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Sun exposure behaviours, attitudes and protection practices among Prince Sattam bin Abdulaziz University Students — A survey study

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Abstract

Objective: To evaluate sun exposure behaviours, sun protection practices, general knowledge, attitudes and awareness of University students about the benefits of sun exposure and harmful effects of too much or avoidance of sun exposure.

Methods: This cross-sectional survey study was conducted in December 2014 and January2015 at Prince Sattam bin Abdulaziz University, Al-Kharj, Saudi Arabia. A questionnaire consisting of multiple-choice closed questions was used. Sample was collected using cluster sampling method. SPSS 16 was used for data analysis.

Results: Of the 399 participants, 200(50.1%) were men and 199(49.9%) were women. The overall mean age was 21±1.82years (range: 18-30 years). Moreover, 217(54.4%) participants intentionally exposed themselves to sun. Spending summer holidays in coastal areas was reported by 150(37.6%). Sunglasses were used by 161(40.4%) participants. Besides, 274(68.7%) participants agreed that sun exposure of 5 to 10 minutes for two or three times per week was very important; 189(47.4%) were aware of the importance of sun exposure for child health. 165(66%), knew that too much sun exposure was harmful and might cause skin cancer.

Conclusion: Most of the participants were aware of both beneficial effects of the appropriate sun exposure and harmful effects of too much exposure or its avoidance. However, proper sun exposure practices and sun protection practices need further guidance and encouragements from health-promoting programmes.

Keywords: Sun exposure, Protective measures, Benefits, Harmful effects. (JPMA 66: 1528; 2016)

Introduction

The sun supports and maintains actually all life on earth as it provides earth with light, warmth, and energy.[1] However, in addition to enabling us to see, sunlight also contains ultraviolet (UV) and infrared (IR) rays.[2]

Over the last 200 years, sun exposure fashions have swung between the poles of sun avoidance and sun worship.[2] The subject of safe sun exposure appears to have slipped down the health agenda in recent times. Many of the health promotion messages about sun exposure have been negative ones, outlining the dangers and health risks of over-exposure. However, it is important to be aware of the essential and beneficial effects of sunlight, too.[3]

Studies have suggested that sun exposure could guard against diseases as diverse as hypertension, diabetes mellitus (DM), multiple sclerosis (MS), cutaneous tuberculosis, psoriasis and cancer.[2]

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UV exposure has been shown to convey beneficial effects in several autoimmune disorders including MS.[4]

Karami et al. suggested that among men, there was an inverse association between occupational UV exposure and the risk of renal cell carcinoma (RCC).[5]

Rhee et al., reviewed published case-control and cohort studies concerning colorectal, prostate, breast cancer, non-Hodgkin's lymphoma (NHL) and both sunlight and vitamin D. They found that almost all epidemiological studies suggested that chronic (not intermittent) sun exposure is associated with a reduced risk of colorectal, breast, and prostate cancer, and NHL.[6]

On the other hand, ultraviolet radiation (UVR) in sunlight is widely considered to be the most significant causal factor in basal cell carcinoma (BCC), squamous cell carcinoma (SCC) and malignant melanoma (MM) of the skin.[7] Effective primary prevention and early detection are the keystones of skin cancer control at a population level, with the focus on behavioural strategies such as regular sun protection, sun avoidance during peak ultraviolet light hours (particularly between 10am and 2pm).[8]

The Middle East registers the highest rates of low vitamin D status worldwide,[9] despite its abundant sunshine and

geographical location, which spans latitudes from 12°N to 42°N, allowing vitamin D synthesis year round.[10] Another study found that vitamin D deficiency was common among Saudi children and adolescents, and it was influenced by both sun exposure and physical activity.[11]

In spite of being a sunny country, several studies from Saudi Arabia reported disorders attributable to inappropriate sun exposure.[12,13] The current study was planned to evaluate the sun exposure behaviours, sun protection practices, and awareness of the community about the benefits of sun exposure and harmful effects of too much sun exposure or its avoidance.

Subjects and Methods

This cross sectional study was conducted at Prince Sattam bin Abdulaziz University (PSAU), Al-Kharj, Saudi Arabia, from December 2014 to January 2015, and comprised non-medical students.

A questionnaire consisting of multiple-choice closed questions was used. The sample was collected by cluster sampling method. Students from three colleges were included. These were college of business administration, college of education and college of sciences and humanities out of 6 eligible colleges in the university (clusters). Students in these colleges were closer to the general community regarding the level of health awareness. The study population was divided into two groups (clusters), male and female students. Fourteen classes were randomly selected from the chosen colleges (out of 202 classes), and all students who attended during the study period were included.

The questionnaire was constructed to assess the general knowledge, attitudes and awareness of the participants about the benefits of sun exposure and harmful effects of too much sun exposure or its avoidance as well as the sun protection behaviour and attitudes towards the use of sun protective measures. Experts had revised the questionnaire.

Questions included participants' sex, age and marital status. We assessed sun exposure behaviours of the participants by asking whether they were exposed to sun during professional activity, intentionally exposed themselves to sun (yes/no), duration they stayed in the sun, the time of sun exposure, and the frequency of sun exposure per week. Subjects were also asked whether they spent summer holidays in coastal areas, the time they went to the beach, and duration of sun exposure at beach.

Behaviours and attitudes towards sun protective measures were assessed by asking the participants whether they used sunscreen, site of application, sun protection factor (SPF) of the screen used, frequency of its application and the use of other sun protective measures such as sunglasses, umbrella, shade, etc.

Some questions assessed knowledge and attitudes of the participants about benefits or harmful effects of too much or avoidance of sun exposure.

Some questions were designed to determine the skin types according to modified Fitzpatrick's skin typing[14] depending on reported cutaneous reaction to sun exposure.

OpenEpi version 3 was used to calculate the sample size.[15] The following considerations were employed for sample size calculation: the total recorded study population for the academic year 2014/2015 was about 16,000 students.[16] The sample size was calculated keeping confidence interval (CI) at 95%. For correction of any possible data loss, the total sample would be 400. A proportionate sampling method was applied for obtaining participants from the three colleges using an appropriate sampling fraction.

Students of medical college or medical sciences, and those not willing to participate in the study were excluded.

SPSS 16 was used for data analysis. The following statistical tests were used:

- The percentage, frequency, means and relative mean for data variables was calculated.

- Relationships between questionnaire variables and gender, age, skin type and personal or family history of skin cancer and chronic diseases were examined using chi-square test.

Approval was obtained from the institutional ethics committee. Approval was also obtained from the selected colleges and informed consent was taken from all participants.

Results

Of the 399 participants, 200(50.1%) were men and 199(49.9%) were women. The overall mean age was 21±1.82 years (range: 18-30 years). Moreover, 187(46.9%) participants were from college of sciences and humanities, 137(34.3%) from college of education and 75(18.8%) from college of business administration. Besides, 386(96.7%) subjects were Saudi citizens, 318(79.7%) were single, and 247(62%) were found to have skin type II and type III.

Table-1: Responses regarding sun exposure behaviour according to gender.

Questions		Gender		Total	P-Value
		Male	Female		
Partial exposure to sun during professional activity	Yes	50(25%)	125(62.8%)	175(43.9%)	< 0.001
	No	150(75.0%)	74(37.2%)	224(56.1%)	
Intentional exposure to sun	Yes	113(56.5%)	104(52.3%)	217(54.4%)	0.422
	No	87(43.5%)	95(47.7%)	182(45.6%)	
Sun exposure duration	None	23(11.5%)	29(14.6%)	52(13.0%)	0.13
	5-10mins	107(53.5%)	86(43.2%)	193(48.4%)	
	15-30mins	50(25%)	56(28.1%)	106(26.6%)	
	1-2Hrs	19(9.5%)	22(11.1%)	41(10.3%)	
	more than 2hrs	1(0.5%)	6(3%)	7(1.8%)	
Time of sun exposure	None	13(6.5%)	5(2.5%)	18(4.5%)	0.016
	Before 10am	53(26.5%)	70(35.2%)	123(30.8%)	
	Bet.10am 3pm	97(48.5%)	75(37.7%)	172(43.1%)	
	After 3pm	37(18.5%)	49(24.6%)	86(21.6%)	
Frequency of sun exposure	None	40(20.0%)	63(31.7%)	103(25.8%)	< 0.001
	Once weekly	34(17.0%)	78(39.2%)	112(28.1%)	
	2–3 d/w	54(27.0%)	31(15.6%)	85(21.3%)	
	More than 3d/w	72(36.0%)	27(13.6%)	99(24.8%)	
Taking of vitamin D tablets	Yes	56(28.0%)	89(44.7%)	145(36.3%)	0.001
	No	144(72.0%)	110(55.3%)	254(63.7%)	
Spending summer holidays in coastal area	Yes	70(35.0%)	80(40.2%)	150(37.6%)	0.284
	No	130(65.0%)	119(59.8%)	249(62.4%)	
What time do you usually go to the beach?	None	59(29.5%)	38(19.1%)	97(24.3%)	< 0.001
	Before 10am	42(21.0%)	76(38.2%)	118(29.6%)	
	10am to 3pm	22(11.0%)	32(16.1%)	54(13.5%)	
	After 3pm	77(38.5%)	53(26.6%)	130(32.6%)	
Duration of sun exposure at beach	None	46(23.0%)	36(18.1%)	82(20.6%)	< 0.001
	5 -10 min	41(20.5%)	64(32.2%)	105(26.3%)	
	15-30 min	47(23.5%)	69 (34.7%)	116 (29.1%)	
	1-2 hrs	48(24.0%)	18(9.0%)	66(16.5%)	
	More than2 hr	18(9.0%)	12(6.0%)	30 (7.5%)	
History and number of severe sun burns	Never	164(82.0%)	99(49.7%)	263 (65.9%)	< 0.001
	Once	24(12.0%)	50(25.1%)	74 (18.5%)	
	Many times	12(6.0%)	50(25.1%)	62 (15.5%)	

d/w: Days per week.

Positive family history of skin cancer was found in 47(11.8%) while personal or family history of chronic diseases such as diabetes mellitus and hypertension was found in 144(36.1%).

In general, all of the participants were students of indoor professional activity, but 175(43.9%) of them [125(71.43%) women and 50(28.57%) men] reported partial exposure to sun during professional activity, ($p < 0.001$).

Furthermore, 217(54.4%) participants exposed themselves to sun intentionally. Besides, 193(48.4%) respondents stayed in sun for 5 to 10 minutes [107(55.44%) men, and 86(44.56%) women], and 106(26.6%) stayed for 15 to 30 minutes [50(47.17%) men and 56(52.83%) women. Moreover, 52(13%) participants said they did not intentionally expose themselves to sun at all.

Regarding the time of sun exposure, 172(43.1%) participants said they had exposed themselves to sun during the period between 10am and 3pm, with 97(56.4%) of them being men and 75(43.6%) women ($p=0.016$). However, 209(52.4%) subjects preferred the safer periods for sun exposure, before 10am or after 3pm, with the number of women being 119(56.94%).

Moreover, 112(28.1%) participants exposed themselves to sun once per week, with 78(69.64%) being women, while 85(21.3%) participants exposed themselves to sun for 2-3 days per week and 99(24.8%) for more than 3 days per week ($p< 0.001$).

Table-2: Responses regarding sun protective measures used according to gender.

Questions & Responses		Gender		Total	P-Value
		Male	Female		
Sunscreen use	Never	175(87.5%)	86(43.2%)	261(65.4%)	< 0.001
	When I go to the beach	22(11.0%)	74(37.2%)	96 (24.1%)	
	Throughout the year	3(1.5%)	39 (19.6%)	42(10.5%)	
Site of application of sunscreen	None	142(71.0%)	59(29.6%)	201(50.4%)	< 0.001
	On all exposed skin	39(19.5%)	64(32.2%)	103(25.8%)	
	On face, neck and hands	15(7.5%)	44(22.1%)	59(14.8%)	
	On face and neck	4(2.0%)	32(16.1%)	36(9.0%)	
Sun protection factor of sunscreen used	Not used at all	144(72.0%)	58(29.1%)	202(50.6%)	< 0.001
	Less than 10	39(19.5%)	45(22.6%)	84(21.1%)	
	30-0ct	13(6.5%)	68(34.2%)	81(20.3%)	
	More than 30	4(2.0%)	28(14.1%)	32(8.0%)	
Frequency of application of sunscreen	None	139(69.5%)	57(28.6%)	196(49.1%)	< 0.001
	Only once	31(15.5%)	49(24.6%)	80(20.1%)	
	Every 2 hours	3(1.5%)	47(23.6%)	50(12.5%)	
	Every time I feel that my skin needs protection	27(13.5%)	46(23.1%)	73(18.3%)	
Use of other sun protective measures	None	24(12.0%)	15(7.5%)	39(9.8%)	< 0.001
	Sunglasses	97(48.5%)	64(32.2%)	161(40.4%)	
	Hat	7(3.5%)	31(15.6%)	38(9.5%)	
	Seating under an umbrella or shade	22(5.5%)	24(6.0%)	46(11.5%)	
	Swimming/shower when feeling over exposed	2(1.0%)	10(5.0%)	12(3.0%)	
	Long sleeved clothes	3(1.5%)	15 (7.5%)	18(4.5%)	
	Use two protective measures	34(17.0%)	29(14.6%)	63(15.8%)	
	Usethree or more protective measures	11(5.5%)	11(5.5%)	22(5.5%)	

Only 145(36.3%) participants took vitamin D supplements, 89(61.38%) among them were women (p= 0.001).

Moreover, 150(37.6%) participants said they spent summer holidays in coastal areas. Besides, 97(24.3%) of the participants said they did not go to the beach, whereas 118(29.6%) went there before 10am, 130(32.6%) after 3pm and 54 (13.5%) during the peak ultraviolet light hours, i.e. between 10am and 3pm (p< 0.001).

Regarding duration of sun exposure at the beach, 105(26.3%) participants were exposed to sun for 5-10 minutes, 116(29.1%) for 15-30 minutes, 66(16.5%) for 1-2 hours and 30(7.5%) for more than 2 hours. There was statistically significant difference between both genders in this practice (p< 0.001).

Besides, 136(34.1%) participants had a positive history of severe sunburn, 74(54.4%) of them once and 62(45.6%) of them for many times; with statistically significant higher percentage among females (p< 0.001) (Table-1).

Furthermore, 261(65.4%) participants said they never used sunscreen, 96(24.1%) used it when they went to the beach, while only 42(10.5%) used it round the year. A significantly higher percentage of female participants used sunscreen (p< 0.001). Of those who used sunscreen, 103(25.8%) applied it on all exposed skin, 59(14.8%) on face, neck and hands, and 36(9%) on face and neck. Besides, 84(21.1%) participants used SPF of less than 10; 81(20.3%) with SPF of 10-30 and 32(8.0%) with SPF of more than 30. Moreover, 80(20.1%) of respondents said they used sunscreen only once, 50(12.5%) used it for every two hours and 73(18.3%) used it every time they felt their skin needed protection.

Sunglasses were used by 161(40.4%) participants, 97(60.3%) of them being men. Besides, 46(11.5%) participants also sat under an umbrella or shade, and 38(9.5%) used hats. Moreover, 18(4.5%) of them preferred wearing long-sleeved clothes and 12(3%) used swimming/shower when feeling overexposed. Except for sunglasses, statistically significant higher portions of women used the different types of aforementioned sun protective measures (p < 0.001) (Table-2).

Besides, 274(68.7%) participants, [133(48.54%) men and 141(51.46%) women], considered that sun exposure of 5 to 10 minutes two or three times per week was very important, 43(10.8%) stated that they did not know about the importance of such regular sun exposure, 14 (3.5%) said this practice was harmful.

Table-3: Questions and responses regarding knowledge and attitudes of the participants about sun exposure according to gender.

Questions & Responses		Gender		Total	P-Value
		Male	Female		
Sun exposure 5 to 10min two or three times/week is	Very important	133(66.5%)	141(70.9%)	274(68.7%)	0.011
	Not very important	38(19.0%)	30(15.1%)	68(17.0%)	
	Harmful	2(1.0%)	12(6.0%)	14(3.5%)	
	Do not know	27(13.5%)	16(8.0%)	43(10.8%)	
Avoidance sun exposure is	Harmful	95(47.5%)	121(60.8%)	216(54.1%)	< 0.001
	Not harmful	39(19.5%)	52(26.1%)	91(22.8%)	
	Beneficial	30(15.0%)	15(7.5%)	45(11.3%)	
	Do not know	36(18.0%)	11(5.5%)	47(11.8%)	
Avoidance sun exposure may cause bone disease	Strongly agree	80(40.0%)	72(36.2%)	152(38.1%)	0.797
	Agree	72(36.0%)	79(39.7%)	151(37.8%)	
	Disagree	40(20.0%)	38(19.1%)	78(19.5%)	
	Strongly disagree	8(4.0%)	10(5.0%)	18(4.5%)	
A little bit of sun on the skin each day is actually good for health	Strongly agree	7(3.5%)	33(16.6%)	40(10.0%)	< 0.001
	Agree	19(9.5%)	58(29.1%)	77(19.3%)	
	Disagree	131(65.5%)	82(41.2%)	213(53.4%)	
	Strongly disagree	43(21.5%)	26(13.1%)	69(17.3%)	
Exposing children few minutes for sun daily is useful for their health	Strongly agree	117(58.5%)	72(36.2%)	189(47.4%)	< 0.001
	Agree	64(32.0%)	78(39.2%)	142(35.6%)	
	Disagree	13(6.5%)	37(18.6%)	50(12.5%)	
	Strongly disagree	6(3.0%)	12(6.0%)	18(4.5%)	
Too much sun exposure is	Beneficial	27(13.5%)	23(11.6%)	50(12.5%)	0.434
	Not beneficial	65(32.5%)	55(27.6%)	120(30.1%)	
	Harmful	94(47.0%)	100(50.3%)	194(48.6%)	
	Do not know	14(7.0%)	21(10.6%)	35(8.8%)	
Prolonged exposure to the sun may cause skin cancer	Strongly agree	34(17.0%)	64(32.2%)	98(24.6%)	< 0.001
	Agree	74(37.0%)	93(46.7%)	167(41.9%)	
	Disagree	72(36.0%)	32(16.1%)	104(26.1%)	
	Strongly disagree	20(10.0%)	10(5.0%)	30(7.5%)	
My skin will show signs of aging and wrinkles if i am overexposed to the sun	Strongly agree	30(15.0%)	39(19.6%)	69(17.3%)	< 0.001
	Agree	112(56.0%)	57(28.6%)	169(42.4%)	
	Disagree	47(23.5%)	68(34.2%)	115(28.8%)	
	Strongly disagree	11(5.5%)	35(17.6%)	46(11.5%)	
I prefer sun avoidance for cosmetic reasons	Strongly agree	18(9.0%)	41(20.6%)	59(14.8%)	< 0.001
	Agree	60(30.0%)	87(43.7%)	147(36.8%)	
	Disagree	91(45.5%)	50(25.1%)	141(35.3%)	
	Strongly disagree	31(15.5%)	21(10.6%)	52(13.0%)	
My skin seems healthier and prettier when tanned	Strongly agree	25(12.5%)	46(23.1%)	71(17.8%)	< 0.001
	Agree	102(51.0%)	73(36.7%)	175(43.9%)	
	Disagree	70(35.0%)	56(28.1%)	126(31.6%)	
	Strongly disagree	3(1.5%)	24(12.1%)	27(6.8%)	

The majority of the participants, i.e. 216(54.1%) [95(43.98%) men and 121(56.02%) women] knew that avoidance of sun exposure was harmful; 45(11.3%) believed this practice was beneficial, while 47(11.8%) said that they did not know about it. There was statistically significant difference between men and women regarding this response (p< 0.001) with better information among women.

Regarding relation of sun exposure to bone disease, 152(38.1%) of the participants strongly agreed and 151(37.8%) agreed that avoidance of sun exposure may cause bone disease, whereas 78(19.5%) disagreed and 18(4.5%) strongly disagreed with this notion.

Moreover, 189(47.4%) participants strongly agreed that sun exposure was important for child health, and 142(35.6%) agreed that exposing children for a few minutes to sun daily was useful for their health. Besides, 194(48.6%) respondents knew that too much sun exposure was harmful while 120(30.1%) said that this was not beneficial. Furthermore, 265(66.5%) of the

participants agreed that prolonged exposure to the sun may cause skin cancer while 134(33.5%) of them disagreed.

At the same time, 206(51.6%) participants, including 128(62.1%) women, preferred sun avoidance for cosmetic reasons (Table-3).

Discussion

Saudi Arabia is a sunny country, characterised by mostly hot and dry climate,[17] receiving large quantity of sunlight throughout the year.

There is no doubt about the benefits of sunlight for life supporting and health promotion for all living organisms on the earth.[3,4] However, it is also documented that prolonged exposure to sunlight may be a real health risk.[8]

Our study showed that 43.9% of the participants were partially exposed to sun during professional activity. A slightly higher percentage of them, i.e. 54.4%, intentionally exposed themselves to the sun. Moreover, 75% of the participants exposed themselves to the sun for 5 to 30 minutes daily, a finding which was closer to that reported by other studies.[13,18] However, unfortunately, 43.1% of our respondents exposed themselves to the sun during the peak ultraviolet light period, between 10am and 3pm,a practice that is not medically acceptable.

Only 36.3% of the participants took vitamin D supplements, with significantly higher percentage of females, this finding concurred with another study from Saudi Arabia which found that only a small portion of the participants took vitamin D supplements.[19]

Spending summer holidays in coastal areas was reported only by 37.6% of the participants, with higher percentage of females. Interestingly, the majority of them went to the beach at safer periods, i.e. before 10am or after 3pm; with most of them staying at the beach for not more than 2 hours. This reflects a good sun protective practice and is opposite to that reported by Al-Robaee,[20] and Nikolaou et al.[21]

In our study, sunglasses were the most commonly used sun protective measures, which was in accordance with the findings of Nikolaou et al.,[21] but in our study, it was especially preferred by males. In other studies,[22,23] sunscreen was the most popular sun protective measures. However, most of our respondents did not use sunscreen, a result similar to other study.[20] Even of those who used sunscreen, many of them either used a low SPF of less than 10 or applied it at an inadequate frequency.

Regarding knowledge and attitudes of the participants to sun exposure, our study showed that 68.7% participants agreed that sun exposure of 5 to 10 minutes two or three times per week was very important. The majority of the respondents were aware of the importance of sun exposure for child health. A relatively high percentage of them (54.1%) also agreed that avoidance of sun exposure was harmful and may cause bone disease. This reflects that most of the participants knew and they were aware of the beneficial effects of sunlight, which was in contrast to findings of other studies in the gulf region,[19,24] but in agreement with Yurtseven et al.[25]

Our study showed that about half of the participants (48.6%) knew that too much sun exposure was harmful, and about 66% of them were aware that prolonged exposure to the sun may cause skin cancer as well as skin aging signs, which was in accordance with other studies.[23,25] A slightly larger portion of the participants (51.6%), with statistically significant higher percentage of the females, preferred sun avoidance for cosmetic reasons, in accordance to findings of Thomas et al.[24]

The study had its limitations as well. It was a questionnaire-based survey study, and would have been better if it also included laboratory estimation for vitamin D. In addition, the sample was taken from a university population, so the results may not be generalised.

Conclusion

Most of the participants were aware of both beneficial effects of the appropriate sun exposure and harmful effects of too much exposure or avoidance of sun exposure. However, proper sun exposure practices and sun protection practices need further guidance and encouragements from health-promoting programmes. We recommend further studies involving different groups of the population and laboratory investigations for vitamin D levels. We also recommend executing health-promoting campaigns to improve the health education of the general population about sun exposure.

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