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Assessment of the level of knowledge, attitudes, and practices regarding cancer in Saudi population

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ABSTRACT

Background: Cancer is the leading threat to global health care with the fastest occurrence rate. As per the global estimate in 2020, about 10.0 million people died due to cancer and 19.3 million new cases were reported. Particularly in Saudi Arabia, 24,485 newly diagnosed cancer patients and 10,518 deaths due to cancer were reported in 2018. *Objective:* This study aim to examine the self-reported knowledge, attitudes and preventive practices on cancer among the people of Saudi Arabia and to find the association between knowledge, attitude and practices on cancer with demographic variables. *Design:* Cross sectional study. *Setting:* Sample size was derived to be 381 individuals. *Methods:* The Statistical Package. For Social Sciences (SPSS) 22.0 version for windows was used for data analysis. *Study duration:* February to December 2021. *Main Outcome Measures:* The findings indicate that among all included participants 64.3% have good knowledge, 61.4% have a positive attitude, and 53.8% follow good practices on cancer.

Keywords: Cancer; questionnaire; screening; risk factor

1. INTRODUCTION

Cancer is the leading threat to global health care with the fastest occurrence rate. As per the global estimate in 2020, about 10.0 million people died due to cancer and 19.3 million new cases were reported (Sung et al., 2021). Particularly in Saudi Arabia, 24,485 newly diagnosed cancer patients and 10,518 deaths due to cancer were reported in 2018 per 33,554,333 total populations (Alqahtani et al., 2020). The incidence of cancer was more pronounced in females than males with an estimated ratio of 1:0.94. However, in contrast, a slight difference was noted in the age-standardized Saudi female population, where the cancer rate was less (82.8 / 100,000) than the male population (83.6 / 100,000). The most prevalent types of cancers in women were colon, thyroid, breast, and non-Hodgkin's lymphoma, however among males the non-Hodgkin's lymphoma, colon lymphoma, liver, and leukemia were most frequently (Ravichandran et al., 2011). Current therapeutic researches indicate the decreased death rate due to cancers which is because of the timely diagnosis and advancement in therapeutic interventions (Jatoi,

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2011; Tabár et al., 2011; CDC, 2011). As per the data reported in 2018, 14.6% of all cancer cases registered in Saudi Arabia was of colon-rectal type. The risk factors of colon-rectal cancer include sex, age, environment, genetic makeup, and inflammatory diseases of the digestive system (WHO, 2018; Zubaidi et al., 2015; Alqahtani et al., 2018).

Prostate cancer is the major type of cancer with high mortality in men and those with altered lipid metabolic profile, HPV infection are most likely to develop this cancer. Additionally, racial differences are also the prominent risk factor for prostate cancer (Siegel et al., 2018). The incidence of brain cancer is not high in among Saudi individuals; it ranges from 2.0 percent in women to 3.2 percent in men, as specified by the Saudi cancer national registry (Taha et al., 2018). Non-(NHL) Hodgkin's, Hodgkin's (HL) lymphomas, and extra-nodal non-Hodgkin lymphoma (EN-NHL) are other types of widespread cancers among Saudi people (Rauf et al., 2015; Al Diab et al., 2011). As per the data cited in reference (Shamoon et al., 2018), the incidence of a rare type of HL with significant clinical variations was 3.4 percent in Saudi Arabia, with a population of age 15 to 35 years were highly affected. Similarly, kidney cancer is another most frequently occurring cancer among Saudi population with the fastest growth rate in the current decade (Medina-Rico et al., 2017).

In 2013, the cancer registry indicated a 2.3% rate of kidney cancer among all types of cancers in the age-standardized population. High prevalence may be due to many associated risk factors that include hypertension, diabetes, obesity, and smoking (Alkhateeb et al., 2018). Another most frequently occurring cancer is thyroid carcinoma which is around 10.1% of all cancers with a noticeably high prevalence in females than males (Bafaraj et al., 2018). The most widespread and malignant type is papillary thyroid carcinoma (WHO, 2008; Saeed et al., 2018). There is a high need to implement effective preventive measures which require a great participation of the general public. The educational campaigns aware the public about the pathogenies, the severity of disease along preventive measures play a chief role in increasing compliance (Sessa et al., 2008). Numerous researches conducted in the kingdom indicated the poor knowledge related to breast cancer and its diagnosis in females, therefore, described current effective preventive health measures and practices including Mammography, Clinical Breast Examination (CBE), breast self-examination (BSE) (Alam, 2006; Amin et al., 2009; Alsaif, 2004; Jahan et al., 2006; Sait et al., 2010; Dandash and Al-Mohaimeed, 2007). However, in a few of these researches, a particular group of people was analyzed, for example teachers and students (Amin et al., 2009; Alsaif, 2004; Jahan et al., 2006). Furthermore, a lack of awareness about cervical cancer in the females of Saudi Arabia was observed compared to females of developed countries in reference (Sait, 2009). There are only a few studies that evaluated the perspective regarding cancer prevention approaches, however, these studies were essentially limited to female data (Jahan et al., 2006; Dandash and Al-Mohaimeed, 2007).

This study aims to present the findings on evaluation of information, viewpoint, and practices regarding cancer in the general public of Saudi Arabia. The aim of this investigation is to provide information to policymakers and educators that may support in initiating effective preventive measures by assessing the level of knowledge and attitude of people about cancer and what preventive measures they follow. These findings are important for two main reasons. First, it reveals the information level of indigenous populations and their perception regarding cancer and its control because the data is lacking in this area. Second, this information will help in improving cancer control.

Aim

This study aims to evaluate the self-responded knowledge, attitudes, and preventive measures on cancer in the Saudi population and to determine the link between the examined parameters and demographic variables.

2. METHODS

A cross-sectional study was performed during the period between Februarys to December 2021, in the Kingdom of Saudi Arabia. All candidates above 18 years were included however; individuals with any acute or chronic disease were excluded as per exclusion criteria. The participants provided data were collected using a pre-tested and self-developed questionnaire. The questionnaire was designed based on experts consultations and analytical literature review in both English and Arabic language. To recognize the logistic issues, a pilot study including 25 participants was performed on that account questionnaire was modified appropriately. The questionnaire comprises a total of 61 items (31 main and 30 sub-items) covering basically four areas including knowledge, viewpoint, practices on cancer, and demographic features. The knowledge section comprises questions from five sub-areas, 6 questions about cancer symptoms, 8 questions about risk factors, 6 questions about cancer prevention, 4 questions about cancer treatment approaches, 6 questions about sources of information. The attitude section comprises 14 questions. The practices section comprises 10 questions. However, the demographic features section comprises questions related to age, gender, family members, family monthly income, occupation, nationality, and educational status.

Sample Size Calculation

Based on the Ethiopian study published in Ethiopia (Tekle et al., 2020), the frequency of effective knowledge in women was found to be 0.431. Therefore, the sample size needed was derived to be 381 at 80% power with 7% absolute precision and 5% level of importance.

Data Collection

Microsoft excel 2010 was used for data collection. Two options (yes or no) are provided with each question in the knowledge section. Each (yes) response is considered correct and marked as (1). Similarly, each (no) response is considered as wrong and marked as (0).). Knowledge became considered as poor if (<80%) and good if it is (≥ 80%) using modified bloom's cutoff points (Jawed et al., 2020). In the attitude section, questions were presented with Likert five-point scale (1-5), where 1= strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree. Subsequently, the responses from the participants were added and the median was calculated for each question. Resulting the participants were categorized as having a negative attitude if the sum is equal or greater than the median value, and a positive attitude if the value is lower than the median value. Lastly, in the practice section, the questions were given with options (yes or no) and the questions were like if any member of your family was diagnosed with cancer, did you get the other family members screened for cancer diagnosis? Resulting, the practice was considered as good, if the response is (yes) and poor/bad if the response is (no).

Statistical Analysis

Statistical Package for Social Sciences (SPSS) (windows version 22.0) was used for analyzing data. Demographic variables results were indicated in percentages and frequencies. To determine the connection between categorical variables, a chi-square test was applied, subsequently, the odds ratio was adjusted, and to determine the effectiveness of this association 95% confidence interval was calculated. Results were considered statistically significant if the (P-value was less than 0.05).

3. RESULTS

A total of 381 individuals were enrolled in this study. Acceptable reliability or internal consistency and Cronbach's alpha index equal to 0.864 were noticed.

Table 1 Demographic Characteristics

Demographic Characteristic		Respondents n=381	
		Number	%
Gender	Male	277	72.7
	Female	104	27.3
Age	< 30	30	7.9
	30 – 59	307	80.6
	> or = 60	44	11.5
Family Type	With siblings (males / females)	377	99.0
	Without siblings (males / females)	4	1.0
Education	Primary / Secondary / Intermediate	59	15.5
	Bachelor/ Diploma	229	60.1
	Master / / Ph.D / Others	93	24.4
Nationality	Saudi	363	95.3
	Non-Saudi	18	4.7
Occupation	Student	10	2.6
	Govt. / Private Job	308	80.8
	Does Not Work	63	16.5
Family income (Monthly)	Less than 5000 SR	26	6.8
	From 5000 to 10,000 SR	97	25.5
	From 10001 to 20000 SR	158	41.5
	More than 20000 SR	100	26.2

Sociodemographic Characteristics of Respondents

Table 1 demonstrates the sociodemographic data. It highlights information related to age, gender, family type information, education level, nationality, occupation, and financial status. Total 381 participants include (27.3%) or 104 women and (72.7%) or 277 males. The dominant age group was 30-59 years because 307 (80.6%) of all participants were in this age range, however, the participants with age ≤ 60 years were only 44 or (11.5%). Almost all participants 377 (99.0%) responded with the presence of siblings in the family and only (1.0%) or 4 participants responded that they do not have siblings. A greater number of participants about 229 (60.1%) were bachelor degree/diploma holders and 93 (24.4%) were qualified for Master / Ph.D. / equivalent compared to the very low number of participants with intermediate or below level 59 (15.5%). Among all, 363 (95.3%) of participants were Saudi, comprising a big part of the study society. Additionally, 308 (80.8%) of participants were Govt. / Private employ in contrast to the (16.5%) or 63 participants who were jobless. Data analysis further reveals that family monthly earning of the majority of study participants 157 (41.5%) was in the range of 10K-20K SAR, about 100 (26.2%) participants income was < 20K SAR however, only 26 (6.8%) individuals responded the >5K monthly family income.

Figure 1 and Table 2 demonstrates the good knowledge level in 245 (64.3%) of all participants. Among all, 246 (64.6%) showed good knowledge on symptoms, 250 (65.6%) on risk factors, 245 (64.3%) on control approaches, 248 (65.1%) on treatment approaches, and 247 (64.8%) on sources of data regarding cancer. Moreover, a big number 247(67.5%) and 253 (66.4%) of all participants were well aware of the reality that changes in breast and bowel are the symptoms of cancer, respectively. In addition, above half of the participants, 255 (66.9%) and 254 (66.7%) were well aware of the fact that tobacco and old age are the potential risk factors for cancer, respectively. Subsequently, regular medical care in view of 254 (66.7%) participants and healthy diet according to 250 (66-1%) participants were the most effective cancer preventive approaches. With respect to treatment approaches, 248 (65.1%) of all participants indicated chemotherapy, 247 (64.8%) surgery and 250 (65.6%) radiotherapy as the available effective treatment approaches for cancer. Lastly, doctors and friends/relatives were regarded as sources of cancer information by 251 (65.9%) and 250 (65.6%) of all participants, respectively.

Table 3 depicts the participant's attitudes regarding cancer. It briefly summarizes the responses of participants with respect to 14 main variables and subsequently grouped into 5 opinions (strongly disagree, disagree, neutral, agree, and strongly agree). The majority of the study population showed a positive attitude because the median value of mainly all 14 items is agreed or strongly agree. The positive attitude of a large study population of 234 (61.4%) with respect to early detection may ultimately help in increasing the hope in cancer patients and the overall treatment. Agreement or strong agreement of 233 (61.5%) participants on cancer risk makes the early screening of cancers is an absolute necessity for effective treatment and prevention.

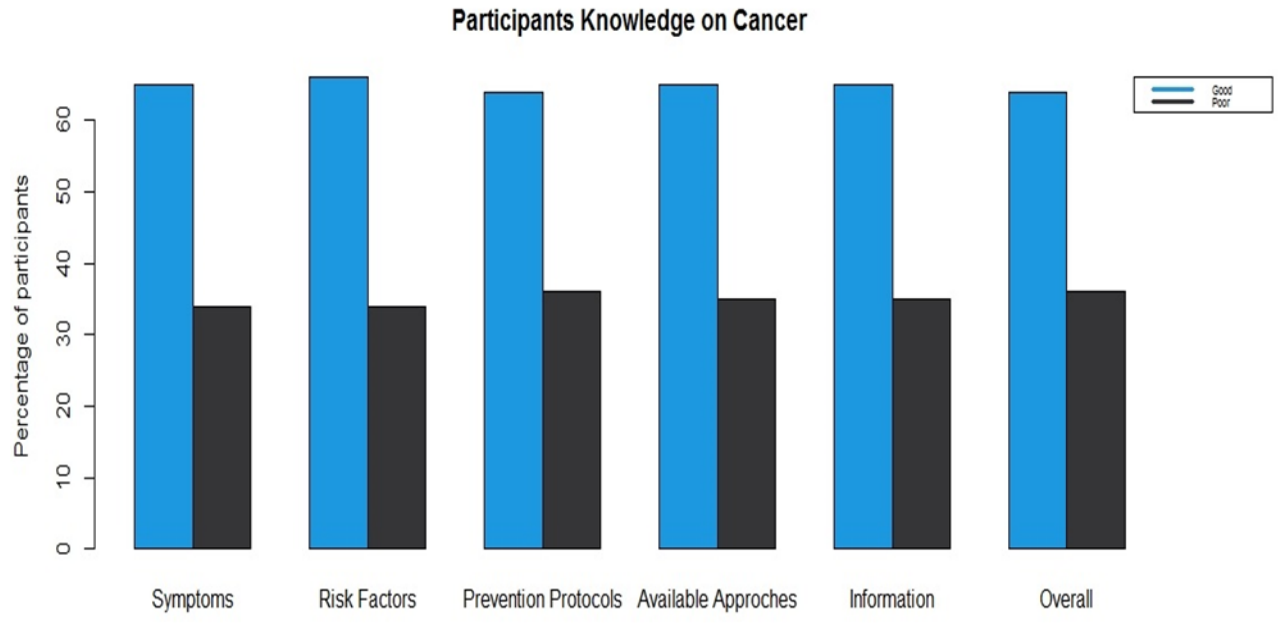

Figure 1 Participant's knowledge on cancer.

Table 2 Study Participants Knowledge on Cancer

Knowledge on Cancer	Responses n=381	
	No (%)	Yes (%)
Knowledge about cancer symptoms: Poor 135 (35.4%) Good 246 (64.6%)		
Breast Changes	124(32.5)	247(67.5)
Bladder Changes	133(34.9)	248(65.1)
Bleeding or Bruising	130(34.1)	251(65.9)
Bowel Changes	128(33.6)	253(66.4)
Cough	131(34.4)	250(65.6)
Eating Problems	133(34.9)	248(65.1)
Knowledge about cancer potential risk factors: Poor 131(34.4%) Good 250(65.6%)		
Older Age	127(33.3)	254(66.7)
Family History	129(33.9)	250(66.1)
Tobacco	133(34.9)	248(65.1)
Obesity	126(33.1)	255(66.9)
Alcohol	128(33.6)	253(66.4)
Viral Infections	133(34.9)	248(65.1)
Chemicals	128(33.6)	253(66.4)
Radiation Exposure	129(33.9)	250(66.1)
Knowledge about the cancer prevention protocols: Poor 136(35.7%) Good 245(64.3%)		
Strictly avoid Tobacco	130(34.1)	251(65.9)
Healthy Diet	129(33.9)	250(66.1)
Maintain Healthy Weight and Physical Activities	134(35.2)	247(64.8)
Get Vaccination	134(35.2)	247(64.8)
Avoid Risky Behavior	133(34.9)	248(65.1)
Get Regular Medical Care	127(33.3)	254(66.7)
Knowledge about available approaches of cancer: Poor 133(34.9%) Good 248(65.1%)		
Surgery	134(35.2)	247(64.8)
Chemotherapy	133(34.9)	248(65.1)
Radiotherapy	131(34.4)	250(65.6)
Others (Immunotherapy, Targeted Therapy, Hormone Therapy, Stem Cell Transplantation etc.,)	133(34.9)	248(65.1)
Participant's source of cancer related information: Poor 134(35.2%) Good 247(64.8%)		
News Paper / Magazine	133(34.9)	248(65.1)
TV / Radio	132(34.6)	249(65.4)
Primary Health Care Workers	131(34.4)	250(65.6)
Doctors	130(34.1)	251(65.9)
Friends or Relatives	131(34.4)	250(65.6)
Composite knowledge score about cancer: Poor 136 (35.7%) Good 245 (64.3%)		

Table 3 Participants Attitudes on Cancer

Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total	Median
Timely diagnosis is necessary for the control and treatment of cancer.	213	20	21	91	36	381	Strongly Agree
Health education and awareness regarding cancer prevention offered by government and private organizations lessen the risk of cancer.	162	51	32	96	40	381	Agree
Initiatives of awareness workshops regarding cancer risk is important.	197	31	22	92	39	381	Strongly Agree
Social media such as (Instagram, WhatsApp, Twitter, Facebook) are helpful in improving the awareness regarding cancer risk.	198	32	20	92	39	381	Strongly Agree
Old media resources such as (radio, television) are helpful in improving the awareness regarding cancer risk.	159	59	32	90	41	381	Agree
For early detection of a particular type of cancer, at a specific age, it is required to follow preventive examinations from an authorized center.	186	42	25	90	38	381	Agree
International standard certified diagnostic tests become an absolute requirement for the timely detection of cancer.	206	28	19	90	38	381	Strongly Agree
Timely diagnosis of cancer may also help in developing a positive attitude, psychological peace, and hope in patient for treatment which ultimately helps in recovery.	229	5	18	90	39	381	Strongly Agree
Discontinued diagnostic testing and awareness programs regarding cancer that do not involve the entire community are sufficient for cancer screening. For instance, the world breast cancer day.	67	31	38	171	74	381	Disagree
Timely treatment of cancer diagnosed patients may impact less on their psychology and finance.	201	31	21	92	36	381	Strongly Agree
If cancer is not diagnosed early it	178	50	24	90	39	381	Agree

may impact the family finances badly because of the huge expenses of treatment							
Additionally, the late detection of cancer may influence the government's financial budget because of the highly expensive radiation therapy, chemotherapy drugs, and other related treatments it requires.	188	37	22	94	40	381	Agree
The most important need is to develop authorized specialized centers to make the early detection of all prevalent cancers possible in all regions.	211	22	19	93	36	381	Strongly Agree
The government should make these cancer diagnostic tests mandatory for all citizens and be required to be re-evaluated every five years.	195	31	27	88	40	381	Strongly Agree
Composite Attitude score about cancer: Negative attitude 147 (38.6%) positive attitude 234 (61.4%)							

Table 4 depicts the general practices of study participants regarding cancer. A fairly good number of participants 64 (53.8%) showed good practices. Surprisingly, 119 out of all participants are relative to cancer patients, 47 (39.50%) responded the diagnosis was late resulting in the patient died, 20 (16.81%) responded the diagnosis was on-time and the patient recovered. However, only 3 (2.52%) participants responded the cancer was diagnosed late and yet the treatment is continued.

Table 4 Participants Practices on Cancer

Practices on cancer		Respondents n=381 and in relation with cancer patients 119	
		No (%)	Yes (%)
Have you ever been diagnosed with any type of cancer before?		368(96.59)	13(3.41)
Is anyone in your family had ever diagnosed with cancer (parents, siblings?		255(66.93)	119(31.23)
If the above answer is yes, is there anyone else in the family affected by the same cancer type?		103(86.55)	16(13.45)
Information related to cancer patients in family	Cancer was timely diagnosed however, treatment is ongoing.	110(92.44)	9(7.56)
	Cancer was timely diagnosed and treatment remained successful.	99(83.19)	20(16.81)
	Cancer was timely diagnosed however treatment was not successful and the patient died.	114(95.80)	5(4.20)
	Cancer was diagnosed in later stages however, treatment is ongoing.	116(97.48)	3(2.52)
	Cancer was diagnosed in later stages however treatment was not successful and the patient died.	72(60.50)	47(39.50)
	Cancer was diagnosed in later stages however, treatment was successful.	113(94.96)	6(5.04)
Have you got to examine the remaining non-affected family members?		55(46.2)	64(53.8)
Composite practices score about cancer: Poor 55 (46.2%) Good 64 (53.8%)			

Table 5 Factors Associated with Knowledge of Cancer

Variable		Knowledge on cancer		AOR	P-Value(95% C.I)
		Poor (%)	Good (%)		
Gender	Male	102(36.8)	175(63.2)	1.200	0.454(0.745-1.933)
	Female	34(32.7)	70(67.3)	1	-
Age	< 30	13(43.3)	17(56.7)	1.090	0.857(0.428-2.775)
	30 – 59	103(33.6)	204(66.4)	1.650	0.120(0.871-3.127)
	> or = 60	20(45.5)	24(54.5)	1	-
Family type	There are brothers (males, females) in the family	133(35.3)	244(64.7)	0.182	0.141(0.019-1.764)
	There are no brothers (male, female) in the family	3(75.0)	1(25.0)	1	-
Education	Primary / Secondary / Intermediate	28(47.5)	31(76.3)	1	-
	Bachelor / Diploma	84(36.7)	145(63.3)	1.559	0.132(0.875-2.777)
	Master / PHD / Others	24(25.8)	69(74.2)	2.597	0.007(1.302-5.180)
Nationality	Saudi	129(35.5)	234(64.5)	1.154	0.722(0.437-3.050)
	Non-Saudi	7(38.9)	11(61.1)	1	-
Occupation	Student	6(60.0)	4(40.0)	-	-
	Govt. / Private	99(32.1)	209(67.9)	3.167	0.079(0.874-11.476)
	Does not work	31(49.2)	32(50.8)	1.548	0.528(0.398-6.022)
Economic status of the family	Less than 5000 SR	17(65.4)	9(34.6)	-	-
	From 5000 to 10,000 SR	36(37.1)	61(62.9)	3.201	0.012(1.292-7.927)
	From 10001 to 20000 SR	54(34.2)	104(65.8)	3.638	0.004(1.521-8.703)
	More than 20000 SR	29(29.0)	71(71.0)	4.625	0.001(1.850-11.560)
Is there a close relationship between parents?	There are a family relationship (cousin or aunt) or (cousin or uncle)	30(36.6)	52(63.4)	-	-
	There are a family relationship but not that mentioned in the second option	25(43.9)	32(56.1)	0.872	0.608(0.517-1.471)
	No family relationship	81(33.5)	161(66.5)	0.644	0.142(0.358-1.159)

Table 5 depicts the influence of different demographic variables on the knowledge level of study participants about cancer. Compared to females, males show good knowledge. Specifically, the data highlight that 175 (63.2%) of male participants show good knowledge, and 102 (36.8%) participants were with poor knowledge. In contrast, decreased number (70) or (67.3%) of females participants show good knowledge and 34 (32.7%) females were with poor knowledge. Ratio of the adjusted odds is 1.200 and its 95% confidence interval (0.745-1.933) found statistically not significant ($P > 0.05$). The majority 204 (66.4%) of participants of age group 30-59 years showed good knowledge however, the number of > 30 years of age participants with good knowledge was only 17 (56.7%). Additionally, a good knowledge level was observed in 244 (64.7%) participants with siblings. Concerning education level, 69 (74.2%) participants holding Master / Ph.D. / equivalent degree showed good knowledge compared to 24 (25.8%) who demonstrated poor knowledge. Odds ratio is 2.597 and its 95% confidence interval (1.302-5.180) was found statistically highly significant ($P < 0.01$). Furthermore, the nation-wise differences were also observed. Good knowledge was observed in 234 (64.5%) Saudi nationals compared to 11 (61.1%) Non-Saudi participants' showed good knowledge. 209 (67.9%) participants who were employees of either private or Government organizations showed good knowledge. 71 (71.0%) participants with monthly income < 20K SAR demonstrated good knowledge. Odds ratio is 4.625 and statistically highly significant ($P<0.01$) 95% confidence interval is (1.850-11.560).

Table 6 Factors Associated with Attitudes on Cancer

Variable		Attitude on cancer		AOR	P-Value(95% C.I)
		Negative (%)	Positive (%)		
Gender	Male	106 (38.3)	171(61.7)	1.050	0.836(0.661-1.666)
	Female	41(39.4)	63(60.6)	1	()
Age	< 30	12(40.0)	18(60.0)	1	-
	30 – 59	113(36.8)	194(63.2)	1.145	0.730(0.532-2.463)
	> or = 60	22(50.0)	22(50.0)	0.667	0.398(0.261-1.706)
Family type	other siblings in the family	144(38.2)	233(61.8)	4.854	0.173(0.500-47.112)
	No other siblings in the family	3(75.0)	1(25.0)	1	-
Education	Primary / Secondary / Intermediate	40(67.8)	19(32.2)	1	-
	Bachelor / Diploma	76(33.2)	153(66.8)	4.238	0.00(2.300-7.811)
	Master / PHD / Others	31(33.3)	62(66.7)	4.211	0.000(2.100-8.443)
Nationality	Saudi	137(37.7)	226(62.3)	2.062	0.137(0.795-5.351)
	Non-Saudi	10(55.6)	8(44.4)	1	-
Occupation	Student	4(40.0)	6(60.0)	1.875	0.365(0.482-7.300)
	Govt. / Private	108(35.1)	200(64.9)	2.315	0.003(1.336-4.009)
	Does not work	35(55.6)	28(44.4)	1	-
Economic status of the family	Less than 5000 SR	17(65.4)	9(34.6)	1	-
	From 5000 to 10,000 SR	39(40.2)	58(59.8)	2.809	0.025(1.137-6.938)
	From 10001 to 20000 SR	58(36.7)	100(63.2)	3.257	0.008(1.364-7.776)
	More than 20000 SR	33(33.0)	67(67.0)	3.835	0.004(1.545-9.518)

Table 6 depicts the influence of different demographic variables on the attitude of study participants about cancer. Compared to females, males show a good attitude. Specifically, the data highlight that 171 (61.7%) of male participants show a positive attitude and 106 (38.3%) participants were with a negative attitude. In contrast, decrease number 63 or (60.6%) of females participants show a positive attitude and 41 (39.4%) females were with a negative attitude. The adjusted odds ratio is 1.050 and its 95% confidence interval (0.661-1.666) found statistically not significant ($P > 0.05$). The majority 194 (63.2%) of participants of age group 30-59 years showed positive attitude however, the number of > 30 years of age participants with positive attitude was only 18 (60.0%). Additionally, a positive attitude level was observed in 233 (61.8%) participants with siblings. Concerning education level, 62 (66.7%) participants hold Master / Ph.D. / equivalent degree showed positive attitude compared to 31 (33.3%) who demonstrated negative attitude. The adjusted odds ratio is 4.211 and its 95% confidence interval (2.100-8.443) was found statistically highly significant ($P < 0.01$). Furthermore, the nation-wise differences were also observed. A positive attitude was observed in 226 (62.3%) Saudi nationals compared to 8 (44.4%) non-Saudi participants' showed a positive attitude. 200 (64.9%) participants who employees of either private or Government organizations were showed a positive attitude. 67 (67.0%) participants with monthly income < 20K SAR demonstrated positive attitude. The adjusted odds ratio is 3.835 and statistically highly significant ($P<0.01$) 95% confidence interval is (1.364-7.776).

Table 7 depicts the link between the demographic variables and general practices of study participants regarding cancer. 91 of the total participants were relatives of cancer patients. 49 (57.0%) males and 15 (45.5%) females got their unaffected family members screened for cancers. 52 (52.5%) of participants of age group 30-59 years and 18 (60.0%) participants of age > 30 years got their unaffected family members examined. Similarly, 62 (53.4%) participants with siblings also did it. Concerning education level, 32 (94.1%) participants hold Master / Ph.D. / equivalent degree got examined their healthy family members for cancer. Furthermore, 63 (54.3%) Saudi nationals got examined their healthy family members for cancer. 58 (54.2%) participants who were employees of either private or Government organizations got examined their healthy family members for cancer. Moreover, 31(79.5%) participants with monthly income < 20K SAR got examined their healthy family members for cancer.

Table 7 Factors Associated with Practices on Cancer

Variable		Did perform medical examination to the rest of the family		AOR	P-Value(95% C.I)
		No (%)	Yes (%)		
Gender	Male	37(43.0)	49(57.0)	0.629	0.261(0.281-1.411)
	Female	18(54.5)	15(45.5)	1	-
Age	< 30	1(20.0)	4(80.0)	0.286	0.309(0.026-3.196)
	30 – 59	47(47.5)	52(52.5)	1.033	0.953(0.348-3.067)
	> or = 60	7(46.7)	8(53.3)	1	-
Family type	There are brothers (males, females) in the family	54(46.6)	62(53.4)	1.742	0.654(0.154-19.747)
	There are no brothers (male, female) in the family	1(33.3)	2(66.7)	1	-
Education	Primary / Secondary / Intermediate	10(83.3)	2(16.7)	80.00	0.000(9.948-643.324)
	Bachelor / Diploma	43(58.9)	30(41.1)	22.933	0.000(5.103-103.060)
	Master / PHD / Others	2(5.9)	32(94.1)	1	-
Nationality	Saudi	53(45.7)	63(54.3)	0.421	0.485(0.037-4.769)
	Non-Saudi	2(66.7)	1(33.3)	1	-
Occupation	Student	1(50.0)	1(50.0)	1.000	1.000(0.048-20.829)
	Govt. / Private	49(45.8)	58(54.2)	0.845	0.799(0.231-3.089)
	Does not work	5(50.0)	5(50.0)	1	-
Economic status of the family	Less than 5000 SR	6(85.7)	1(14.3)	23.250	0.006(2.438-221.734)
	From 5000 to 10,000 SR	21(72.4)	8(27.6)	10.172	0.000(3.300-31.3584)
	From 10001 to 20000 SR	20(45.5)	24(54.5)	3.229	0.019(1.215-8/.586)
	More than 20000 SR	8(20.5)	31(79.5)	1	-

4. DISCUSSION

The existing study looked at the level of knowledge, attitude, and practicing preventive measures for cancer control in the Saudi population was determined. In addition, the association between these parameters versus demographic variables was examined. The findings indicate that among all included participants 64.3% have good knowledge, 61.4% have good attitude, and 53.8% follow good practices on cancer.

Information Regarding Cancer

A study reported in Riyadh, Saudi Arabia (Ravichandran et al., 2011), showed that 29.4% of all study participants declared that they acquired information about cancer from doctors, however about 7.9% responded that their source of information is health care professionals. Contrary to that, the current study shows the sources of knowledge regarding cancer for (60%) of all included individuals were doctors, newspaper/magazine, television/radio, friends/relatives, and primary health care professionals (Veerakumar and Kar, 2017). The difference is most likely due to the different educational backgrounds of registered participants, in

the former study the high percentage of participants (< 60%) were educated up to intermediate level, however in this study (<60%) participants were bachelor degree/diploma holders.

Regarding Risk Factors

In this study, about 65.1% of all participants observed tobacco and 66.4% alcohol as the risk factors for cancer. Consistent with this in another study from India (Veerakumar and Kar, 2017), about (60%) of study participants considered both smoking and smokeless tobacco as a risk factor for cancers. Similar findings were also observed in a study carried out in Saudi Arabia (Ravichandran et al., 2011; Alam, 2006). Additional, there are some less discussed chief risk factors including obesity, nulliparity, early childbearing, industrial radiation, and red meat intake.

Regarding Prevention of Cancers

The greater number of all participants of this study about (64.8%) regarded physical activity as the greatest preventive measure. Similarly, in a different study (Alam, 2006) a big number of participants (82.4%) had the same view regarding physical activity effectiveness in cancer prevention.

Overall Knowledge on Cancers

According to the study carried out in Riyadh Saudi Arabia (Ravichandran et al., 2011) 82.4% of the participants had good knowledge about cancers, however, in the current study the percentage of participants with good knowledge was found to be 64.3%.

Factors Associated with Knowledge

Out of all study participants, bachelor degree/diploma holder showed about 63.3% and masters/Ph.D./equivalent level indicated about 74.2% good knowledge regarding cancer. Data analysis indicates that the level of knowledge is 1.559 and 2.597 times higher in participants with bachelor degree/diploma education and masters/Ph.D./equivalent level, respectively than participants with basic education level (primary/secondary/intermediate level). Furthermore, the results show that the financial status of the participants significantly impacts the knowledge of cancer. Participants with monthly income (< 20000 SAR) were 4.625 times more knowledgeable than the participants with monthly income (≥ 5000 SAR). Our results further support the previous studies in Ethiopia (Tekle et al., 2020; Shrestha et al., 2013), and Saudi Arabia (Ravichandran et al., 2011).

Factors Associated with Attitude

This study indicates the positive attitude regarding cancer in about 61.4% of the participants. Various other factors such as economic status, education level, and occupation of participants significantly impact the attitude on cancer. Out of all study participants, bachelor degree/diploma holder showed about 66.8% and masters/Ph.D./equivalent level indicated about 66.7% positive attitude regarding cancer. Data analysis indicates that the positive attitude is 4.238 and 4.211 times higher in participants with bachelor degree/diploma education and masters/Ph.D./equivalent level, respectively than participants with basic education level (primary/secondary/intermediate level). Furthermore, there is a noticeable influence of occupation on the attitude; our findings indicate 2.315 times greater positive attitude regarding cancer in Govt. /private job participants than unemployed participants. Moreover, participants having per month income about 10K-20K SAR greater than 20K SAR showed 3.257, 3.835 times greater positive attitude regarding cancer in contrast to the individual with 5K SAR or less monthly income. Our findings further support the previous studies (Tekle et al., 2020, Cullati et al., 2009).

Factors Associated with Practice

Good practices were found in 53.8% of the participants. Various other factors such as economic status, education level, and occupation of participants significantly impact the practice of people on cancer control. Similar findings were found in studies (Tekle et al., 2020; Cullati et al., 2009).

5. CONCLUSION

This survey-based study indicates a modest level of knowledge, attitudes, and practices regarding control cancer in the registered participants. Additionally, occupation, education level, and financial status impact individuals' knowledge, attitude, and practices

on cancer. There is certainly a need to increase awareness of the public regarding health and diseases at primary health care units. This study can be further analyzed qualitatively at a community level.

Author Contribution

All authors contributed equally to the manuscript

Ethical approval

The study was approved by the Ethics Committee of the Taif University (No 43-069).

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Conflicts of interest

The authors declare that there are no conflicts of interests

Data and materials availability

All data associated with this study are present in the paper.

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