



Skin Cancer and Soft-tissue Sarcoma Prevalence and Incidence Rate among the Population of Karbala, Iraq, 2008–2015

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Background: There is no restricted area free from cancer. Skin cancer and soft-tissue sarcoma (STS) are among many types of cancer that can develop among any population worldwide. Thus, it is important to follow-up these malignant diseases in Iraq cities for information about the epidemiological pattern of such types of cancer. **Methods:** Incidence rate, prevalence, and age-specific rate (ASR) for skin and STS were determined. The data about 143 positive cases of skin cancer and 38 patients with STS in Karbala, a city in Iraq, were collected for the past 8 years (2008-2015). **Results:** The prevalence and incidence rate were found higher for STS than for skin cancer, especially in males. In males with skin cancer, the ASR was greater than 10 per 100,000 of the population for the age range 50–85 years, whereas in females, it was for 40–85 + years over the period considered. Meanwhile, in males with STS, a higher ASR was shown for age range 55–85+ years, whereas it was for 65–74 years in females. **Conclusion:** The STS showed a higher prevalence and incidence rate than that skin cancer, especially in older males. Both types of malignant disease are considered among more serious types of cancer among the population of Karbala and people are under the progressive risk of such type of cancers.

Key words: Karbala, Iraq, prevalence, skin cancer, soft-tissue sarcoma

INTRODUCTION

Skin cancer and soft-tissue sarcoma (STS) are registered as less common cancer diseases compared with other high prevalence types worldwide. Skin cancer includes two main types, melanoma skin cancer (MSC) and non-MSC (NMSC) which both show an increasing incidence, especially in the past three decades.¹ According to the WHO estimate in 2015, there are 2–3 million cases of NMSC and 132,000 of MSC occurring globally each year, which they consider to be one in every three diagnosed cancer.² Although the mortality rate of skin cancer is stable or slightly decreased,¹ its increasing incidence with time make the mortality rate more expected to rise as noted in Canada.³ However, the incidence rate of the skin cancer was recently elevated in many of the Arab countries. In Bahrain, skin cancer accounted for 6.7% of all malignancies during the period between 1952 and 1999.⁴ This rise was also recorded in Egypt between 2002 and 2003⁵ and in the United Arab Emirates between 1981 and 1995.⁶

STS is considered a heterogeneous group of rare tumors that affect many of supporting extraskelatal tissues.^{7,8} Thus,

different types of soft tissue of the human body can be affected, predominantly in the lower extremities. Worldwide, the annual incidence of STS is around 30/million⁹ which represents 1% of all malignant tumors.^{9,10} According to a report in 2014, there were 12,000 new cases of STS in the USA with an estimated 4000 deaths.¹¹ The cancer is very common in old age and is mainly found in males.¹² Although several STS are benign, the malignant form is very dangerous due to its ability of metastasis to many of other organs such as liver and bone.¹¹

The present study was designed for investigation of the prevalence and incidence rate of skin cancer and STS in Karbala, an Iraqi city, during the past 8 years.

METHODS

An epidemiological study of skin cancer and STS in Karbala, which has 1,185,687 population count as estimated in 2015 was designed. Biopsy specimens from patients suspected to have cancer were collected by the surgeon during

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surgical operations. The collected tissues were examined by the histopathologist members of the Histopathology Department of Al Ammam AL-Hussein general teaching hospital of Karbala province from April 2008 to June 2015. Of 1766 (775 males and 991 females) suspected cases with skin cancer, 143 cases (81 males and 62 females) were positively confirmed. The age of positive cases with skin cancer ranged from 0 to more than 85 years for males and from 10 to more than 85 years for females. Of 365 patients who were suspected to have STS, 38 patients (22 males and 16 females) were positively confirmed. The age of positive cases with STS ranged from 5 to more than 85 years for males and from 0 to 69 years for females. All diagnostic specimens not confirmed positive were eliminated from the data of this survey.

Data analysis

All of the data about skin cancer and STC were analyzed according to the methods of an epidemiological assessment of the US 2000 standard population (Wyoming Department of Health, 2012). Skin cancer and STC prevalence, incidence, and age-specific rate (ASR) were calculated using the equations mentioned by the direct adjustment method of US 2000 standard population.

RESULTS

After analyzing the data of skin cancer and STS for 8 years, the prevalence rate was found higher for STS (3.2%) than for skin cancer (1.2%) among the population of Karbala city. The highest value of both diseases was noted in 2011 followed by high values for skin cancer in 2009, 2013, 2008, 2010, and 2014, respectively, and for STS in 2013, 2008, 2012, and 2014, respectively [Figure 1]. The prevalence and incidence rate of skin cancer and STS in males were higher than in females in most years of the survey. However, those

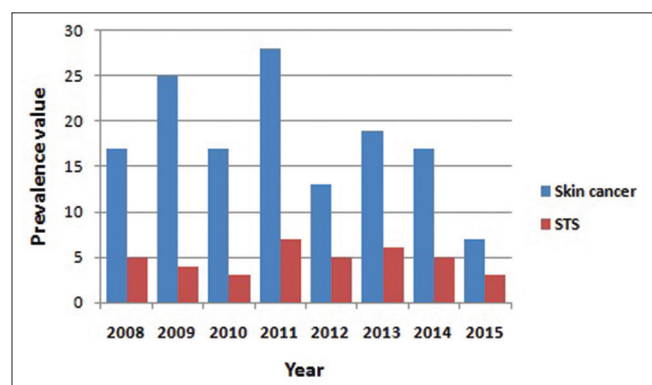


Figure 1: The total prevalence value of skin cancer and soft-tissue sarcoma during 8 years

cancers were more common in females than in males in some periods [Figures 2-4].

From Table 1, the ASR of skin cancer and STS was more than 10 per 100,000 of the population in many years of this survey. The high value of ASR among males with skin cancer in 2008 was observed for the age range 60–64 years and ≥ 85 years, whereas it was between 50–54 years and 65–69 years among females. In the 2nd year (2009), the ASR among males was found to be higher in age groups between 50–54 years and 75–79 years, whereas it was higher in groups aged 65–69 years and age more than 85 years among females. In the 3rd year (2010), the males with high ASR was revealed at the age range between 55–59 years and 80–84 years, whereas it was for the age range 70–74 years and more than 85 years among females. The ASR in 2011 of more than 10 per 100,000 of the population was higher in males among age range 55–59 years, whereas it was higher in females at the age range between 40–44 years and 75–79 years. In the 5th year (2012), the high value of ASR of skin cancer in males was shown between the age range 50–54 years and more than 85 years, whereas the ASR in all ages of females was less than 10 per 100,000 of population. In the 6th year (2013) of the survey, the males with high value of ASR of skin cancer were clearly shown at age group between 60–64 years and 80–84 years, whereas it was between 50–54 years and 55–59 years

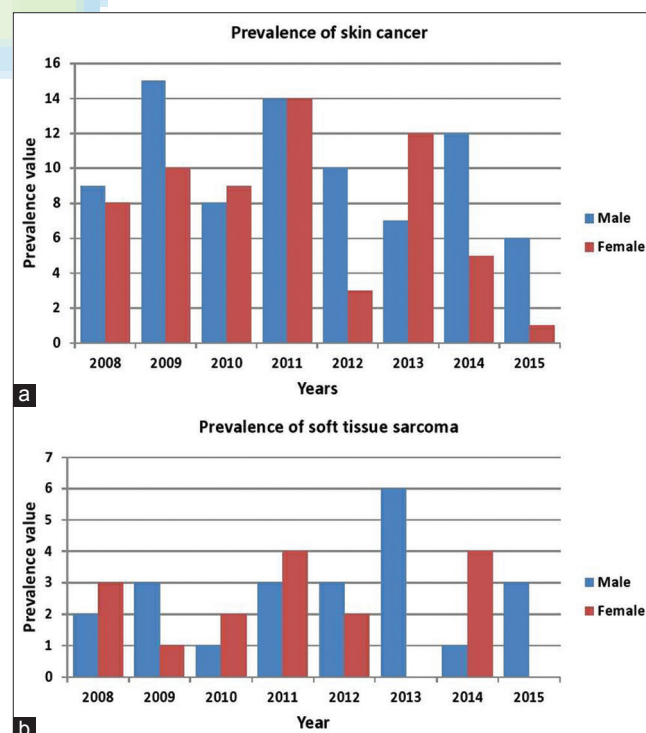


Figure 2: The prevalence value of skin cancer and soft-tissue sarcoma. (a) The prevalence of skin cancer. (b) The prevalence of soft-tissue sarcoma cancer

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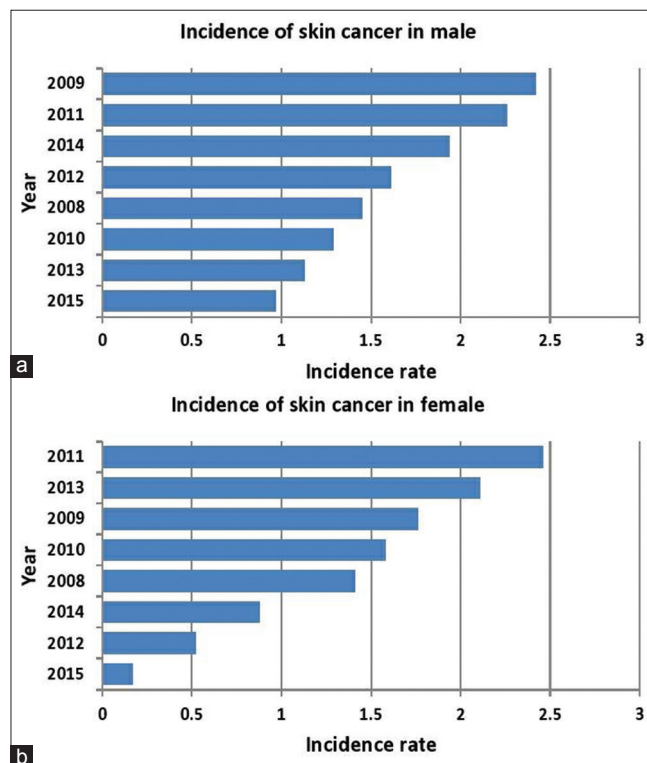


Figure 3: The incidence value of skin cancer. (a) The incidence of skin cancer in male. (b) The incidence of skin cancer in female

in females. The high ASR of males with skin cancer in 2014 was observed in more than one age group starting from 55 to 59 years to that of age more than 85 years, whereas it was higher in the age group 75–79 years of females. Meanwhile, the ASR of males during the last year (2015) of this survey was higher in the age range between 50–54 years and 70–74 years, whereas the ASR of females in the same year was less than 10 per 100,000 of population in all of the age groups.

The value of ASR of STS that was higher than 10/100,000 of population was observed in fewer years compared with that of skin cancer. The higher ASR of males with STS was shown at age range 55–59 years, ≥ 85 years, and 65–69 years in 2009, 2012, and 2013, respectively. Meanwhile, the ASR of females with STS was higher at age groups 65–69 years and 70–74 years in 2014 and 2009, respectively [Table 1].

DISCUSSION

Cancer disease is usually initiated after a mutation in the DNA sequence of the genes responsible for regulating cell growth, which leads to the continuous growth of affected cells.¹³ The mutation can occur in any cell of the human body, resulting in production of many different types of cancer diseases.

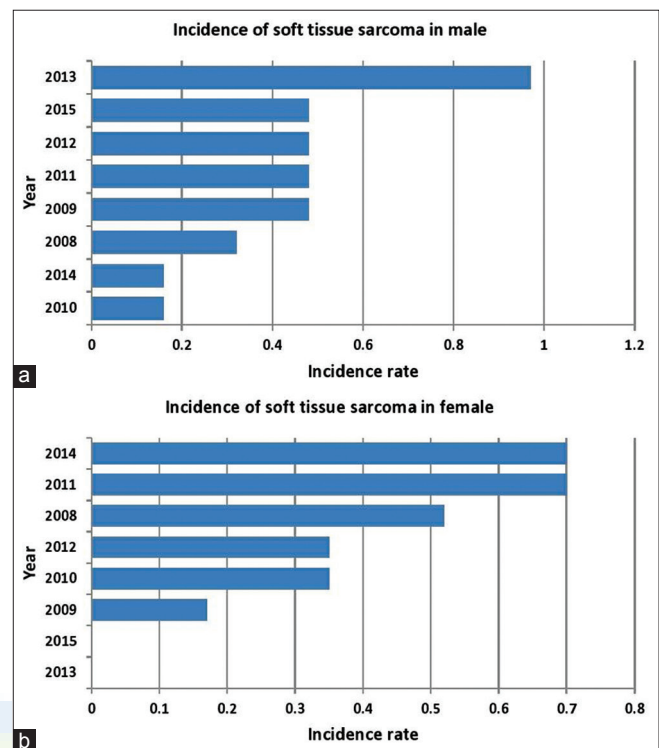


Figure 4: The incidence value of STS. (a) The incidence of soft-tissue sarcoma cancer in male. (b) The incidence of soft-tissue sarcoma cancer in female

Karbala city is a small province in Iraq. Histopathological specimens from all parts of the city were usually examined by the histopathological laboratory of Al Ammam AL-Hussein general teaching hospital located in the downtown of the city. High percentage of skin cancer (3.2%) and STS (1.2%) was found significantly higher among the city population during the past 8 years.

MSC and NMSC, which includes basal-cell (BCC) carcinoma and squamous cell carcinoma (SCC) are the most common types of cancer among a wide range of populations in the world.¹⁴ From NMSC, the BCC type has a higher incidence rate than SCC.^{15–17} In general, the mortality rate from MSC is higher than that of NMSC.^{14,18} This ratio was found to be strongly associated with skin color. The incidence and mortality rate of skin cancer among white-skinned people are usually greater than in dark-skinned individuals.^{14,18,19} Furthermore, SCC is considered the most common type of skin cancer in dark-skinned peoples.¹⁹ However, in the Mediterranean region as well as in the Arab area, skin cancer is regarded as a predominant tumor type.²⁰

Considering the worldwide high incidence rate of skin cancer, the Arab countries still have a lower level than in the Western world.¹⁶ Among Arab immigrants residing in the USA, the incidence rate of skin cancer showed 25% less skin melanoma than in non-Arab American peoples,²¹ but

Table 1: Age-specific rate of skin cancer and soft-tissue sarcoma during 8 years

Males				Females			
Cancer types	Year	Age range	ASR (100,000)	Cancer types	Year	Age range	ASR (100,000)
Skin cancer	2008	15-19	1.49	Skin cancer	2008	10-14	1.54
		40-44	3.24			35-39	3.05
		50-54	5.96			40-44	2.63
		55-59	7.70			50-54	15.53
		60-64	25.81			65-69	29.29
		70-74	22.74		2009	35-39	3.05
		85+	33.84			40-44	5.26
	2009	20-24	1.77			45-49	3.47
		30-34	2.04			50-54	5.17
		35-39	3.07			65-69	29.29
		40-44	6.48			70-74	23.25
		50-54	11.92			85+	79.80
		55-59	7.70		2010	15-19	1.73
		60-64	17.21			25-29	2.16
		65-69	44.15			35-39	3.05
		70-74	22.74			40-44	5.26
		75-79	37.05			60-64	8.51
	2010	30-34	4.09			70-74	46.50
		50-54	5.96			85+	39.90
		55-59	15.41		2011	10-14	1.54
		70-74	45.48			30-34	2.52
		80-84	34.63			35-39	6.10
	2011	0-4	4.84			40-44	13.17
		5-9	1.27			50-54	10.35
		20-24	1.77			70-74	23.25
		30-34	4.09			75-79	70.89
	2012	45-49	3.37			50-54	5.17
		55-59	15.41			55-59	7.00
		60-64	8.60			60-64	8.51
	2012	5-9	1.27		2013	10-14	1.54
		35-39	3.07			40-44	5.26
		40-44	3.24			45-49	6.95
		50-54	11.92			50-54	15.53
		60-64	8.60			55-59	21.02
		70-74	22.74			60-64	8.51
		75-79	74.10		2014	10-14	1.54
		85+	33.84			20-24	2.01
2013	2013	40-44	3.24			30-34	2.52
		50-54	5.96			35-39	3.05

Contd...

Table 1: Contd...

Males				Females						
Cancer types	Year	Age range	ASR (100,000)	Cancer types	Year	Age range	ASR (100,000)			
STO	2014	55-59	7.70	STO	2015	75-79	35.44			
		60-64	25.81			55-59	7.00			
		80-84	34.63							
		0-4	1.21							
		30-34	2.04							
		40-44	6.48							
		55-59	15.41							
		60-64	8.60							
		65-69	14.71							
		75-79	37.05							
		80-84	34.63							
		85+	33.84							
		2015	20-24			1.77				
			50-54			17.88				
			60-64			8.60				
	70-74		22.74							
	2008		40-44	3.24	STO	2008	25-29	2.16		
	2009	60-64	8.60	30-34			2.52			
		30-34	2.04	45-49			3.47			
	2010	55-59	15.41	2009			70-74	23.25		
		50-54	5.96	2010			45-49	3.47		
	2011	5-9	1.27	2011			60-64	8.51		
		20-24	1.77				15-19	1.73		
	2012	40-44	3.24	2012			35-39	3.05		
		45-49	3.37				40-44	2.63		
		60-64	8.60				50-54	5.17		
		85+	33.84				0-4	1.31		
		15-19	1.49				40-44	2.63		
	2013	30-34	4.09	2013			0	0		
		40-44	3.24				20-24	2.01		
60-64		8.60	35-39				3.05			
65-69		14.71	50-54		5.17					
35-39		3.07	65-69		14.64					
2015	15-19	2.98	2015	0	0					
	50-54	5.96								

ASR=Age-specific rate; STS=Soft-tissue sarcoma

even this low percentage is still higher than that found among people living in the Middle East.¹⁸ Saudi Arabia is among the majority of Arabian countries that register the incidence of skin cancer starting from 1983 until now.^{15,16} Furthermore, reporting on this malignant disease are many other Arab

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countries such as Egypt, Qatar, and Bahrain.^{4,5} In Iraq, the incidence rate of skin cancer in 2004 was estimated at 93,289 for the population of 25,374,691.²² This rate may be higher now if we take in considering that the incidence rate in only one small city (Karbala) of Iraq has increased as represented by the results of this study. The weather is almost hot and dry during all the long periods of the summer with a moderate temperature or very cold in winter. Most of the people work in this condition which increase the property to exposure to ultraviolet (UV) of the sunlight that responsible for the development of skin cancer.

Among males, the prevalence and incidence rate of skin cancer were higher than in females in most periods of the recent study. However, the same result was also reported by many studies in respect to the type of skin cancer and the patient's age.^{15,16} On the other hand, one previous study showed that MSC had a higher incidence in females compared with males, especially before the age of 40 years,¹⁸ whereas NMSC is rare in younger women.¹⁴

The ASR of skin cancer in many periods of this survey was very high in old age (≥ 70 years) as is recorded globally.¹⁵ This is similar to that found in Bahrain (more than 60 years), but lower ages were observed in other Arab countries such as in Egypt (mean age for basal cell carcinoma was 55.2 years and for squamous cell carcinoma was 57.9 years)⁵ and in Saudi Arabia (50 years).²³ However, the incidence rates of skin cancer in Arab countries are considered lower than those in developed countries.⁴

In general, the MSC usually affects people in middle age (up to 55 years),¹⁸ whereas most NMSC can develop in a wide range of ages (35–98 years)¹⁶ with the majority at ages over about 45 years.¹⁸

Skin cancer usually develops from one of two places in the human body. The first, especially for MSC, is from a common nevus which is characterized by slow progression.¹⁸ The second source is by metastasis from another carcinoma in the body as with breast carcinoma in women and oral cavity carcinoma in men.¹⁵ Recently, a study of the gene that encodes the HLA has suggested it has a role in the development of skin cancer.²⁴

There are many factors that cause skin cancer, including long exposure to sunlight or UV through increased outdoor activities or use of indoor tanning technique, change in clothing style, blood group, exposure to chemical carcinogens, ionizing radiation, viral carcinogens, scarring dermatoses, and in addition to the genetic and immune suppression in some cases.^{1,3,5,14,18,20} The WHO expected that a 10% decrease in ozone levels will annually add 300,000 NMSC and 4500 MSC cases.² Thus, the differences between Arab and expatriate population in genetic and ethnic background and reduction of exposure to sunlight, make the incidence of skin cancer in Arab regions lower than in other developed countries.⁴

The STS is a term referring to a wide range of malignant diseases in different extraskeletal tissues such as muscle, fascia, nerves, connective, fibrous, and fatty tissues.^{8,25} It has a benign character when it develops in most of these tissues.⁹ However, the WHO recognized fifty types of STS.²⁶ This large number of STS may develop anywhere in the body, but mainly in the limb or limb girdle or even in the abdomen.²⁷ Thus, the size of STS depends on the site of origin; a smaller size of tumor can be found on the head or neck, whereas a larger one can occur in the thigh and retroperitoneum.²⁷ Furthermore, the STS may metastasis to other organs at rates ranging from 25% to 30%.¹¹ This does not always occur, when approximately 60% of STS are locally restricted without dissemination.²⁸ Thus, the mortality rate of STS usually increased in proportion to the incidence rate as noted in The Netherlands between 1950 and 1988.²⁹ However, the increase of STS is affected by many factors, including changes in classification, coding, and diagnosis over time and instability of rates due to the small numbers.³⁰

Although the STS are considered a rare type of cancer, higher incidence is recorded in various regions of the world. Many developed countries reported that STS has gradually increased within the time. In the US, there were 18,525 newly diagnosed cases of STS as estimated between 1973 and 1987.³¹ The incidence rate of STS in Switzerland increased from 2.68 and 3.61/100,000 in 1974–1979 to 6.86 and 4.27 in 1990–1994 for males and females, respectively.³² In Ireland, the annual mean incidence rate of STS between 1994 and 2012 was 4.48/100,000 person-years.³³ On the other hand, the incidence of STS in developing countries such as Iraq revealed a significantly higher rate, which is estimated at 774 per 25,374,691 of the population according to the international database in 2004.³⁴ However, the prevalence and incidence rate of STS in Karbala city during the past 8 years was variable, but usually at high values which means it needs serious attention.

From our results, males with STS showed a higher prevalence than females. This fact is also recorded by many studies worldwide.^{7,25,29,30} Furthermore, the effect of gender on the incidence of STS is associated with the skin color. Black women have higher incidence rates than white women,³⁵ whereas there is no significant differences in age-standardized incidence rates between males and females in another study²⁸ with the possibility of change within the time.³⁶

The highest value of ASR of STS among the population of Karbala was observed among males at age not < 55 years and among females of more than 65 years. This result was also reported by many other studies, including that in Iraq, in which it was found that more than 65% of STS cases occurred in

people aged 50 years or more.^{28,36-38} Furthermore, the incidence rate of STS increased with high value in male aged 85 years and over.²⁵ In general, the STS can be found in any age of both genders, which means that children at age 0–14 years are also under the risk to develop STS as recorded in Russia when the highest age-specific incidence was observed in infants (1.76 per 100,000 children/year).³⁶

Recently, the incidence rate of STS rapidly increased as a result of the increase of Kaposi's sarcoma, caused by HHV-8, that is mainly associated with the high prevalence of HIV infection.²⁹⁻³¹ However, many other factors may play a role in the development of STS including genetics (e.g., retinoblastoma, Li-Fraumeni syndrome, Gardner's syndrome, and Werner's syndrome), environmental factors (e.g., chemical carcinogens), exposure to agriculture chemicals (e.g., arsenical pesticides, phenoxy herbicides, dioxin, vinyl chloride, chlorophenol-contaminated drinking water), irradiation, viral infection (e.g., herpes zoster, chicken pox, mumps), immune deficiency, prior injury (scars, burns), and chronic tissue irritation.^{8-10,30} High percentage of Karbala population work in agriculture areas and deals with several chemical materials that could be responsible for the development of STS.

In general, it is difficult to control the incidence of cancer diseases in any population of the world due to the widespread and different causative agents and risk factors. Primary detection of cancer development and increase the education level are the golden factors to limit the continuous worry about the progress of this disease and to eliminate it from the human body.³ For skin cancer, supplying better protection from sunlight and from other artificial sources of UV radiation is an important factor to reduce the development of this tumor.³ Whereas, the control of STS is practically more difficult than of other types of cancer due to the STS comprising many types of cancers. Better management could limit the incidence of STS or even reduce the prevalence rate. Thus, any suspicious lesion that has a size more than 5 cm should be histologically examined for the detection of STS.^{38,39} Furthermore, reducing exposure to the predisposing factors is also considered an essential measure that can be used to prevent the development of STS.

CONCLUSION

The STS showed a higher value of prevalence and incidence rate than skin cancer, especially in older males. Actually, it was found that both malignant diseases are considered among the more serious types of cancer among the population of Karbala and people are under the progressive risk of such types of cancer.

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Conflicts of interest

There are no conflicts of interest.

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