

Original Article

Knowledge and Attitudes of Parents about the Exposure to Solar Radiation

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Abstract

Purpose: The purpose of this study was to evaluate parents' knowledge and attitudes towards the exposure to solar radiation and its harmful impacts on human health.

Material and Method: The sample of the study were parents whose children were hospitalized in a pediatric hospital in Greece. The study period was from February 2018 until April 2018. The type of study was descriptive with a review character and cross-sectional design. An anonymous questionnaire was used, based mainly on a similar study, as well as on the relevant guidelines of World Health Organization. For the data analysis the statistical program SPSS 13.0 was used.

Results: The questionnaire was completed by 146 parents. The majority of the individuals (80.6%) reported that they knew what malignant melanoma is, 22.2% stated having more than five moles in their body whereas 56.8% of these did not visit a doctor to monitor these moles. Overall, 50.0% of the sample reported that always used sunscreen, but only 59% of those used sunscreen with a protection factor > 30. A percentage of 33.8% said they were going for swimming between 10.00-16.00, hours that sun exposure should be avoided. All the parents had some information about the dangers of sun exposure without protection, and this information was obtained from various sources such as internet (69.7%), television (69.0%) and physicians (65.5%).

Conclusions: Continuous and systematic implementation of sun protection awareness programs at all stages of education, coupled with family and community activation, will be able to deliver more significant results through the adoption of healthy behaviors in order the risk to be reduced and an optimal health level to be achieved.

Key Words : Health education, sun protection, sunscreen, skin cancer, melanoma

Introduction

The reduction of the ozone layer in the earth's atmosphere is a significant factor of the climate change with serious impacts. Ozone's reduction allows the ultraviolet radiation of the sun to penetrate skin and eyes, increasing thus, the risk of serious health problems such as skin cancer and photokeratitis. The increase in cases of malignant melanoma, perhaps the most aggressive form of cancer and the growth of other types of skin cancer in younger age groups, is especially worrying (Fitzpatrick et al, 2003; Saridi et al, 2012). Overexposure to the solar ultraviolet radiation may also result in chronic health problems such as premature aging of the skin, cataracts, flap and keratopathy. Children and adolescents are considered to be a high risk group for development of skin cancer due to the detrimental effect of the sun in the first two decades of life, but also because of the increased time they spend out in the sun, usually without sun protection. On these age groups focus the most of the information and awareness programs that have been initiated worldwide, by Health Organizations such as the World Health Organization (WHO), the Center for Disease Control (CDC) and the Health Commission (WHO, 2012; Armstrong and Kricker, 2001).

Epidemiological data show that exposure to sun in childhood is a determining factor in the risk of melanoma in adulthood. (Liu-Smith et al.2017; Armstrong and Kricker, 2001). It is clear that most teenagers do not take protective measures for sun exposure, and sometimes they also use tanning aids and thus expose themselves to a greater risk (Purdue et al, 2008; Lucas 2010). In Greece, there are estimated to be around 500 new Skin Melanoma incidents every year. Despite the fact that our country is a country with a high exposure to solar radiation due to its geographical location, nevertheless, there are no systematic pre-school and school information programs on sun protection (Saridi et al, 2014; Dadlani and Orlow, 2018). Given that about 75% of all skin cancers could be prevented, parents' knowledge about the potential risks of sun exposure as well as the sun protection measures they must be taken for their children is a key point in triggering population prevention programs that can lead to healthy behaviors (Hoang and Eichenfield, 2000).

Material & Methods

The sample of the study was parents whose children were hospitalized in a pediatric hospital in Greece. The study period was from February 2018 until April 2018. The anonymous questionnaire was distributed to 170 parents. 149 of these were completed and returned giving a response rate of 0,87%. Of these, 4 were partially completed, so they were excluded from the study. The final number of questionnaires evaluated was 145. The type of the study is non-experimental, descriptive with a review character and cross-sectional design. This type of study is considered suitable for attitudes' measurement and for the limited timeframe for the elaboration of the diploma thesis-project. The descriptive or correlation study is designed to obtain information from populations on the prevalence of the distribution and correlation of variables within these populations, and the term can be used for any study in which the researcher collects data in order to exploring features, knowledge, opinions, attitudes and values. The cross-term descriptive study can be considered particularly well suited to describe relationships between variables at a given moment, giving a glimpse of the phenomenon of that particular period.

The research protocol was approved by the Ethics Committee of the Karamandanio Children Hospital. The participants signed informed consent forms and anonymity was strictly observed.

Study tool

The questionnaire was used, derived from a similar study conducted in America and the guidelines of WHO on this topic (WHO, 2012), previously used in another Greek study (Saridi et al, 2015). The questionnaire was translated, modified, weighed and tested for its validity and reliability, which were judged to be satisfactory (Cronbach's $\alpha = 0.70$ and $r_s = 0.78$). The relevant tool has been a tool for measuring attitudes, knowledge and beliefs of individuals about the sun's radiation and the harmful effects it can have on the human body. It included questions about the demographic characteristics of the sample, questions that reflect the basic knowledge on solar radiation and the risks of overexposure to it and, finally, questions about parental beliefs and

attitudes about sun protection measures for their children.

Statistical analysis

In order to compare the total knowledge of parents, a parametric dispersion analysis test (ANOVA) was used and a 191 Student's t-test parameter was applied to compare the total score between two groups, whereas the x2 test was used to compare ratios. For the statistical analysis the statistical program SPSS 13.0 was used.

Results

The mean age of the sample was 39.24 years and the standard deviation was 7 years. The majority of the participants were women (67.6%), whereas 99.3% of the parents were of Greek origin (n = 145). The majority of the respondents (39.9%) were high school graduates, followed by Technological education graduates (30.8%), (table 1). Regarding the economic situation of their household, the majority of the parents (43.80), stated that they lived comfortably, they are missing nothing but they do not save, whereas 32.9% reported that they live satisfactorily but not comfortably, followed by those who reported that they have economic difficulties but they can afford with it (16.4%). As far as the physical characteristics, the hair color of the parents was mainly brown (71.9%), 71.0% had a brown eyes color and 46.9% skin color, neither dark nor open. 28.5% reported number of moles 1-5 followed by those reported they had 5-10 moles (22.2%) whereas 56.8% of those had not visited a doctor for monitoring the moles, yet 69.7% checked the moles by themselves for any changes in shape or color and 45.0% of these went to a dermatologist (table 2). Regarding the body distribution of moles, the largest number was recorded on head (1.44), followed by hands (1.25) and feet (1.25) (table 2). It was observed that 100% of parents had received some information about the risks of sun exposure without protection. The above information came almost equally from different sources as internet (69.7%), television 69.0%, and physician 65.5%), (table 3). Regarding the level of the participants' basic knowledge about melanoma, ultraviolet radiation, sun protection measures and the importance of the sun protection index, it was noted that 80.6%, of the parents knew that skin melanoma is a type of cancer, and that UVA, UVB and UVC are UV

types (73.3%). In addition, a percentage of 71.2% correctly responded that sun protection index is the number that shows the safe sun exposure time, while 17.1% believed that the sun protection index is type of ultraviolet solar radiation (table 4). The vast majority of the participants responded that sun protection with a high protection index provides greater protection and that the hours that sun exposure should be avoided is between 10.00-16.00 (90.3% and 94.5% respectively), whereas, 71.2%, reported that using an umbrella and staying in a shady place protects against sunlight. Concerning the risk factors for the appearance of skin damage, 99.3% of the parents answered that sunbathing without protection increases the risk and 97.3% considered skin cancer as the most significant damage caused by solar radiation, followed by skin aging (85.6%) and allergies (24%). Almost one third of parents (37.2%), reported that they were going to the beach in safe hours (between 16.00-18.00), whereas an almost equal percentage (33.8%) stated they were having sea baths between 10.00-16.00 (table 5). According to the protection measures, 54.1% of the participants didn't use to wear a hat or they used to wear it a few times, while only 10.3% responded they always were wearing a hat, and 50.0% answered they always used a sunscreen with a protection index greater than 30. Finally, 91.7% of parents said that several times or always were wearing sunglasses, whereas, 85.6% were avoiding the prolonged sunbathing, and 50.7% reported they were covering the body with clothes as a protective measure. As far as the parents' stance on sun exposure last summer, 55.2% reported that they did not sunbathe for obtaining darker color, and 56.6% said they stayed in the sun less than an hour in every bath, while 20.6% declared they had sunburns at least one time in the last summer. For the 74.7% of the respondents the sunburn was described it as a mild red skin without pain, while, the body site with the most sunburns' frequency was the back (81.8%), followed by the face (25.8%). Regarding the reasons of sunbathing, the majority of parents reported they were tanned for beauty and style reasons (65.2% and 34.8% respectively). The main incentive of sun protection was the family (55.6%), followed by the physician (51.1%), whereas the television and magazines were not important advisory factors.

Table 1 . Demographic Characteristics of the sample

<i>Demographic data</i>		N	%
Age-mean (Standard deviation), median		39,24 (7,00), 39,0	
Gender	Man	47	32,4
	Woman	98	67,6
Nationality	Greek	145	99,3
	Other	1	0,7
Residence	Urban	140	97,2
	Rural	4	2,8
Education level	Primary school	2	1,4
	High school	3	2,1
	College	57	39,9
	Professional training institute	2	1,4
	Technological Institute	44	30,8
	University	23	16,1
	Postgraduate title	12	8,4

Table 2: Average number of moles per body site

<i>Body site</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>
Head	1,44	0,53	1,0
Torso (front)	1,22	0,45	1,0
Torso (back)	1,22	0,47	1,0
Hands	1,25	0,47	1,0
Feet	1,25	0,53	1,0

Table 3: Information sources on solar radiation risks

Information sources	N	%
Family	69	47,6
School	48	33,1
Magazines	71	49,0
Newspapers	43	29,7
Internet	101	69,7
Television	100	69,0
Radio	15	10,3
Friends	45	31,0
Doctor	95	65,5

Table 4: basic knowledge of parents about melanoma and solar radiation.

Basic knowledge of parents about melanoma and solar radiation		N	%	Correct response
What the skin melanoma is?	Benign damage of the skin, like spots and moles	16	11,1	
	A laceration on the skin	0	0,0	
	A type of skin cancer	116	80,6	+
	I don't know	12	8,3	
What UVA, UVB UVC are?	Medications for cancer	0	0,0	
	Types of ultra-radiation	107	73,3	+
	Solar radiation's protection indexes	27	18,5	
	Indexes of suntan measurement	0	0,0	
	I don't know	12	8,2	
What the solar radiation's protection index is?	The number shows the safe time staying under the sun	104	71,2	+
	Ultraviolet solar radiation types	25	17,1	
	Index of sun tan measurement	3	2,1	
	I don't know	9	6,2	
Does a sun block with a higher index gives a greater protection?	High	131	90,3	+
	Medium	9	6,2	
	Low	1	0,7	
	No connected	2	1,4	
	I don't know	2	1,4	
Which ours of the day the sun exposure should be avoided?	8.00-10.00 in the morning	0	0,0	
	10.00-16.00 at noon	138	94,5	+
	16.00-18.00 in the afternoon	8	5,5	
	18.00-21.00 in the evening	0	0,0	
	I don't know	0	0,0	
The use of umbrella and the stay in a shady place protects from the solar radiation?	Yes	104	71,2	+
	No	34	23,3	
	I don't know	8	5,5	
The reflection from sand and sea could increase the intense of solar radiation?	Yes	121	82,9	+
	No	13	8,9	
	I don't know	12	8,2	
Sun is equally dangerous during the winder as during the summer?	Yes	68	46,9	+
	No	63	43,4	
	I don't know	14	9,7	

Table 5: Parents' right attitude towards taking protective measures from solar radiation

		N	%
Selecting safe time for going to sea	8.00-10.00	96	66,2
Use hat for protection	Several times	38	26,1
Frequent stay in the shade of the beach	The most of the time	68	47,6
Use of sunscreen in the last summer	Several times	110	75,3
Safe protection index	30-40	85	59,3
Use of sunscreen for face protection	Several times	82	58,2
Safe protection index for the face sunscreen	30-50	85	58,2
Correct use of sunscreen	Before leaving the house	71	50,7
Sunbathing for the purpose of obtaining a darker skin color	No	80	55,2
Acquiring sunburn last summer	No	116	79,5
Use of sunglasses	Several times	134	91,7
Protect against skin cancer by avoiding sunburn		76	52,1
Protect against skin cancer by clothing		74	50,7
Protect against skin cancer by using sunscreen		128	87,7
Protect against skin cancer by using hat		84	57,5

Table 6: Correct sun protection behaviors according to the level of education

		Education level				P Pearson χ^2
		Secondary education		Higher education		
		N	%	N	%	
Selecting safe time for going to sea	8.00-10.00 16.00-18.00 18.00-20.00	40	61,5	54	69,2	0,309 Likelihood Ratio
Use hat to protect	Several times Always	9	13,8	29	36,7	0,012
Frequent stay in the shade of the beach	Most of the time Always	24	38,1	44	56,4	0,004
Use of sunscreen during the last summer	Most of the time Always	45	69,2	64	81,0	0,150
Safe protection index	30-40 >40	33	54,1	50	64,1	0,691 Likelihood Ratio
Use a special sunscreen to protect the face	Several times Always	31	50,8	49	62,8	0,233
Safe protection index for face sunscreen	30-50	32	38,6	51	61,4	0,282 Likelihood Ratio
Correct use of sunscreen	Before leaving the house After every dive	24	34,3	46	65,7	0,027
Acquiring sunburn last summer	No	47	41,2	67	58,8	0,147 Likelihood Ratio
Use of sunglasses	Several times Always	61	93,8	71	89,9	0,274 Likelihood Ratio
Protect against skin cancer by avoiding sunburn		32	42,1	44	57,9	0,439

Protect against skin cancer by clothing		24	32,9	49	67,1	0,003
Protect against skin cancer by using sunscreen		54	42,5	73	57,5	0,084
Protect against skin cancer by using hat		31	37,3	52	62,7	0,028

Table 7: Correct sun protection behaviors depending on the economic situation

		Economic situation				P Pearson χ^2
		Living comfortably / satisfactorily		We have economic difficulties		
		N	%	N	%	
Selecting safe time for going to sea	8.00-10.00 16.00-18.00 18.00-20.00	80	69,0	16	55,2	0,386
Use hat to protect	Several times Always	31	26,5	7	24,1	0,018
Frequent stay in the shade of the beach	Most of the time Always	56	48,7	12	42,9	0,035 Likelihood Ratio
Use of sunscreen during the last summer	Most of the time Always	92	78,6	18	62,1	0,187 Likelihood Ratio
Safe protection index	30-40 >40	74	64,3	11	42,3	0,260 Likelihood Ratio
Use a special sunscreen to protect the face	Several times Always	68	59,1	14	53,8	0,549 Likelihood Ratio
Safe protection index for face sunscreen	30-50	70	82,4	15	17,6	0,367 Likelihood Ratio
Correct use of sunscreen	Before leaving the house After every dive	60	84,5	11	15,5	0,459
Sunbathing for the purpose of obtaining a darker skin color	No	65	81,3	15	81,8	0,676
Acquiring sunburn last summer	No	92	79,3	24	20,7	0,604 Likelihood Ratio
Use of sunglasses	Several times Always	107	91,5	27	93,1	0,391 Likelihood Ratio
Protect against skin cancer by avoiding sunburn		61	80,3	15	19,7	0,968
Protect against skin cancer by clothing		60	81,1	14	18,9	0,772
Protect against skin cancer by using sunscreen		105	82,0	23	18,0	0,225 Continuity Correction
Protect against skin cancer by using hat		70	83,3	14	16,7	0,260

A significant statistical difference was found as far as the correct attitude according to the level of education. The high education level is connected with positive attitudes and behaviors of sun protection measures as is the use of hat ($p=0,012$), frequent stay under the shadow ($p=0,004$), and proper use-

application of sunscreen ($p=0,027$)(table 6). A significant correlation was also found between economic situation and correct attitudes of sun protections. More specifically, those who had bad economic conditions were less likely to wear hat for

protection ($p= 0,018$), or to stay frequently under the shadow on the beach ($p= 0,035$) whereas no other correlation was found between economic conditions and the adoption of positive attitudes (table 7).

Discussion

Recent studies have shown that exposure of a person to the sun during his childhood and adolescent life is an important risk factor for the development of various lesions and especially the development of skin cancer. Children and adolescents are considered a high-risk group for skin cancer due to the detrimental effect of the sun in the first two decades of life, but also because of the increased time they spend out in the sun, usually without protection (Olson et al. 2008; Pagoto et al., 2009).

According to the moles' distribution on the body, it appears that their average number of moles in our sample, was recorded in the head followed by hands, feet and torso back trunk, a finding which is in agreement with the literature where is reported that the most common sites of melanoma are head, neck, and hands (Piperakis et al., 2003; Hobbs et al. 2014; Zaid and AL-Ramahi 2014; Stratigos et al. 2007).

In a relative study in Greece the data after mapping of melanomas were showed maximum head and neck location, followed by limbs and torso, without determining whether the substrate of Melanoma was a mole (Stefanaki et al. 2017). A finding that should be causes concern is that one second of the parents surveyed, reported that they do not visit the doctor for the monitoring of the moles nevertheless more than two third of those are watching the moles for any changes to the shape or color.

In the present study 8 out of 10 respondents reported that melanoma is a skin cancer. These rates are higher than those showed in a similar study conducted in teens in Malta (Aquilina et al. 2004).A comparative also study between Danish and American students showed that American students were more informed about what melanoma is (Savona et al. 2005).On the contrary, in a Greek study, the knowledge of students in School of Occupational Health and Welfare, about skin melanoma was inadequate (Piperakis et al. 2003).

The overwhelming majority of parents responded correctly about the hours of the day, during

which sun exposure should be avoided. These results are consistent with those of similar studies worldwide, conducted both in teens and adults, where the majority of the individuals surveyed were aware of the times where the intensity of the solar radiation is greater and should therefore be avoided the sun exposure (Savona et al. 2005; Purdue et al. 2008; Gavin et al. 2011). In contrast to these findings, a study in Chile showed lower levels of knowledge about this issue (Buller et al. 2006; Cottrell et al. 2005; Dadlani and Orlow 2008).

In the present study, the participants knew the impacts and risks of the sun exposure. Generally, studies conducted worldwide show that the knowledge levels about sun exposure and its risks or impacts such as skin cancer, aging and allergies, are especially low (Savona et al. 2005; Scope et al. 2011). However, there are other surveys' results which showed better rates (Aquilina et al. 2004), demonstrating thus the variation of knowledge levels globally. There are many factors involved which are making the difference in these rates, such as the age of the sample, the implementation of educational programs, as well as the type of region where a survey is conducted, given that residents of regions next to the sea could be more informed about the solar and are more likely to take protective measures (Saridi et al. 2015).In additional, the results varied globally as far as the knowledge about sunscreen protection index. The parents in our study had high levels of knowledge about this parameter. Other studies have shown lower levels of knowledge with a need of further increase (Yurtseven et al. 2012; Scope et al. 2011; Alghamdi 2010). As far the knowledge about the use of an umbrella or the stay under a shady place as additional protective measures against the solar radiation, the parents seemed to be adequately informed, which is a finding consisted to those of another survey conducted in Australian adolescents where the stay under the shadow it was reported as an important protective factor from solar radiation (Buller et al. 2006; Wright et al. 2016). On the contrary, much lower were the percentages of other studies conducted in students and elementary school children (Piperakis et al. 2003; Scope et al. 2011; Kouzes et al. 2017) .Concerning, the information sources, our results showed that the majority of this information appeared to be provided almost equally by

internet, television and doctors. On the contrary, in other surveys, the main source of information was TV followed by magazines (Scope et al. 2011; Yurtseven et al. 2012; Kouzes et al. 2017).

In the present study, the factor family it was also found as the most strong incentive for taking anti-solar protective measures, showing that it could be an important source of information. Thus, the parents' role is very important for the adoption of healthy behaviors of the children from the very first age. An important also finding was that there was a connection between levels of parents' knowledge and educational level. In a pilot application of a relevant awareness program in Greece to a satisfactory sample of parents having pre-school children, showed that parents' knowledge is definitely dependent on the level of education, but they are clearly amenable to improvement (Saridi et al. 2015).

Finally, it was very important to say that despite the high levels of knowledge of the parents surveyed about solar radiation risks and measures should be taken, this knowledge seems that doesn't compromise with their attitudes, giving the impression that beauty and styling reasons are stronger incentives than those of health and safety. Given that family's influence and imitation is very strong to young children, parents should be also the target population for every awareness program about the risks of solar radiation in order the risks attitudes to be improved. Therefore, we consider that it is important this survey to be followed by other future surveys from a larger region in an extended sample of parents.

Conclusions

The damaging effects of solar radiation are a fact that worries the global community. Excessive exposure of children and adolescents to the sun increases the incidence of skin cancer and melanoma, the most dangerously migrating form of cancer today. On these age groups focus most of the awareness programs that have been initiated by Health Organizations worldwide. However, these programs, in order to have positive results, should be applied after first registering the knowledge and attitude of the target groups, so as to identify the real shortcomings and needs. Information should be multi-faceted and aimed at increasing both the level of knowledge about solar radiation and the risks that may be caused by prolonged exposure

to the sun, but also to teach protection measures and the right way to apply them for the decrease of the risk of skin cancer, which has been experiencing an epidemic over the last few years in the world. The level of knowledge about the benefits and damages caused by solar radiation is predicated on the need to increase and activate educational programs for younger children as well as for their families and teachers, perhaps by upgrading the educational role of the school in the of health education field.

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