Oncology
and Radiotherapy ©
Vol.15 Iss.6:4-9 • Case Report

Risk factors for thyroid cancer in women in Chaharmahal and Bakhtiari province

Masoud Amiri[1], Mohammad Hassan Lotfi[1], Hossein Fallahzadeh[1], Hassan Askarpour[2], Mehdi Naderi Lordjani[3]

[1]Department of Statistics and Epidemiology, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
[2]Department of Diseases, Deputy of Health, Yasouj University of Medical Sciences, Yasouj, Iran
[3]Department of Diseases, Deputy of Health, Shahrekord University of Medical Sciences, Shahrekord, Iran

SUMMARY

Introduction: Thyroid cancer is the most common type of endocrine cancer, which accounts for 1% of all cancers. This type of cancer has the highest mortality rate of all endocrine cancers. The aim of this study was to determine the risk factors for thyroid cancer in women in Chaharmahal and Bakhtiari province.

Methods: The present study was a retrospective and case-control study in which 115 thyroid cancer patients and 230 controls were matched in women of Chaharmahal and Bakhtiari province. Data were collected using a questionnaire and interviewed by the researcher. To analyze the data, Chi-square and logistic regression tests with odds ratio with 95% confidence were performed using SPSS v.22 software.

Results: The results showed that the two groups of case and control in terms of physical activity, history of thyroid cancer in second degree relatives, history of smoking and history of ocp pill use had no significant relationship with thyroid cancer ($p>0.05$). But there is a significant relationship between the history of thyroid cancer in first degree relatives, history of organ photography, history of chemotherapy or radiotherapy, history of thyroid disease, history of levothyroxine, low income, fast food consumption and red meat consumption They had thyroid cancer ($p<0.05$).

Conclusion: Low income, consumption of fast food, consumption of red meat, history of thyroid cancer in first degree relatives, history of organ photography, history of chemotherapy or radiotherapy, history of thyroid disease, history of levothyroxine from The most important predictor of thyroid cancer in this study was that it can be considered by educational and health planners to prevent this cancer and take appropriate intervention measures.

Key words: thyroid cancer, risk factor, Chaharmahal and Bakhtiari province

Address for correspondence:

Mohammad Hassan Lotfi, Department of Statistics and Epidemiology, Faculty of Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, email: medicalresearch79@yahoo.com

Word count: 4669 **Tables:** 04 **Figures:** 00 **References:** 35

Received: - 19 December 2020

Accepted: - 25 January, 2021

Published: - 12 February, 2021

INTRODUCTION

Cancer is one of the leading causes of death worldwide and its burden is increasing worldwide and has certain complexities and characteristics due to its multifactorial nature [1]. Today, cancer is a major health problem in many countries around the world. Cancer is currently the second leading cause of death in developed countries and the third leading cause of death in developing countries [2]. It is estimated that cancer deaths will reach more than 13.1 million worldwide by 2030 [1]. In Iran, cancer is the third leading cause of death after cardiovascular disease, accidents and incidents [3]. Although endocrine cancers are relatively uncommon, they may be one of the most important and potential cancers to treat [4]. Differentiated thyroid cancer is the most common type of endocrine cancer, 90% of which is papillary and follicular [5], which accounts for 1% of all cancers, and thyroid cancer is predicted to be the third most common cancer in women in 2019. Will be [6]. According to studies, the prevalence of this disease has increased globally in recent years, which is the largest annual increase in the United States due to the improvement of diagnostic technologies [6]. The prevalence of approximately 51% of all cancers in women, and about 2 percent in men [7]. In Iran, the prevalence of this cancer has been about 1.2 to 2.4 people per 100,000 people [8]. The prevalence of this cancer in women is almost 3 times higher than men [9]. The incidence of thyroid cancer worldwide is usually less than 3 per 100,000 in men and 5 per 100,000 in women [10,11]. Thyroid cancer is actually one of the 10 most common cancers in women in the world [12]. This type of cancer has the highest mortality of all other endocrine cancers [13]. Thyroid cancer accounts for 1.8% of all cancers and 76.1% of endocrine cancers. Iranian patients 43 years and an average age of female to male ratio was 1.8 to 1 [11]. The patients with age-standardized incidence 4.46 and 1.67 in the hundreds of thousands of women and men [14]. In 2019, it will be introduced as the third most common cancer in women with an age-appropriate incidence of 37 percent per year [15]. The incidence of thyroid cancer increases with age, but reaches a constant after the age the most common type of thyroid cancer of 50 [16]. Papillary thyroid cancer is and is three times more common in women than men [17]. Radon, urogenital, urinary tract infections, urinary incontinence (urinary incontinence) and urinary tract infections, especially iodine, play an important role in the pathogenesis of thyroid

cancer [18]. It also studies the relationship between family history of thyroid cancer, thyroid exposure to radiation in childhood obesity and TSH with thyroid cancer [19,21].

MATERIALS AND METHODS

Type of study

The study was retrospective and case-control. The case group consisted of people with thyroid cancer and the control group consisted of healthy people living in the area where the patient lived.

Statistical society

The study population consisted of 115 patients with thyroid cancer and 230 as controls. Participants were matched based on gender and location variables. In order to conduct the study, after performing the administrative steps and the researcher's commitment to the confidentiality of patients' information, the relevant information was extracted from the Cancer Registry Office of Chaharmahal and Bakhtiari Center.

Sample size

The required sample size considering the significance level of 0.05, test power 90% and according to cancer risk factors, the prevalence of thyroid cancer history factor in the control group is equal to 12% and in the case group 31%, the sample size with a total of 345 corrections (115 as cases and 230 as controls) were needed in total.

Sampling method

Sampling of patients was done by census using information related to the years 1995-98 of the Cancer Registry Office of Chaharmahal and Bakhtiari Health Center. Sampling in the control group was selected by easy sampling method from the samples available at the residence of the case group.

Inclusion criteria

Inclusion criteria included all women living in Chaharmahal and Bakhtiari province with thyroid cancer with definite diagnosis of cancer, healthy people living in patients' neighborhoods and matched in terms of age and sex variables (control group), willingness to cooperate in the study (study with Conscious satisfaction) and being a native of Chaharmahal and Bakhtiari province.

Exclusion criteria

Exclusion criteria included non-natives and any type of cancer in the control group.

Methods and tools of data collection

The data collection tool was a researcher-made checklist that was revised and compiled under the supervision of an epidemiologist. The questionnaire consisted of nine sections that after explaining the objectives of the study and obtaining informed consent, data collection was done using a combination of face-to-face or telephone interviews.

Information analysis method

After collecting the data, the information is entered into SPSS software. V.22 and was analyzed using Chi-square test and multiple logistic regression with the corresponding odds ratio and with a 95% confidence level, and finally the risk factors for thyroid cancer were determined.

Research ethics

The above article was approved by the ethics committee of Yazd University of Medical Sciences under the number IR.SSU.SPH.REC.1398.099.

RESULTS

345 people participated in this study. 115 people were selected as case and 230 people as control. In both groups, the highest frequency was related to the age group of 30-to 60 years (69.6% in the case group and 70.4% in the control group). The mean age and standard deviation of case and control groups were 51.69 ± 11.33 years and 50.82 ±11.68 years, respectively. The majority of cases and controls lived in the village (54.8%). The most common type of thyroid cancer is papillary type with 74%

Tab. 1. Records of risk factors in case and control groups

Variable		Case		Control		OR	CI 95%	p-value
		Number	Percentage	Number	Percentage			
History of thyroid cancer in first degree relatives	Yes	20	17.40%	12	5.20%	3.82	1.79-8.13	0.001
	No	95	82.60%	218	94.80%	1	--------	
History of thyroid cancer in 2nd degree relatives	Yes	14	12.20%	18	7.80%	1.63	0.78-3.41	0.19
	No	101	87.80%	212	92.20%	1	----------	
History of dental photography	Yes	47	40.90%	86	37.40%	1.15	0.73-1.86	0.53
	No	68	59.10%	144	62.60%	1	----------	
History of ultrasound	Yes	101	87.80%	182	79.10%	1.9	1-3.62	0.04
	No	14	12.20%	48	20.90%	1	--------	
Continuous physical activity	Yes, regular	14	12.20%	9	3.90%	1	---------	
	Yes sometimes	53	46.10%	163	70.90%	0.53	0.21-1.33	
	does not have	48	41.70%	58	25.20%	2.54	1.55-4.16	0.19
History of smoking	Yes	16	13.90%	24	10.40%	1.38	0.7-2.72	0.34
	No	99	86.10%	206	89.60%	1	---------	

and the lowest type of thyroid cancer is related to the medullary type with 3.42%. Most occupations in the case and control groups were related to being housewives.

According to Table 1, Chi-square test showed a significant difference between case and control groups in terms of history of thyroid cancer in first degree relatives ($p<0.05$). But was not observed in second degree relatives ($p>0.05$). Also, there was no significant difference between case and control groups in terms of history of dental photography, continuous physical activity and history of smoking ($p>0.05$). According to the table, a significant difference was observed between the case and control groups in terms of the history of sonography ($p<0.05$).

According to Table 2, there was a significant difference between case and control in terms of history of thyroid disease, stress, BMI, seafood consumption history and fruit and vegetable consumption history ($p<0.05$). Overall, stress is a strong factor in thyroid cancer. Consumption of fruits and vegetables is a protective factor against thyroid cancer. There was no relationship between case and control groups in terms of history of taking birth control pills ($p>0.05$).

Tab. 4.

The results of the regression model in Table 3 were the monthly income of individuals, so that the chance of getting the disease in people who earned less than one million was 11.01 times more than people who earned more than 2 million. People who ate fast food more often were 10 times more likely to get the disease The chance of getting the disease in people who always ate red meat was 10.39 times higher than people who did not eat red meat. The chance of developing thyroid cancer in people with a history of thyroid cancer in first-degree relatives was 3.40 times higher. Those with a history of organ photography were 2.50 times more likely to develop thyroid cancer. People with a history of chemotherapy or radiotherapy were 2.30 times more likely to develop thyroid cancer. The chance of getting the disease in people with a history of thyroid disease was 3.44 times higher

Tab. 2. Records of variables in case and control groups

Variable		Case		Control		OR	CI 95%	p-value
		Number	Percentage	Number	Percentage			
History of thyroid disease	Yes	54	47%	47	20.40%	3.44	2.11-5.60	0.001
	No	61	53%	183	79.60%	1	---------	
Having stress	I do not	11	9.60%	30	13%	1	--------	
	I rarely have	20	17.40%	58	25.20%	2.05	0.58-7.23	
	Sometimes I have	35	30.40%	60	26.10%	2.14	0.61-7.45	
	I have often	43	37.40%	77	33.50%	3.27	0.82-12.92	0.001
	I always have	6	5.20%	5	2.20%	3.48	0.95-12.65	
History of taking pills Ocp	Yes	79	68.70%	153	66.50%	1.1	0.68-1.80	
	No	34	31.30%	73	33.50%	1	----------	0.68
BMI	Under 18 (skinny)	4	3.50%	10	4.30%	1	----------	
	18-25 (normal)	29	25.20%	95	41.30%	1	----------	
	25-30 (overweight)	60	52.20%	74	32.20%	2.7	0.69-10.52	
	30-35 (first degree obesity)	17	14.80%	46	20%	3.2	0.88-12.11	
	35-40 (second degree obesity)	5	4.30%	25	2.20%	4.1	0.95-14.15	0.001
Seafood consumption history	Yes	70	60.90%	180	78.30%	0.85	0.91-5.70	
	No	45	39.10%	50	21.70%	1	--------	0.001
Consume fruits and vegetables	I do not drink at all	5	4.30%	8	3.50%	1	----------	
	I rarely consume	8	7%	10	4.30%	0.09	0.01-0.81	
	I take it sometimes	49	42.60%	33	14.30%	0.17	0.01-1.76	
	I consume often	52	45.20%	172	74.80%	0.22	0.02-2.45	0.01
	I always consume	1	0.90%	7	3%	0.47	0.05-3.92	

Tab. 3. Records of variables in case and control groups in terms of history of taking birth control pills

Variable		B	Wald	df	Sig	Adjusted OR	CI
Income	Under 1 million	2.39	66.24	1	0.001	11.01	5.20-23.27
	1 to 2 million	1.76	39.46	1	0.001	5.81	3.31-10.20
	More than 2 million	----	----	---	--	1	------
Consume fast food	I do not drink at all	---	----	----	---	1	-----
	I rarely consume	1.36	1.65	1	0.19	3.91	0.49-31.24
	I take it sometimes	1.84	4.89	1	0.08	6.3	0.75-52.5
	I consume often	2.3	4.8	1	0.02	10	1.27-78.27
	I always consume	----	----	---	---	---	----
Consume red meat	I do not drink at all	----	----	----	----	----	-----
	I rarely consume	0.75	0.48	1	0.48	2.11	0.25-17.59
	I take it sometimes	1.46	1.48	1	0.22	4.37	0.40-47.01
	I consume often	1.72	2.17	1	0.14	5.6	0.56-55.42
	I always consume	2.34	4.59	1	0.03	10.39	1.22-88.45

Tab. 4. Fits of logistic regression model between case and control groups

History of thyroid cancer in first degree relatives	1.26	1.69	1	0.01	3.4	0.45-47.30
History of organ photography	0.88	12.2	1	0.001	2.55	1.40-3.99
History of radiotherapy or chemotherapy	0.91	5.32	1	0.02	2.3	1.10-5.21
History of thyroid disease	1.23	24.83	1	0.001	3.44	2.15-5.70
History of taking levothyroxine	0.66	6.09	1	0.01	2.1	1.19-3.46
History of gestational diabetes	3.2	9.3	1	0.002	21.2	3.10-183.12

than in people without a history of thyroid disease. People with a history of levothyroxine were 2.10 times more likely to develop thyroid cancer. Those with a history of gestational diabetes were 21.20 times more likely than those who did not.

DISCUSSION

In our study, the mean age and standard deviation of the case and control groups were 51.6 ± 11.33 and 50.82 ± 11.68 years, respectively. Which is similar to the studies conducted in Kurdistan and the study of Bager Larijani et al [21,22]. This indicates that thyroid cancer mainly occurs over the age of 50 and is similar to other cancers that usually occur over the age of 50. In the present study, the history of thyroid cancer in first-degree relatives was higher in the case group than in the control group. In a case-control study by Seung-Kwon Myung et al [23] they had a 9.41 times higher chance of developing thyroid cancer and were also similar to the study by ASIF et al (OR=2.63, CI 1.41-4.88) [24] but different from the study by Oberman et al. [15]. Reasons for family history of thyroid cancer include genetic influences, diet, and similar socioeconomic status. In our study, the univariate analysis in about 55% of the income of 1 to 2 million in the control group, 61 percent more than two million are the results Asif et al [24] Approximately 70% of those earning below 2 million, and the results Our study was similar. Also, according to logistic regression analysis, those with low incomes were more likely to develop thyroid cancer and it was statistically significant. In this study, people who had a history of organ photography and a history of chemotherapy or radiotherapy, according to univariate analysis and logistic regression, had a higher chance of developing thyroid cancer. Introduced radiation exposure which was similar to the results of our study [25] it is also consistent with the results of the study of Asif et al. [24] and the study of Muzzy et al. [26] which introduced X-ray exposure as a risk factor for thyroid cancer and had a significant relationship with thyroid cancer. In another study, exposure to ionizing radiation, especially in childhood, was the highest risk factor for thyroid cancer. Therefore, one way to reduce thyroid cancer is to avoid ionizing radiation [27]. In the above study, based on univariate analysis, those who had a history of ultrasound were 1.9 times more likely to develop thyroid cancer, which has not been discussed in any of the studies and requires extensive research into the role of these factors in thyroid cancer in the future. According to the findings of this study, a history of thyroid disease had a positive relationship with the risk of thyroid cancer. Also, according to logistic regression, those who had a history of thyroid disease were 3.44 times more likely to develop thyroid cancer than those who had no history of it. There was an increased risk of thyroid cancer, which was consistent with the results of our study [26]. In other studies, the relative risk between thyroid cancer and benign thyroid disease was estimated to be 7.7, with a strong association between thyroid cancer and these diseases, and was similar to our study [28]. According to univariate analysis and logistic regression, having a history of levothyroxine with thyroid cancer was statistically significant. Thus, people with a history of levothyroxine were 2.10 times more likely to develop thyroid cancer than those without a history. In the study of Karkoubi et al. The history of levothyroxine use was significantly associated with the incidence of thyroid cancer (OR=4.78, p=0.002) and was associated with an increased incidence of thyroid cancer [21]. The results of other studies on the same subject are often the same. The study of Ratcliffe et al, Confirmed a significant association between thyroid cancer and levothyroxine use [29] and no study was found to be inconsistent with these results. Another risk factor in this study was having a history of stress. According to univariate analysis, those who were always stressed were 3.40 times more likely to develop thyroid cancer than those who were not stressed, which was statistically significant. The study of Asif et al. [24] According to logistic regression analysis, among the risk factors for thyroid cancer, the highest odds ratio was related to stress (OR=4.11, p=0.006) and was similar to the results of our study. Another risk factor in this study was a history of gestational diabetes, which according to logistic regression analysis, those who had a history of gestational diabetes were 21 times more likely to have thyroid cancer than those who did not, which was statistically significant. None of the studies discussed this variable, and we hope that useful studies on the importance of this variable in thyroid cancer in pregnant women will be conducted in the future. According to the results of the study, those who had a BMI greater than 35 were 4 times more likely to develop thyroid cancer according to univariate analysis, which was statistically significant. This finding, according to the results of a study by Kirkoubi et al. Has shown that obesity is associated with the incidence of thyroid cancer. Those who had a history of obesity had a 1.26 times higher chance of developing thyroid cancer, which was statistically significant [21]. The findings also show that in a meta-analysis of 32 studies of thyroid cancer, the relative risk of cancer increased by 5 RR=14.1 in men and RR=1.33 in women. [30]. According to the results of the study, those who had a history of eating seafood were less likely to develop thyroid cancer than those who did not eat seafood, which was statistically significant. A case-control study by Mac et al. In the United States found that high consumption of oysters at least several times a week in childhood reduced the risk of thyroid cancer (OR=0.2). One of the reasons that many seafood reduces thyroid cancer is the presence of iodine factors in these foods [31]. According to the results of the study, based on univariate analysis, those who always had a history of red meat consumption were more at risk of thyroid cancer and logistic regression showed that one of the important risk factors in our study was always red meat consumption. Those who always had a history of eating red meat were 10 times more likely to develop thyroid cancer than others, which was statistically significant. The study by Asif et al. [24] showed that eating red meat could increase the incidence of thyroid cancer, which was consistent with the results of our study. In another study, high

levels of nitrosamines in some meat products may increase the risk of thyroid cancer [32]. According to our study, according to univariate analysis, those who ate fast food most often had thyroid cancer more than other people, and also according to logistic regression analysis, one of the important risk factors for thyroid cancer was fast consumption. Who often ate fast food were 8.75 times more likely than other people to develop thyroid cancer, which was statistically significant. According to a case-control study by Galanti MR et al. the consumption of fast food was significantly associated with thyroid cancer, and people who consumed fast food more than 2 days a week had a 3.65 times higher risk of developing They have thyroid cancer, which is consistent with our study [33]. According to our study, according to univariate analysis, those who always ate vegetables and fruits had less thyroid cancer than other people, and the fruit and vegetables variable in our study was a protective factor, so that those who always ate vegetables and fruits Were less likely to develop thyroid cancer (OR=0.47, p=0.001). In a study similar to ours, people who ate a lot of vegetables showed a 20% reduced risk of thyroid cancer [34]. In a case-control study conducted by Memon et al. In Kuwait in 2002, there was no clear association between thyroid cancer and vegetables, which was contrary to our study [35].

CONCLUSION

Low income, consumption of fast food, consumption of red meat, history of thyroid cancer in first-degree relatives, history of organ photography, history of chemotherapy or radiotherapy, history of thyroid disease, history of levothyroxine and the most important Predisposing factors for thyroid cancer in this study could be considered by educational and health planners to prevent this cancer and take appropriate intervention measures.

CONFLICT OF INTEREST

In the above article, there was no conflict of interest between the authors.

ACKNOWLEDGMENTS

Special thanks and appreciation are due to Yazd and Shahrekord University of Medical Sciences for their comprehensive support in providing data and extracting information.

REFERENCES

1. Azizi F, Hatami H, Janghorbani M. Epidemiology and control of common diseases in Ira n. 3 th. Research Institute for endocrine sciences, shahid beheshti university of medical sciences: khosravy. 2010.
2. Zeinalzadeh AH, Hosseini R, Abdullahi L. Survey of epidemiology of cancers in the patients above 15 years old in east Azerbaijan province , Iran 2013. J Ardabil Univ Med Sci. 2015;15:46-55.
3. Mousavi SM, Gouya MM, Ramazani R, Davanlou M, Hajsadeghi N, et al. Cancer incidence and mortality in Iran. Ann Oncol. 2008;20:556-563.
4. Hajizadeh N, Pourhoseingholi MA, Baghestani A. Incidence rate of thyroid cancer in Iranian population, trend analysis from 2003 to 2009. Int J Epidemiol Res. 2015;2:12-17.
5. Nozhat Z, Azizi F, Hedayati M. A review on molecular biomarkers of thyroid carcinoma. J Mazandaran Univ Med Sci. 2015;25:154-170.
6. Fiore M, Oliveri Conti G, Caltabiano R, Buffone A, Zuccarello P, Cormaci L, et al. Role of emerging environmental risk factors in thyroid cancer: a brief review. Int J Environ Res Public Health . 2019;16:1185.
7. Patel KN, Shaha AR. Poorly differentiated and anaplastic thyroid cancer. Cancer control. 2006;13:119-128.
8. Nasseri K, Mills PK, Allan M. Cancer incidence in the Middle Eastern population of California, 1988-2004. Asian Pac J Cancer Prev. 2007;8:405-411.
9. Rahbari R, Zhang L, Kebebew E. Thyroid cancer gender disparity. Future Oncol. 2010;6(11):1771-1779.
10. Ferlay J BF, Steliarova-Foucher E, Forman D. Cancer incidence in five continents, CI5plus. IARC CancerBase No. 9th. Lyon. International Agency for Research on Cancer. 2014.
11. Larijani B AS, Haghpanah V, Mosavi-Jarrahi A, Bastanhagh M. Review of thyroid cancer in Iran. Aust-Asian J Cancer. 2005;4:199-203.
12. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer. 2015;136:E359-E386.
13. Wartofsky L. Increasing world incidence of thyroid cancer: increased detection or higher radiation exposure? Hormones. 2010;9:103-108.
14. Brito JP, Davies L. Is there really an increased incidence of thyroid cancer? Curr Opin Endocrinol Diabetes Obes. 2014;21:405-408.
15. Oberman B, Khaku A, Camacho F, Goldenberg D. Relationship between obesity, diabetes and the risk of thyroid cancer. Am J Otolaryngol. 2015;36:535-541.
16. Davies L, Welch HG. Increasing incidence of thyroid cancer in the United States, 1973-2002. JAMA. 2006;295:2164-2167.
17. Mulla ZD, Margo CE. Primary malignancies of the thyroid: epidemiologic analysis of the Florida Cancer Data System registry. Ann Epidemiol. 2000;10:24-30.
18. Salabe G. Aetiology of thyroid cancer: an epidemiological overview. Thyroidol. 1994;6:11-19.
19. Ma J, Huang M, Wang L, Ye W, Tong Y, Wang H. Obesity and risk of thyroid cancer: evidence from a meta-analysis of 21 observational studies. Med Sci Monit: Int Med J Exp Clin Res. 2015;21:283-291.
20. Hong K-S, Son J-W, Ryu OH, Choi M-G, Hong JY, Lee SJ. Cardiac effects of thyrotropin oversuppression with levothyroxine in young women with differentiated thyroid cancer. Int. J. Endocrinol. 2016;2016.
21. Karkoobi Y, Moradi G, Sharifi P, Ghafoori S. Assessment of thyroid cancer risk factors in Kurdistan province. Sci. J. Kurdistan Univ. Med. Sci. 2018;23:10-18.
22. Larijani B, Aghakhani S, Khajeh-Dini H, Baradar-Jalili R. Clinico-pathological features of thyroid cancer as observed in five referral hospitals in Iran. Acta Oncol. 2003;42:334-337.
23. Myung S-K, Lee CW, Lee J, Kim J, Kim HS. Risk factors for thyroid cancer: a hospital-based case-control study in Korean adults. Cancer Res Treat: J Korean Cancer Assoc. 2017;49:70-78.
24. Asif F, Ahmad MR, Majid A. Risk factors for thyroid cancer in females using a logit model in Lahore, Pakistan. Asian Pac J Cancer Prev. 2015;16:6243-6247.
25. Khodamoradi F, Ghoncheh M, Mehri A, Hassanipour S, Salehiniya H. Incidence, mortality, and risk factors of thyroid cancer in the world: a review. World J. Cancer Res. 2018;5:9.
26. Moazezi Z, Mahmoudi M, Yahyahpour Y, Alaleh A. Risk factors of thyroid cancer in Babol, Northern Iran. Caspian J Intern Med. 2011;2:171-177.
27. Dal Maso L, Bosetti C, La Vecchia C, Franceschi S. Risk factors for thyroid cancer: an epidemiological review focused on nutritional factors. Cancer Causes Control. 2009; 20: 75-86.
28. Mack WJ, Preston-Martin S, Bernstein L, Qian D, Xiany M. Reproductive and hormonal risk factors for thyroid cancer in los angeles county females. Cancer Epidemiol, Biomarkers Prev .1999; 8: 991-997.
29. Cornelli U, Belcaro G, Recchia M, Finco A. Levothyroxine and lung cancer in females: the importance of oxidative stress. Reprod Biol Endocrinol 2013; 11: 75.
30. Renehan AG, Tyson M, Egger M, Heller RF, Zwahlen M. Body-mass index and incidence of cancer: a systematic review and meta-analysis of prospective observational studies. Lancet .2008; 371: 569-578.

31. Mack WJ, Preston-Martin S, Bernstein L, Qian D. Lifestyle and other risk factors for thyroid cancer in Los Angeles County females. Ann Epidemiol .2002; 12: 395-401.

32. Allen NE, Appleby PN, Key TJ, Bueno-de-Mesquita HB, et al. Macronutrient intake and risk of urothelial cell carcinoma in the European prospective investigation into cancer and nutrition. Int J Cancer . 2013; 132: 635-644.

33. Galanti MR, Hansson L, Bergström R, et al (1997). Diet and the risk of papillary and follicular thyroid carcinoma: a population-based case-control study in Sweden and Norway. Cancer Causes Control, 8, 205-214.

34. Paes JE, Hua K, Nagy R, Kloos RT, Jarjoura D, Ringel MD. The relationship between body mass index and thyroid cancer pathology features and outcomes: a clinicopathological cohort study. J Clin Endocrinol Metab. 2010; 95: 4244-4250

35. Memon A, Varghese A, Suresh A. Benign thyroid disease and dietary factors in thyroid cancer: a case-control study in Kuwait. Br J Cancer. 2002; 86: 1745-1750.