

Research Article

Thyroid Cancer Risk Factors and Early Detection Awareness among Umm Al-Qura University Medical Students

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ABSTRACT

Background: Thyroid carcinoma (TC) is the most prevalent head and neck cancer. Pre-clinical students lacked essential knowledge of thyroid cancer. Furthermore, clinical years medical students needed more awareness of thyroid screening and self-examination. Consequently, this study aims to identify the knowledge and understanding of thyroid cancer, among Umm Al-Qura University medical students in Saudi Arabia.

Methods: A cross-sectional study was conducted on undergraduate medical students in the third to sixth year of a medical college using an online questionnaire from April to June 2022.

Results: A survey of 297 medical students from the 3rd to 6th year found that 46.1% knew all early signs of thyroid cancer, while only 12.5% did not know any diagnostic tools. Most participants (74.4%) knew all desirable candidates for a thyroid cancer screen. 260 (87.5%) students answered positively that any unexplained lump or swelling could be an early sign of cancer. The gender of the participants had a significant correlation with many factors related to student knowledge of thyroid cancer, with gender having a substantial correlation with only two early signs. The student's grade point average (GPA) and academic year also had a significant correlation with many factors related to thyroid cancer knowledge.

Conclusion: Thyroid cancer prevalence can be reduced by increasing public awareness and knowledge of risk factors. Students' knowledge and participation in public education can lead to better results. In addition, increased public awareness about early signs of thyroid cancer can improve overall disease prognosis, morbidity, and mortality.

1. INTRODUCTION

Thyroid carcinoma (TC) is the most prevalent head and neck cancer (Siegel et al., 2016). Women are three times more likely than males to develop thyroid cancer (Alok Pathak et al., 2013). There is an increased risk of thyroid cancer after puberty and before menopause, indicating that female hormones influencing the development of thyroid cancer to a higher prevalence (A McTiernan, n.d.). Frequently, TC is identified during a physical examination without presenting any symptoms. In advanced TC, the clinical signs include palpable nodules, occasionally hoarseness, dyspnea, and lymph node metastasis (Cabanillas et al., 2016)). The occurrence of the TC is affected by different risk factors such as height,

weight, cold temperature, thyroid stimulating hormone levels, and genetic anomalies (Guignard et al., 2007; Xiao et al., 2019). In recent years, thyroid cancer incidence rates have increased, in the year 2020, it reaches 2833 new cases worldwide (884 in males, 1949 in females), an increment of 10.2% in both sexes'. For young Saudi women, it became the second most prevalent form of cancer, as incidence started to increase at the age 15 and 19 years and reached a peak for person between 60–64 years. which make TC with papillary thyroid carcinoma the most common malignant type in Saudi Arabia (Bazarbashi et al., 2017; *Saudi Arabia Source: Globocan Incidence, Mortality and Prevalence by Cancer Site*, 2018). Awareness of thyroid cancer is an essential factor that significantly impacts the incidence and outcomes of the disease. As future physicians, medical students play a

crucial role in public education. A better understanding of TC would enable them to promote public awareness better and provide more expert advice to persons with suspicious thyroid nodules. In a cross-sectional study conducted in Pakistan, the authors examined the knowledge and attitudes toward thyroid cancer and its risk factors among Pakistani university students. The study involved 3722 students majoring in medical and non-medical degree programs, and the results showed that overall knowledge and awareness need improvement (Iqbal et al., 2021). In another study conducted by P Liu et al. in Peking Union Medical College, the authors recruited participants with 274 effective responses. The study showed that pre-clinical students lacked essential information about thyroid cancer. Furthermore, clinical medical students needed more awareness of thyroid screening and self-examination (P. Liu et al., 2021). Unfortunately, the number of published articles regarding thyroid cancer awareness and knowledge is lacking, especially in Saudi Arabia. Therefore, this study aims to identify the knowledge and understanding of cancer, particularly thyroid cancer, among Umm Al-Qura University medical students in Saudi Arabia.

2. MATERIALS AND METHODS

This descriptive cross-sectional study is based on an electronic survey made by Google Forms. It was conducted between April 2022 and June 2022, after ethical approval was obtained from the Biomedical Ethics Committee at Umm Al-Qura University (UQU), College of Medicine, Makkah, KSA, with approval No. HAPO-02-K-012-2022-03-1028.

The total sample size was 297 medical students from the undergraduate level the 3rd to 6th academic year in 2022. The average number of targeted medical students was 1000. According to the sample size calculator, this study's minimum recommended sample size was 278, with a confidence interval level of 95%, a margin of error of 5%, and a response distribution of 50% (Raosoft, Inc.) We included medical students, males and females at UQU, and excluded students in a preparatory year, second year, and those who refused to participate. The questionnaire gathered general demographic information about the participants, such as sex, academic year level, and GPA. The subsequent section included a validated 32-question survey assessing knowledge (Iqbal et al., 2021), including eight questions assessing the risk factors of thyroid cancer, nine assessing general cancer-related warning signs, and eleven about people's opinions on which elements can increase a person's probability of getting cancer.

The obtained data were subjected to a Microsoft Office Excel spreadsheet for typographical error checking, and then the data were imported to SPSS version 26 for statistical analysis (Sullivan et al., 2009). The chi-square test was used to test the relationship between variables (Alok Pathak et al., 2013), and qualitative data were expressed as numbers and percentages. Quantitative data were expressed as mean and standard deviation (SD) to assess the

relationships between variables, and the Mann–Whitney and Kruskal–Wallis tests were used. Statistical significance was set at $p < 0.05$.

3. RESULTS

Two hundred ninety-seven medical students from the 3rd to 6th year at the Faculty of Medicine, Umm Al-Qura University, Saudi Arabia, responded and completed the questionnaire survey. This sample was divided into males ($n=143$) and females ($n=154$). Participants in this study were from different academic years 59 persons from the 3rd year, 97 from the 4th year, 66 from the 5th year, and 75 from the 6th year. Furthermore, they had different GPAs as well. From all participants, 172 students were categorized as above 3.5, 90 as between 3 and 3.5, 33 between 2.5 and 3, and only two were below 2.5, as shown in Table 1.

Table (1): Study sample distribution according to the demographic variables ($n=297$)

Variables	N	%	
Gender	Male	143	48.1
	Female	154	51.9
Academic Year	3rd year	59	19.9
	4th year	97	32.7
	5th year	66	22.2
	6th year	75	25.3
GPA (Grade point average)	below 2.5	2	.7
	between 2.5 and 3	33	11.1
	between 3 and 3.5	90	30.3
	Above 3.5	172	57.9

Students' knowledge of thyroid cancer was essential for this research, and 253 (85.2%) of the respondents knew that iodine was required for synthesizing thyroid hormones. In addition, 231 (77.8%) of the students participating in the study knew that thyroid function impacts the menstrual cycle. Out of the total, 271 (91.2%) knew that the female gender was most affected by thyroid dysfunction. About half of the participating student sample, 137 (46.1%) students, knew all the early signs of thyroid cancer. Knowledge of thyroid cancer diagnostic tools was also considered an essential parameter in our study. As shown in Table 2, we found that only 37 (12.5%) participants did not know any of diagnostic tools for thyroid cancer. But the most of the participants, 221 (74.4%), knew all the desirable candidates for a thyroid cancer screen.

Table (2): Student knowledge of thyroid cancer (n=297)

Student knowledge of thyroid cancer	Knowledge parameters	
	N	%
<i>Is Iodine required for the synthesis of thyroid hormones?</i>		
No	19	6.4
Neutral	25	8.4
Yes	253	85.2
<i>Does thyroid function impact the menstrual cycle</i>		
No	29	9.8
Don't know	37	12.5
Yes	231	77.8
<i>What is the gender most affected by Thyroid dysfunction</i>		
Male	26	8.8
Female	271	91.2
<i>What is the early sign of thyroid cancer?</i>		
A lump or swelling in your neck	84	28.3
Pain in your neck and sometimes in your ears	12	4.0
Difficulty swallowing	20	6.7
Difficulty breathing or constant wheezing	1	.3
Hoarseness that is not related to a cold	6	2.0
A cough that continues and is not related to a cold	2	.7
asymptomatic	35	11.8
All of the above	137	46.1
<i>What are the most common methods for screening for thyroid cancer</i>		
Neck palpation and thyroid ultrasonography	113	38.0
Blood smear	12	4.0
Biopsy	71	23.9
Hormonal level testing	64	21.5
Don't know	37	12.5
<i>Which of the following desirable candidates for a thyroid cancer screen</i>		
Old age	17	5.7
High radiation exposure	17	5.7
Family history of cancer (especially thyroid cancer)	42	14.1
All of the above	221	74.4

Table (3): Early signs of cancer according to student perception (n=297)

Early signs of cancer	Yes		I don't know		No	
	N	%	N	%	N	%
Unexplained lump or swelling could be a sign of cancer	260	87.5	26	8.8	11	3.7
Persistent unexplained pain could be a sign of cancer	137	46.1	80	26.9	80	26.9
Unexplained bleeding could be a sign of cancer	152	51.2	73	24.6	72	24.2
A persistent cough or hoarseness could be a sign of cancer	209	70.4	54	18.2	34	11.4
A persistent change in bowel or bladder habits could be a sign of cancer	152	51.2	81	27.3	64	21.5
Persistent difficulty swallowing could be a sign of cancer	227	76.4	36	12.1	34	11.4
A change in the appearance of a mole could be a sign of cancer	193	65.0	73	24.6	31	10.4
A sore that does not heal could be a sign of cancer	124	41.8	96	32.3	77	25.9
Unexplained weight loss could be a sign of cancer	256	86.2	27	9.1	14	4.7

According to the students' perceptions, early signs of cancer, in general, were assessed in this study, as shown in Table 3, 260 (87.5%) students answered positively that an unexplained lump or swelling could be a sign of cancer. In addition, 137 (46.1%) participants considered persistent unexplained pain a potential cancer sign. Unexplained bleeding and a constant change in bowel or bladder habits were early signs of cancer recognized by 152 (51.2%) participants. In contrast, persistent cough or hoarseness could be a thyroid cancer sign and was considered a warning sign by 209 (70.4%) participants. Moreover, 227 (76.4%) and 256 (86.2%) of the participants, considering persistent difficulty swallowing and weight loss was an early sign of cancer respectively.

Table 4 shows that the study participants' perception of a person's chance of developing cancer-based on common risk factors was also assessed with help of the Likert scale, as per the tool used in this study. The result showed that smoking was considered a potential risk factor for cancer by 154 (51.9%) participants.

In comparison, the contribution of passive smoking as a risk factor for developing cancer was strongly agreed upon by 63 (21.2%) participants. About 91 (30.6%) participants agreed that alcohol consumption was considered a risk factor for developing cancer. Also, food consumption can significantly affect the development of cancer,

13 (4.4%) considering eating less than five portions of fruit and vegetables a day could be a potential risk for developing cancer. About 22 (7.4%) participants strongly agreed that eating red or processed meat and junk food once or more daily could be a significant risk factor for developing cancer. Being overweight (BMI over 25) was also considered a risk factor for developing cancer and was strongly agreed upon by 26 (8.8%) participants. Another factor which could influencing the development of cancer is the age, Participants considering an age more than 70 years as high-risk factor for developing cancer and was strongly agreed upon by 89 (30%) participants. Familial history is also an important factor in cancer development, upon 125 (42.1%) participants agreed that person have close relative with cancer are more likely to also get cancer. Other important factors influencing the cancer development are the environmental condition and viral infection, in this context, getting sunburnt more than once as a child was considered a risk factor for developing cancer and was strongly agreed upon by only 29 (9.8%) participants. The infection with HPV (Human Papillomavirus) was considered a risk factor for developing cancer and was strongly agreed upon by 63 (21.2%) participants. Less physical activity is also a risk factor, about 5% of the participants (15) agreed that doing less than 30 minutes of moderate physical activity five times a week considered a risk factor for developing cancer

Table (4): Perception of students regarding a person's chance of developing cancer (n=297)

	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	N	%	N	%	N	%	N	%	N	%
factor can increase a person's chance of developing cancer										
Smoking any cigarettes at all	154	51.9	62	20.9	22	7.4	4	1.3	55	18.5
Exposure to another person's cigarette smoke	63	21.2	95	32.0	67	22.6	37	12.5	35	11.8
Drinking more than one unit of alcohol a day	91	30.6	75	25.3	65	21.9	29	9.8	37	12.5
Eating less than five portions of fruit and vegetables a day	13	4.4	35	11.8	96	32.3	103	34.7	50	16.8
Eating red or processed meat and junk food once a day or more	22	7.4	62	20.9	100	33.7	69	23.2	44	14.8
Being overweight (BMI over 25)	26	8.8	82	27.6	88	29.6	61	20.5	40	13.5
Getting sunburnt more than once as a child	29	9.8	64	21.5	101	34.0	58	19.5	45	15.2
Being over 70-year old	89	30.0	100	33.7	43	14.5	23	7.7	42	14.1
Having a close relative with cancer	125	42.1	86	29.0	22	7.4	18	6.1	46	15.5
Infection with HPV (Human Papillomavirus)	63	21.2	80	26.9	74	24.9	35	11.8	45	15.2
Doing less than 30 min of moderate physical activity five times a week	15	5.1	43	14.5	101	34.0	72	24.2	66	22.2

In this study, as shown in Table 5, the gender of the participants was found to have a significant correlation with students' knowledge of many factors related to thyroid cancer, as female students had higher knowledge than male students. In contrast, gender did not significantly correlate with knowledge of all factors that can increase a person's cancer risk. The student's GPA significantly

correlated with student knowledge of the many factors related to thyroid cancer, as students with higher GPA also had higher knowledge scores. In contrast, GPA did not significantly correlate with knowledge of all the factors that can increase a person's cancer risk. Regarding the academic year, 5th-year and 6th-year students had higher knowledge scores than 3rd- 4th year students.

Table (5): Correlation of factors influencing knowledge and perception towards the development of cancer and its warning signs (n=297)

Student knowledge of thyroid cancer	Gender	Academic Year	GPA
<i>Student knowledge of thyroid cancer</i>	0.11	0.02	0.24**
Does Iodine required for the synthesis of thyroid hormones			
Does thyroid function impact on the menstrual cycle	0.17**	0.20**	0.18**
What is the gender most affected by Thyroid dysfunction	0.25**	0.14*	0.15*
What is the early sign of thyroid cancer	0.07	0.02	-0.02
What is the most common methods for screening of thyroid cancer	-0.14*	-0.13*	-0.14*
Which of the following desirable candidate for a thyroid cancer screen	0.18**	0.02	0.08
<i>Early signs of cancer</i>			
Unexplained lump or swelling could be a sign of cancer	0.12*	-0.08	0.21**
Persistent unexplained pain could be a sign of cancer	-0.04	-0.02	-0.02
Unexplained bleeding could be a sign of cancer	0.08	0.03	0.03
A persistent cough or hoarseness could be a sign of cancer	0.09	-0.03	0.20**
A persistent change in bowel or bladder habits could be a sign of cancer	0.10	0.12*	0.09
Persistent difficulty swallowing could be a sign of cancer	0.05	0.01	0.11
A change in the appearance of a mole could be a sign of cancer	0.12*	0.09	0.06
A sore that does not heal could be a sign of cancer	0.02	0.06	0.00
Unexplained weight loss could be a sign of cancer	0.06	0.10	0.15*
<i>factor can increase a person's chance of developing cancer</i>			
Smoking any cigarettes at all	-0.02	-0.14*	0.09
Exposure to another person's cigarette smoke	-0.04	-0.11	0.09
Drinking more than one unit of alcohol a day	0.03	-0.12*	0.10
Eating less than five portions of fruit and vegetables a day	-0.11	-0.02	-0.07
Eating red or processed meat and junk food once a day or more	-0.04	-0.10	-0.01
Being overweight (BMI over 25)	-0.11	-0.08	0.00
Getting sun burnt more than once as a child	-0.03	-0.20**	0.01
Being over 70-year old	-0.04	-0.15*	0.10
Having a close relative with cancer	-0.03	-0.19*	0.09
Infection with HPV (Human Papilloma virus)	-0.03	-0.07	0.09
Doing less than 30 min of moderate physical activity five times a week	-0.07	-0.07	-0.02

** Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

4. DISCUSSION

Thyroid cancer is a prevalent and rapidly increasing endocrine cancer worldwide ("Cancer Incidence in Five Continents. Volume IX," 2008). Early studies identified many risk factors which can potentially lead to the development of thyroid cancer (Y. Liu et al., 2017). If we take these factors in consideration and follow preventive measures, this can reduce risk factors decrease the risk and incidence of developing cancer. Thus, it is essential to assess thyroid cancer knowledge, which may contribute to preventive screening, early diagnosis, and decreased mortality from thyroid cancer.

The knowledge of Umm Al-Qura University medical students about early signs, risk factors, and the effectiveness of thyroid cancer prevention was evaluated in this study and was found to be borderline overall. This result is consistent with a study conducted in Pakistan (Iqbal et al., 2021), where university students' knowledge was assessed and found to be poor overall and the student's academic year also significantly correlated with student knowledge of thyroid cancer, as the 5th-year and 6th-year students had higher knowledge scores. This finding explains the importance of education in improving medical students' knowledge.

In this study, 5.7% of the participants considered previous radiation exposure as a predisposing factor. This result is consistent with other studies conducted on those who survived the atomic bomb and those exposed to radiation in early life. The results of those studies imply that those people are significantly prone to developing thyroid cancer (Thompson et al., 1994). However, our result is different from the study conducted in Pakistan, where 25% of the study participant considered radiation exposure as a risk factor (Iqbal et al., 2021).

Thyroid cancer has a significant association with the female gender, with a ratio of 1:2.2 male to female, and this correlation was known to most of our study participants (Alok Pathak et al., 2013; L M Zuberi et al. J Pak Med Assoc, 2004). Furthermore, early publications defined thyroid gland illnesses commonly caused by iodine deficiency (Zimmermann & Galetti, 2015) as the major early sign of TC. This is also consistent with our study respondents recognized this as a major early sign more than three-quarters of the participants considered iodine vital for synthesizing thyroid hormones, which is consistent with the iodine knowledge found in other studies (Dal Maso et al., 2009; Iqbal et al., 2021; Shoichiro Tsugane.2013).

Regarding cancer in general, most students (87.5%) considered that unexplained lumps or swelling could be an early malignancy sign, followed by unexplained weight loss (86.2%). In comparison, 76.4% of the students considered persistent difficulty swallowing, 46.1% considered persistent unexplained pain, 51.2% considered unexplained bleeding, and 41.8% considered sore throats that cannot be healed. However, a study from Pakistan revealed that most students considered unexplained lumps or swelling to be early cancer signs, but with a lower percentage (58.6%), followed by unexplained

bleeding (51.8%). In comparison, 42.5% considered difficulty swallowing, 38.3% considered persistent unexplained pain, and 37.8% considered sore throats that cannot be healed (Iqbal et al., 2021).

More than 50% of participants believed that smoking poses a severe threat as a causative factor for cancer, which is consistent with numerous epidemiological studies that have shown a positive correlation between tobacco use and an increased risk of various cancer sites (Shoichiro Tsugane. 2013). In particular, a study examining the German population stated that tobacco use is the most significant and potentially modifiable risk factor for cancer in Germany. Furthermore, It has been found that up to 30% of cancer-related mortality in Germany is caused by tobacco use (Scherübl, 2021).

In this study, almost one-third of the participants strongly agreed that alcohol consumption is one of the hazards of getting cancer. However, a Mendelian randomization study in the United Kingdom found no evidence linking alcohol use to an increased possibility of cancer overall (Larsson et al., 2020). However, regarding to site-related cancer and alcohol consumption, men were found to have an increased risk of prostate cancer, both sexes had an increased risk of colorectal, central nervous system, pharynx, and mouth cancers. Furthermore, it was reported that alcohol consumption among former smokers and non-smokers may be inversely related to the risk of developing thyroid cancer. Interestingly, no link was found between alcohol use and the development of ovarian, endometrial, lung, or bladder cancers (de Menezes et al., 2013).

The increase in the prevalence of obesity-related cancers places obesity as a public health priority (Avgerinos et al., 2019). In this study, , almost 50% of participants disagreed that there was an association between cancer and obesity, in contrast to a study that found strong proof that being overweight raises the risk of getting cancer in at least 13 anatomic sites (Avgerinos et al., 2019).

4.1 Limitations of the Study:

Even though our questionnaire was short and simple to read, self-reported, web-based cross-sectional studies can have misconceptions that lower the quality and generalizability of the study's conclusions. Additionally, the design of this study leaves room for recollection bias.

5. CONCLUSION AND RECOMMENDATION

Thyroid cancer prevalence can be reduced by increasing public awareness and knowledge of risk factors. Students' knowledge and participation in public education can lead to better results. In addition, increased public awareness about early signs of thyroid cancer can improve overall disease prognosis, morbidity, and mortality. Also, more research is required throughout Saudi Arabia to determine the deficiencies in medical education and gauge public awareness.

AUTHOR CONTRIBUTION

The authors participated equally in each step of the research process.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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