protect against ultraviolet rays.	33 (23.6)	**57 (40.7)**	50 (35.7)
Light-coloured clothes are more protective from the sun than dark-coloured clothes.	99 (70.7)	**17 (12.1)**	24 (17.1)
The sun-protective properties of wet clothes are reduced.	**23 (16.4)**	33 (23.6)	84 (60.0)

*Correct answers are scored as "1 point" and incorrect or missing answers as "0". Correct answers are highlighted in bold.

The frequencies of sunburn and sunbathing practices during summer were higher in parents compared to their children ($p<0.05$) (Table III). The rate of children sunbathing during summer was documented as 57.9% (n=81), while 85% (n=119) of parents reported their children becoming tanned at the end of summer.

Table II. Demographic and clinical characteristics of children and their parents

Children (n=140)	
Age, year, median (range)	4 (3-5)
Sex, female:male	69:71
Skin phototype, n (%)	
1-2	60 (42.9)
3-4	80 (57.1)
Parents (n=140)	
Age, year, median (range)	35 (27-49)
Sex, female:male	113:27
Skin phototype, n (%)	
1-2	43 (30.7)
3-4	97 (69.3)
Educational background, n (%)	
Primary school	2 (1.4)
High school	10 (7.1)
College	84 (60)
Postgraduate	44 (31.4)
The parent working as a healthcare worker, n (%)	37 (26.4)
Number of children, median (range)	1 (1-4)
Familial history of skin cancer, n (%)	4 (2.9)

Sunscreen was the leading sun protection strategy for both children and parents (Table III). All measures except wearing sunglasses were more prevalent in children than in parents (Table III) (Figure 1). The frequency of each strategy was higher in children whose parents applied the same strategy for themselves than in those whose parents did not (Table IV).

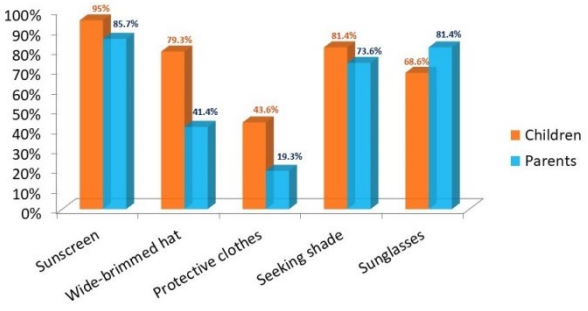

Figure 1.
Use of five main sun protection strategies in parents and their children

Table III. Comparison of children and their parents regarding sun protection strategies*

	Children (n=140)	Parents (n=140)	p-value
History of sunburn, n (%)	25 (17.9)	99 (70.7)	**<0.001** [N]
Sunbathing during summer, n (%)	81 (57.9)	114 (81.4)	**<0.001** [N]
Sun protection strategies, n (%)			
Sunscreen	133 (95.0)	120 (85.7)	**0.001** [N]
Wide-brimmed hat	111 (79.3)	58 (41.4)	**<0.001** [N]
Protective clothes	61 (43.6)	27 (19.3)	**<0.001** [N]
Seeking shade	114 (81.4)	103 (73.6)	**0.043** [N]
Sunglasses	96 (68.6)	114 (81.4)	**0.010** [N]
Using none of the strategies	0 (0)	3 (2.1)	0.250 [N]
Using sunglasses with ultraviolet filters, n (%)			
Yes	76 (79.2)	96 (84.2)	0.143 [N]
No	7 (7.3)	4 (3.5)	
Do not know	13 (13.5)	14 (12.3)	
Time for sunscreen application, n (%)			
During summer	72 (54.1)	49 (40.8)	
Only at the pool/beach	44 (33.1)	33 (27.5)	**<0.001** [N]
All year long	17 (12.8)	38 (31.7)	
The properties considered while choosing sunscreen, n (%)			
Ultraviolet spectrum	110 (82.7)	89 (74.2)	**0.007** [N]
SPF	112 (84.2)	90 (75.0)	**0.004** [N]
Water-resistance	67 (50.4)	43 (35.8)	**0.001** [N]
Cost	20 (15.0)	23 (19.2)	0.146 [N]
Brand	69 (51.9)	61 (50.8)	1.000 [N]
Physician's suggestion	66 (49.6)	31 (25.8)	**<0.001** [N]
The form of sunscreen, n (%)			
Cream/lotion	99 (74.4)	107 (89.2)	**0.002** [N]
Spray	34 (25.6)	13 (10.8)	
Timing of sunscreen application, n (%)			
Immediately before going outside	42 (31.6)	45 (37.5)	0.064 [N]
15-30 minutes before going outside	91 (68.4)	75 (62.5)	
Sunscreen reapplication following swimming, n (%)	112 (84.2)	90 (75.0)	**0.001** [N]
Sunscreen reapplication following sweating, n (%)	68 (51.1)	50 (41.7)	**0.007** [N]
Sunscreen reapplication frequency, n (%)			
Every 2 hours	52 (39.1)	19 (15.8)	N/A
Every 4-6 hours	37 (27.8)	29 (24.2)	
Forget to reapply	18 (13.5)	34 (28.3)	
No need to reapply	20 (15.0)	33 (27.5)	
Do not know	6 (4.5)	5 (4.2)	
Preferred sunscreen SPF, n (%)			
50	113 (85.0)	93 (77.5)	0.124 [N]
30	14 (10.5)	21 (17.5)	
15	1 (0.8)	1 (0.8)	
Do not know	5 (3.8)	5 (4.2)	
Sunscreen application area, n (%)			
Face only	4 (3.0)	49 (40.8)	**<0.001** [N]
All areas exposed to the sun	129 (97.0)	71 (59.2)	
Time intervals spent outside, n (%)			
Before 10.00 a.m.	39 (27.9)	35 (25.0)	0.523 [N]
Between 10.00 a.m. – 4 p.m.	51 (36.4)	52 (37.1)	1.000 [N]
After 4 p.m.	122 (87.1)	117 (83.6)	0.302 [N]

*Statistically significant results are highlighted in bold.
Abbreviations: SPF, sun protection factor; N/A, not applicable
[N] McNemar's test

Parents who achieved higher awareness test scores and followed their physicians' recommendations were found to apply sunscreen to their children more frequently (Table IV). Seventy-six parents (54.3%) agreed that sun protection during winter/cloudy weather was required (Table I). However, only 31.7% of parents reported applying sunscreen to themselves all year long, while this rate was even lower for their children (12.8%) ($p<0.05$) (Table III). On the other hand, parents were observed to be more meticulous when choosing sunscreen (considering SPF, ultraviolet spectrum, water resistance and physician suggestions) for their children than for themselves (Table III). Sunscreen reapplication rates in case of swimming or sweating, as well as the frequency of application to all areas exposed to the sun, were also higher in children ($p<0.05$) (Table III).

Wearing protective clothes was the least frequent strategy in both groups, with a 43.6% rate in children. The parents' knowledge regarding light-coloured and wet clothes was even more inadequate, with only 12.1% and 16.4% of parents answering related questions correctly (Table I).

In total, 81.4% of parents indicated that their children requested sun protection strategies from them. The child's request was found to positively impact the use of sunscreen and sunglasses (Table IV). The use of wide-brimmed hats was more frequent in girls (88.4%) compared to boys (70.4%) ($p<0.05$). The main reason and barrier for using protective measures were the motivation to prevent sunburn (72.9%) and forgetfulness (41%), respectively (Figures 2 and 3).

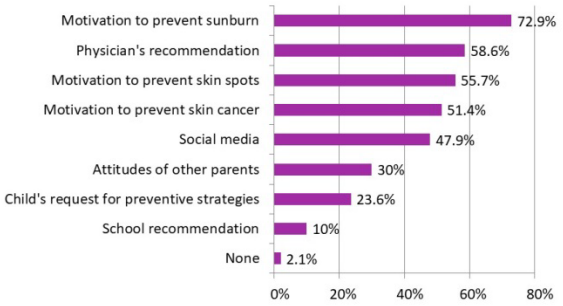

Figure 2.
Reasons for using sun protection strategies reported by parents

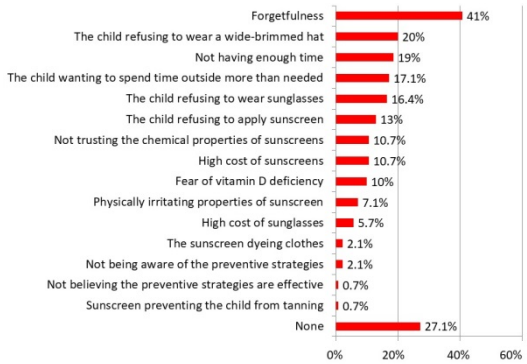

Figure 3.
Barriers to sun protection strategies reported by parents

Table IV. Comparison of child and parent-related factors regarding the use of five sun protection strategies in children*

	Sunscreen			Wide-brimmed hat			Protective clothes			Seeking shade			Sunglasses		
	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Child-related factors															
Sex, n															
Female	66	3	1.000 F	61	8	**0.009** X^2	29	40	0.717 X^2	57	12	0.723 X^2	50	19	0.328 X^2
Male	67	4		50	21		32	39		57	14		46	25	
Skin phototype, n															
1-2	56	4	0.462 F	51	9	0.148 X^2	21	39	0.077 X^2	47	13	0.415 X^2	41	19	0.958 X^2
3-4	77	3		60	20		40	40		67	13		55	25	
Child requesting protective measures, n (%)	111 (83.5)	3 (42.9)	**0.023** F	92 (82.9)	22 (75.9)	0.387 X^2	51 (83.6)	63 (79.7)	0.560 X^2	96 (84.2)	18 (69.2)	0.094 F	83 (86.5)	31 (70.5)	**0.024** X^2
Parent-related factors															
Sex, n															
Female	111	2	**0.003** F	89	24	0.754 X^2	49	64	0.919 X^2	99	14	**<0.001** X^2	80	33	0.246 X^2
Male	22	5		22	5		12	15		15	12		16	11	
Age, years, median	35.0	37.0	0.402 m	35.0	33.0	0.180 m	34	36	0.087 m	35.0	38.5	**0.006** m	35.0	35.5	0.966 m
Healthcare worker, yes, n (%)	34 (25.6)	3 (42.9)	0.381 F	31 (27.9)	6 (20.7)	0.431 X^2	18 (29.5)	19 (24.1)	0.468 X^2	30 (26.3)	7 (26.9)	0.949 X^2	20 (20.8)	17 (38.6)	**0.027** X^2
Awareness test score, median	13.0	9.0	**0.002** m	13.0	12.0	0.169 m	13.0	12.0	0.092 m	13.0	11.0	**0.016** m	13.0	12.0	0.057 m
Physician's recommendation, n (%)	90 (67.7)	1 (14.3)	**0.008** F	74 (66.7)	17 (58.6)	0.419 X^2	42 (68.9)	49 (62.0)	0.401 X^2	78 (68.4)	13 (50.0)	0.076 X^2	67 (69.8)	24 (54.5)	0.079 X^2
Familial history of skin cancer, n (%)	4 (3.0)	0 (0)	1.000 F	4 (3.6)	0 (0)	0.580 F	2 (3.3)	2 (2.5)	1.000 F	4 (3.5)	0 (0)	1.000 F	2 (2.1)	2 (4.5)	0.590 F
Using sunscreen, yes, n (%)	119 (89.5)	1 (14.3)	**<0.001** F	-	-	-	-	-	-	-	-	-	-	-	-
Using a wide-brimmed hat, yes, n (%)	-	-	-	53 (47.7)	5 (17.2)	**0.003** X^2	-	-	-	-	-	-	-	-	-
Wearing protective clothes, yes, n (%)	-	-	-	-	-	-	22 (36.1)	5 (6.3)	**<0.001** X^2	-	-	-	-	-	-
Seeking shade during noon, yes, n (%)	-	-	-	-	-	-	-	-	-	96 (84.2)	7 (26.9)	**<0.001** X^2	-	-	-
Using sunglasses, yes, n (%)	-	-	-	-	-	-	-	-	-	-	-	-	85 (88.5)	29 (65.9)	**0.001** X^2

*Statistically significant results are highlighted in bold.

m Mann-Whitney U test / X^2 Chi-square test / F Fisher's exact test

Discussion and Conclusion

This single-center study emphasizes the role of parents in their children's sun safety practices in Türkiye which has also been explored in different populations in previous literature.[1-5,7-15] In one of these studies, increasing parental knowledge of sun protection was observed to positively influence the regular application of sun protection strategies for children.[7] Likewise, awareness test scores were higher in parents who were using sunscreen and seeking shade for their children in our study. Besides, parents' sun protection practices for themselves were linked to the practices of their children in terms of the five main strategies[3,9], which was in line with our findings. Furthermore, parents considering themselves as role models for their children were shown to apply sun protection measures more frequently.[1] The children of these parents were also noted to be more vigilant upon sun protection.[8]

Sunscreen was the most preferred sun protection measure (ranging up to 89%) for children by their parents in major reports.[1,7,10,13] A previous telephone survey conducted on 4217 adolescents and adults demonstrated that sunscreen was considered the most effective strategy.[16] This was linked to sunscreens being the most commonly marketed sun protection products.[3] However, it should be noted that sunscreen use is not adequate alone and individuals often fail to apply these products sufficiently.[16] On the other hand, sunscreens were less frequently used in other studies conducted in western and southern Türkiye.[17,18] The high cost of sunscreens and parents' educational background might account for this difference. Most of the parents in our study had a college or postgraduate degree, which was reflected in their relatively high level of awareness on sun safety and relatively high frequency of utilization of sun protection strategies, particularly sunscreens. Moreover, the increasing awareness regarding sun protection and the rising prevalence of sunscreen use throughout the years, also shown in studies addressing adults[19], might explain the relatively high frequency of sunscreen use in our current study.

Wearing protective clothes was the least frequently implemented strategy for children in our series. Likewise, physical protective measures, particularly long-sleeved shirts, were shown to be preferred less commonly by children with a family history of melanoma.[13] In a recent Turkish study, authors also reported that this strategy was rarely utilized.[18] More importantly, parents' knowledge regarding the ideal features of protective textiles (dark-coloured) and the protectivity of wet clothes was also relatively low in our study, which in turn means more ineffective protection.

The parents in our study were generally aware of the role of sunglasses in preventing ophthalmic disorders. On the other hand, only 40% answered the tricky question regarding the protective properties of dark lenses correctly (Table I). Besides, the parental use of sunglasses was higher than that of their children. Previous reports mentioned a lower prevalence of sunglasses in children (12.5-31%).[1-3,10] This was attributed to considering sunglasses as a fashion accessory rather than a protective measure.[1] The higher frequency of the use of sunglasses associated with the child's request in our series might partly be explained by this trendy feature of sunglasses. The high costs of ultraviolet protective sunglasses, also mentioned by the parents as a barrier (Figure 3), might be speculated as a contributing factor for the low rates of children wearing sunglasses. Considering the low level of knowledge regarding dark lenses, the relatively high share of children using sunglasses in our study could be explained by the possible use of nonprotective sunglasses, despite most parents declaring to use sunglasses with ultraviolet protection. Thus, young children's infrequent use of sunglasses would be better than using sunglasses with no ultraviolet protection, which might cause additional damage.

The use of protective measures showed differences among children with regard to sex in some studies. Hats and protective clothes were reported to be more prevalent in boys, whereas sunglasses were in girls.[1,9,10] On the other hand, no sex-related difference was observed related to protective measures in our series except hats, which were often used by girls, possibly linked to the use of fashionable wide-brimmed hats.

More than half of the study population was aware of the need for sun protection during winter and cloudy weather. In contrast, only a few parents were noted to apply sunscreen all year long for their children. It was also striking that the daily sunscreen application rate was higher in parents than in their children. Salvado et al. reported a similar tendency of caregivers to apply sunscreen only during summer, despite most participants agreeing to use sun protection methods during winter.[2] Another study conducted on parents of children aged 2-5 years revealed that parents adopted different sun protection behaviors across different seasons and became more vigilant during summer, although they were knowledgeable about sun protection.[20]

The skin phototype of children was found to be a determinant of sun protection strategies. Several studies reported more strict sun protection in children with fair skin due to the misinterpretation that darker skin was more resistant to solar exposure.[1,10,12] However, individuals with darker skin phototypes are also prone to ultraviolet damage and, therefore, need

sun protection.[1,21] Conversely, the majority of the parents in our study confirmed that dark skin phototypes also need sun protection, which explains the lack of difference between skin phototypes regarding sun protection strategies.

Our research demonstrated that physicians played an essential role in educating parents regarding sun protection, particularly sunscreens, similar to a previous report.[15] Although there is a vast amount of information available on the internet and social media about sun safety, healthcare professionals need to eliminate misleading information and provide reliable recommendations to their patients. They should also encourage parents to use additional sun protection strategies, as sunscreen was the most focused one, overshadowing the others.[3,16]

In line with our findings, preventing sunburn was among the main encouraging factors for using sun protection strategies[7,11] However, preventing sunburn should not be the only objective, as prolonged time spent under the sun following sunscreen application might result in excessive solar damage even if no sunburn occurs. This might result in tanned skin, which is generally considered a sign of health by most parents.[14] Some parents also claimed that tanning was inevitable for their children despite ideal sun protection during summer.[4] Our study revealed an inconsistency between the rate of children reported to sunbathe and those who get tanned at the end of summer. In fact, more than half of our participants agreed that they could tan safely by using sunscreen. A recent qualitative study on adults experiencing unintended sunburn despite using sunscreens revealed insufficient reapplication of sunscreen and prolonged exposure to the sun.[22] The parents' sunscreen reapplication frequencies for their children were lower in case of sweating compared to swimming, which might be the main reason for the unintentional tanning observed in children in our study.

Forgetfulness, also reported by our participants, was defined as one of the most common barriers to sun protection.[3,13] This might be overcome by the healthcare professionals considering their positive role in parents' knowledge and attitudes.[3] Reminder messages about sun protection sent by physicians following appointments might be beneficial, along with recently developed mobile applications that send notifications.[23] The fear of vitamin D deficiency due to strict sun protection was another factor (reported by 10% of participants in our survey) causing parents to refrain from applying sun protection measures.[4,24] However, recent literature revealed that optimal sunscreen use does not prevent vitamin D synthesis.[24-27]

The small sample size was the main limitation of our study. Furthermore, there might be a possible response bias regarding the sun protection strategies reported by parents intending to give socially acceptable answers to the questionnaire. The frequency of sunburn might be underreported due to recall bias. The evaluation of the parents' general sun safety awareness and details regarding sun protection measures, such as SPF, application frequency of sunscreens, and ultraviolet filters of sunglasses, were the main strengths.

Despite parents' moderate-to-high knowledge of the undesirable effects of solar exposure and sun safety measures, there is still room for improvement in sun protection for young children. While sunscreen was the most commonly utilized method, other strategies should be adopted more frequently by parents. In addition to the interventions in children regarding sun safety[28], campaigns primarily targeting parents where healthcare professionals play a central role should be planned.

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