

Epidemiology of Non-Melanoma Skin Cancer Patients Attending at Hiwa Hospital in Sulaimani City, Iraq

Bushra Mohammed Ali

Family and Community Medicine Department
College of Medicine
University of Sulaimani
Sulaimani, Iraq
bmakfb.2002@yahoo.com

Hiwa Abas Ahmed

Bone Marrow Transplantation Department
Hiwa Hospital
General Directorate of Health of Sulaimani
Sulaimani, Iraq
Hiwaph@yahoo.com

Abstract: *Objectives are to identify the frequency of non-melanoma skin cancer cases were registered at Hiwa hospital and to find out the association between cases and controls with their sociodemographic status and risk factors. A case control approach was used, by retrospective chart review of all non-melanoma skin cancer cases presented between 1st of January 2015 till 31st of December 2016 at Sulaimani Hiwa hospital from which 70 cases conducted and 70 controls from Baxshen hospital. Data entered to Microsoft excel, analysed by SPSS V 21. Chi-square test was employed to assess the association between different variables, P value of 0.05 or less considered as statistical significant. This study included 70 cases and 70 controls were age and gender matched, most of the cases were in between age 56-70 years old, illiterate 39(55.7%), jobless 26(37.1%), from urban area 45 (64.3%) , married 65 (92.9%). had sufficient income and barely sufficient. About (64%) of cases had squamous cell carcinoma and (36%) had basal cell carcinoma. Most of the cases had family history of skin cancer (11.4%), and 44 (62.9%) of cases had a history of more than 4 hours exposure to sun in a day and 36 (51.4%) of cases were with normal BMI. Most of the cases 32 (45.7%) with type (O) blood group, not smoking cigarette 51 (72.9%) and not drinking alcohol 69 (98.6%). This study showed a statistical significant association between non-melanoma skin cancer with level of education (P value =0.002), family history (P value = 0.02), time of exposure to sun light (P value of < 0.001) and BMI (p value = 0.001). Skin cancer and cancer percentage were in increase pattern especially non-melanoma skin cancer, most of non-melanoma skin cancer cases were squamous cell carcinoma, with a significant association with level of education, income status, time of exposure to sun light, family history and BMI*

Keywords: Non-melanoma skin cancer, Hiwa hospital, Sulaimani.

1. INTRODUCTION

Skin cancer is the most frequent malignant neoplasm in white populations. Over the last four decades, Basal cell carcinoma (BCC) and Squamous cell carcinoma (SCC) are frequently described as non-melanoma skin cancers (NMSCs) [1,2]. The incidence of NMSC has increased markedly over time, in part reflecting our ageing

population as well as patterns of sun exposure [3-5]. However, the cause of NMSC is multifactorial and complex but the Ultraviolet light exposure has been a principal pathogenic environmental factor and it acts by inducing DNA mutations in epidermal cells and immunosuppression, leading to unrestrained growth and tumor formation [6,7]. Studies have identified ultraviolet radiation (UVR) damage to adult skin as an important environmental risk factor for both SCC and BCC [8]. Together, SCC and BCC are the most frequently reported malignancies in Caucasian populations [9]. In addition, more than 1 million non-melanoma skin cancers (NMSC) are diagnosed in the United States of America (U.S.A.), For those Americans who will live to age 65, approximately 40% to 50% will have at least one NMSC and those Americans living in the southern parts of USA, the incidence is even higher [10]. Despite this, few publications have focused on the epidemiology of Merkel-cell carcinoma (MCC) or other rare malignant tumors of the skin, or on patient survival [11]. Many cancer registries do not register NMSC or only record the first tumors [12-14]. Therefore, the true disease burden of skin cancer remains unclear and is often underestimated. However, accurate data on NMSC incidence and mortality evolution are difficult to obtain but Increasing incidence rates of BCC and SCC have been reported in several European countries. A study from the Scottish cancer registry over a period of 12 years revealed an annual increase of 1.4 – 3.5% [15]. The Danish cancer registry also evaluated the incidence rates of BCC and SCC and over a period of 30 years the incidence rates have raised between 3.1-4.6% per year [16]. Finally, a German study including data from 11 cancer registries over a period of 13 years, reported an annual increase of 3.3-11.6% for BCC and SCC [17]. The previous results from Iraqi Cancer Board (2011) show that the number of male patients (397) with skin cancers is higher than female patients (333) [18], But no giving information in detail. This research study for the first time in Kurdistan region north of Iraq estimates the characteristics of NMSC reported at Hiwa Hospital.

The aim of this research study was firstly, to identify the pattern of non-melanoma Skin cancer among skin cancer at Hiwa Hospital. Secondly, to identify the types of non-melanoma skin cancer which is treating at Hiwa Hospital. Thirdly, to find out the association between outdoor (equal and more than 4 hours sun exposer) and indoor

(less than 4 hours sun exposure) in non-melanoma skin cancer and control. Finally, to find out the association between socio-demographic status of the participants in non-melanoma skin cancer and control.

2. METHODS AND MATERIALS

A case control approach was used for the implementation of the study. We conducted a retrospective chart review of all non-melanoma skin cancer cases (Histo-pathologically confirmed) presenting between 2015 and 2016 at Hiwa hospital for cancer patients. Age-matched and gender-matched control group were selected by researchers from Baxshen hospital. The Patients' inclusion criteria were: All patients with a histopathologic diagnosis of squamous cell carcinoma (SCC) and basal cell carcinoma (BCC) between 2015 and 2016, confirmed by laboratory investigation from 1st of January 2015 till 31st of December 2016. Patients with unverified diagnosis, and patients with insufficient chart documentation were excluded. The sample size was 70 cases and 70 controls. The researcher contacted some of participants through the interview (face to face) or phone for obtaining the data needed which was not in file of cases. After obtaining consent from the participant, sociodemographic data and history of various exposures was collected using a structured interview questionnaire for cases clinical data was retrieved from the patient's hospital records under the supervision of the managing physician. No patient examination was conducted during this study. The questionnaire included: Socio-demographic status, risk factors related to non-melanoma skin cancer and anthropometric measurements which include the; Height, weight Body Mass Index (BMI) Formula BMI: weight (kg) / [height (m)]² Normal weight ranges: Body mass index (BMI). Underweight: BMI is less than 18.5. Normal weight: BMI is 18.5 to 24.9. Overweight: BMI is 25 to 29.9. Obese: BMI is 30 or more and smoking and alcohol habit. All data were coded and added to a Microsoft excel spread sheet. Data analysis was done by using the SPSS version 21.0. percentages were calculated to present group characteristics, Chi-square test was employed to assess the association between different variables, P value of 0.05 or less considered as statistical significant.

Ethical considerations: The researcher obtained the approval of the Ethics Committee of college of Medicine University of Sulaimani for conduction of the study and this complied with the international Ethical Research Guidelines. Informed consent was obtained from the participants and strict patient confidentiality was preserved. Oral consent was received from the participants before starting the interview.

3. RESULTS

Figure 1. Show all cancer cases were recorded from 1st January of 2015 to 31st December of 2016 in Sulaimani Hiwa hospital were 4345 cases and with a comparison between Non-melanoma cases were 100 (2.3%) cases,

other cancer skin cases were 255 (5.9%) cases and all other cancer cases were 3990 (91.8%) cases.

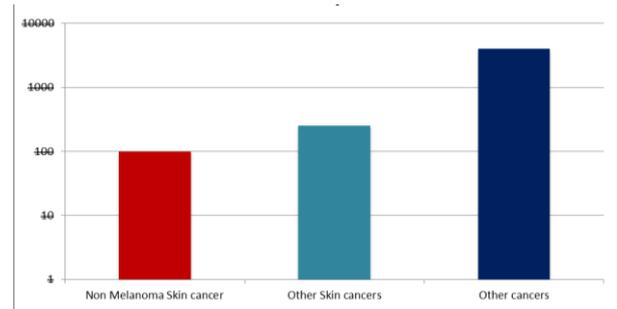


Figure 1. Registered cancer cases in the Hiwa hospital during (2015-2016).

Figure 2 Shows Percentage skin cancer cases at Hiwa hospital at 2016, were 197 skin cancer cases out of total cancer cases were 2338, which 8.4% was skin cancer cases of all cancer cases with comparing skin cancer cases in 2015 with 2016 show.

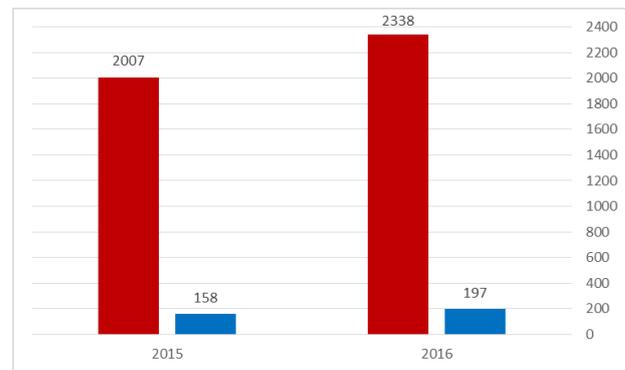


Figure 2: Compare in a percentage of skin cancer and total cancer in 2015 and 2016 at Hiwa hospital.

In this study, 45 (64%) of cases had squamous cell carcinoma and 25 (36%) had basal cell carcinoma in **Figure 3.**

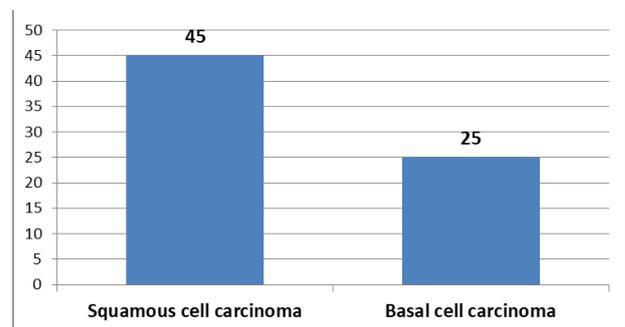


Figure 3: Types of non - melanoma skin cancer.

This figure 4 shows 44 (62.9%) of cases had a history of more than 4 hour exposure to sun in a day compared to 24 (34.3%) in control group, while the percentage of fewer than 4 hours exposure to the sun in case and control groups were subsequently 26 (37.1%) and 46 (65.7) with the P value of < 0.001.

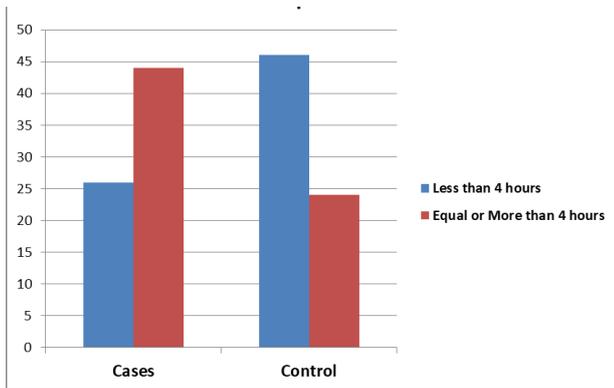


Figure 4: Comparison of cases and control regarding the time of exposure to the sun.

Table 1 Majority of the study participants were male 48 (68.6%) of cases and 47 (67.1%) of controls, there was no significant association regarding P value (0.86). most cases were between age 56-70 years old group 42.9% for cases and 40% for control, there was no significant association regarding P value (0.65). For the level of education, majority of cases were illiterate 39(55.7%) on the other hand, 31 (44.2%) had secondary or higher education level, there was a significant association regarding to P-value (0.002). Regarding occupations, most of cases and controls were jobless [26(37.1%), 22(31.4%)] respectively with a significant association regarding P value=0.019. Most of the participants in both case and control groups were married 65 (92.9%) and 68 (97.1%) subsequently, half of the cases group had sufficient and half had barely sufficient economic status in contrary to 6 (8.6%) of control group had sufficient economic status most of them were with barely sufficient 56 (80%) or insufficient at all 8 (11.4%) *p value <0.001*.

Table 1: Association between Socio- demographic in relation to cases and control.

Socio- demographic characteristics		Case	Control	P value
Gender	Male	48 (68.6%)	47 (67.1%)	0.86
	Female	22 (31.4%)	23 (32.9%)	
Age groups	26 - 40 Years	8 (11.4%)	8 (11.4%)	0.65
	41 - 55 Years	14 (20.0%)	20 (28.6%)	
	56 - 70 Years	30 (42.9%)	28 (40.0%)	
	> 70 Years	18 (25.7%)	14 (20.0%)	
Mean ± SD		61.0 ± 15.2	58.9 ± 16.0	0.44
Level of education	Illiterate	39 (55.7%)	22 (31.4%)	0.002
	Primary	19 (27.1%)	17 (24.3%)	
	Secondary	5 (7.1%)	18 (25.7%)	
	Institute	3 (4.3%)	1 (1.4%)	
	College or higher	4 (5.7%)	12 (17.1%)	
Marital status	Single	5 (7.1%)	1 (1.4%)	0.16

	Married	65 (92.9%)	68 (97.1%)	
	Widow	0 (0.0%)	1 (1.4%)	
Socio - economic status	Sufficient	35 (50.0%)	6 (8.6%)	< 0.001
	Barely sufficient	35 (50.0%)	56 (80.0%)	
	Insufficient	0 (0.0%)	8 (11.4%)	
Residency	Urban	45 (64.3%)	50 (71.4%)	0.34
	Semi-urban	21 (30.0%)	19 (27.1%)	
	Rural	4 (5.7%)	1 (1.4%)	
Occupation	Governmental	5 (7.1%)	14 (20.0%)	0.019
	Self employed	5 (7.1%)	0 (0.0%)	
	Retired	18 (25.7%)	12 (17.1%)	
	Jobless	26 (37.1%)	22 (31.4%)	
	Other	16 (22.9%)	22 (31.4%)	

Table 2 presents the distribution of participants, according to BMI in the study, as follows; 3 (4.3%) of cases and none of the controls were underweight; 36 (51.4%) of cases and 16 (22.9%) of controls were with normal weight; 20 (28.6%) of cases and 40 (57.1%) of controls were overweight; and finally, 11 (15.7%) of cases and 14 (20%) of controls were obese *p value = 0.001*. Majority of cases and controls were type O blood groups (cases 45.7%, control 51.4%), non-smokers (cases 72.9%, controls 81.4%) and not consume alcohol (cases 98.6%, control 98.6%). however, there was no statistically significant relation between non-melanoma skin cancer and the participant's blood group, alcohol consumption and their smoking status. The percentage of individuals who had the family history of skin cancer was significantly higher among case group (11.4%) compared with the control group (1.4%) *P value = 0.02*.

Table 2: Distribution of non-melanoma skin cancer cases and their controls according to risk factors.

Risk factors	Case	Control	P value	
The family history of skin cancer	Yes	8 (11.4%)	1 (1.4%)	0.02
	No	62 (88.6%)	69 (98.6%)	
Blood group	O (+ ve and - ve)	32 (45.7%)	36 (51.4%)	0.75
	A (+ ve and - ve)	21 (30.0%)	17 (24.3%)	
	B (+ ve and - ve)	11 (15.7%)	13 (18.6%)	
	AB (+ ve and - ve)	6 (8.6%)	4 (5.7%)	
Smoking	Yes	19 (27.1%)	13 (18.6%)	0.23
	No	51 (72.9%)	57 (81.4%)	
Body built	Underweight	3 (4.3%)	0 (200%)	0.001
	Normal	36 (51.4%)	16 (22.9%)	
	Overweight	20 (28.6%)	40 (57.1%)	
	Obese	11 (15.7%)	14 (20.0%)	
Mean (BMI) ± SD		25.3 ± 4.8	26.9 ± 3.5	0.02
Alcohol	Yes	1 (1.4%)	1 (1.4%)	1.00
	No	69 (98.6%)	69 (98.6%)	

4. DISCUSSION

Skin cancer at 2015 in Hiwa hospital were 158 cases out of total cancer 2007 cases but in 2016 were 197 cases out of total cancer cases were 2338 in Sulaimani city these results goes with A study done in Northern Ireland Cancer Registry [19] a study done in Germany from

1970 and 2012 to predict incidence until 2030 showed there is a continuous long-term increase of NMSC incidence and the current NMSC Increasing incidence rates in Germany is expected to double [20]. This study demonstrates that most of cancer were at old age were at highest in 56-70 years old group and more were in male than female, same results were found in studied don in Australian [21] and in Iran [22]. This is resulting from long and lifetime sun exposure in an increasingly aging population. In this study type of occupations had significant relation to skin non-melanoma cancer between case and control groups, same result found in studies which show outdoor workers are at more risk than indoor workers. [23] it related to daily work in outdoor and sunny environment or contact with the carcinogen without using protections and expose to carcinogenic chemicals during working can be main factors cause to the high rate of the cancer in males and in some type of occupations [24]. But in this study, did not demonstrate a significant relation for age and gender. Most of skin cancer cases in this study were Squamous cell carcinoma (SCC), it was found opposite results in other studies like (25) survey in UK and [26] a study in Canada, we did not find significant relation between smoking and non-melanin carcinoma; it might be related to type of sampling for choosing cases and control groups or need more cases and control other factors to get that result. Majority of skin cancer cases where in low-income occupations and there was a significant relation between occupations with cancer because most of low income occupations in this area were outdoor occupations like hand-workers, constructors, gardeners...etc. however, other study which was done in Denmark demonstrated opposite; skin cancer more in high-income occupations [27]. It might be related to safety of occupation and workers law in this area. Most of cases where in urban area than rural, it might be related to urban people were more expose to intermittent sun light and more doses than rural people. same results found in a study done in Denmark [27] study however our relation was not significant. Majority of cases where in low level of education and there was significant relation between education and skin cancer, other studies concluded that most of cases where in high education level like in Finland [28] and in Denmark [27]. This deference might be related to geographical area and other lifestyle factors like occupation, time of sun exposure, use of predictive equipment and sun blockers. Most of cancer cases were not take or drink alcohol and relation were not significant, it related to religion effect on our community which prohibit drinking alcohol. However, in cohort study found that drinking alcohol might increase risk to BCC but not SCC. [29] Skin cancer in this study were more in normal BMI people than obese people with significant relation, the same result was found in a study [30] done in US Caucasians concluded significant relation. Obesity not only risk factor for non-melanoma skin cancer there are many other well known risk factors that play important role like genotypic, phenotypic, environment, family history of skin cancer, certain skin colours, susceptibility to burn and light hair colour [27]. because obese compared with normal weight individuals are less active outdoor this lead to decreased levels of cumulative sun exposure

therefore lower risk of non-melanoma skin cancers as cumulative sun exposure is a major risk factor for the development of these cancers. Family history of skin cancer had significant role to skin cancer cases in this study and we found same result in [3] study. Certain genodermatoses increase the risk of both tumor types (xeroderma pigmentosum) and others of either SCC (epidermodysplasia verruciformis) or BCC (nevroid BCC syndrome) [32]. In this study majority of the cases were among O blood group this goes in contrast with a study (33) it might be related to percentage of this type of blood in our region which is most common type of blood groups. With non-significant relation but [3] study, demonstrate significant relation between non-melanoma skin cancer and ABO/Rh factors.

5. CONCLUSION

Skin cancer and cancer percentage where in increase pattern especially non-melanoma skin cancer. Most of non-melanoma skin cancers were squamous cell carcinoma. Sun exposure (outdoor) played significant role for non- melanoma skin cancer. Most of non-melanoma skin cancer cases were male, O blood group, between ages 56 to 70 years old, jobless or retired and illiterate with significant relation for level of education. Majority of cases had good income with significant relation to non-melanoma skin cancer. Majority of non-melanoma skin cancer cases were not drinking and not smoking cigarette. Majority of non-melanoma skin cancer were normal BMI people with significant relation with BMI.

REFERENCE

- [1] Trakatelli M, Ulrich C, Del Marmol V, Euvrard S, Stockfleth E, Abeni D. Epidemiology of nonmelanoma skin cancer (NMSC) in Europe: accurate and comparable data are needed for effective public health monitoring and interventions. *British Journal of Dermatology*. 1;156(s3):1-7.2007.
- [2] Leiter U, Keim U, Eigentler T, Katalinic A, Holleczek B, Martus P, et al. Incidence, mortality, and trends of nonmelanoma skin cancer in Germany. *Journal of Investigative Dermatology*. 1;137(9):1860-7. 2017.
- [3] Staples MP, Elwood M, Burton RC, Williams JL, Marks R, Giles GG. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Med J Aust*. 2;184(1):6-10. 2006.
- [4] Lomas A, Leonardi-Bee J, Bath-Hextall F. A systematic review of worldwide incidence of nonmelanoma skin cancer. *British Journal of Dermatology*. 1;166(5):1069-80. 2012
- [5] National Cancer Control Initiative. The 2002 national non-melanoma skin cancer survey. A report by the NCCI Non-melanoma skin cancer working groups. Melbourne: NCCI. 2003.
- [6] Asgari MM, Kiviat NB, Critchlow CW, Stern JE, Argenyi ZB, Raugi GJ, Berg D, Odland PB, Hawes SE, de Villiers EM. Detection of human papillomavirus DNA in cutaneous squamous cell carcinoma among immunocompetent individuals. *Journal of Investigative Dermatology*. 1;128(6):1409-17 2008.
- [7] Fabbrocini G, Triassi M, Mauriello MC, Torre G, Annunziata MC, De Vita V, Pastore F, D'Arco V, Monfrecola G. Epidemiology of skin cancer: role of some environmental factors. *Cancers*. 24;2(4):1980-9. 2010
- [8] Woolley T, Buettner PG, Lowe J. Predictors of sun protection in northern Australian men with a history of nonmelanoma skin cancer. *Preventive medicine*. 1;39(2):300-7 2004.
- [9] Parkin DM, Whelan SL, Ferlay J, Raymond L, Young J. Cancer incidence in five continents. Lyon (France): World Health Organization, International Agency for Research on

- Cancer.
- [10] Payette MJ, Whalen J, Grant-Kels JM. Nutrition and nonmelanoma skin cancers. *Clinics in dermatology*. 1;28(6):650-62. 2010
 - [11] Rubió-Casadevall J, Hernandez-Pujol AM, Ferreira-Santos MC, Morey-Esteve G, Vilardell L, Osca-Gelis G, et al. Trends in incidence and survival analysis in non-melanoma skin cancer from 1994 to 2012 in Girona, Spain: A population-based study. *Cancer epidemiology*. 1;45:6-10. 2016
 - [12] Katalinic A, Kunze U, Schäfer T. Epidemiology of cutaneous melanoma and non-melanoma skin cancer in Schleswig-Holstein, Germany: incidence, clinical subtypes, tumour stages and localization (epidemiology of skin cancer). *British Journal of Dermatology* 1;149(6):1200-6. 2003
 - [13] Rogers HW, Weinstock MA, Feldman SR, Coldiron BM. Incidence estimate of nonmelanoma skin cancer (keratinocyte carcinomas) in the US population, 2012. *JAMA dermatology*. 1;151(10):1081-6. 2015
 - [14] Rudolph C, Schnoor M, Eisemann N, Katalinic A. Incidence trends of nonmelanoma skin cancer in Germany from 1998 to 2010. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*. 1;13(8):788-97. 2015
 - [15] Brewster DH, Bhatti LA, Inglis JH, Nairn ER, Doherty VR. Recent trends in incidence of nonmelanoma skin cancers in the East of Scotland, 1992–2003. *British Journal of Dermatology*. 1;156(6):1295-300 2007.
 - [16] Birch-Johansen F, Jensen A, Mortensen L, Olesen AB, Kjær SK. Trends in the incidence of nonmelanoma skin cancer in Denmark 1978–2007: rapid incidence increase among young Danish women. *International journal of cancer*. 1;127(9):2190-8. 2010
 - [17] Rudolph C, Schnoor M, Eisemann N, Katalinic A. Incidence trends of nonmelanoma skin cancer in Germany from 1998 to 2010. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*. 1;13(8):788-97. 2015
 - [18] Ministry of Health, Iraqi Cancer Board, Results of Iraqi Cancer Registry 2011.
 - [19] Madan V, Lear JT, Szeimies RM. Non-melanoma skin cancer. *The Lancet*. 20;375(9715):673-85. 2010
 - [20] Rudolph C, Schnoor M, Eisemann N, Katalinic A. Incidence trends of nonmelanoma skin cancer in Germany from 1998 to 2010. *JDDG: Journal der Deutschen Dermatologischen Gesellschaft*. 1;13(8):788-97. 2015
 - [21] Richmond-Sinclair NM, Pandeya N, Ware RS, Neale RE, Williams GM, Van Der Pols JC, et al. Incidence of basal cell carcinoma multiplicity and detailed anatomic distribution: longitudinal study of an Australian population. *Journal of investigative dermatology*. 1;129(2):323-8. 2009
 - [22] Razi S, Enayatrads M, Mohammadian-Hafshejani A, Salehiniya H. The epidemiology of skin cancer and its trend in Iran. *International journal of preventive medicine*;6. . 2015
 - [23] Surdu S. Non-melanoma skin cancer: occupational risk from UV light and arsenic exposure. *Reviews on environmental health*. 1;29(3):255-65. 2014
 - [24] Mackie RM, Quinn AG. Non-Melanoma Skin Cancer and Other Epidermal Skin Tumours. *Rook's Textbook of Dermatology, Seventh Edition*.:1801-50. 2004
 - [25] Griffin LL, Ali FR, Lear JT. Non-melanoma skin cancer. *Clinical Medicine*. 1;16(1):62-5. 2016
 - [26] Demers AA, Nugent Z, Mihalciou C, Wiseman MC, Kliever EV. Trends of nonmelanoma skin cancer from 1960 through 2000 in a Canadian population. *Journal of the American Academy of Dermatology*. 1;53(2):320-8. 2005
 - [27] Steding-Jessen M, Birch-Johansen F, Jensen A, Schütz J, Kjær SK, Dalton SO. Socioeconomic status and non-melanoma skin cancer: a nationwide cohort study of incidence and survival in Denmark. *Cancer epidemiology*. 1;34(6):689-95. 2010
 - [28] De Kok IM, Van Lenthe FJ, Avendano M, Louwman M, Coebergh JW, Mackenbach JP. Childhood social class and cancer incidence: results of the globe study. *Social science & medicine*. 1;66(5):1131-9. 2008
 - [29] Jensen A, Birch-Johansen F, Olesen AB, Christensen J, Tjønneland A, Kjær SK. Intake of alcohol may modify the risk for non-melanoma skin cancer: results of a large Danish prospective cohort study. *Journal of Investigative Dermatology*. 1;132(12):2718-26. 2012
 - [30] Pothiwala S, Qureshi AA, Li Y, Han J. Obesity and the incidence of skin cancer in US Caucasians. *Cancer causes & control*. 1;23(5):717-26. 2012
 - [31] Nikolaou V, Stratigos AJ, Tsao H. Hereditary nonmelanoma skin cancer. *Seminars in cutaneous medicine and surgery*. *Frontline Medical Communications* (Vol. 31, No. 4, pp. 204-210). 2012
 - [32] Rass K, Reichrath J. UV damage and DNA repair in malignant melanoma and nonmelanoma skin cancer. In *Sunlight, Vitamin D and Skin Cancer* (pp. 162-178). Springer New York. 2008
 - [33] Xie J, Qureshi AA, Li Y, Han J. ABO blood group and incidence of skin cancer. *PLoS One*. 4;5(8):e11972. 2010
 - [34] Cihan YB, Baykan H, Kavuncuoglu E, Mutlu H, Kucukoglu MB, Ozyurt K, et al. Relationships between skin cancers and blood groups-link between non-melanomas and ABO/Rh factors. *Asian Pacific Journal of Cancer Prevention*.;14(7):4199-203. 2013.