



KNOWLEDGE, BELIEF AND PRACTICES RELATED TO PHOTO EXPOSURE AND USE OF SUNSCREENS: A COMMUNITY BASED SURVEY

Mubashar M Mir¹ and Nazish Mir²

¹Department of Dermatology, Government Medical College Jammu

²ESIC Hospital Doda, Jammu and Kashmir

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ABSTRACT

Background: Chronic sun exposure leads to various deleterious effects on the skin including pigmentary changes, skin cancers and photoaging. Being a modifiable factor, it can be adequately corrected by incorporating awareness and photo protective practices including use of sunscreens. This can have positive health outcomes in terms of decrease in skin cancers and other photo dermatoses. Aim of this study was to assess the knowledge and practices related to photo exposure and photo protection including use of sunscreens.

Methods: It was a community based cross sectional study of 1044 subjects conducted in a city of North India. Data was collected in the form of a questionnaire.

Results: Around 51% had knowledge about sun induced pigmentary abnormalities and photo aging on sun exposure while 39% attributed photo-exposure for causing skin cancers and around 10% were not aware of adverse effects of sun exposure. Only 45% were following general photo protective practices while 32% were using sunscreens. Of those using sunscreens, 53% used it daily. Less than half of routine users were using it at least twice daily. Only 25 percent users were applying sunscreens over all photo exposed sites besides face. Majority (79.6%) were using sunscreens for prevention of non-cancerous skin effects like pigmentation and aging. Females, educated and high socioeconomic class had better overall knowledge and photo protective practices.

Conclusions: Knowledge and photo protective practices in our part of the region are much low in comparison to western countries and needs to be supplemented. Few of those despite having knowledge of the harmful effects of sun exposure were actually practising photo protective methods. Sizeable proportion of those using sunscreens were using them inadequately or improperly. Males, people belonging to lower socioeconomic strata and those lacking education were poor performers as per our study and more focus need to be put on such groups.

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INTRODUCTION

Photo exposure and consequently the exposure to ultraviolet radiation is responsible for many adverse cutaneous manifestations like skin cancers besides other problems like photoaging, freckles and melasma.¹ Although these manifestations especially skin cancers are less frequent in predominantly darker skin types due to protection offered by melanin, if present skin cancers may carry a poor prognosis due to late recognition.² However, sun exposure is a modifiable risk factor and its harmful effects can be avoided to a large extent by adopting sun protection practices including use of sunscreens.³ Sunscreens form an important part of sun protective measures and prevent harmful effects of sun by absorbing, reflecting or deflecting sun rays from the skin surface.⁴ Patient education in this regard has had positive outcomes in bringing a behavioural change in many societies as has been observed in various studies abroad.^{5,6} However

there has been paucity of such studies in our part of Asian subcontinent.⁷ The knowledge and practices about sun exposure in our population are also shaped by the cultural beliefs where sun is revered as one of the gods in some religions besides lack of public education, cost issues and practical issues leading to noncompliance.⁸

This study intends to assess the knowledge and beliefs of the general population regarding the effects of photo exposure and their practices with regard to sun exposure and photoprotection in day to day life.

MATERIAL AND METHODS

A cross sectional survey of local population was conducted in a city in north India from April to June 2020. The city experiences an approximate UV index of 3 to 5 which comes in the moderate category of exposure. One thousand forty-four subjects participated in the study. Data was recorded in a

*Corresponding author: Mubashar M Mir

Department of Dermatology, Government Medical College Jammu

questionnaire which was in the form of a printed paper filled by the researchers on verbal questioning from the study subjects. Consecutive sampling was done by home visits. Questionnaire included basic demographic data, socioeconomic status, nature of work, timing and duration of sun exposure, knowledge about effects of photo exposure and use of photo protective measures. Data regarding the timing, site and preference of use of sunscreen if any was also recorded among those using sunscreens. Inclusion criteria: Patients 18 years and above willing to participate in the study voluntarily. **Exclusion Criteria:** Those not willing to give consent for study. Educated subjects were defined as those having attained education of high school (matriculation) and above.

Statistical Analysis

Data was analysed using Microsoft Excel and Statistical Product and Service Solutions (SPSS 22.0). Numerical data was calculated in the form of mean, standard deviation and categorical data as frequencies and proportions. Chi square test was used to test association between categorical variables. p value of <0.05 was taken as significant.

RESULTS

The study included 1044 subjects. Mean age of the study group was 32.9 years (standard deviation = 9.8 years) (range = 18 to 56 years). There was a slight male predominance in the study with males contributing to 540(51.7%) of study population. People from high socioeconomic strata of the society dominated the study contributing to 647(62.0%) subjects. In our study 612(58.6%) people were involved in daily work requiring indoor activity whereas 432(41.4%) were engaged in jobs requiring outdoor activity [Table 1].

Table 1 Demographics and baseline characteristics of the study population

Feature	(n=1044)No (%)
Age (yrs.), mean±SD Range	32.9±9.8 18-65 years
Gender	Male 540(51.7%)
	Female 504(48.3%)
Marital status	Married 664(63.6%)
	Unmarried 380(36.4%)
Education Status	Uneducated 477(45.7%)
	Educated 567(54.3%)
Socioeconomic status	High 647(62.0%)
	Low 397(38.0%)
Occupation	Indoor 612(58.6%)
	Outdoor 432(41.4)

SD: Standard Deviation.

As far as degree of photo exposure among study subjects was concerned, 552(52.9%) were exposed to sun for less than ten hours per week and 492(47.1%) were exposed for over ten hours per week. Around 553(52.9%) reported that they are usually exposed to sunlight during the peak between 11 am to 3 pm. So far as awareness about the adverse effects of photo exposure were concerned 532(51.0%) of the subjects acknowledged that excessive photo-exposure can contribute to development of pigmentary abnormalities like Freckles, Lentigines and can accentuate aging while 407(39.0%) said it could cause skin cancers whereas 105(10.0%) were not aware that sun exposure can lead to any such side effects. Regarding photo protective practices, 45 percent of the subjects used to follow only general photo protective practices like wearing broad brim hats, using scarfs, gloves and sun glasses. Whereas

334 (32 percent) of the total subjects used sunscreens and 240(23.0%) used no photo protective measures [Table 2].

Table 2 Awareness about sun exposure and photoprotective practices among study subjects.

Feature	(n=1044) No. (%)
Avg. Sun exposure per week	
<10 hours	552(52.9)
>10 hours	492(47.1)
Timing of exposure	
Exposed to sun between 11 am to 3 pm	553(52.9)
Not exposed between 11 am to 3 pm	491(47.1)
Knowledge about photo exposure	
Aging, pigmentation etc.	407(39.0)
Skin cancers	532(51.0)
Not aware of any side effects	105(10.0)
Sun protective practices	
Take general precautions	470(45.0)
Use sunscreens	334(32.0)
None	240(23.0)

Out of 1044 only 334 people were using sunscreens. Only 178 (53.3%) out of them used sunscreens daily while the rest used on occasional, irregular basis. Almost half of the people 176(52.7%) were using sunscreens with a higher sun protection factor (SPF) higher than 30 while 87(26.0%) were using sunscreen with SPF of less than 30. Around 71(21.3%) were not able to recall the SPF of their sunscreen at the time of answering the questionnaire.

Of those using sunscreens, 314(94.0%) used to apply the sunscreen in the morning whereas 173(51.8%) said they applied it in the afternoon. However, 152(45.5%) selected both i.e. they were using it twice, once in the morning and the afternoon. A huge majority of people 325(97.3%) were using the sunscreen only on the face whereas 140(41.9%) were using it on the back of hands and arm. About 83(24.8%) selected both over face and the bare extremities. On being asked about the reason for the use of sunscreen about 266(79.6%) said it was for protection against non-cancerous side effects of photo exposure like to prevent pigmentation, ageing etc. whereas 68(20.4%) said it was to protect against skin cancers [Table 3].

Table 3 Description of sunscreen use among subjects.

Feature	(n=334) No. (%)
Frequency of use	
Daily	178(53.3)
Occasionally	156(46.7)
SPF	
>30	176(52.7)
<30	87(26.0)
Don't remember	71(21.3)
Timing of use	
Morning	314(94.0)
Afternoon	173(51.8)
Both	152(45.5)
Site of application	
Face	325(97.3)
Hands and forearms	140(41.9)
Both	83(24.8)
Reason for use	
To prevent Pigmentation/ageing	266(79.6)
To prevent Skin cancers	68(20.4)

SPF: Sun protection factor.

On comparative analysis it was found that there was strong statistically significant association between some sociodemographic factors like gender, educational status and socioeconomic status with knowledge and practices related to photo-exposure and photo protection [Table 4]. Females were seen to have an overall better knowledge about various

harmful effects of sun exposure and practiced sun protection more commonly than males. Similarly, people who were educated and belonged to a higher socioeconomic class were more knowledgeable with regards to detrimental effects of prolonged photo exposure and practiced better photo protective practices.

Table 4 Relation between sociodemographic factors with knowledge and practice related to photo exposure

Feature	Gender		Educated		S.E. Status		p value
	M	F	Y	N	H	L	
Knowledge	363 (72%)	448 (83%)	442 (78%)	172 (36%)	446 (69%)	191 (48%)	<0.001
	232 (46%)	389 (72%)	476 (84%)	105 (22%)	401 (62%)	171 (43%)	
Practice							<0.001

M: Male, F: Female, Y: Yes, N: No, S.E.: Socioeconomic, H: High, L: Low, Knowledge: Had Knowledge of adverse side effects of photo exposure, Practice: Used sun Protective Practices.

DISCUSSION

In our part of the world, the effects of sun exposure are less apparent despite the high intensity of solar radiation received by our area being at a peri equatorial location. The darker complexion of the population makes people less concerned regarding the pigmentary abnormalities however this also sometimes delays early diagnosis of cutaneous malignancies.

In our study majority of people were from a good socioeconomic background and were educated. Similar demographic compositions were seen in other studies on the subject in India and abroad.^{8,9}

On assessment of knowledge about the effects of photo exposure about 51 percent people knew that excessive photo exposure can cause pigmentary abnormalities and photo aging while 39 percent knew that skin cancers can be contributed by chronic photo exposure. However, 10% population had no idea whatsoever of any such side effects. This was in consistency with some Asian studies however the level of awareness was much higher in subjects of western studies.^{8,10} These findings reiterate the need of better health education in developing countries with respect to harmful effects of photo exposure.

While assessing attitude and incorporation of sun protective practices among the people in their daily lives it was surprising to see that only 45 percent of the subjects used to follow only general photo protective practices like wearing broad brim hats, using scarfs, gloves and sun glasses. Moreover, only 32 percent of the total subjects used sunscreens. It highlights the finding that although relatively larger number of people knew about harmful effects of photo exposure, less than half were practising photo protection and less than one third were using sunscreens. The more important message to learn here is that knowledge doesn't necessarily transform into practice unless behavioural change is incorporated. Perhaps, inculcation of such practices in childhood as a part of school curriculum can promote a behavioural change.¹¹ We observed that out of 334 people using sunscreens, mere 178(53%) of them used sunscreens daily while the rest used on occasional, irregular basis signifying improper use and compliance issues associated with sunscreens. Poor compliance with sunscreens is usually associated with factors like the need of repeated use, sticky nature of some sunscreens, cost issues and lack of knowledge of proper application.^{12,13} Fortunately, a good number (53%) of those using sunscreens were using sunscreens with a higher sun protection factor (SPF), this was

perhaps due to wider availability and marketing of high SPF sunscreens nowadays.

With regards to the application of sunscreen among users, a huge majority (94%) were using sunscreens during the morning however only 45 percent were using it for the second time in the afternoon. This was perhaps due to the fact that most people are engaged in work and find it impractical to carry and use sunscreen during the afternoon. It must be noted here that most sunscreens lack such high substantivity to withstand efficacy despite the effect of sweating and physical factors which virtually dilute and wash away the sunscreen applied over time. Thus it is recommended that to be effective the sunscreen must be reapplied at least twice daily.¹⁴ Based on the site of application, it was found that a huge majority of people (97.3%) were using the sunscreen only on the face whereas only 24.8% were using it both over face and the bare extremities. This percentage was higher than that found in another study from the region in which 78% applied sunscreen only on the face. It should be emphasised that to get maximal benefit and protection from sunscreens it should be applied on all photo exposed sites including the face.¹⁵

Among those using sunscreens, an enquiry was made regarding the reason of use and it was noted that majority (79.6%) of people were using it to avoid pigmentation and aging while only 20 percent used them to protect the skin against malignancies. This was similar to a previous study in which majority were using it to prevent tanning (79%) and sunburn (65%).⁸

On comparative analysis, a strong statistically significant association between sociodemographic factors like gender, education and socioeconomic status was seen with knowledge and practices related to photo-exposure and photoprotection (p<0.001). It was inferred that females were overall more aware about harmful effects of sun exposure and were practising photoprotection more often than males. Also, those with better education and belonging to a higher socioeconomic status were more aware and practising photoprotection. Limitation of the study was that it was done in a tier-2 city and sample was taken from an urban setup. The reasons for poor compliance to photoprotection were not inquired.

It was concluded that knowledge and photo protective practices in developing regions like ours is much low in comparison to western countries and needs to be supplemented through health education and inculcating behavioural change through local and national policy efforts. Much lesser number of those having knowledge of the harmful effects of sun exposure were actually practising photo protective methods including the use of sunscreens. It mandates the use of better tools to incorporate the health education into the daily practice of individuals. Perhaps steps like making such education a part of school learning can help inculcate such practice. It was also noted that a big proportion of the people using sunscreens were using them inadequately or improperly which required better dissemination of information on sunscreen use. Males, people belonging to lower socioeconomic strata and those lacking education were poor performers as per our study and more focus need to be put on such groups.

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Declarations

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