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LYMPHOMA: EXPLORING AWARENESS IN LEBANON

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Abstract

In 2012, 14.1 million patients were diagnosed with cancer worldwide of which 385,700 estimated new cases of non-Hodgkin lymphoma (NHL). Also, 81,080 new cases of lymphoma were reported in the United States (US) among both genders in 2016. In Lebanon, Lymphoma represents the fifth most frequent cancer, nonetheless, little is known regarding its epidemiological attributes. This study aims to determine the current knowledge of the Lebanese people living in Lebanon about Lymphoma. About 400 participants were approached in public places, universities, hospitals or work places in different regions across Lebanon. A survey including questions about lymph nodes, cancer and lymphoma as well as demographic characteristics was given to all eligible participants. The data was collected and analyzed using SPSS and p value < 0.05 was considered significant. When asked about the types of cancers they knew, the majority of participants (93.5%) were able to identify breast cancer, while less than half of (30.67%) identified lymphoma as a cancer. Enlargement of the lymph nodes (LN) was the most common recognized symptom (93.4%) whereas 76.42% thought that family history of lymphoma was the most frequent risk factor for lymphoma. Among those who claim to know about lymphoma (30%), true in-depth knowledge about lymphoma was still lacking. The results of this independently conducted survey reveal the lack of awareness about lymphomas among the Lebanese population and highlight the need for campaigns to increase the knowledge and awareness.

Keywords

Awareness, Lymphoma, Cancer, Lebanon

Authors

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LYMPHOMA: EXPLORING AWARENESS IN LEBANON

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ABSTRACT: *In 2012, 14.1 million patients were diagnosed with cancer worldwide of which 385,700 estimated new cases of non-Hodgkin lymphoma (NHL). Also, 81,080 new cases of lymphoma were reported in the United States (US) among both genders in 2016. In Lebanon, Lymphoma represents the fifth most frequent cancer, nonetheless, little is known regarding its epidemiological attributes. This study aims to determine the current knowledge of the Lebanese people living in Lebanon about Lymphoma. About 400 participants were approached in public places, universities, hospitals or work places in different regions across Lebanon. A survey including questions about lymph nodes, cancer and lymphoma as well as demographic characteristics was given to all eligible participants. The data was collected and analyzed using SPSS and p value < 0.05 was considered significant. When asked about the types of cancers they knew, the majority of participants (93.5%) were able to identify breast cancer, while less than half of (30.67%) identified lymphoma as a cancer. Enlargement of the lymph nodes (LN) was the most common recognized symptom (93.4%) whereas 76.42% thought that family history of lymphoma was the most frequent risk factor for lymphoma. Among those who claim to know about lymphoma (30%), true in-depth knowledge about lymphoma was still lacking. The results of this independently conducted survey reveal the lack of awareness about lymphomas among the Lebanese population and highlight the need for campaigns to increase the knowledge and awareness.*

KEYWORDS: Awareness, Lymphoma, Cancer, Lebanon

1. INTRODUCTION

Despite all the progress in the diagnostic and therapeutic arsenal against cancer, lymphoma is still considered a worldwide life threatening disease as reported by the European Lymphoma Institute (The European Lymphoma Institute, 2017).

Lymphoma is a type of cancer that affects different cells within the immune system, and is classified as either Hodgkin [HL] or non-Hodgkin [NH] lymphoma (Chan, Alexandre, & Gary, 2014). The latter, however, is much more common than Hodgkin lymphoma accounting for about 90% of all lymphomas (Shankland, Armitage, & Hank, 2012).

According to World Cancer Research Fund International in 2012, lymphoma was considered to be the 8th most common cancer worldwide among males and the 10th most common cancer among females, yet in 2017, as stated by the American Cancer Society, it was found to be the seventh-most common cancer among both males and females (American Cancer Society, 2017). In fact, lymphoma's incidence is globally increasing in such a way that every 90 seconds someone is diagnosed with NHL (Roche Survey, 2017).

As for Lebanon, about 600-700 cases of Hodgkin and NHL are diagnosed yearly (Sader-Ghora et al, 2014). Despite this fact, NHL was not considered among the most-reported cancers in Lebanon, until 2008 when it recorded 14.1 and 11.6 per 100000 incidence rates among males and females respectively, with expectations of increasing incidence rates (Shamseddine et al, 2014). A retrospective study of lymphoma cases diagnosed from 2008 till 2012 at Hotel-Dieu de France University Hospital was conducted to assess the distribution of lymphoma.

The results concluded that the Lebanese patients had unique features and characteristics when compared to other countries where Hodgkin Lymphoma was more frequent than other European and American countries (Sader-

Ghorra et al, 2014). Epstein Bar Virus (EBV) infection along with other etiologies may explain the higher prevalence of HL and NHL among Eastern countries as suggested by a study conducted in Lebanon between 2010 and 2014 (Aftimos et al, 2018).

Although many researchers have attempted to spread knowledge and awareness among general population about cancer and particularly breast cancer (Fink, 1989), little is done for lymphoma among the population and general practitioners as revealed by the conducted Roche survey (2017). In fact, the probability of misdiagnosing lymphoma has increased. The lack of awareness on signs and symptoms of lymphoma has driven diagnosis to become challenging (Lymphoma Coalition, 2012). “Increasing the level of education and awareness of lymphoma is crucial implying that the delay in diagnosis is down to poor general public knowledge concerning lymphomas and would influence the effectiveness of treatment” as quoted by Dr. Sehn (Lymphoma Coalition, 2012).

The aim of this study is to investigate the extent of knowledge and awareness about lymphoma among the general population in Lebanon.

2. METHODS AND MATERIALS

A cross-sectional questionnaire based study was conducted among the Lebanese population to assess the level of awareness about lymphoma. Institutional Review Board (IRB) approval was acquired from Beirut Arab University (2017H-0060-M-R-0228). A simple random sampling technique was applied to distribute the questionnaire to about 400 eligible participants. Any Lebanese person that was 18 years old or above was considered eligible to participate in the study. The participants were approached randomly in healthcare clinics, universities, places of work and public places. After being informed about the purpose of the research, each participant signed an informed consent; the latter assured the confidentiality and anonymity of the personal data.

Thus, a 10 minute-questionnaire including 20 questions was administered to participants. The questionnaire is divided into 2 parts; the first related to participant’s demographic characteristics (age, gender, educational level, occupation, family history of cancer and smoking status). The other part included questions to assess the level of knowledge of participants on lymphatic system (general knowledge), cancer (causes, risk factors, types and screening test), and lymphoma specifically.

To assess the level of knowledge about lymphoma (11 questions), one point was given to correct answers and zero to wrong answers. Total scores thus ranged from 1 to 11. Thus, lymphoma knowledge scores were categorized as “not at all aware” (1-2points), “slightly aware” (3-4 points), “somewhat aware” (5-6), “moderately aware” (7-8), and “extremely aware” (9 and above).

The questionnaire was made by research team by referring to “Know Your Nodes” survey conducted by Lymphoma Canada, Cancer Awareness Measure (CAM) survey and Lymphoma European Roche survey. Thereafter, it was reviewed by a pathologist and hematologist for accuracy and validity. It was then pre-tested twice for validation.

The first pilot study was conducted on 11 participants in order to value the feasibility and test the adequacy of the survey; also to test the length of the interview and familiarize the investigators in the process of data collection. The comments were related to the order, wording and ambiguity of some questions.

The final version was written in English and then translated to the native language Arabic. The second pilot study was conducted on 22 participants after modifying the questionnaire. The feedback remarks were considered and adjusted. The developments turned up to be fulfilling the purpose of research.

3. RESULTS

3.1. Socio-Demographic Characteristics

A total of 401 complete surveys were recruited. 61.8% of the participants were females and 38.2% were males; the highest age frequency was between 18 and 27 (65.3%) with a mean age of the sample is 29.33 years (SD=13.051). Moreover, the level of education among the participants was as follows: almost half of the participants were undergraduates (47.9%), one third of them were post-graduate (33.7 %), about 10% were school educated (10.7%), 6.2% were in technical institutes, and lastly 1.5% were non-educated. Likewise, 44% of participants were employed with majority working in non-medical fields. 38.4% were smokers and 61.6% were non-smokers. Finally, concerning family history of cancer only 37.2% had positive family history of cancer (Table 1).

Table 1: Demographical features of the participants

Reference: Authors and statistician

Total participants (N=401)		Percentage (%)
Gender(n) %		
a)	Male (n= 153)	38.2%
b)	Female (n=248)	61.8%
Age		
a)	18-27 (n=262)	65.3%
b)	28-37 (n=45)	11.2%
c)	38-47 (n=43)	10.7%
d)	48-57 (n=30)	7.5%
e)	>58 (n=21)	5.2%
Education		
a)	Non-educated (n=6)	1.4%
b)	School (n=43)	10.7%
c)	Undergraduate (n=192)	47.8%
d)	Postgraduate (n=135)	33.6%
e)	Institutional (n=25)	6.2%
Occupation		
a)	Medical (n=29)	7.2%
b)	Non-medical (n=148)	36.9%
c)	None (n=224)	55.8%
Family history of cancer		
a)	YES (n=149)	37.2%
b)	NO (n=252)	62.8%
Smoking status		
a)	YES (n=154)	38.4%
b)	NO (n=247)	61.6%

3.2. Lymph Node Knowledge

The knowledge of the participants about their immune system in association with their level of education and occupation was analyzed using Pearson chi square test. The results showed that the answer to the definition of lymph nodes is significantly related to the participants' occupation ($P=0.006$) while no association was related to their level of education was observed ($P=0.095$). Participants working in the medical field had higher accurate response to lymph nodes being part of the immune system (75.9% (22 correct answers from 29)).

When asking about the most common site of lymph nodes in the body, the "neck" was mostly answered by both medical and non-medical related occupation participants (51.7% and 43.2% respectively), followed by "armpit" (44.8% and 24.3 % respectively), and lastly "anywhere" in the body (31% and 25%).

As for the question related to the cause of enlarged lymph nodes, significant number of the participants working in the medical field answered "infection" (72.4%) compared to the participant in the non-medical field (39.9%) ($P=0.006$).

Similarly, with respect to the level of education, undergraduate participants mainly answered "infection" to be the cause (57.3%) ($P=0.021$), followed by postgraduates (40.7%), technical (44%), school-level (32.6%) and non-educated (33.3%).

As for the cause of lymph node enlargement, no significant relation could be established between the occupation and level of education and knowing the cause of lymph node enlargement whether acutely or more than one week (Table 2).

Table 2: Frequencies and percentages of participants' knowledge about lymphatic system in association with level of education and occupation
Reference: Authors and statistician

		OCCUPATION (N=401)			LEVEL OF EDUCATION (N=401)						
			Medical (n=29)	Non-medical (n=148)	None (n=224)	Non-educat ed (n=6)	Schoo l (n=43)	Undergradua te (n=192)	Postgraduat e (n=135)	Technical (n=45)	
What do you think lymph nodes are?	<ul style="list-style-type: none"> Glands of the immune system 	Count % within occupation & level of education	22 (75.9%)	77 (52%)	150 (67%)	2 (33.3%)	19 (44.2%)	133 (69.3%)	80 (59.3%)	15 (60%)	
				P=0.006			P=0.095				
Where can you find lymph nodes in your body?	<ul style="list-style-type: none"> Armpit 	Count % within occupation & level of education	13 (44.8%)	36 (24.3%)	66 (29.5%)	3 (50%)	12 (57.9%)	53 (27.6%)	37 (27.4%)	10 (40%)	
				P=0.058			P=0.312				
	<ul style="list-style-type: none"> neck 	Count % within occupation & level of education	15 (51.7%)	64 (43.2%)	88 (39.3%)	1 (16.7%)	14 (32.6%)	81 (42.2%)	60 (44.4%)	11 (44%)	
				P= 0.048			P=0.592				
	<ul style="list-style-type: none"> anywhere 	Count % within occupation & level of education	9 (31%)	37 (25%)	78 (34.8%)	1 (16.7%)	10 (23.3%)	66 (34.4%)	42 (31.1%)	5 (20%)	
				P=0.12			P=0.53				
Causes of enlarged lymph nodes acutely	<ul style="list-style-type: none"> infection 	Count % within occupation & level of education	21 (72.4%)	59 (50%)	112 (50%)	2	14	110 (57.3%)	55 (40.7%)	11 (44%)	

		(39.9%)			(33.3%)		(32.6%)			
Causes of enlarged lymph nodes for more than 1 week	• cancer	P=0.006			P=0.021					
		Count	14	34	91	1	12	78	42	6
		% within occupation & level of education	(48.3%)	(23%)	(40.6%)	(16.7%)	(27.9%)	(40.6%)	(31.1%)	(24%)
	• immune system disorder	P=0.003			P=0.192					
		Count	12	51	107	0	15	92	55	8
		% within occupation & level of education	(41.4%)	(34.5%)	(47.8%)	(0%)	(34.9%)	(47.9%)	(40.7%)	(32%)
	P=0.083			P=0.148						
	• infection	P=0.114			P=0.109					
		Count	12	34	63	1	7	65	32	4
		% within occupation & level of education	(41.4%)	(23%)	(28.1%)	(16.7%)	(16.3%)	(33.9%)	(23.7%)	(16%)
	• cancer	P=0.104			P=0.321					
		Count	12	51	105	1	13	91	52	11
% within occupation & level of education		(41.4%)	(34.7%)	(46.9%)	(16.7%)	(30.2%)	(47.4%)	(38.8%)	(44%)	
• immune system disorder	P=0.147			P=0.493						
	Count	14	51	82	1	12	67	57	10	
	% within occupation & level of education	(48%)	(34.7%)	(36.6%)	(16.7%)	(27.9%)	(34.9%)	(42.5%)	(40%)	

3.3. Cancer Knowledge

Studying the participants' familiarity to definition of cancer, there was a significant association with age ($P=0.005$). In other words, younger age group participants [18-27 yr.] were more familiar with cancer definition and concept (52.37% (N= 210)). Moreover, participants' level of education was a significant variable ($P=.000$) in which undergraduates were the most familiar (38.4% (N=154) with definition of cancer followed by post graduates (25.93% (N=104)), and occupation medical and non- medical ($P=0.013$). Table 3.

Table 3: Percentages of participant familiarity of cancer definition with respect to demographical features

Reference: Authors and statistician							Chi square test
Percentages of participant familiarity of cancer definition n=401							
Age (n=299) (74.56%)	Count (%)	[18-27] 210 (52.37%)	[28-37] 31 (7.73%)	[38-47] 30 (7.48%)	[48-58] 17 (4.23%)	>58 11 (2.74%)	P= 0.005
Place of living (74.56%)	Count (%)	Beirut 51 (12.72%)	Beqaa 74 (18.45%)	Mount Lebanon 52 (12.96%)	South 57 (14.21%)	North 65 (16.21%)	P=0.000
Level of education (74.56%)	Count (%)	Uneducated 2 (0.5%)	School 20 (4.98%)	Undergraduate 154 (38.4%)	Postgraduate 104 (25.93%)	Technical 19 (4.73%)	P=0.000
Occupation (74.56%)	Count (%)	Medical 26 (6.48%)	Non-medical 98 (24.43%)		None 175 (43.64%)		P=0.013
smoker (74.56%)	Count (%)	Yes 115 (28.67%)		No 184 (45.88%)			P=0.197
Family history of cancer (74.56%)	Count (%)	Yes 118 (29.42%)		No 181 (45.13%)			P=0.093
Gender 74.56%	Count (%)	Male 114 (28.43%)			Female 185 (46.13%)		P=0.996

The findings revealed that most of the participants had variable responses regarding the general signs and symptoms of cancer, as the data that was collected concerning these aspects was asked in the following binary question format (Yes/NO): "Do you think all types of cancer have warning signs and symptoms?" 27.4% of the participants said "YES" and 72.6% responded "NO". The participants thought that the following could be common signs or symptoms of cancer: unintentional weight loss (71% (N=286), loss of appetite (61.8% (N=248)), night sweats and easy fatigability (51.1% (N=205)). A significant association between the participants' demographical features and their familiarity to cancer signs and symptoms was found, meaning that participants with family history of cancer were more familiar to loss of appetite, night sweats and easy fatigability ($P=0.003$, $P= 0.001$) respectively. In addition, participants working in the medical field were more familiar to the mentioned signs and symptoms compared to the non-medical field participants ($P=0.043$, $P=0.008$). The other demographical features such as gender, age, place of living, level of education and smoking status didn't show any significant association with the familiarity of cancer general signs and symptoms ($p>0.05$) (Table 4).

**Table 4: Association of signs and symptoms of cancer with relative demographical features
Reference: Authors and statistician**

Symptoms of cancer	Age	Gender	Place of living	Level of education	Occupation	Smoker	Family history of cancer
Weight loss	p=0.749	p=0.896	p=0.575	p=0.625	p=0.081	p=0.79	p=0.194
Loss of appetite	p=0.504	p=0.108	p=0.110	p=0.910	p=0.043	p=0.951	p=0.003
Night sweats and easy fatigability	p=0.369	p=0.605	p=0.000	p=0.87	p=0.008	p=0.46	p=0.001

Upon asking the participants about the most heard or known type of cancer, the majority of the participants answered breast cancer (93.5% (N=375)), followed by lung cancer (86% (N=345)), colon cancer (65.3% (N=262)), prostate (70.8% (N=284)) and eventually lymphoma which was the least known among them (30.7% (N=123))

As for the most known or commonly heard screening test, mammography was mainly chosen (80.3% (N=322)), followed by blood test (73.3% (N=73.3)), colonoscopy (50.6% (N=203)), and lastly Pap smear (45.9% (N=184)).

3.4. Sources of Information on Lymphoma

Participants were asked to choose, among a range of listed sources including school/university, work, doctor, organization campaigns, family and friends, internet and others, the source that was behind their information on lymphoma. About 70% of participants claimed that school/university was their main source of information about lymphoma while the organization campaigns was the least chosen one mentioned by less than 1% (0.8%) of the participants. Other sources selected by the respondents were family and friends 13.8%, internet 11.4% and from doctors 3.3%.

3.5. Lymphoma Knowledge

Regarding the first question "Where in the body does lymphoma affect?" the majority (91.86%) agreed that lymph nodes will be affected. On the other hand, less than half of the respondents thought that blood (32.52%) and bone marrow (17.88%) will also be affected.

However, as revealed by Pearson's chi-squared test there was no significant association between knowing that lymphoma affects lymph nodes mainly and any of these socio-demographic characteristics level of education, occupation and having history of cancer ($p > 0.05$) (Table 5)

**Table 5: Frequencies of participants' knowledge about lymphoma regarding where it affects, its early detection, and screening test in relation with occupation, level of education, and family history of cancer
Reference: Authors and Statistician**

		Occupation (N'=123)			Level of education (N'=123)					Family history of cancer(N'=123)	
		Medical (n'=18)	Non-medical (n'=28)	None (n'=77)	Non-educate d (n'=1)	School (n'=4)	Undergraduate (n'=73)	Postgraduate (n'=37)	Technical (n'=8)	Yes n'=66	No (n'=57)
Where do you think lymphoma affects?	• blood	9	10	21	1	2	16	18	3	24	16
		P=0.061			P=0.247					P=0.332	
	• Lymph nodes	15	28	70	1	4	67	33	38	62	51
		P=0.724			P=0.763					P=0.370	
	• Bone marrow	2	9	11	1	2	11	8	0	13	9
		P=0.623			P=0.398					P=0.577	
Do you think early detection of lymphoma	• yes	16	26	68	0	2	66	35	7	58	52

increases risk of survival?		P=0.678			P=0.236			P=0.838			
Do you think lymphoma has a screening test?	• yes	15	20	59	1	3	56	28	6	52	42
		P=0.632			P=0.901			P=0.668			

When asked “What tests do you know for diagnosing lymphoma?” the majority (79.9%) were aware that biopsy is the used diagnostic tool while the minority thought that mammography (3.3%) , colonoscopy (0.8%) and fecal occult blood test (0.8%) can be used for diagnosis. Moreover, few participants (15.4%) were not aware of any of the mentioned tests (Table 5).

As for the (Yes/No) binary question “Do you think that early detection of lymphoma can increase the chance of survival?” most of the participants 89.43% (n=110, N'=123) were able to recognize that early detection increases the survival; while only 10.56% (n=13, N'=123) thought that it wouldn't affect survival.

Similarly for the question “Do you think that lymphoma has a screening test” only 23.57% were aware and responded by “No” while the remaining 76.42% responded by “Yes”. (Table 5).

Furthermore, the answers to the previous two questions were independent of the aware respondents' socio-demographics characteristics related to level of education, occupation and having history of cancer (p>0.05) (Table 5).

To clarify, when categorizing lymphoma knowledge into extremely aware, moderately aware, somewhat aware, slightly aware and not at all aware , the majority of the respondents were considered to be somewhat aware (37.34%) and moderately aware (34.14%) based on their score value that ranged from (5-6) and (7-8) respectively, fewer were considered to be extremely aware (21.12%) , less than 10% were slightly aware (6.4%) and very small portion were not at all aware (0.8%).

3.6. Risk Factors for Lymphoma

Respondents were asked to choose among a list of risk factors as many choices as they believed were relevant. Family history of lymphoma was the most frequently cited risk factor (76.42%), while the least recognized factors were HIV/chronic disease (56.91%) and having previous cancer (55.28%). However, virus (EBV) was poorly recognized as a risk factor (37.39%).

Moreover, there were no any significant relation between the respondents' answers and any of level of education and family history of cancer (p>0.05) (Table 6).

Table 6: Frequencies of participants' knowledge of lymphoma regarding its signs, symptoms, and risk factors in relation to family history of cancer and level of education

			Reference: Authors and statistician		Level of education (n'=123)				
			Family history of cancer (n'=123)		non-educated(n'=1)	school (n'=4)	undergraduate (n'=51)	postgraduate (n'=31)	technical (n'=8)
			yes (n'=66)	no (n'=57)					
Signs and symptoms of lymphoma	Enlarged lymph nodes	count	63	52	1	4	68	34	8
			p= 0.347		P= 0.741				
	fever	count	42	32	1	3	37	26	7
			p= 0.401		p= 0.039				
	night sweats	count	35	20	1	1	29	19	5
			p= 0.046		p= 0.401				
Risk factors of lymphoma	HIV/chronic disease	count	42	28	0	2	45	19	4
			p= 0.163		p= 0.668				
	having previous cancer	count	41	27	1	2	42	19	4
			p= 0.102		p= 0.965				
	predisposing family history of lymphoma	count	51	43	0	4	51	31	8
			p= 0.813		p= 0.046				
	EBV	count	32	14	0	1	31	11	3
			p= 0.006		p= 0.602				

3.7. Signs and Symptoms of Lymphoma

The most widely known symptom of lymphoma was enlarged lymph nodes (93.4%) followed by fever (60.1%) and night sweats (44.7%) respectively.

Based on Pearson's chi-squared test there were significant association between the level of education and having family history of cancer and recognizing the signs and symptoms. Among the respondents undergraduate were more likely to recognize fever with significant p value ($p=0.039$) while those who had family history of cancer recognized night sweats ($p=0.046$) as a symptom (Table 6).

4. DISCUSSION

As early as the 1950s, numerous campaigns and researches were done to raise awareness towards cancer. However, current studies suggest lack of public recognition to early signs of cancer. The lack of apprehension towards the gravity of the symptoms remains the predominant risk factor facing society according to two systematic literature reviews. Moreover, they have shown that delayed presentation is common when the symptoms are of atypical nature (Robb et al, 2009). As an illustration, a study performed on the Iranian general population indicated decreased knowledge concerning certain signs and symptoms (Feizi et al, 2011).

A very high number of our respondents know that lymph nodes are part of the immune system. However, regarding the position of the lymph nodes, little knew that lymph nodes are present anywhere in the body (30.9% ($N=124$)). Similarly, most participant answered "infection" as the cause of acute enlargement of lymph nodes, regardless of their level of education and occupation, this result is assured by lymphoma Coalition that built up "Know Your Nodes" campaign as a believe that people know little about their lymphatic system (Lymphoma Coalition, 2012).

In reviewing the literature, there was no scale found to measure the general awareness of cancer. In this population-based sample, recall of cancer definition as an abnormal growth of cells was identified by 74.6% of the participants, by which their answers were influenced by the level of education and age. These results were compatible with previous studies that showed the knowledge of cancer in general among the general population (Al Wutayd et al, 2015).

Regarding the three basic symptoms that are involved in all types of cancers (weight loss, loss of appetite, and night sweats), the majority of participants (61%) has identified these symptoms in relation to cancer. In addition, there was a significant association between their knowledge and the participant's family history of cancer and being in the medical field. It is believed that the cancer campaigns made so far may have an impact on the awareness about cancer and its symptoms in Lebanon. However, these results did not match up with a research about public awareness of warning signs of cancer in Oman that showed that majority of their participants were unaware of common signs and symptoms identified by CAM (Al-Azari et al, 2015). In addition, a similar study conducted in the United Kingdom, has shown there is little to no awareness about cancer in general Robb et al, 2009).

As for the most common types of cancers known or heard by the participants, Breast cancer showed the highest response, followed by lung cancer, colon and skin cancer. Breast cancer continued to be the most reported cancer among females, which can be correlated to the high response for "breast cancer" among the participants, and this may be due to the influence of the widespread national breast cancer awareness campaigns since 2000 (Shamseddine et al, 2014). This also can be correlated with the most known screening test by the participants, where mammography showed the highest response. Eventually, awareness campaigns that have increased the number of women seeking physicians for screening and diagnosis, as well as the wide utilization of mammography by NGOs and primary health care centers with the cheapest prices made it easier for women to adopt screening programs (Shamseddine et al, 2014).

The results underline the lack of awareness, where the percentage of participants who knew about lymphoma was only 30.67% ($N=123$) and those who did not know was 69.32%. Although 123 respondents considered themselves aware, it was found that going in depth their knowledge was relatively poor.

These findings align with other studies, which also demonstrated poor awareness of lymphoma. In accordance to Roche survey that was conducted on the general population in five European countries, awareness of lymphoma was low where about a third (32%) of respondents were unable to identify lymphoma as a type of cancer at all (Roche Survey, 2017).

Participants tended to have only a basic knowledge of lymphoma and were unaware of many important factors. For example, while having family history of lymphoma was by far the most identified risk factor (76.42%), less than half of participants mentioned virus (EBV) as a risk factor. However, in fact, according to Cancer Research

UK Hodgkin, lymphoma risk is 2.6-6 times higher in people with a history of infectious mononucleosis associated with EBV while only 3 times higher in those with positive family history of lymphoma (Cancer research UK).

According to Roche survey less than half of the enrolled participants were able to identify signs and symptoms of lymphoma (Roche Survey, 2017). Interestingly, the findings of our study showed that out of 123 who claimed awareness about lymphoma 44 participants (35.77%) were aware of all the items. On the other hand, 39 participants (31.70%) selected two out of three of the symptoms and 33 participants (26.82%) selected only one symptom with only 7 participants (5.69%), reported that they weren't familiar with any of the mentioned signs and symptoms. Moreover, both patients and general physicians usually overlook these symptoms because they mimic symptoms of less serious illnesses such as influenza or other viral infection (Lymphoma Coalition). In addition to that, there is misconception among the general population about lymphoma's screening tests where 76.42% mistakenly thought that lymphoma can be screened. However, in reality at present time, there is no screening test for lymphoma and it is usually not manifested in the blood (Lymphoma Coalition). Accordingly, the lack of awareness of these symptoms, delayed detection, and absence of screening tests have contributed to increase the probability of lymphoma misdiagnosis and thereby impeding the patient's chances for early and successful treatment.

5. CONCLUSIONS

This study demonstrated the lack of awareness and knowledge of the Lebanese population regarding the risk factors, clinical presentation, diagnosis and treatment of lymphoma. We believe that awareness campaigns and courses should be held to raise awareness and knowledge about lymphoma.

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