

Original Article

Assessment of the knowledge, attitude, and practice towards sun-exposure and skin cancer in Riyadh city, Saudi Arabia

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Abstract: Background: Although there is an emergent increase in the epidemiology of skin cancer in Saudi Arabia, yet knowledge, attitude, and awareness towards skin cancer prevention measures is still poor. Therefore, the present study aimed to assess the knowledge and attitudes and practice towards skin cancer among the Saudi population, as well as, to evaluate the level of awareness relating to exposure to sunlight. Methods: This cross-sectional survey involved 438 participants who were randomly selected from Riyadh city, Saudi Arabia. A standard questionnaire was used to collect data regarding skin cancer. The questionnaire focused on three main aspects knowledge, attitude, and practice. The skin cancer quality of life impact tool (SCQOLIT) was employed. Results: The present study included 438 participants, aged 18 to 55 years old. The response in the present study was 81.9%. Regarding the causes and effects of skin cancer, 61.2% of the respondents have prior knowledge about it. The positive attitude about skin cancer was exhibited by 68.9%, and only 31.1% showed a negative attitude towards it. Conclusion: In conclusion, Knowledge, attitude, and practice towards skin cancer still under the desired level to prevent skin cancer and its related conditions in Saudi Arabia. Greater emphasis should be made through awareness campaigns and available media to raise the knowledge about implications related to prolonged exposure to sunlight.

Keywords: Skin cancer, Saudi Arabia, knowledge, attitude, practice, sun-exposure, UV

Introduction

Skin cancer represents two distinct varieties; malignant melanoma (rare type) and non-melanoma skin cancer (NMSC) (common type) [1]. The most common subtypes of NMSC include basal cell carcinomas and squamous cell carcinoma [2]. In 2017, there were 7.7 million (95% uncertainty interval (UI), 5.3-10.6 million) incident cases of NMSC of which 5.9 million due to basal cell carcinoma (BCC) and 1.8 million due to squamous cell carcinoma (SCC). There were 65000 (95% UI, 63000-66000) deaths due to NMSC [3]. Skin cancer is most common in the

white population due to their high sensitivity to the risk of exposure to ultraviolet radiation (UVR) [4].

Skin cancer has been considered as one of the malignant diseases having a major health impact on the Arab countries, especially in the desert areas. The occupational and recreational exposure along with the duration of exposure to UVR [5, 6] has an impact on the prevalence of skin cancer [7]. According to a recent estimate, melanoma skin cancer in Saudi Arabia has an incidence of 0.2%, a mortality rate of 0.2%, and a 5-year prevalence of 0.47% for

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Table 1. Knowledge and attitude questions and statements implemented during the survey (n=483) Pertaining to skin cancer

Questions
1. The negative attitude towards skin cancer
2. Sun exposure can cause cancer
3. Sunburn increases chances for cancer
4. Moles as a risk factor for cancer
5. Melanoma is dangerous to skin cancer
6. Positive attitude towards UV exposure and skin cancer
About other skin aspects
1. Ultraviolet rays cause suntan
2. The sunlight is harmful between 11.00 a.m. & 4.00 p.m.
3. Sunscreen can protect from UV radiation
4. A suntan is a sign of being healthy
5. The sun is harmful to skin only due to sunburn
6. Sunscreen is not enough to protect
7. The sun is more harmful to fair skin than to dark skin
8. Too much sun exposure can cause freckles
9. Too much sun exposure can cause wrinkles on the skin
10. You cannot get too much sun on a cloudy day
11. Sunscreen protects your skin for at least 4 hours
12. Sunbeds lead to a tan
13. A suntan makes attractive
14. A suntan makes healthier
15. Skin age more quickly if exposed to the maximum time in the sun

ovarian cancer (<https://gco.iarc.fr/today/data/factsheets/populations/682-saudi-arabia-factsheets.pdf>) [8]. A study from Saudi Arabia has reported 204 NMSC cases in a single center. The commonest cutaneous malignancies were basal cell carcinoma (36%) followed by squamous cell carcinoma (23%) [9]. Another study reviewed all patients diagnosed with BCC primary SCC within the period from 2003 to 2016. Of 593 cases reviewed, 279 had NMSC. Most (95%) were diagnosed with BCC or SCC or both in a few cases [10].

Based on the emergent trend of skin cancer in Saudi Arabia, the present study aimed to assess the knowledge and attitudes towards skin cancer among the Saudi population, as well as, to evaluate the level of awareness relating to exposure to sunlight.

Materials and methods

This cross-sectional survey involved 438 participants who were randomly selected from Riyadh city, Saudi Arabia. A standard questionnaire (self-made) was used to collect data

regarding skin cancer. The questionnaire focused on three main aspects knowledge, attitude, and awareness. The knowledge and attitude aspect consisted of 21 multiple choice questions and statements out of which six questions are directly focused on skin cancer and 15 on other skin aspects (**Table 1**). Each question/statement had five answer options (disagree, strongly disagree, neutral, agree, and strongly agree). The questionnaire methodology covered four parameters; age, gender, nationality, and educational level. The skin cancer quality of life impact tool (SCQOLIT) was carried out to cover the essential aspects of the present study.

Statistical analysis

The obtained data were analyzed using IBM SPSS software, version 25.0 (Chicago, IL, USA). One-way ANOVA was computed and p -value ≤ 0.05 was accepted as the level of the significance for interpreting the presented results. The odds ratio (OR) and their relative 95% confidence intervals (CIs) were computed through uni- and multivariate logistic regression models

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Table 2. Factors associated with knowledge and attitudes towards skin cancer

Variables	(%)	p-value
Nationality		
Saudi	91.5	≤ 0.003
Non-Saudi	8.5	≤ 0.79
Education		
Intermediate school	0.7	0.06
Secondary school	23.0	≤ 0.001
University-PG	76.3	≤ 0.005
Background knowledge		
Yes	61.2	≤ 0.05
No	38.8	≤ 0.33
Acquired knowledge		
Yes	28.5	≤ 0.002
No	71.5	≤ 0.001
Knowledge level		
Weak	3.9	≤ 0.02
Average	86.3	≤ 0.001
High	9.8	≤ 0.03
Gender		
Male	41.1	≤ 0.04
Female	58.9	≤ 0.001
Age		
18-24	50.7	≤ 0.001
25-34	38.6	n.a
25-44	8.5	n.a
45-54	1.1	≤ 0.20
>55	1.1	≤ 0.08
Attitude		
Positive	68.9	≤ 0.001
Negative	31.1	≤ 0.004

to evaluate the association questionnaire variables with the knowledge and attitude levels. Chi-square, cross-tabulations, and relative risk estimations were performed.

Results

Demographical characteristics

The present study included 438 participants, aged 18 to 55 years old. The response in the present study was 81.9%. Females' respondents represent (58.9%) (**Table 2**). Based on socio-demographic characteristics of participants females under age 45 were significantly better informed about the consequences of prolonged sun exposure. The educational levels varied from intermediate school (0.7%) to university postgraduate level (76.3%).

Knowledge about skin cancer

Regarding the causes and effects of skin cancer, 61.2% of the respondents have prior knowledge about it. A wide variation in knowledge level about skin cancer has been noted. About 3.9% of the respondents have weak knowledge levels on the subject, 86.3% have an average, and only 9.8% have a high level of knowledge. The overall knowledge about skin cancer was found significantly higher than the participants lacking sufficient knowledge on it.

Attitude about skin cancer

The positive attitude about skin cancer was exhibited by 68.9%, and only 31.1% showed a negative attitude towards it. The knowledge and attitude in the present results were found to be associated with educational level, as well as, awareness among the sampled population.

The frequency of strongly agreed responses to questions like "sun exposure and sunburn can cause cancer", showed significantly ($P \leq 0.001$) higher scores (32.0 and 28.5%) with odds ratios (OR) (95% confidence interval) (95% CI) ranging from 1.86 (1.24-1.30) to 1.87 (1.25-2.90) respectively (**Figure 1; Table 3**). Whereas, other responded to other parameters like melanoma (24.7%) and effects of UV radiations (23.5%) as a risk factor for skin cancer, with calculated OR (95% CI) ranged from 1.9 (1.31-1.61) to 2.1 (1.26-2.90), respectively. In contrast, only 3.7% of the respondents showed a negative attitude towards the linkage of skin cancer with exposure to sun OR (95% CI) 1.40 (1.23-1.68).

Levels of awareness about skin cancer

The present data revealed the awareness of the respondents about the consequences of the severity of exposure to UV radiation and sunburn. In the present study, 28.5% of the respondents believed that sunburn in childhood increases the chances of getting cancer later in life. The results corroborate with the earlier findings where it is stated that UV exposure during childhood and adolescence increases the chances of developing cancer especially when the sunburn is more severe. Moreover, 8.2% of the respondents are of agreement that fair skin types are more prone to the development of skin cancer. Knowledge of other factors increases the risk include;

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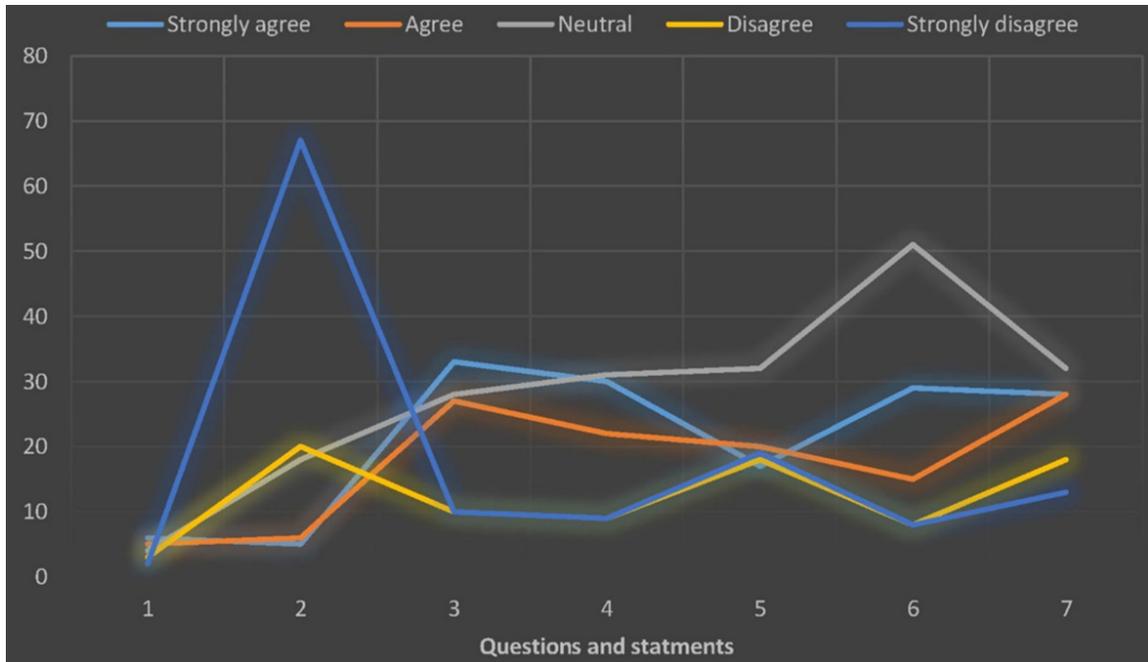


Figure 1. Knowledge and attitude scores for skin cancer (n=438).

Table 3. Multivariate analyses: knowledge and attitudes towards skin cancer

Variables	OR	95% CI	p-value
Negative attitude towards skin cancer	1.40	1.23-1.68	≤ 0.003
Sun exposure can cause cancer	1.86	1.24-1.30	≤ 0.001
Sunburn increases chances for cancer	1.87	1.25-2.90	≤ 0.001
Moles as a risk factor for cancer	1.66	0.25-2.30	≤ 0.03
Melanoma is dangerous to skin cancer	1.9	1.31-1.61	≤ 0.003
Positive attitude towards UV exposure and skin cancer	2.1	1.26-2.90	≤ 0.004

an increased number of moles development (14.6%), freckles (26.9%), and wrinkles (32.6%).

However, concerning other questions related to the effect of sun exposure on the skin, the highest scoring (55.3%), OR (95% CI) (1.11-2.15), respondents are of opinion that sunlight is harmful to the skin between 11.00 a.m. to 4.00 p.m. and only due to sunburn (50.0%), OR (95% CI) (2.50-3.38) (**Figure 2; Table 4**). Around 27.4% of the respondents think that UV radiation is the cause of suntan, OR 1.20, (95% CI, 1.71-2.79). Though no significant value was obtained concerning time factor to sunlight exposure, the harmful effects of sunlight on sunburn were found to be statistically significant ($P \leq 0.001$). Other significant positive attributes and knowledge were shown towards the use of sunscreen as a protectant (26.3%), and effects of excessive exposure as cause of

freckles (26.9%) and wrinkles (32.6%). Only (4.3%) showed negative attitudes toward suntan as a sign of healthy, (3.0%) as sunscreen is not enough to protect and suntan makes a person attractive (9.8%) and healthier (2.1%).

Discussion

Besides skin cancer exposure to the sun, UVR can cause several disorders including skin cell damage, suntan, and sunburn, freckles, wrinkles, and moles of skin [20]. Raising knowledge, a positive attitude, and awareness can prevent or decrease most of these conditions.

In the present study relatively reasonable knowledge, positive attitude, and awareness towards skin cancer were identified (61.2%). The source of these factors was being predominantly social media.

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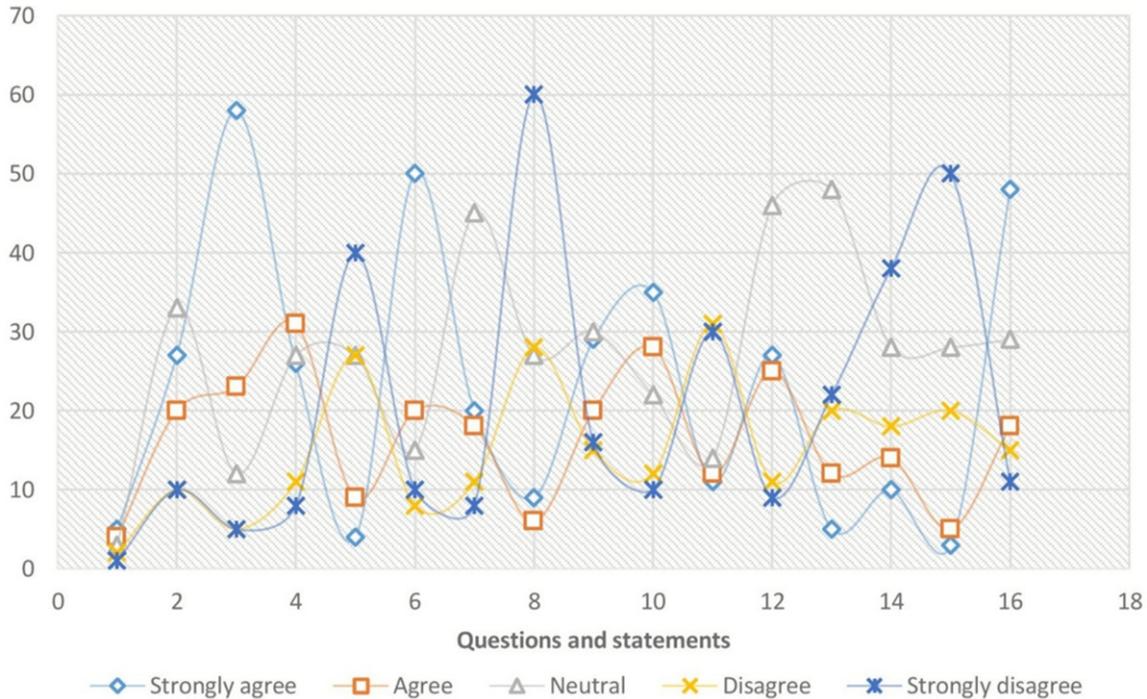


Figure 2. Knowledge and attitude scores for other skin aspects (n=438).

Table 4. Multivariate analyses: knowledge and attitudes towards other skin parameters

Variables	OR	95% CI	p-value
Ultraviolet rays cause suntan	1.20	1.71-2.79	≤ 0.08
The sunlight is harmful between 11.00 a.m. & 4.00 p.m.	2.32	1.11-2.15	≤ 0.66
Sunscreen can protect from UV radiation	1.25	0.72-1.55	≤ 0.003
A suntan is a sign of being healthy	1.22	2.19-3.60	≤ 0.07
The sun is harmful to skin only due to sunburn	3.12	2.50-3.38	≤ 0.001
Sunscreen is not enough to protect	3.90	2.70-3.65	≤ 0.002
The sun is more harmful to fair skin than to dark skin	1.98	1.00-2.10	≤ 0.59
Too much sun exposure can cause freckles	1.82	1.90-2.89	≤ 0.001
Too much sun exposure can cause wrinkles on the skin	1.63	1.30-2.34	≤ 0.003
You cannot get too much sun on a cloudy day	1.88	1.31-1.79	≤ 0.47
Sunscreen protects your skin for at least 4 hours	1.68	1.08-2.55	≤ 0.53
Sunbeds lead to a tan	2.10	3.32-4.23	≤ 0.002
A suntan makes attractive	3.30	2.41-3.23	≤ 0.28
A suntan makes healthier	1.73	2.16-2.64	≤ 0.45
Skin age more quickly if exposed to the maximum time in the sun	2.10	1.37-1.81	≤ 0.11

The attitude described the opinions of the participants, awareness, acquired beliefs, and perspectives on social and cultural sides from Saudi society. Thereby, a practice aspect reflects their attitude as well. Furthermore, the overall impression of our findings on the knowledge and attitude was good. The frequency responses showed prior experience among par-

ticipants and about the reasons behind having skin cancer among the Saudi Arabia population. Though the nature, type, and prevalence of skin cancer and other allied skin problems are based on Arab climatic conditions, these parameters may vary for different countries [7]. As the participants were selected from Riyadh city, the findings may not represent the

cognitive level of the entire Saudi population. Our findings in agreement with several studies [7, 11-17], which reported that the underestimation of skin cancer or the lack of knowledge is the primary influencing factor for the spread of skin cancer. The background knowledge on skin cancer among the Saudi population encountered in the present investigation may be attributed to the reading passion of newspapers and through electronic media. The level of knowledge has been found to have profound effects on attitude and behavioral practices in the present findings. Lack of sufficient knowledge on complications of sun exposure is one of the major limiting factors in developing countries compared to developed countries [7, 15-17]. As it has already been established that exposure to UV radiation during the childhood increases the chances of getting cancer in later life; therefore sound knowledge and improved behavioral protective and preventive measures starting from the young age can be one of the viable practices to get rid of skin cancer [18]. Due to variable skin texture in Saudi Arabia, most cases of skin cancer are not commonly linked to sunlight exposure in clinical settings [19]. Consequently, the present study may stimulate the role of sun exposure as a risk when assessing skin cancer in Saudi Arabia as well as, the neighboring Arabian countries [20-22]. The present findings considered various parameters for accessing sun exposure as a possible risk factor for skin cancer which may have potential implications for preventing skin cancer in hot climatic conditions like Saudi Arabia.

In conclusion, Knowledge, attitude, and awareness toward skin cancer still under the desired level to prevent skin cancer and its related conditions in Saudi Arabia. Greater emphasis should be made through awareness campaigns and available media to raise the knowledge about implications related to prolonged exposure to sunlight. Improved population-specific skin cancer awareness through effective communications may correct the most common malpractices and to develop a healthy attitude thereby limiting the spread of skin cancer and locally associated skin complications in Saudi Arabia.

Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

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Besides consenting each participant before inclusion in the study. The study protocol was approved by the Ethical Committee, at the College of Medicine, University of Hail.

Disclosure of conflict of interest

None.

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References

- [1] Rezende HD, Almeida APM, Shimoda E, Milagre ACX and Almeida LM. Study of skin neoplasms in a university hospital: integration of anatomopathological records and its interface with the literature. *An Bras Dermatol* 2019; 94: 42-46.
- [2] Kato J, Horimoto K, Sato S, Minowa T and Uehara H. Dermoscopy of melanoma and non-melanoma skin cancers. *Front Med (Lausanne)* 2019; 6: 180.
- [3] Global Burden of Disease Cancer Collaboration, Fitzmaurice C and Abate D. Global, regional, and national cancer incidence, mortality, years of life lost, years lived with disability, and disability-adjusted life-years for 29 cancer groups, 1990 to 2017: a systematic analysis for the Global Burden of Disease Study. *JAMA Oncol* 2019; e192996.
- [4] Apalla Z, Lallas A, Sotiriou E, Lazaridou E and Ioannides D. Epidemiological trends in skin cancer. *Dermatol Pract Concept* 2017; 7: 1-6.
- [5] Molho-Pessach V and Lotem M. Ultraviolet radiation and cutaneous carcinogenesis. *Curr Probl Dermatol* 2007; 35: 14-27.
- [6] van der Geer S, Reijers HA, van Tuijl HF, de Vries H and Krekels GA. Need for a new skin cancer management strategy. *Arch Dermatol* 2010; 146: 332-336.
- [7] Roebuck H, Moran K, MacDonald DA, Shumer S and McCune RL. Assessing skin cancer prevention and detection of educational needs: an andragogical approach. *JNP* 2015; 11: 409-416.
- [8] GLOBOCAN 2018. Saudi Arabia-Global cancer observatory. Accessed 12 December 2019.

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- [9] Al-Dawsari NA and Amra N. Pattern of skin cancer among Saudi patients attending a tertiary care center in Dhahran, Eastern Province of Saudi Arabia. A 20-year retrospective study. *Int J Dermatol* 2016; 55: 1396-1401.
- [10] AlSalman SA, Alkaff TM, Alzaid T and Binamer Y. Nonmelanoma skin cancer in Saudi Arabia: single center experience. *Ann Saudi Med* 2018; 38: 42-45.
- [11] AlGhamdi KM, AlAklabi AS and AlQahtani AZ. Knowledge, attitudes, and practices of the general public toward sun exposure and protection: a national survey in Saudi Arabia. *Saudi Pharm J* 2016; 24: 652-657.
- [12] Christos PJ, Oliveria SA, Mâsse LC, McCormick LK and Halpern AC. Skin cancer prevention and detection by nurses: attitudes, perceptions, and barriers. *J Cancer Educ* 2004; 19: 50-57.
- [13] Emmons KM, Geller AC, Puleo E, Savadatti SS, Hu SW, Gorham S and Werchniak AE; Dana-Farber Skin Cancer Screening Group. Skin cancer education and early detection at the beach: a randomized trial of dermatologist examination and biometric feedback. *J Am Acad Dermatol* 2011; 64: 282-289.
- [14] Coups EJ, Stapleton JL, Hudson SV, Medina-Forrester A, Rosenberg SA, Gordon M, Natale-Pereira A and Goydos JS. Skin cancer surveillance behaviors among US Hispanic adults. *J Am Acad Dermatol* 2013; 68: 576-584.
- [15] Gandhi SA and Kampp J. Skin cancer epidemiology, detection, and management. *Med Clin North Am* 2015; 99: 1323-1335.
- [16] Kelati A, Baybay H, Atassi M, Elfakir S, Gallouj S, Meziane M and Mernissi FZ. Skin cancer knowledge and attitudes in the region of Fez, Morocco: a cross-sectional study. *BMC Dermatol* 2017; 17: 2.
- [17] Almutlaq BA, Aljishi FK, Gaafar RA, Alyousif LA and Ahmed HG. Quality of life of Saudi patients with dermatologic disorders. *Clinical Medicine and Diagnostics* 2018; 8: 1-6.
- [18] Reinau D, Meier C, Gerber N, Hofbauer GF and Surber C. Sun protective behaviour of primary and secondary school students in North-Western Switzerland. *Swiss Med Wkly* 2012; 142: w13520.
- [19] Miola AC, Castilho MA, Schmitt JV, Marques MEA and Miot HA. Contribution to characterization of skin field cancerization activity: morphometric, chromatin texture, proliferation, and apoptosis aspects. *An Bras Dermatol* 2019; 94: 698-703.
- [20] Arab KA, AlRuhaili A, AlJohany T and AlHammad RS. Melanoma and non-melanoma skin cancer among patients who attended at King Khalid University Hospital in Riyadh, Saudi Arabia from 2007-2018. *Saudi Med J* 2020; 41: 709-714.
- [21] Arab KA, AlRuhaili A, AlJohany T and AlHammad RS. Melanoma and non-melanoma skin cancer among patients who attended at King Khalid University Hospital in Riyadh, Saudi Arabia from 2007-2018. *Saudi Med J* 2020; 41: 709-714.
- [22] Nahar VK, Wilkerson AH, Pearlman RL, Ferris TS, Zardoost P, Payson SN, Aman I, Quadri SSA and Brodell RT. Skin cancer-related knowledge, attitudes, beliefs, and practices among the population in Gulf Cooperation Council countries: a systematic search and literature review. *Arch Dermatol Res* 2020; 312: 533-544.