RESEARCH ARTICLE

Awareness of Risk Factors for Cancer among Omani adults- A Community Based Study

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Abstract

Background: Cancer is the leading cause of mortality around the world. However, the majority of cancers occur as a result of modifiable risk factors; hence public awareness of cancer risk factors is crucial to reduce the incidence. The objective of this study was to identify the level of public awareness of cancer risk factors among the adult Omani population. Materials and Methods: A community based survey using the Cancer Awareness Measure (CAM) questionnaire was conducted in three areas of Oman to measure public awareness of cancer risk factors. Omani adults aged 18 years and above were invited to participate in the study. SPPSS (ver.20) was used to analyse the data. Results: A total of 384 participated from 500 invited individuals (response rate =77%). The majority of respondents agreed that smoking cigarettes (320, 83.3%), passive smoking (279, 72.7%) and excessive drinking of alcohol (265, 69%) are risks factors for cancer. However, fewer respondents agreed that eating less fruit and vegetables (83, 21.6%), eating more red or processed meat (116, 30.2%), being overweight (BMI> 25) (123, 32%), doing less physical exercise (119, 31%), being over 70 years old (72, 18.8%), having a close relative with cancer (134, 34.9%), infection with human papilloma virus (HPV) (117, 30.5%) and getting frequent sunburn during childhood (149, 38.8%) are risk factors for cancer. A significant association was found between participant responses and their educational level. The higher the educational level, the more likely that respondents identified cancer risk factors including smoking (p<0.0005), passive smoking (p= 0.007), excessive drinking of alcohol (p<0.0005), eating less fruit and vegetables (p= 0.001) and infection with HPV (p<0.0005). Conclusions: The majority of respondents in this study in Oman were not aware of the common risk factors for cancer. It may be possible to reduce the incidence of cancers in Oman by developing strategies to educate the public about these risk factors.

Keywords: Cancer - risk - factors - awareness - public - Oman

Introduction

Cancer is the leading cause of mortality in many countries around the world. Approximately 7.6 million deaths worldwide (around 13% of all deaths) occurred in 2008 as a result of cancer; the incidence of different types of cancer has increased in the past 20 years and is expected to rise further with an estimated 13.1 million deaths per annum by 2030 (World Health Organization, 2014a, Babu et al., 2013; Shi et al., 2014; Keramatinia et al., 2014). The majority of deaths from all types of cancer (70%) occurred in low and middle income countries (World Health Organization, 2014a). Furthermore, cancer survival tended to be poorer in developing countries, most likely because of a delayed diagnosis, low availability of the test or screening programs, limited access to standard treatment, fear of being diagnosed with cancer and not seeing oneself at risk (Rastad et al., 2012; Jassem et al., 2013; Norwati,

2014). Nonetheless, the majorities of cancer occurred as a result of potentially modifiable risk factors including smoking, excessive alcohol consumption, unhealthy diet (high fat, less fiber), obesity, lack of physical activity, sexually transmitted Human Papilloma Virus (HPV) infection and urban air pollution (Danaei, 2005). Indeed adopting a healthier life style has been found to decrease the risks of cancer (Sun et al, 2012).

In developed countries, smoking, excessive alcohol consumption and obesity were the most common causes of cancer (World Health Organization, 2014a; Danaei, 2005). Indeed, smoking is still the most important risk factor for lung cancer deaths in developed and developing countries (Ezzati et al., 2005). Cancers occurring as a result of viral infections such as Hepatitis B Virus (HBV), Hepatitis C Virus, and HPV are responsible for many deaths in the low and middle-income countries (Danaei, 2005). In the Middle East countries, particularly in the middle

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and high-income countries, the incidence of cancer has increased substantially as behavioral risk factors such as smoking, unhealthy diet, physical inactivity and obesity in both adults and children have increased (Rahim et al., 2014; Kruk and Marchlewicz, 2013; Qin, 2013). The incidence of cancer can be reduced by primary prevention through adopting a healthy lifestyle and environmental interventions (Danaei, 2005; Luqman et al., 2014). However, studies conducted in developed and developing countries including Arabic and Middle East countries showed that public knowledge and awareness of cancer risk factors are poor (Breslow et al., 1997;Robb et al., 2009; Feizi et al., 2010; Ravichandran et al., 2010; Radi, 2013).

Oman is one of the developing countries in the Middle East located on the south-eastern tip of the Arabian Peninsula. The total population of Oman was 2.8 million based on 2010 census including 1.9 million expatriates. Approximately 36% of Omanis were below the age of 15 years and only 2.4% above the age of 65 years; the median age of Omanis was 21 years (Ministry of Health, 2012). Similar to other neighboring Gulf countries, more than 75% of the disease burden in Oman is attributable to non-communicable diseases; the burden of non-communicable diseases including cancer has increased in Oman and their related risk factors among general population is similar to that of industrialized nations (Al-Lawati et al., 2008; Rahim et al., 2014). Data from the National Cancer Registry showed that approximately 900 new cases of cancer are reported annually in Oman; cancer has been regarded as the second leading cause of death and the third cause of loss of Disability-Adjusted Life Years (DALYs) (Al-Lawati et al., 2008).

The annual age-adjusted incidence of cancer ranges from 70 to 110 per 100,000 populations (Rahim et al., 2014; World Health Organization, 2010). In the nine-year period (1998-2006), stomach cancer, Non-Hodgkin lymphoma and leukemia were the most common cancer in men. Lung cancer was fourth, most likely because smoking was uncommon in Oman until after 1970; breast cancer, thyroid cancer and cervical cancers were the most common cancer in women (Nooyi and Al-Lawati, 2011). The majority of patients with cancer in Oman tend to present at advanced stages, at younger age and with low survival rates even though up to date treatment modalities are available (Kumar et al., 2011). Furthermore, there are no early screening programs for the majority of cancers, except for breast cancer which was introduced in 2010 (Ministry of Health, 2010a). There are also other cultural barriers that might contribute to the delay in early detection and diagnosis of cancer (Al-Moundhri et al., 2004).

A recent study conducted in Oman showed that obesity, high caloric intake, higher consumption of carbohydrate and protein are associated with increased risk of non-Hodgkin's lymphoma, whereas increase intake of vegetables reduced the risk (Ali et al., 2013). Behavioral risk factors, including smoking, unhealthy diets, and physical inactivity are prevalent, and obesity in adults and children has reached an alarming level (Ng et al., 2011; Amin et al., 2014). Also, over the next 25 years, the elderly population in Oman will increase 6-fold, and

the urbanization rate is expected to reach 86% with non-communicable diseases including cancer as the leading cause of death (Al-Lawati et al., 2008). Primary prevention has been identified as playing an essential part in the reduction of cancer incidence rates (Breslow et al., 1997). Thus, public awareness of cancer risks factors could play a major role in avoiding such factors and, hence, reducing the mortality rate. The classical example for this is the proven association between smoking and lung cancer that offers the best opportunity for lung cancer prevention (Simon et al., 2012). To our knowledge, there has been no previous study conducted in Oman to identify public awareness of cancer risk factors. The aim of the study is, therefore, to identify the level of public awareness for cancer risk factors among adult Omani population.

Materials and Methods

Tool used to measure cancer awareness

Cancer Awareness Measure (CAM) questionnaire is a validated standardized measurement for cancer awareness in the general population (Stubbings et al., 2009). The questionnaire includes 11 closed ended questions with five options corresponding to the level of agreement with a known risk of developing different common types of cancer. CAM has been used in several previous studies (Robb et al., 2009; Simon et al., 2012). The internal reliability and test–retest reliability of CAM questionnaire were found to be high (Stubbings et al. 2009). The author of the CAM was contacted and permission to use the CAM in this study was obtained. The CAM was translated from English to Arabic and back to English again by different people, to check that it was an accurate translation.

Recruitment of participants

Oman is divided geographically into four governorates (Muscat, Dhofar, Musandam, Buraimi) and five regions (Ad-Dakhiliyah, Ash-Sharqiyah, Al-Batinah, Adh-Dhahira, Al-Wusta). One governate (Muscat) and two regions (Ash-Sharqiyah and Al-Batinah) were selected for this study. A group of medical students studying at the College of Medicine and Health Sciences, Sultan Qaboos University (SQU) were trained how to distribute the questionnaire to a cluster of houses in their local communities and how to administer the questionnaire to illiterate participants. The medical students approached each household and asked for the number of adults (≥ 18 years) living in each house. Thus, the numbers of CAM questionnaires were given to each household accordingly. Participants were asked to read about the purpose of the study and to sign a consent form before answering the questions.

Before embarking on data collection, a pilot study of the first 30 respondents was conducted to assess the validity and reliability of the Arabic version of the CAM questionnaire. The pilot study was also used to check the clarity of the questionnaire. Based on the standardized items, the Cronbach's Alpha of the Arabic Version of CAM questionnaire from the pilot was 0.653. A week was allowed for each household to complete the questionnaire. After one week non-respondents in each household were

reminded and another week was given to complete the questionnaire. Data collection was conducted from the beginning of September to the end of October 2013.

Data analysis

Data was entered in to SPPSS (ver.20) (SPSS Inc., Chicago, USA) software program as variables. Descriptive statistics for socio-demographic variables (age, gender, educational level) and participants' responses of cancer risk factors. Chi-square test was used to test if there was any relationship between socio-demographic variables and participants' responses. Significance finding (p<0.05) were identified and reported. The study has been approved by the Local Research Ethics committee of the College of Medicine and Health Sciences, SQU.

Results

A total of 384 responded from 500 invited participants (response rate =77%). There were 154 (40.1%) male and 230 (59.9%) female. Their ages ranged between 19 and 77 years with mean=30 years, median= 27 years, mode =20 years and Standard deviation= 9.9. There were 28 (7.3%) respondents with no formal education (cannot read or write), 93 (24.2%) completed school (primary, intermediate, secondary) and 263 (68.5%) completed higher education (diploma, bachelor, Masters, PhD).

The majority of respondents agreed with the fact that smoking cigarettes (320, 83.3%), exposure to another person's cigarette smoke/ passive smoking (279, 72.7%) and drinking of more than one unit of alcohol a day (265, 69%) were risks factors for cancer. Less than half of respondents thought that eating less than five portions of fruit and vegetables a day (83, 21.6%), eating red or processed meat once a day or more (116, 30.2%), being overweight with Body Mass Index (BMI) over 25 (123, 32%) and doing less than 30 minutes of moderate physical activity five times a weeks (119, 31%) were risk factors for cancer. Also, less than half of respondents agreed that being over 70 years old (72, 18.8%), having a close relative diagnosed with cancer (134, 34.9%), infection with HPV (117, 30.5%) or getting sunburn more than once during childhood (149,38.8%) increased the risk of cancer (Table 1).

A significant association was found between the participants' responses and their socio-demographic characteristics. Females agreed more than males with the fact that smoking is a risk factor for cancer (p=0.044) and they also agreed more than the males that drinking more than one unit of alcohol a day increased the risk of cancer (p=0.0314). The younger respondents agreed more than older respondents that, being over the age of 70 year could increase the risk of cancer (p=0.010) (Table 2).

A significant association was also found between

Table 1. Patients' Responses to Factors that Might Cause Cancer (n=384)

Factors that might increase the chance of getting cancer	Agree (%)	Neither agrees nor disagree (%)	Disagree (%)	Total respondents for each item
Smoking	320(83.3)	12(3.1)	52(13.5)	384
Exposure to another person's cigarette smoke	279(72.7)	54(14.1)	51(13.3)	384
Drinking more than one unit of alcohol a day	265(69)	75(19.5)	44(11.5)	384
Eating less than five portions of fruit and vegetables a day	83(21.6)	75(19.5)	226(58.9)	384
Eating red or processed meat once a day or more	116(30.2)	170(44.3)	98(25.5)	384
Being overweight (BMI over 25)	123(32.0)	162(42.2)	99(25.8)	384
Doing less than 30 minutes of moderate physical activity five times a week	119(31.0)	80(20.8)	185(48.2)	384
Being over 70 years old	72(18.8)	136(35.4)	176(45.8)	384
Having a close relative with cancer	134(34.9)	103(26.8)	147(38.3)	384
Infection with HPV (Human Papillomavirus)	117(30.5)	205(53.4)	62(16.1)	384
Getting sunburn more than once as a child	149(38.8)	137(35.7)	98(25.5)	384

Table 2. Significant Findings of Respondents' Agreement to Causes of Cancer According to Their Gender, Age and Educational Level after Applying Chi-Square Tests

Risk factor that may cause cancer	Gender				p value*
	Male		Female		
	Respondents	Agreed (%)	Respondents	Agreed (%)	
Smoking	154	121 (78.6)	230	199 (86.5)	0.044
Drinking more than one unit of alcohol a day	154	95 (61.7)	230	170 (73.9)	0.031

	Age					p value*
	Less than 24		24-35		More than 35	
	Respondents	Agreed (%)	Respondents	Agreed (%)	Respondents Agreed (%)	
Being over 70 years old	138	32 (23.2)	155	27 (17.4)	91 13(14.3)	0.01

	Educational level					p value*
	No formal education		School education		Higher education	
	Respondents	Agreed (%)	Respondents	Agreed (%)	Respondents Agreed (%)	
Smoking	28	16 (57.1)	93	76 (81.7)	263 228 (86.7)	<0.0005
Exposure to another person's cigarette smoke	28	16 (57.1)	93	65 (69.9)	263 198 (75.3)	0.007
Drinking more than one unit of alcohol a day	28	12 (42.9)	93	67 (72.0)	263 186 (70.7)	<0.0005
Eating less than five portions of fruit and vegetables a day	28	12 (42.9)	93	28 (30.1)	263 43 (16.3)	0.001
Infection with HPV (Human Papillomavirus)	28	8 (28.6)	93	33 (35.5)	263 76 (28.9)	<0.0005

*p value obtained after excluding neutral respondents

the participants' responses and the educational level (no formal education, school education, higher education). The higher the educational level of the respondents, the more likely they were to recognize that the following were risk factors of cancer: smoking (p<0.0005), exposure to another person's cigarette smoke/passive smoking (p= 0.007), drinking more than one unit of alcohol a day (p<0.0005), eating less than 5 portions of fruit and vegetables a day (p= 0.001) and infection with HPV (p<0.0005) (Table 2).

Discussion

To our knowledge, this is the first study conducted in Oman to identify public awareness of cancer risks factors in the community. The majority of respondents in our study agreed with the fact that cigarette smoking (active and passive) and excessive drinking of alcohol increased the risk of cancer. This is expected for smoking but the striking finding from our study is that, majority of respondents were also aware that drinking alcohol is a risk factor for cancer. The findings from western studies, where alcohol is commonly used, showed only modest awareness of the public that excessive alcohol intake increased risk of cancer (Wardle et al., 2001; Redeker et al., 2009).

The majority of people in Oman are Muslims and alcohol intake is forbidden as part of religious faith. Also culturally, like other Arabic societies, smoking and alcohol are regarded by the majority of people as a "social stigma" and people tend not to drink alcohol or smoke in order to protect their health (Ahmed, 2013). Thus, the majority of respondents in this study agreed with the fact that smoking and alcohol are harmful for their health and could cause cancer.

Respondents in this study showed low awareness that adopting a "westernized life style", such as eating more red or processed meat, eating less fruit and vegetables and obesity, increased the risk of cancer. Indeed, the western dietary pattern including red and processed meat and refined grains and sedentary lifestyles are associated with increase the risk of cancer (Falzon et al., 2012; Yusof et al., 2012), It is perhaps surprising that previous studies conducted in the UK showed similar findings and that awareness in the UK was not greater than in Oman (Wardle et al., 2001; Redeker et al., 2009).

The burden of non-communicable diseases including cancer in the Arab world has increased substantially over the past 10 years (Rahim et al., 2014). Low fruit and vegetable intake, smoking, drinking of alcohol and obesity were still the leading risk factors for death from cancer worldwide (Danaei, 2005). The low public awareness in Oman of the importance of adopting a healthier lifestyle could be a key cause for the increasing incidence of cancer in this country (Danaei, 2005; Rahim et al., 2014). Indeed, it has been found that, developing chronic disease, including cancer decreased progressively as an individual adopted a healthier life style (Tayyem et al., 2013; Liu et al., 2014).

Respondents in our study showed low awareness of certain risk factors that could increase the risk of cancer including increased age, having relatives diagnosed with cancer, infection with HPV and getting frequent sunburn during childhood. This is similar to findings in developed countries including UK, Canada, Australia and USA, where public awareness of the increased risk of cancer with increasing age was low (Breslow et al., 1997; Forbes et al., 2013). Indeed, age is the strongest risk factor for most adult cancers including breast, colon and prostate (Hewitt et al., 2003; Yancik, 2005; Yancik and Ries, 2004).

The low awareness of respondents in our study of the fact that there is a genetic risk factor for cancer is important. It is well documented that family history of cancer increases the risk to certain types of cancer (Murff et al., 2004). For example, the presence of breast cancer among first degree relatives increased the risk of developing breast cancer 5.7 times and adults who had relatives with any types of cancer advised to adapt a healthy lifestyle to decrease the risk (Lotreane tal., 2013; Gokdemir-Yazar et al., 2014). Thus, the majority of women in western countries were able to identify that family history of breast cancer is a risk factor for breast cancer (Breslow et al., 1997). The lack of awareness of women in Oman to consider family history of breast cancer as a risk factor, and to seek medical help or screening at an early stage, might be a reason for late stage diagnosis with poor prognosis (Al-Moundhri et al., 2004).

The low public awareness in this study that infection with HPV is a risk for cancer (mainly cervical cancer) might be expected. Sexual Transmitted Disease in Oman is not discussed openly, because of the associated stigma in a conservative Islamic society. However, the prevalence of HPV is increasing at alarming rate in women in the Gulf countries (Turki et al., 2013). Also, the majority of women in a similar society were not aware of the availability of HPV vaccination (Ortashi et al., 2014). Nonetheless, studies conducted in the UK and USA (more liberal societies) showed that only 2.5% of female respondents in the UK and less than 50% of female respondents in the USA knew that the virus is sexually transmitted and can cause cervical cancer. Hence urgent public education about the role of HPV in cancer has been suggested (Marlow et al., 2007).

The low public awareness about the relationship between getting frequent sunburn during childhood and skin cancer is expected, as skin cancer is relatively uncommon in Oman and other Arabic countries. The naturally brown pigmented skin gives more protection from skin cancer. Indeed the incidence of skin cancer continues to increase in westerns countries because of falling ozone levels and lack of skin pigmentation in Caucasian populations (Tarstedt et al., 2005). Despite this, a UK study showed that the majority of the public were not aware that sun exposure increased risk of skin cancer and they need to use appropriate sun-protection (Miles et al., 2005).

The findings from the current study showed that the higher the level of the education of respondents the more likely they were to be aware of cancer risk factors. It is well known that the level of the education is one of the global factors that determine the health, as low level of education is linked to poor health (World Health Organization, 2014b). The higher the individual's level of

Awareness of Risk Factor for Cancer among Omani adults- A Community Based Study

education, the greater their awareness of the preventive measures for cancer and the greater their ability to access more information from different resources, than the less educated individual (Faresj and Rahmqvist, 2010; Norlaili, 2013). A previous study in the USA showed that, although Americans lack knowledge about the major risk factors for common cancers, the majority were among those with the lowest educational level (Breslow et al., 1997). Indeed, the higher the level of the education, the lower the mortality rate from cancer. It has been suggested, therefore, that identifying groups at high risk of death from cancer by the level of education is useful in targeting interventions and tackling cancer disparities (Albano et al., 2007).

This study has limitations. Firstly, the sample has been selected because of convenience and taken from only three areas in Oman. Hence it might not be applicable to the whole community. A larger national study with a more representative sample size and better sampling methods is required. Secondly, more educated individuals were enrolled in this study which might explain the significant impact of the level of the education on the awareness of cancer risk factors.

In conclusion, this is the first study conducted in Oman to identify the level of public awareness for cancer risk factors among the adult Omani population. The findings from this study showed that the majority of the respondents were aware that smoking (active and passive), and excessive drinking of alcohol are risk factors for cancer. However, they were less likely to identify other risk factors including eating less fruit and vegetables, eating more of red or processed meat, doing less physical exercise, being overweight or elderly, having a close relative with cancer, infection with HPV and getting frequents sunburns. Also the results showed that the higher the level of education, the more likely people are to be aware of cancer risks factors.

The Ministry of Health (MOH) in Oman could integrate public awareness of cancer risks factors as part of the future strategic health plans. Indeed, the previous national strategic plans for health development have considered involvement of public in all activities of health care, promoting health awareness of the community and establishing a culture of healthy lifestyle (Ministry of Health, 2010a). The example for this was the successful campaigns of Clinical Breast Examination (CBE) conducted in secondary schools. Also the program includes establishing screening clinics for common types of cancer at primary health care level, activate the participation of community support groups, women association and national cancer association (Ministry of Health, 2010b).

As the incidence of cancer in Oman increases, strategies to increase public awareness for cancer risks factors for common types of cancer are needed. Public awareness of cancer risk factors can be increased by using mass media, leaflets school visits, and posters in hospitals and primary care health centers. Indeed, intensive and tailored printed information and community-based awareness programs was found to be effective as a strategy to improve cancer risk awareness (Austoker et al., 2009; Simayi, 2013). Greater educational activity is needed in Oman to improve public health awareness of adopting a healthy lifestyle to reduce the incidence of cancer.

Acknowledgements

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Mohammed Al-Azri et al

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