

## RESEARCH ARTICLE

# Public Awareness of Warning Signs and Symptoms of Cancer in Oman: A Community-Based Survey of Adults

Mohammed Al-Azri<sup>1\*</sup>, Ibtisam Al-Hamedi<sup>1</sup>, Huda Al-Awisi<sup>2</sup>, Mustafa Al-Hinai<sup>1</sup>, Robin Davidson<sup>1</sup>

## Abstract

**Background:** The majority of deaths from cancer occur in low and middle income countries, partly due to poor public awareness of the signs and symptoms of cancer. **Materials and Methods:** A community based survey using the Cancer Awareness Measure (CAM) questionnaire was conducted in three different communities in Oman. Omani adults aged 18 years and above were invited to participate in the study. **Results:** A total of 345 responded from 450 invited participants (response rate=76.7%). The majority of respondents were unable to identify the common signs and symptoms of cancer identified in the CAM (average awareness was 40.6%). The most emotional barrier to seeking help was worry about what the doctor might find (223, 64.6%); a practical barrier was too busy to make an appointment (259, 75.1%) and a service barrier was difficulty talking to the doctor (159, 46.1%). The majority of respondents (more than 60% for seven out of ten symptoms) would seek medical help in two weeks for most signs or symptoms of cancer. Females were significantly more likely than males to be embarrassed ( $p<0.001$ ), scared ( $p=0.001$ ), and lack confidence talking about their symptoms ( $p=0.022$ ). **Conclusions:** Urgent strategies are needed to improve public awareness of the signs and symptoms of cancer in Oman. This might leads to earlier diagnosis, improved prognosis and reduced mortality from cancer.

**Keywords:** Cancer symptoms - cancer signs - awareness - public - questionnaires - Oman

*Asian Pac J Cancer Prev*, 16 (7), 2731-2737

## Introduction

Cancer is the leading cause of mortality in many countries around the world (World Health Organization, 2014). The majority of deaths from cancer occur in low and middle income countries and is most likely because of delayed presentation (Jemal et al., 2011; Moore et al., 2014). This is due to a number of factors including poor awareness of the signs and symptoms of cancer, cancer risk factors, poor availability of tests or screening programs and limited access to standard treatment (Jemal et al., 2011; Gajda and Kaminska-Winciorek, 2014; Jassem et al., 2014; Sathian et al., 2014). However, poor public knowledge of the signs and symptoms of cancer is considered to be the predominant reason for delayed presentation, particularly if these symptoms are atypical in nature (Macleod et al., 2009; Ravichandran et al., 2010). It is known that certain types of cancer have high chance of cure if detected early and treated adequately (Harford, 2011).

Poor public knowledge of the signs and symptoms of cancer combined with negative beliefs such as “worried about wasting doctor’s time”, will delay the presentation and diagnosis (Forbes et al., 2013; Jassem et al., 2014;

Jemal et al., 2011; Richards, 2009). Thus, raising public awareness of the warning signs and symptoms of cancer and encouraging prompt presentation, could reduce patient-attributable delay and increase early diagnosis which in turn could lead to improved prognosis and decrease mortality (MacDonald et al., 2006; El Saghir et al., 2007; Austoker, et al., 2009; Robb et al., 2009; Simon, et al., 2010).

The existing evidence from the literature on the other hand, indicates that public awareness of the warning signs and symptoms of cancer are poor (El Saghir et al., 2007; Robb et al., 2009; Yaw et al., 2014). A population-based study conducted in the UK in 2001 showed that fewer than one in ten of the population could recognize seven warning signs and symptoms of cancer (Austoker, et al., 2009). Eight years later, another study conducted in the same country showed no improvement particularly among young males from low socio-economic status or minority ethnic groups (Robb et al., 2009). In developing countries, a study conducted in Iran showed poor public awareness of cancer signs and symptoms (Feizi et al., 2010). Another study conducted in Saudi Arabia showed that 68% of respondents had no knowledge of the early warning signs and symptoms of cancer (Ravichandran et al., 2010).

<sup>1</sup>Department of Family Medicine and Public Health, College of Medicine and Health Sciences, <sup>2</sup>Nursing Directorate, Sultan Qaboos University Hospital, Muscat, Oman \*For correspondence: [mhalazri@squ.edu.om](mailto:mhalazri@squ.edu.om)

Oman is a developing country in the Middle East, at the south-eastern tip of the Arabian Peninsula. Based on 2010 census, the total population of Oman was 2.8 million, 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). More than 75% of the disease burden in Oman is attributable to non-communicable diseases, including cancer which has increased similar to that of developed countries (Al-Lawati et al., 2008; Rahim et al., 2014). Data from the National Cancer Registry shows 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 most likely 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 population (World Health Organization, 2010; Rahim et al., 2014).

In the nine-year period (1998-2006), stomach cancer, Non-Hodgkin lymphoma and leukemia were the most common cancers in men; breast cancer, thyroid cancer and cervical cancers were the most common cancers in women. Lung cancer was fourth, most likely because smoking was uncommon in Oman until after 1970 (Al-Lawati et al., 2008; Nooyi and Al-Lawati, 2011). Over the next 25 years, the elderly population in Oman is expected to increase 6-fold, and the urbanization rate is expected to reach 86% with non-communicable diseases, including cancer, as the leading cause of mortality (Al-Lawati et al., 2008).

The majority of patients with cancer in Oman tend to present at advanced stages, at a younger age and with low survival rates, even though up-to-date treatments are available (Kumar et al., 2011). Furthermore, there are no screening programs for cancer except for breast cancer which was introduced in 2010 (Ministry of Health, 2010). There are also other social and cultural barriers that might contribute to the delay in early detection and diagnosis of cancer in Oman (Al-Moundhri et al., 2004; Al-Azri et al., 2014b). To our knowledge, no previous study has been conducted to identify public awareness of the early signs and symptoms of cancer in Oman. The aim of the study is, therefore, to investigate this, in a community based study of the adult Omani population.

## Materials and Methods

### *Tool used to measure cancer awareness*

The Cancer Awareness Measure (CAM) questionnaire is a validated standardized questionnaire to measure public awareness of signs and symptoms of cancer (Stubbings et al., 2009). The questionnaire measures awareness of warning signs, anticipated time before seeking medical help and perceived barriers to presentation for nine common warning signs. The barriers to seeking medical help were further categorised into emotional, practical and service barriers. The internal reliability and test-retest reliability of the CAM were found to be high and it has been used in several studies around the world (Robb et al., 2009; Stubbings et al., 2009; Simon et al., 2012). The

author of the CAM was contacted and permission to use it in our study was obtained. We translated CAM from English to Arabic and back to English by different people to check that it was an accurate translation.

Before embarking on data collection, a pilot study for the first 30 respondents was conducted to assess validity and reliability of the Arabic version of the questionnaire and the clarity of the questions. Based on the standardized items, the Cronbach's Alpha of the Arabic Version of the CAM from the pilot study was 0.785.

### *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 governorate (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 on how to distribute the questionnaire to a cluster of houses in their local communities and how to administer the questionnaire to illiterate participants. Their involvement was part of the research module of the undergraduate medical curriculum.

The medical students approached each household and asked for the number of adults ( $\geq 18$  years) living in each house. Thus, the number 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. 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 2014.

### *Data analysis*

Data was entered in to SPSS (ver.21) (SPSS Inc., Chicago, USA) software program as variables. Descriptive statistics for socio-demographic variables (age, gender, educational level) and participants' responses of cancer signs and symptoms were recorded. Chi-square test was used to test if there was any relationship between socio-demographic variables and participants' responses. Significance findings ( $p < 0.05$ ) 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 345 responded from 450 invited participants (response rate=76.7%). There were 108 (31.3%) male and 237 (68.7%) female. Their ages ranged between 19 and 84 years with mean=28 years, median=25 years, mode=19 years and Standard deviation=9.2. There were 113 (32.8%) respondents who had completed primary education, 77 (22.3%) had completed secondary education and 155 (44.9%) had completed university and higher education (diploma, bachelor, Masters, PhD).

The average cancer awareness for the respondents was (40.6%) for all nine items of the CAM. Less than half of respondents thought that the following could be sign or symptoms of cancer including change in the appearance of a mole (153, 44.3%), unexplained weight loss (151, 43.8%), sore that does not heal (149, 43.2%), persistent change in bowel or bladder habits (147, 42.6%), unexplained bleeding (111, 32.2%), persistent difficulty swallowing (97, 28.1%) and persistent cough or hoarseness (76, 22.0%). On the other hand, more than half of respondents thought that the following could be sign or symptoms of cancer including persistent unexplained pain (203, 58.8%) and unexplained lump or swelling (175, 50.7%) (Table 1).

The most widely reported emotional barriers to seeking a doctor's help were "worried about what the doctor might find" (223, 64.6%), too scared (203, 58.8%), too embarrassed (169, 49.0%) and not feeling confident talking about the symptom or signs with the doctor (156, 45.2%). In relation to practical barriers, the majority of respondents reported being too busy to make time to see to the doctor (259, 75.1%), had too many other things to worry about (155, 44.9%) and/or had difficulty in

arranging transport to the doctor's clinic (151, 43.8). In relation to service barriers, many respondents reported difficulty talking to the doctor (159, 46.1%), making an appointment with the doctor (62, 18.0%) and/or were worried about wasting the time of the doctor (51, 14.8%) (Table 2).

The majority of respondents indicated that they would seek medical help in two weeks for most signs or symptoms including unexplained bleeding (293, 84.9%), difficulty in swallowing (279, 80.9%), change in bowel or bladder habits (249, 72.2%), sore that did not heal (245, 71.0%), unexplained pain (238, 69.0%), cough or hoarseness (217, 62.9%), unexplained lump or swelling (214, 62.0%), change in the appearance of a mole (184, 53.3%) and unexplained weight loss (118, 34.2%) (Table 3).

A significant association was found between the participants' agreed responses about the perceived barriers to seeking medical help and their socio-demographic characteristics. Females were more likely than males to be too embarrassed ( $p<0.001$ ), too scared ( $p=0.001$ ), too busy to make time to see a doctor ( $p=0.007$ ), worried about what the doctor might find ( $p=0.002$ ), to have difficulty in

**Table 1. Participants' Responses to Signs and Symptoms of Cancer (n=345)**

Early signs and symptoms of cancer	Yes (%)	No (%)	Don't know (%)
Do you think persistent unexplained pain could be a sign of cancer?	203 (58.8)	94 (27.2)	48 (13.9)
Do you think an unexplained lump or swelling could be a sign of cancer?	175 (50.7)	125 (36.2)	45 (13.0)
Do you think a change in the appearance of a mole could be a sign of cancer?	153 (44.3)	99 (28.7)	93 (27.0)
Do you think unexplained weight loss could be a sign of cancer?	151 (43.8)	130 (37.7)	63 (18.3)
Do you think a sore that does not heal could be a sign of cancer?	149 (43.2)	99 (28.7)	97 (28.1)
Do you think a persistent change in bowel or bladder habits could be a sign of cancer?	147 (42.6)	108 (31.3)	90 (26.1)
Do you think unexplained bleeding could be a sign of cancer?	111 (32.2)	162 (47.0)	72 (20.9)
Do you think persistent difficulty swallowing could be a sign of cancer?	97 (28.1)	151 (43.8)	97 (28.1)
Do you think a persistent cough or hoarseness could be a sign of cancer?	76 (22.0)	181 (52.5)	88 (25.5)

**Table 2. Participants' Responses for Barriers to Seek Doctor's help in Relation to Signs and Symptoms of Cancer (n=345)**

Item		Yes (%)	No (%)
Emotional barriers	Worried about what the doctor might find	223 (64.6)	121 (35.1)
	Too scared	203 (58.8)	142 (41.2)
	Too embarrassed	169 (49.0)	176 (51.0)
	Not feeling confident talking about the symptom with the doctor	156 (45.2)	189 (54.8)
Practical barriers	Too busy to make time to go to the doctor	259 (75.1)	86 (24.9)
	Too many other things to worry about	155 (44.9)	190 (55.1)
	Difficult to arrange transport to the doctor's clinic	151 (43.8)	193 (55.9)
Service barriers	Difficult to talk to doctor	159 (46.1)	185 (52.7)
	Difficult to make an appointment with doctor	62 (18.0)	133 (38.6)
	worried about wasting the doctor's time	51 (14.8)	294 (85.2)

**Table 3. Participants' Decision to consult a Doctor within a Time in Response to sign and Symptoms of Cancer (n=345)**

Signs and symptoms of cancer	Never (%)	Less than 2 weeks (%)	From 1-3 months (%)	More than 3 months (%)
Having unexplained bleeding	9 (2.6)	293 (84.9)	31 (9.0)	12 (3.5)
Having difficulty in swallowing	8 (2.3)	279 (80.9)	35 (10.1)	23 (6.7)
Noticed a change in bowel or bladder habits	10 (2.9)	249 (72.2)	65 (18.1)	21 (6.1)
Having sore that did not heal	10 (2.9)	245 (71.0)	64 (18.6)	26 (7.5)
Having unexplained pain	12 (3.5)	238 (69.0)	59 (17.1)	36 (10.4)
Having a cough or hoarseness	12 (3.5)	217 (62.9)	82 (23.8)	34 (9.9)
Noticed an unexplained lump or swelling	18 (5.2)	214 (62.0)	80 (23.2)	33 (9.6)
Noticed a change in the appearance of a mole	36 (10.4)	184 (53.3)	72 (20.9)	53 (15.4)
Having unexplained weight loss	56 (16.2)	118 (34.2)	94 (27.2)	77 (22.3)

**Table 4. Significant Findings of Respondents' Agreement to Sign and Symptoms of Cancer according to their gender, age and educational level after applying Chi-Square tests**

Reasons that might put patients off from consulting doctor	Gender			p-value
	Male (n=108) Agreed (%)	Female(n=237) Agreed (%)		
Too embarrassed	36(33.3)	133(56.1)		<0.001
Too scared	49(45.4)	154(65.0)		0.001
Too busy to make time to go to the doctor	71(65.7)	188(79.3)		0.007
Difficult to arrange transport to the doctor's clinic	37(34.3)	114(48.1)		0.015
Worried about what the doctor might find	57(52.8)	166(70.0)		0.002
Wouldn't feel confident talking about the symptoms	39(36.1)	117(49.4)		0.022

  

	Age			p-value
	less than 24 (n=128) Agreed (%)	24-35 (n=158) Agreed (%)	more than 35 (n=59) Agreed (%)	
	Too embarrassed	69 (53.9)	81 (51.3)	
Too scared	85 (66.4)	94 (59.5)	24 (40.7)	0.004
Too busy to make time to go the doctor	106 (82.8)	112 (70.9)	41 (69.5)	0.038
Wouldn't feel confident talking about symptoms	69 (53.9)	66 (41.8)	21 (35.6)	0.032

**Table 5. Significant findings of Respondents' Response within the Time to Consult a Doctor about Signs and Symptoms According to their Educational Level**

Signs and symptoms of cancer	Reported time	Educational Level			p-value
		Less than primary (%) (n=113)	Secondary (%) (n=77)	University and higher (%) (n=155)	
If you noticed an unexplained lump or swelling how soon would you contact your doctor to make an appointment to discuss it?	Never	3 (2.7)	4 (5.2)	11 (7.1)	0.017
	Less than 2 week	81 (71.7)	52 (67.5)	81 (52.3)	
	From 1 to 3 months	23 (20.4)	12 (15.6)	45 (29.0)	
	More than 3 months	6 (5.3)	9 (11.7)	18 (11.6)	
If you had a cough or hoarseness how soon would you contact your doctor to make an appointment to discuss it?	Never	6 (5.3)	1 (1.3)	3 (1.9)	0.008
	Less than 2 week	48 (42.5)	44 (57.1)	56 (36.1)	
	From 1 to 3 months	55 (48.7)	25 (32.5)	80 (51.6)	
	More than 3 months	4 (3.5)	7 (9.1)	16 (10.3)	
If you noticed a change in bowel or bladder habits how soon would you contact your doctor to make an appointment to discuss it?	Never	1 (0.9)	4 (5.2)	5 (3.2)	0.018
	Less than 2 week	91 (80.5)	59 (76.6)	99 (63.9)	
	From 1 to 3 months	18 (15.9)	11 (14.3)	36 (23.2)	
	More than 3 months	3 (2.7)	3 (3.9)	15 (9.7)	

arranging transport to the doctor's clinic (p=0.015), and to lack confidence talking about their symptoms with the doctor (p=0.022) (Table 4).

Younger respondents were significantly more likely than older respondents to be too embarrassed (p=0.016), too scared (p=0.004), too busy to make time to see a doctor (p=0.038) and to lack confidence talking about their symptoms (p=0.032) (Table 4).

Uneducated respondents were significantly more likely than those with some education to seek medical help in less than 2 weeks if they noticed an unexplained lump or swelling(p=0.017), had a cough or hoarseness (p= 0.008) and noticed change in bowel or bladder habits (p=0.018) (Table 5).

## Discussion

To our knowledge, this is the first study conducted in Oman to assess public awareness of the signs and symptoms of cancer, anticipated time before seeking medical help and the perceived emotional, practical and service barriers to presentation. The majority of

respondents in our study were unaware of the common signs and symptoms of cancer identified in the CAM (The average cancer awareness for the respondents was 40.6%). This finding is supported by previous studies conducted in developed and developing countries which also showed poor public awareness of the signs and symptoms of cancer (El Saghir et al., 2007; Austoker et al., 2009; Robb et al., 2009; Feizi et al., 2010; Ravichandran et al., 2010; Hashim et al., 2011).

Previous studies conducted in Oman showed a high incidence of cancer, late diagnosis and poor outcomes despite the availability of up-to-date treatments (Al-Moundhri et al., 2004; Nooyi and Al-Lawati, 2011). The late diagnosis and poor outcomes might be partly attributed to the failure of the public to identify the signs and symptoms of cancer at an early stage and to seek medical help (Macleod et al., 2009; Robb et al., 2009). Indeed, patients who delayed due to lack of awareness of cancer signs and symptoms were unable to interpret their complaints as cancer signals and therefore they did not regard these symptoms as a serious health threat that required medical attention (De Nooijer et al., 2002).

Respondents in our study were able to recognize some “classical symptoms” of cancer such as persistent unexplained pain or unexplained lump compared to other “ambiguous symptoms” such as changes in the appearance of a mole and unexplained weight loss. As mentioned earlier, sufficient knowledge of signs and symptoms of cancer is a prerequisite for correct interpretation and seeking medical help (Macleod et al., 2009; Smith et al., 2003). Obvious cancer symptoms such as swelling, symptoms that cause pain or interfere with daily function, triggers the individual to seek medical help earlier than if symptoms are vague (Robb et al., 2009). For example, it has been found that patients with breast cancer were least likely to delay and patients with prostate and rectal cancer were most likely to delay (Forbes et al., 2014).

The most common emotional barrier that delayed seeking medical help for our respondents (particularly among females) was “worried about what the doctor might find”. This finding is in line with previous work, and is known as “cancer-protective behaviours” which could delay the diagnosis of cancer (Robb et al., 2009). This protective behavior includes fear of cancer, denial, fatalism, hypochondriacal beliefs, disease phobia, feared effects of symptoms and reliance on alternative therapies (Lostao et al., 2001; Mohamed et al., 2005; Macleod et al., 2009; Robb et al., 2009; Rastad et al., 2012). Indeed, a previous study of breast cancer in Oman, showed that women went through a denial phase as a result of cancer symptoms (Al-Azri et al., 2014b).

The other emotional barriers that delayed seeking medical help in this study, were feeling embarrassed and not feeling confident talking about their possible cancer symptoms with the doctor. Being ashamed or embarrassed about symptoms was found to be an impeding factor for early detection and diagnosis in cancer patients (De Nooijer et al., 2001). Recognition and interpretation of symptoms, fear of consultation, fear of embarrassment (symptoms affecting a sensitive body area), and a fear of cancer pain, suffering, and death are other factors attributed to the delay in seeking medical help (Smith et al., 2003).

Continuity of care is an important aspect which promotes trust, confidence, rapport and honesty between the patient and the doctor within the context of a patient-doctor relationship (Alazri et al., 2007). However, patients in Oman can move between doctors, primary health centers, hospitals and private clinics. (Al-Azri, et al., 2014a). Thus, the lack of continuity might be another factor that caused our respondents to feel embarrassed and to lack the confidence to explore their cancer symptoms with a doctor at an early stage (Fouladi et al., 2014).

A significant finding in this study showed females were more likely than males to feel embarrassed and lack the confidence to explore their cancer related symptoms. Some women in Oman might be reluctant to presents their gynecological or breast symptoms or be examined by a male in the absence of female doctor. It has been reported that a large number of women in most of Arab countries still present with locally advanced and metastatic breast cancer. The reasons for this includes fear of cancer, shyness, poor health education and inadequate access to

health care facilities (El Saghir et al., 2007; Bayrami et al., 2014).

Indeed, the most common practical and service barriers to seeking medical help identified by our respondents, were the difficulty in talking to a doctor and “too busy to make time to see the doctor” (the latter was more significant for younger and female respondents). A recent study conducted in the UK showed that being too busy to go to the doctor and worrying about wasting the doctor’s time were strong risk factors for delayed presentation in cancer patients (Forbes et al., 2014). Similar to other counties in the Middle East, a very large number of patients in Oman visit primary care facilities, resulting in a heavy burden on the health care system and family physicians provide only outpatient care services. There is also a lack of coordination between family physicians and secondary care through advanced information systems or other method (Abyad et al., 2007). Patients also do not have a defined family physician where they can consult regularly or communicate over the phone about their symptoms when needed. All these are factors that could delay early presentation of cancer patient and increase the chance of poor outcomes.

The striking finding from this study was that, although the majority of responds were poor at identifying the signs and symptoms of cancer, many will seek medical help in the first two weeks. As many of respondents in our study were women, they were more likely than men to pay attention to symptoms and to seek medical help within the appropriate time (De Nooijer et al., 2003). Furthermore, seeking medical help at an early stage does not always indicate that respondents are aware of the signs and symptoms of cancer as this knowledge might not be entirely predictive of help seeking behavior (Sheikh and Ogden, 1998).

In this study, less educated respondents were significantly more likely than the more educated to seek medical help in less than two weeks for some of cancer symptoms, such as unexplained lump or swelling, cough or hoarseness and change in bowel or bladder habits. Although we expected educated respondents to be more knowledgeable about signs and symptoms of cancer, the intention to seek medical help was found to be influenced by cognitive representations of the identity, attitudes towards help-seeking and perceived behavioural control (Hunter et al., 2003). Indeed, it has been found that people who paid attention to cancer symptoms had more knowledge of them and perceived the advantages of paying attention to cancer symptoms regardless of their education (De Nooijer et al., 2003). On the other hand, a study has shown strong evidence of positive association between lower education level and the delay in seeking medical help for certain types of cancer including breast and colorectal as opposite to the more educated women (Macleod et al., 2009; Donnelly et al., 2014; Karadag et al., 2014).

This study has limitations. The sample has been selected from three communities in Oman because of convenience; hence the findings might not be applicable to the whole country. A larger national study with a more representative sample size and better sampling methods

is required for greater generalizability. Also, more women than men responded which might explain some of the significant findings.

Findings from this study added to the growing body of literature showed poor public awareness of cancer signs and symptoms in Oman. The Ministry of Health in Oman has succeeded in the past few years to increase public awareness for breast cancer through promoting health awareness in schools, activating community support groups and establishing screening clinics at primary health care level (Ministry of Health, 2010). Thus, urgent strategies are needed to improve public awareness of the signs and symptoms of cancer, for other types of cancer. This might include media campaigns and screening programs for cancer at a national level. Finally, working to establish and support continuity of care with a defined family physician at primary care level should also help to increase patients trust and confidence and reduce their emotional and access barriers to seeking a doctor's help at the early stages of cancer.

## Acknowledgements

The authors thank students who were involved in data collection.

## References

Abyad A, Al-Baho AK, Unluoglu I, et al (2007). Development of family medicine in the Middle East. *Fam Med*, **39**, 736-41.

Al-Azri M, Al-Ramadhani R, Al-Rawahi N, et al (2014a). Patients' attitudes and experiences of relational continuity in semi-urban general practices in Oman. *Fam Pract*, **31**, 303-10.

Alazri M, Heywood P, Neal RD et al (2007). Continuity of Care: Literature review and implications. *Sultan Qaboos Univ Med J*, **7**, 197-206.

Al-Azri MH, Al-Awisi H, Al-Rasbi S, et al (2014b). Coping with a diagnosis of breast cancer among Omani women. *J Health Psychol*, **19**, 836-46.

Al-Lawati JA, Mabry R, Mohammed AJ (2008). Addressing the threat of chronic diseases in Oman. *Prev Chronic Dis*, **5**, 99.

Al-Moundhri M, Al-Bahrani B, Pervez I, et al (2004). The outcome of treatment of breast cancer in a developing country-Oman. *Breast*, **13**, 139-45.

Austoker J, Bankhead C, Forbes LJL, et al (2009). Interventions to promote cancer awareness and early presentation: systematic review. *Br J Cancer*, **101**, 31-9.

Bayrami R, Taghipour A, Ebrahimipour H (2014). Challenges of providing cervical cancer prevention programs in Iran: a qualitative study. *Asian Pac J Cancer Prev*, **15**, 10071-7.

De Nooijer J, Lechner L, De Vries H (2001). Help-seeking behaviour for cancer symptoms: perceptions of patients and general practitioners. *Psychooncol*, **10**, 469-78.

De Nooijer J, Lechner L, De Vries H (2002). Early detection of cancer: knowledge and behavior among Dutch adults. *Cancer Detect Prev*, **26**, 362-9.

De Nooijer J, Lechner L, De Vries H (2003). Social psychological correlates of paying attention to cancer symptoms and seeking medical help. *Soc Sci Med*, **56**, 915-20.

Donnelly TT, Al Khater AH, Al-Bader SB, et al (2014). Factors that influence awareness of breast cancer screening among Arab women in Qatar: results from a cross sectional survey. *Asian Pac J Cancer Prev*, **15**, 10157-64.

El Saghir NS, Khalil MK, EidT, El Kinge AR, et al (2007). Trends in epidemiology and management of breast cancer in developing Arab countries: a literature and registry analysis. *Int J Surg*, **5**, 225-33.

Feizi A, Kazemnejad A, Babae G, Parsayekta Z, et al (2010). Public awareness of risk factors for cancer and its determinants in an Iranian Population. *Asia Pac J Public Health*, **22**, 76-88.

Forbes LJ., Warburton F, Richards MA, et al (2014). Risk factors for delay in symptomatic presentation: a survey of cancer patients. *Br J Cancer*, **111**, 581-8.

Forbes LJL, Simon AE, Warburton F, et al (2013). Differences in cancer awareness and beliefs between Australia, Canada, Denmark, Norway, Sweden and the UK (the international cancer benchmarking partnership): do they contribute to differences in cancer survival? *Br J Cancer*, **108**, 292-300.

Fouladi N, Ali-Mohammadi H, Pourfarzi F, et al (2014). Exploratory study of factors affecting continuity of cancer care: Iranian Women's perceptions. *Asian Pac J Cancer Prev*, **15**, 133-7.

Gajda M, Kaminska-Winciorek G (2014). Do not let to be late: overview of reasons for melanoma delayed diagnosis. *Asian Pac J Cancer Prev*, **15**, 3873-7.

Harford JB (2011). Breast-cancer early detection in low-income and middle-income countries: do what you can versus one size fits all. *Lancet Oncol*, **12**, 306-12.

Hashim SM, FahTS, Omar K, et al (2011). Knowledge of colorectal cancer among patients presenting with rectal bleeding and its association with delay in seeking medical advice. *Asian Pac J Cancer Prev*, **12**, 2007-11.

Hunter MS, Grunfeld EA, Ramirez AJ (2003). Help-seeking intentions for breast-cancer symptoms: A comparison of the self-regulation model and the theory of planned behaviour. *Br J Health Psychol*, **8**, 319-33.

Jassem J, Ozmen V, Bacanu F, et al (2014). Delays in diagnosis and treatment of breast cancer: a multinational analysis. *Eur J Public Health*, **24**, 761-7.

Jemal A, Bray F, Center MM, et al (2011). Global cancer statistics. *CA Cancer J Clin*, **61**, 69-90.

Karadag G, Gungormus Z, Surucu R, et al (2014). Awareness and practices regarding breast and cervical cancer among Turkish women in Gaziantep. *Asian Pac J Cancer Prev*, **15**, 1093-8.

Kumar S, Burney I, Al-Ajmi A, et al (2011). Changing trends of breast cancer survival in Sultanate of Oman. *Oncol*, **2011**, 316243.

Lostao LI, Joiner TE, Pettit JW, et al (2001). Health beliefs and illness attitudes as predictors of breast cancer screening attendance. *Eur J Public Health*, **11**, 274-9.

MacDonald S, Macleod U, Campbell NC, et al (2006). Systematic review of factors influencing patient and practitioner delay in diagnosis of upper gastrointestinal cancer. *Br J Cancer*, **94**, 1272-80.

Macleod U, Mitchell ED, Burgess C, et al (2009). Risk factors for delayed presentation and referral of symptomatic cancer: evidence for common cancers. *Br J Cancer*, **101**, 92-101.

Ministry of Health (2010). Early detection and screening for breast cancer- operational guidelines. Oman: ministry of health, department of family and community health. directorate general of health affair <http://www.moh.gov.om/en/mgl/Manual/Guidelines%20on%20Breast%20cancer%20Screening%20services%20in%20Oman.pdf> (Accessed 21.1.2015).

Ministry of Health (2012). Glimpses of Health System and Health Status in the Sultanate of Oman. [http://www.moh.gov.om/en/archives/healthvision2050/eng/Sultanate\\_of\\_Oman\\_Health\\_System\\_profile.pdf](http://www.moh.gov.om/en/archives/healthvision2050/eng/Sultanate_of_Oman_Health_System_profile.pdf) (Accessed 21.1.2015).

Mohamed IE, Skeel WK, Tamburrino M, et al (2005).

- Understanding locally advanced breast cancer: what influences a woman's decision to delay treatment? *Prev Med*, **41**, 399-405.
- Moore MA, Sangrajrang S, Bray F (2014). Asian Cancer Registry Forum 2014 - regional cooperation for cancer registration: priorities and challenges. *Asian Pac J Cancer Prev*, **15**, 1891-4.
- Nooyi SC, Al-Lawati JA (2011). Cancer incidence in Oman, 1998-2006. *Asian Pac J Cancer Prev*, **12**, 1735-8.
- Rahim HF, Sibai A, Khader Y, et al (2014). Non-communicable diseases in the Arab world. *Lancet*, **383**, 356-67.
- Rastad H, Khanjani N, Khandani BK (2012). Causes of delay in seeking treatment in patients with breast cancer in Iran: a qualitative content analysis study. *Asian Pac J Cancer Prev*, **13**, 4511-15.
- Ravichandran K, Mohamed G, Al-Hamdan NA (2010). Public knowledge on cancer and its determinants among Saudis in the Riyadh region of Saudi Arabia. *Asian Pac J Cancer Prev*, **11**, 1175-80.
- Richards MA (2009). The National Awareness and Early Diagnosis Initiative in England: assembling the evidence. *Br J Cancer*, **101**, S1-4.
- Robb K, Stubbings S, Ramirez A, et al (2009). Public awareness of cancer in Britain: a population-based survey of adults. *Br J Cancer*, **101**, 18-23.
- Sathian B, Nagaraja SB, Banerjee I, et al (2014). Awareness of breast cancer warning signs and screening methods among female residents of Pokhara valley, Nepal. *Asian Pac J Cancer Prev*, **15**, 4723-6.
- Sheikh I, Ogden J (1998). The role of knowledge and beliefs in help seeking behaviour for cancer: a quantitative and qualitative approach. *Patient Educ Couns*, **35**, 35-42.
- Simon AE, Juszczak D, Smyth N, et al (2012). Knowledge of lung cancer symptoms and risk factors in the UK: development of a measure and results from a population-based survey. *Thorax*, **67**, 426-32.
- Simon AE, Waller J, Robb K, et al (2010). Patient delay in presentation of possible cancer symptoms: the contribution of knowledge and attitudes in a population sample from the United Kingdom. *Cancer Epidemiol Biomarkers Prev*, **19**, 2272-7.
- Smith LK, Pope C, Botha JL (2003). Patients' help-seeking experiences and delay in cancer presentation: a qualitative synthesis. *Lancet*, **366**, 825-31.
- Stubbings S, Robb K, Waller J, et al (2009). Development of a measurement tool to assess public awareness of cancer. *Br J Cancer*, **101**, 13-7.
- World Health Organization (2010). Country cooperation strategy for WHO and Oman 2010-2015. [http://www.who.int/countryfocus/cooperation\\_strategy/ccs\\_omn\\_en.pdf](http://www.who.int/countryfocus/cooperation_strategy/ccs_omn_en.pdf) (Accessed 21.1.2015).
- World Health Organization (2014). Cancer- Fact sheet. <http://www.who.int/mediacentre/factsheets/fs297/en/> (Accessed 21.1.2015).
- Yaw YH, Shariff ZM, Kandiah M, et al (2014). Diet and physical activity in relation to weight change among breast cancer patients. *Asian Pac J Cancer Prev*, **15**, 39-44.