

# Shared thoughts and practices on some modifiable cancer risk factors

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**Abstract.** – **OBJECTIVE:** Numerous cancer-causing factors are inversely correlated with health literacy. The current study's objective was to evaluate the Saudi community's knowledge, attitude, and behavior regarding certain carcinogens.

**SUBJECTS AND METHODS:** To perform this descriptive study, a cross-sectional survey was carried out in Hail City, Northern Saudi Arabia, between September 2020 and November 2020. In the city of Hail, about 450 volunteers have expressed interest in taking part in the study.

**RESULTS:** A total of 165 individuals smoked cigarettes and drank alcohol, respectively (67%) and 42 (9%). Negative attitudes toward cigarette smoking, alcohol consumption, radiation exposure, genetic predisposition, some viruses, some bacterial infection, some parasites, and fungi were 85/450 (19%), 209/450 (46.4%), 206/450 (45.8%), 322/450 (71.6%), 297/450 (66%), 375/450 (83.3%), 403/450 (89.6%), and 405/450 (90%), in that order.

**CONCLUSIONS:** Some cancer-causing substances are widely used in the Saudi community. Lack of understanding and a negative attitude toward some carcinogens are widespread, necessitating immediate interventions at the community and health affairs levels.

*Key Words:*

Cancer, Risk factors, Smoking, Alcohol consumption, Saudi Arabia.

renal (5-fold); ovarian and pancreatic (4-fold), and others. These high incidence rates coincided with increases in mortality rates<sup>2</sup> due to a lack of cancer awareness initiatives, a negative attitude toward cancer causes such as cigarette use, infections, an unhealthy lifestyle (sedentary lifestyle), and altering eating patterns (adopting the Western type)<sup>1</sup>.

Many causes have been well-documented as generating genomic instability, which leads to cancer. A single malignant alteration might occur from the combination of several genetic and epigenetic changes generated by a variety of etiological causes. Environmental (external or internal carcinogens) as well as genetic predisposition factors may play a role in cancer development. Approximately 80-90% of cancers are caused by exogenous carcinogens, the majority of which are caused by lifestyle. Tobacco use, alcohol consumption, dietary habits, and reproductive illnesses have all been linked to malignant transformation<sup>3,4</sup>.

Numerous cancer risk factors, such as the use of tobacco and alcohol and exposure to numerous external environmental carcinogens, are inversely correlated with health literacy. Contrarily, it has a favorable correlation with knowledge of cancer risk, which promotes cancer control and prevention<sup>5</sup>. The current study's objective was to evaluate the Saudi community's knowledge, attitude, and behavior about various carcinogens.

## Introduction

The expanding cancer burden is a key source of concern for the global health system. Saudi Arabia has shown a rapid growth in practically all cancer forms, with some incidence variations<sup>1</sup>. Incidence rates for cancer have increased more frequently in the last decade for the thyroid (26-fold); breast, colon, bladder, and uterine (10-fold); prostate (8-fold);

## Subjects and Methods

This descriptive study included a cross-sectional survey done in Hail City, Northern Saudi Arabia, from September to November 2020. Approximately 450 participants from the city of Hail have agreed to take part in the study. People from vari-

ous areas of the city were requested to participate at random, regardless of gender, age, or nationality. A purposeful questionnaire was constructed and utilized to obtain demographic data as well as vital data concerning attitudes and practices toward various carcinogens from participants.

### Statistical Analysis

Following the collection of the data, it was transmitted to the SPSS program (SPSS Inc., Chicago, IL, USA) for analysis in order to provide meaningful statistical values, such as the relative risk, which was constructed using a 95% confidence interval. It was tested using the Chi-square method (a *p*-value of 0.05 was deemed statistically significant).

### Ethical Consent

The Ethical Committee approved the present study's proposal at the College of Medicine, University Ha'il, Saudi Arabia (HREC 00121/CM-UOH.04/20).

## Results

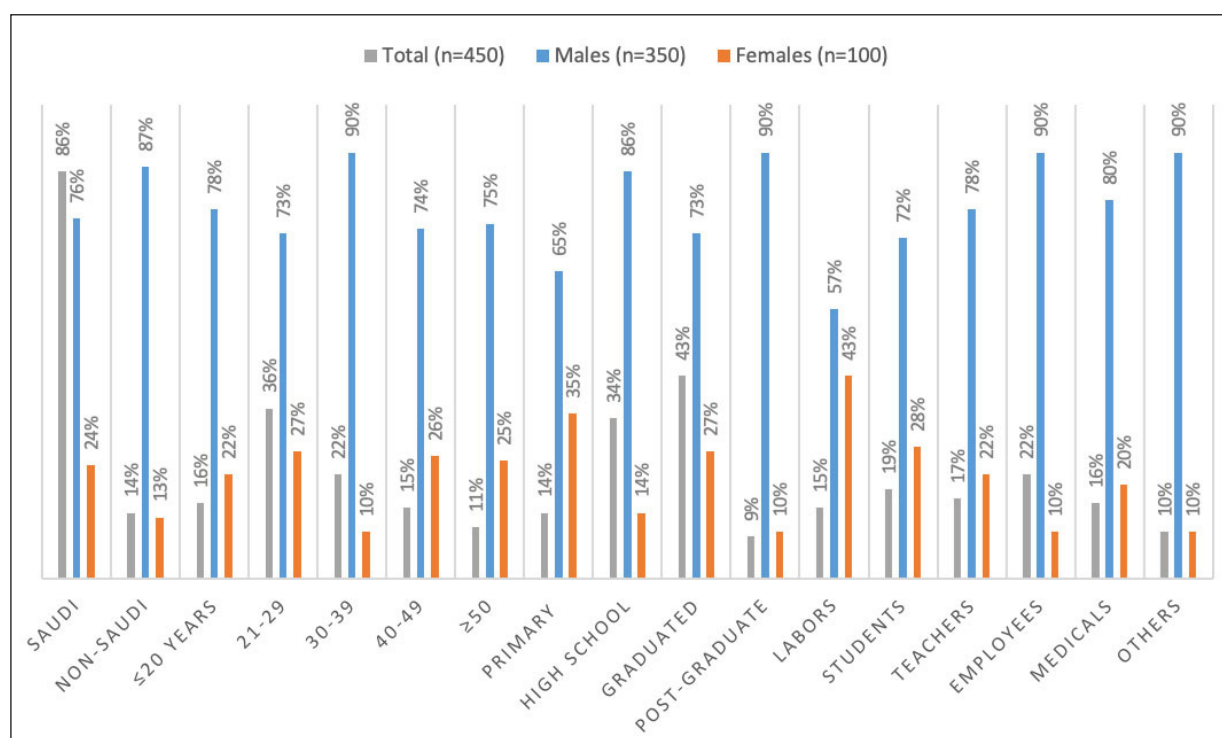
Table I and Figure 1 illustrate the demographic characteristics of the individuals involved in this study (*n* = 450). The average age was 32 years

(range 14-77 years), with 350 men (77.8%) and 100 females (22.2%), 382 Saudis (84.9%), and 68 non-Saudis (15.1%). About 52.2% had a college diploma, while 47.8% had a high school diploma. Employees made up the bulk of participants [100 (22.2%)], followed by students 86 (19.1%), and teachers 78 (17.3%).

About 165 (67%) of the individuals smoked cigarettes, 135 (82%) smoked for more than two years, 30 (18%) for less than two years, and 50 (30%) reported to have quit smoking. Furthermore, 242 (53.8%) reported living with an active smoker. There were just two female smokers. The odds ratio (OR) and 95% confidence interval (95% CI) for smokers/non-smokers were: 42.7 (10.37-175.93), *p*-value < 0.001. OR (95% CI) = 1.5 (1.38-1.64) for the male cohort. Cohort for male gender, OR (95% CI) = 0.035 (0.009-0.141); Fisher's Exact Test (males/females), *p*-value < 0.0001. Level of education did not show any significant correlation with smoking status, OR (95% CI) = 1.316 (0.896-1.933), *p*-value = 0.16, with exception for postgraduates (OR (95% CI) = 0.232 (0.0857 to 0.5817), *p* = 0.0022, *z* statistic = 3.069), as shown in Table II and Figure 2. Concerning occupation, only employees 50/165 (30%) showed a significant correlation with smoking; the OR (95%CI) = 2.4783 (1.5836 to 3.8782), *p* = 0.0001. The age

**Table I.** Participants by demographic characteristics.

Variable	Males (n=350)	Females (n=100)	Total (n=450)
<b>Nationality</b>			
Saudi	291	91	382
Non-Saudi	59	9	68
<b>Age</b>			
≤20 Years	57	16	73
21-29	119	44	163
30-39	87	10	97
40-49	51	18	69
≥50	36	12	48
<b>Education</b>			
Primary	41	22	63
High school	130	22	152
Graduated	143	52	195
Postgraduate	36	4	40
<b>Occupation</b>			
Labors	38	29	67
Students	62	24	86
Teachers	61	17	78
Employees	90	10	100
Medicals	59	15	74
Others	40	5	45



**Figure 1.** Participants by demographic characteristics within the entire group.

**Table II.** Distribution of the participants by smoking status and demographical characteristics.

Variable	Smokers (n=165)	Non-smokers (n=285)	Total (n=450)
<b>Gender</b>			
Males	163	187	350
Females	2	98	100
<b>Nationality</b>			
Saudi	151	231	382
Non-Saudi	14	54	68
<b>Education</b>			
Primary	20	43	63
High school	66	86	152
Graduated	74	121	195
Postgraduate	5	35	40
<b>Occupation</b>			
Labors	19	46	65
Students	20	66	86
Teachers	34	44	78
Employees	50	50	100
Medicals	20	54	74
Others	20	25	45
<b>Age</b>			
≤20 years	16	57	73
21-29	69	94	163
30-39	48	49	97
40-49	16	53	69
≥50	16	32	48

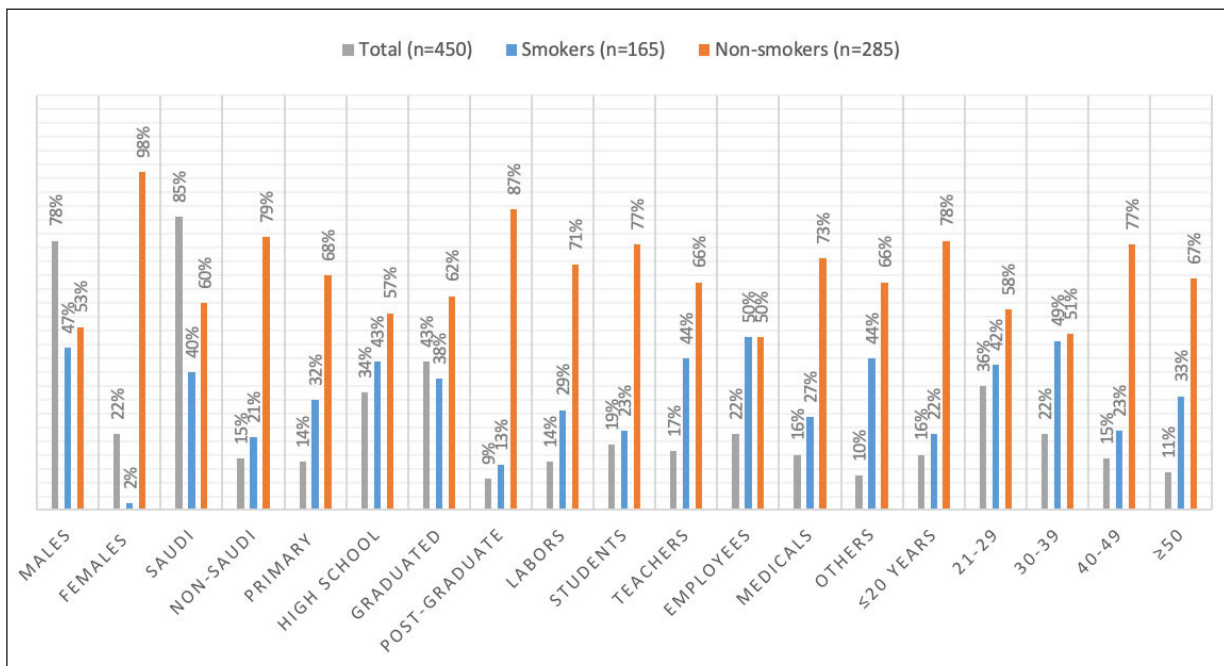


Figure 2. Smoking status by demographical characteristics within entire groups.

range did not show any significant correlation with smoking status, with an exception for the age group 21-29 years [OR (95% CI) = 1.9759 (1.2529 to 3.1162),  $p = 0.0034$ ], as shown in Table II and Figure 2.

Around 42 (9%) people drank alcohol, 12 (29%) drank for two years, 30 (71%) drank for two years, and 25 (60%) quit. A total of 365 (81%) and 241 subjects (53.6%) thought that smoking cigarettes and drinking alcohol could both cause cancer. The distribution of participants by their attitude toward carcinogens was described in Table III and Figure 3. Negative attitudes toward cigarette smoking, alcohol consumption, radiation exposure, genetic predisposition, some viruses, some bacterial infection, some parasites, and fungi were 85/450 (19%), 209/450 (46.4%), 206/450 (45.8%), 322/450 (71.6%), 297/450 (66%), 375/450 (83.3%), 403/450 (89.6%), and 405/450 (90%), in that order.

Out of 350 men, 74/350 (21%) believed that smoking could not cause cancer, whereas just 11/100 (11%) believed the same. The RR (95% CI) was 1.9221 (1.0622 to 3.4781),  $p = 0.0308$ , and z statistics were 2.159 for men vs. women.

Around 180/350 (51%) and 29/100 (29%), respectively, argue that alcohol consumption cannot cause cancer. Males had a higher risk of negative attitude than females, with an RR (95% CI) of

1.7734 (1.2837 to 2.4499),  $p = 0.0005$ , and z statistics of 3.475.

Negative attitude toward radiation exposure, genetic predisposition, certain viruses, some bacterial infections, some parasites, and fungus, demonstrating very high proportions regardless of gender, as shown in Table III and Figure 3.

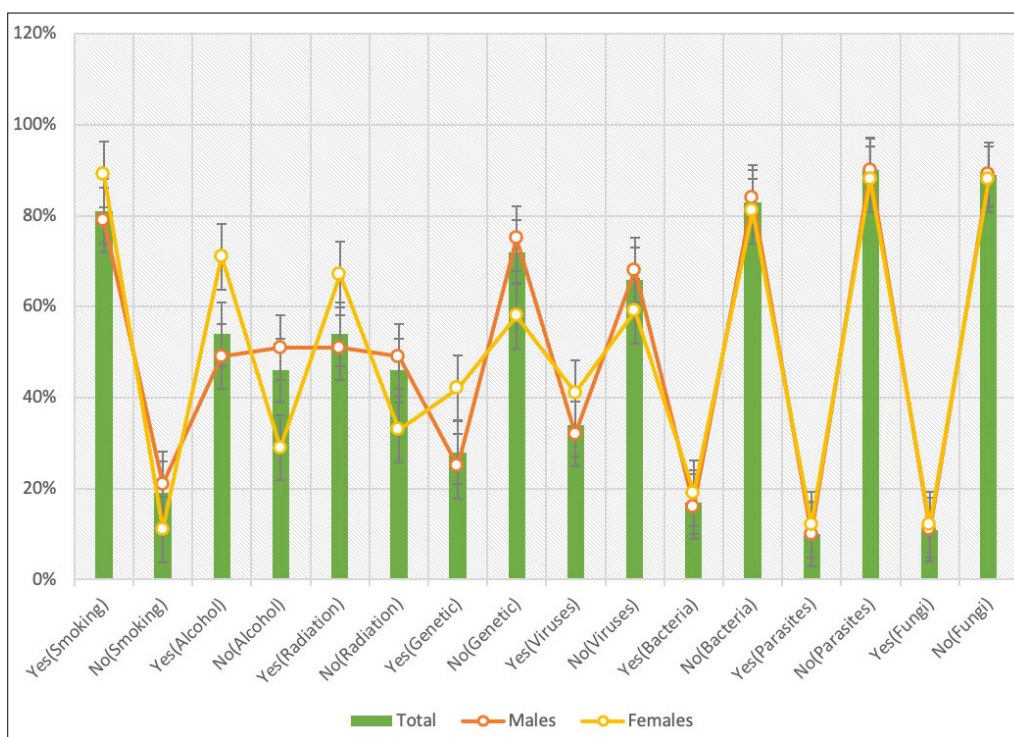
The distribution of participants by education level and attitude toward certain cancer factors was described in Table IV and Figure 4. A total of 16/173 (9.2%) graduates, 6/124 (4.8%) high school students, and 4/34 (11.8%) postgraduate students all showed a negative opinion about smoking as a cancer-causing agent. There were 67/173 (39%) graduates, 55/124 (44.3%) high school students, and 21/54 (39%) postgraduates who had an unfavorable attitude toward alcohol. There were strong negative feelings about all the other causes of cancer (Table IV, Figure 4). Figures 5 and 6 show the relationship between age and perceptions of some cancer factors (alcohol and cigarette smoking).

## Discussion

The best way to put disease prevention plans into action is to find out how a community feels and acts about the things that put people at risk for a disease. Cancer can now be found almost

**Table III.** Participants by sex and attitude towards carcinogens.

Variable	Males (n=350)	Females (n=100)	Total (n=450)
<b>Nationality</b>			
<b>Smoking</b>			
Yes	276	89	365
No	74	11	85
<b>Alcohol</b>			
Yes	170	71	241
No	180	29	209
<b>Radiation</b>			
Yes	177	67	244
No	173	33	206
<b>Genetic</b>			
Yes	86	42	128
No	264	58	322
<b>Viruses</b>			
Yes	112	41	153
No	238	59	297
<b>Bacteria</b>			
Yes	56	19	75
No	294	81	375
<b>Parasites</b>			
Yes	35	12	47
No	315	88	403
<b>Fungi</b>			
Yes	38	12	50
No	312	88	400



**Figure 3.** Descriptions of participants by the attitude towards carcinogens (with standard error).

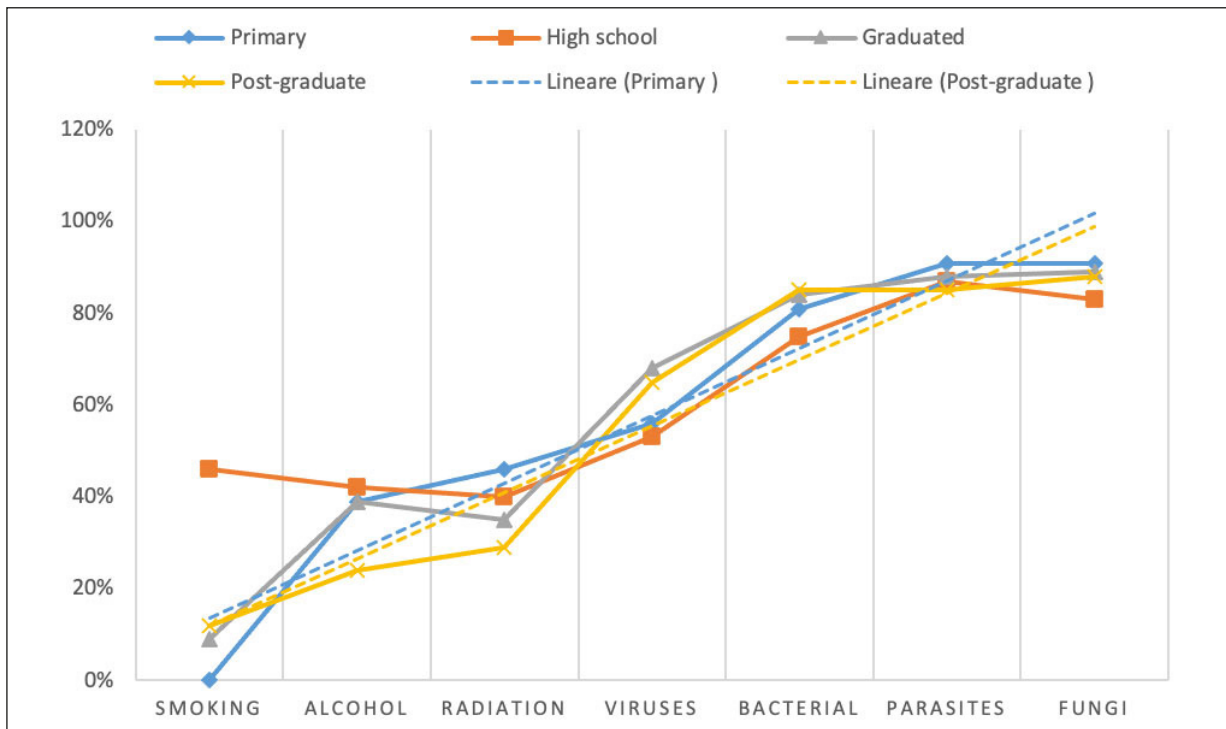
## Modifiable cancer risk factors

**Table IV.** Participants by education level and attitude towards some cancer causes.

Variable	Primary	High school	Graduated	Postgraduate	Total
Cigarette smoking can cause cancer					
Yes	53	124	157	30	364
No	0	6	16	4	26
Total	53	130	173	34	390
Alcohol consumption can cause cancer					
Yes	33	76	106	26	241
No	21	55	67	8	151
Total	54	131	173	34	392
Exposure to radiation can cause cancer					
Yes	29	78	113	24	244
No	25	53	60	10	148
Total	54	131	173	34	392
Some viruses can cause cancer					
Yes	24	61	56	12	153
No	30	70	117	22	239
Total	54	131	173	34	392
Some bacterial species can cause cancer					
Yes	10	33	27	5	75
No	44	98	146	29	317
Total	54	131	173	34	392
Some parasites can cause cancer					
Yes	5	17	20	5	47
No	49	114	153	29	345
Total	54	131	173	34	392
Some fungi species can cause cancer					
Yes	5	22	19	4	50
No	49	109	154	30	342
Total	54	131	173	34	392

anywhere<sup>6</sup>, with different risks depending on geography and community<sup>7,8</sup>. The current study focused on the entire Saudi community's attitude and practice toward the most common carcinogens in order to drive additional cancer prevention and control initiatives in the country, since cancer epidemiology grows in Saudi Arabia as it does globally<sup>9</sup>. The current data only show male smokers (67%). This is because smoking is considered a social taboo in Saudi Arabia, so female smokers may never report it. Most Saudi Arabian metrics were more relevant to students than to the general public. According to a recent meta-analysis<sup>10</sup>, the majority of university students in the Arab nation-state had disturbingly high prevalence rates of smoking cigarettes and waterpipes. Comparable outcomes to our findings were found in the meta-analysis on Saudi Arabia. Additionally, 53.8% of participants said they shared a home with an active smoker. According

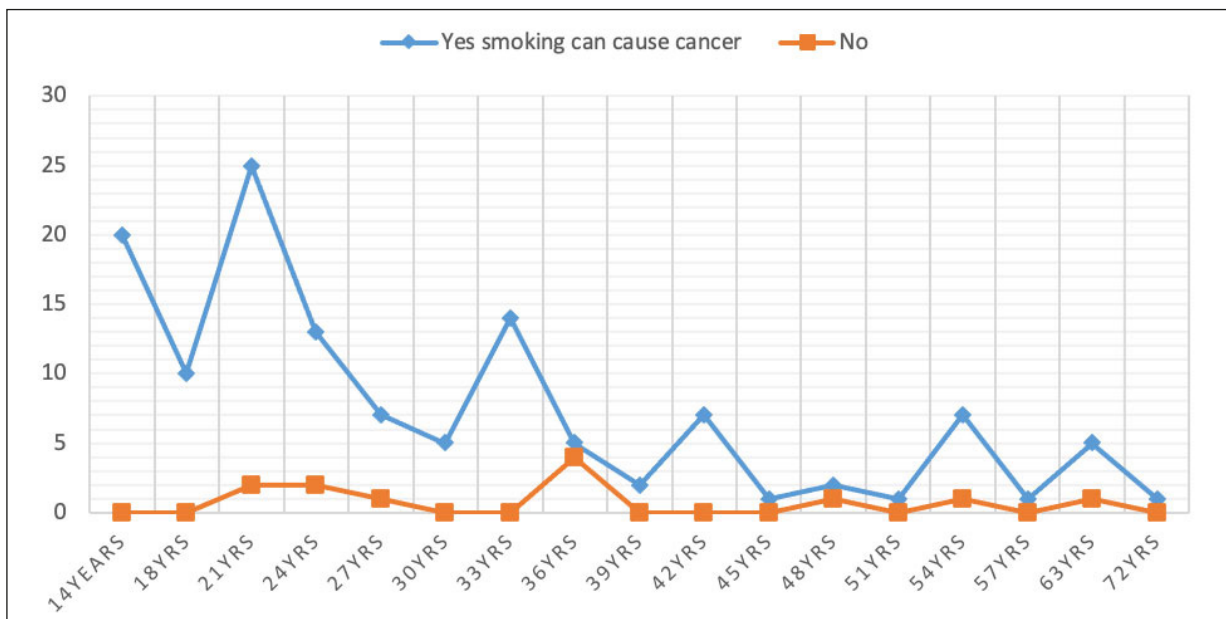
to a Saudi Arabian study that looked at cotinine levels in schoolchildren, 38.4% of them had fathers who smoked, 61.8% had been exposed to indoor smoking, and 49.3% had been exposed to outdoor smoking<sup>11</sup>. A survey of 10,195 respondents looked for patterns and contributing variables to tobacco use among the Saudi population. Current smoking was prevalent in 12.8% of the population. 12% of the population reported smoking daily. In both the univariate and multivariable models, gender, age group, education, marital status, and occupation were major predictors of cigarette use. According to the multivariable model, men were 14.54 times more likely than women to consume tobacco (OR 14.54, 95% CI 11.07-19.11). Respondents aged 15 to 30 years, 31 to 45 years, and >60 years were 3.36 times (OR 3.36, 95% CI 2.29-4.93) and 3.51 times (OR 3.51, 95% CI 2.47-4.98) more likely to smoke tobacco, respectively<sup>12</sup>.



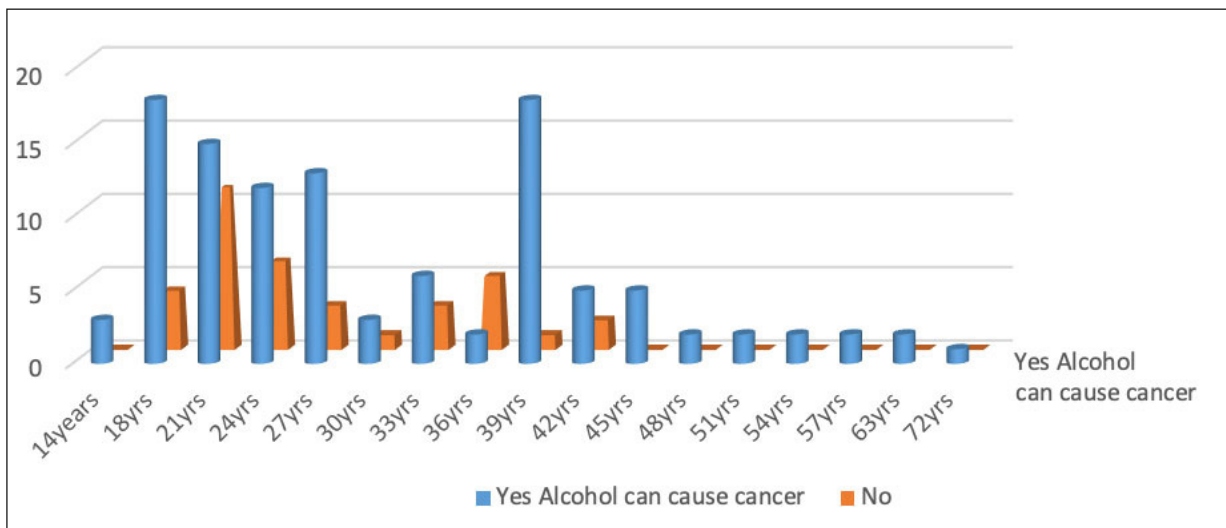
**Figure 4.** Participants by education level and negative attitude towards some cancer causes.

Except for postgraduate education, which exhibited a positive correlation in the current study and suggests a negative link with rising education level, the level of education did not substantially correlate with smoking status. Due to the absence

of Saudi Arabian literature, results from other regions of the world have produced inconsistent findings<sup>13</sup>. In the current study, only employees (30%) showed a significant correlation with smoking. It has been stated that people in Saudi Arabia smoke,



**Figure 5.** Description of the study subjects by age and attitude towards cigarette smoking as a possible cause of cancer.



**Figure 6.** Description of the study subjects by age and attitude towards cigarette smoking as a possible cause of cancer.

despite being aware of the dangers of tobacco<sup>14</sup>. Except for the age group 21-29 years, there was no significant correlation between age and smoking status. This could be related to the high number of participants in this age group. However, 52% of smokers in the current study were under the age of 29. Our study area previously found a comparable high frequency of cigarette smoking among the younger population<sup>15</sup>. Alcohol intake was reported by just 9% of the participants in the current study. Since alcohol consumption is illegal in Saudi Arabia, it is difficult to report the effective use of alcohol. Previous scholars<sup>16</sup> found a substantially lower prevalence. Aside from incorrect health-related habits, the current study found that attitude and understanding are critical for cancer prevention and control. Approximately 81% and 53.6% of people believed that cigarette smoking, and alcohol consumption may cause cancer, respectively. These findings indicate a high level of awareness, which is incompatible with the habits examined in the current study. Almost all smokers and many individuals are aware of the link between tobacco smoking and cancer because of the graphic warning labels on cigarette cartons<sup>17</sup>. However, while this may not be the case for alcohol, the current investigation findings indicate a high level of awareness. Tobacco use raises the risk of all cancers, but alcohol consumption raises the risk of only a few cancers. Combined cigarette smoking and alcohol consumption aggravate the risk of several cancers<sup>18</sup>.

Radiation exposure, genetic predisposition, some viruses, some bacterial infections, some

parasites, and some fungi all had negative attitudes (not causing cancer), with relative percentages of 45.8%, 71.6%, 66%, 83.3%, 89.6%, and 90%. These results indicate low levels of cancer awareness among the sample population, regardless of gender, age, occupation, or degree of education, which calls for immediate interventions by both the community and health officials. Programs to raise awareness of cancer and even research in this area are lacking in Saudi Arabia. The few studies<sup>19,20</sup> that have been conducted on this subject have only looked at colon and breast cancer. To the best of our knowledge, no study has specifically evaluated the country's total carcinogen load. Even though the current study has a lot of data sets that could lead to new projects in Saudi Arabia and new areas of research, it also has some problems, such as its cross-sectional design.

## Conclusions

Some cancer-causing substances are widely used in the Saudi community. Lack of understanding and a negative attitude toward certain carcinogens are widespread, necessitating immediate interventions at the community and health-care levels.

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### Authors' Contributions

HGA: Conception, administration, analysis, drafting, approval of the final version. AMAA: Conception, design, data acquisition, practical part, approval of the final version. EAAA: Conception, analysis, drafting, practical part, approval of the final version. GMOE: Conception, design, data acquisition, approval of the final version. SAM: Conception, analysis, drafting, approval of the final version. RAHA: Conception, analysis, drafting, approval of the final version. AYB: Conception, analysis, drafting, approval of the final version. MSAM: Consultation, analysis, drafting, approval of the final version.

### Conflict of Interest

The authors declare no conflict of interest.

### Informed Consent

All individuals involved in the study gave their written and/or verbal consent after being fully informed. Additional informed consent was obtained from all individuals for whom identifiable information is presented in this paper.

### Ethics Approval

The 1964 Helsinki Declaration and its later amendments as well as other related ethical standards were followed in all procedures carried out in the study. The Ethical Committee approved the present study's proposal at the College of Medicine, University Ha'il, Saudi Arabia (HREC 00121/CM-UOH.04/20).

### Availability of Data and Materials

The data presented in this study are available on request to the corresponding author.

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