



## Public Awareness of Hepatocellular Carcinoma and its Risk Factors Among General Population in Southern Region, Saudi Arabia, Cross Sectional Study

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### ABSTRACT

**Background:** Globally, Hepatocellular carcinoma (HCC) is the third leading cause of cancer related mortality. There are many reported causes of HCC including chronic Hepatitis B virus (HBV), Hepatitis C virus (HCV) infection, primary autoimmune hepatitis, hemochromatosis, Budd-Chiari syndrome, and chronic alcohol consumption, which mostly result in liver cirrhosis. Fibrosis and cirrhosis are typically antecedents of HCC. Lack of population awareness may be by itself risk factors for disease and its sequelae. **Aim:** To assess the general population awareness regarding hepatocellular carcinoma and its risk factors in Southern region, southern of Saudi Arabia. **Methodology:** A descriptive cross-sectional survey was used targeting all population in Southern region, Saudi Arabia. The study was conducted during the period from February 2020 to May 2020. Data were collected using structured questionnaire included person's socio-demographic data, Participants' awareness regarding HCC. The questionnaire was uploaded online using social media platforms. **Results:** The study included a total of 956 participants whose ages ranged from 18 to 65 years old with mean age of  $31.5 \pm 8.6$  years old. Exact of 149 (15.6%) participants had positive family history of liver cancer and 157 (16.4%) had family history of liver cirrhosis. Exact of 78.7% of the respondents reported that they know about liver cancer and 75.2% know about liver cirrhosis. In total, good awareness level regarding liver cirrhosis and cancer was low. **Conclusions and recommendations:** The study revealed that public awareness regarding HCC and its risk factors were low especially for signs and symptoms which are the early alarming noise for having liver disorder. Health care staff was not the main source of knowledge regarding HCC and liver cirrhosis.

**Keywords:** Hepatocellular carcinoma, Liver, cancer, Malignancy, Awareness, Population, Cirrhosis, Fibrosis

### BACKGROUND

Hepatocellular carcinoma (HCC) is the most common type of primary liver cancer with high incidence and mortality rate worldwide [1]. Globally, Hepatocellular carcinoma (HCC) is the third leading cause of cancer related mortality [2]. There are many reported causes of HCC including chronic Hepatitis B virus (HBV), Hepatitis C virus (HCV) infection, primary autoimmune hepatitis, hemochromatosis, Budd-Chiari syndrome, and chronic alcohol consumption, which mostly result in liver cirrhosis [3]. Fibrosis and cirrhosis are typically antecedents of HCC [4].

DM Considered as a significant risk factor with an approximately two-fold increase in the risk of developing HCC in comparison with non-diabetic individuals [5]. One of the causes to increase hepatocellular carcinoma is non-alcoholic fatty liver disease [6].

In Saudi Arabia, HCC represents 4.3% of all diagnosed cancers diagnosed in 2012 [7]. The incidence of liver cancer in Saudi Arabia recorded an increased incidence between 1990 and 2016 by about 3-folds [8]. Regarding treatment, liver transplantation is the only definitive treatment up till now. Resection of the tumour and other percutaneous therapies are more commonly used in practice, because most hepatocellular cancers are detected at an advanced stage and the prognosis is dependent on both the underlying liver function and the stage at which the tumour is diagnosed [9]. Liver transplant is contraindicated in case of Extrahepatic cancer or large sized HCC [10]. HCC is highly refractory to therapeutic interventions. Even after surgical resection or ablation, 70% of patients experience tumour recurrence within five years [11]. The prognosis of hepatocellular cancer depends on tumour stage and liver function [12].

Most people don't show symptoms in the early stages of HCC. However, when signs and symptoms do appear, they might be related to cancer or to chronic liver disease [13].

Population awareness regarding HCC and its risk factors can help in early detection of suspected cases lowering the advance of the disease and its complications. The current study aimed to assess public awareness regarding liver cancer and its risk factors in Southern region, Saudi Arabia.

## METHODOLOGY

A descriptive cross-sectional survey was used targeting all population in Southern region. The study was conducted during the period from February 2020 to May 2020. Data were collected using structured questionnaire which developed by the researchers after intensive literature review and expert's consultation. The questionnaire data included person's socio-demographic data such as age, gender, and education. Participants' awareness regarding liver cirrhosis and cancer was assessed covering general awareness, signs and symptoms, risk factors, preventive and treatment methods, and precautions to avoid developing liver cancer. A panel of 3 experts reviewed the questionnaire independently for content validity and all suggested modifications were applied till the final tool achieved. The questionnaire was uploaded online using social media platforms by the researchers and their relatives and friends to be filled with all population in Southern region. A pilot study was conducted to assess tool applicability and reliability. The tool reliability coefficient (Alpha Cronbach's) was assessed and equalled 0.86.

### Data Analysis

After data were extracted, it was revised, coded and fed to statistical software IBM SPSS version 22 (SPSS, Inc. Chicago, IL). All statistical analysis was done using two tailed tests. P value less than 0.05 was considered to be statistically significant. For awareness items, each correct answer was scored one point and total summation of the discrete scores of the different items was calculated. A patient with score less than 60% (26 points) of the maximum score was considered to have poor awareness while good awareness was considered if he had score of 60% (27 points or more) of the maximum or more. Descriptive analysis based on frequency and percentage distribution was done for all variables including demographic data, awareness items and source of information. Cross tabulation was used to assess distribution of awareness according to participants' personal data and source of information. Relations were tested using Pearson chi-square test.

## RESULTS

The study included a total of 956 participants whose ages ranged from 18 to 65 years old with mean age of  $31.5 \pm 8.6$  years old. Majority of the participants were males (73.2%; 700) and were university graduated (71.4%; 683). Exact of 149 (15.6%) participants had positive family history of liver cancer and 157 (16.4%) had family history of liver cirrhosis. About 89.1% of the participants reported that they want to know more about liver cirrhosis and cancer (Table 1).

Table 2 illustrates General population awareness regarding liver cirrhosis and cancer. Exact of 78.7% of the respondents reported that they know about liver cancer and 75.2% know about liver cirrhosis. Regarding causes of liver cancer and cirrhosis, 74.6% of the participants agreed on that drinking alcohol may increase your incidence of liver cancer by causing cirrhosis followed by Unsafe injection practices and unsafe blood transfusions can lead to hepatitis B and C transmission to healthy individuals (73.7%), Cirrhosis is one of the most important causes of liver cancer (66.1%), Sharing shavers, toothbrushes, etc. with Hepatitis B patients can spread the disease to healthy people (66.1%), and

Hepatitis B (C) infection can lead to cirrhosis and then liver cancer (59.4%). Considering protective and treatment methods for liver cirrhosis and cancer, 86.2% of the respondents reported that Exercise is important to get rid of fatty deposits on the liver and then reduce the risk of cirrhosis and liver cancer later followed by quitting alcohol helps prevent cirrhosis and then liver cancer (83.2%), It is strictly prohibited to share shavers, toothbrushes, etc. with other individuals (83.1%), Eating healthy, fresh meals with fresh fruits and vegetables will prevent cirrhosis and liver cancer later on. (76.4%), and if there is a family history of liver cancer, then the other family members should see the doctor (73.1%).

Table 3 illustrates continued population awareness level. As for signs and symptoms, jaundice was the most reported by the participants (16.3%; 156) followed by loss of appetite with nausea (13.9%; 133), hematemesis (10.7%; 102), weight loss (9.9%; 95), and malaise (7%; 67). Considering required precaution to minimize having liver cirrhosis and cancer, stopping smoking and alcohol intake was the most reported by the participants (65.9%; 630), followed by having HBV vaccine (65.4%; 625), practice exercise and weight loss (64.1%; 613), periodic check-up for viral hepatitis (64%; 612), Periodic abdominal ultrasound for patient with positive family history of HCC (56%; 535), and control of diabetes and hypertension (55.3%; 529). In total, good awareness level regarding liver cirrhosis and cancer was recorded among 336 participants (35.1%).

About source of information, Figure 1 demonstrates that the most reported source was internet and social media (22.2%) followed by medical books (18.9%), health care workers (11.6%), and mass media (6.9%). Exact of 21.3% of the participants had no source regarding their information.

Table 4 shows distribution of participant's awareness level regarding liver cancer by their personal data. Good awareness level was recorded for 50% of old age participants (>60 years) compared to 16.7% of those who aged below 20 years with recorded statically significance ( $p=0.009$ ). Also, 39.8% of university graduated participants had good awareness level compared to 23.5% of primary educated respondents ( $p=0.001$ ). Exact of 63.5% of participants who had their information from health care staff had good awareness level compared to 8.3% of those who had no specific source for their information ( $p=0.001$ ).

**Table 1 Personal data of study participants in Southern region, Saudi Arabia**

Personal data	No.	Percentage (%)
<b>Gender</b>		
Male	700	73.20%
Female	256	26.80%
<b>Age in years</b>		
<20 years	42	4.40%
20-39	633	66.20%
40-60	267	27.90%
>60 years	14	1.50%
<b>Level of education</b>		
Primary	17	1.80%
Intermediate	28	2.90%
Secondary	228	23.80%
University	683	71.40%
<b>Had family history of liver cancer</b>		
Yes	149	15.60%
No	807	84.40%
<b>Had family history of liver cirrhosis</b>		
Yes	157	16.40%

No	799	83.60%
<b>Want to know more about liver cirrhosis and cancer</b>		
Yes	852	89.10%
No	104	10.90%

**Table 2 General population awareness regarding liver cirrhosis and cancer in Southern region, Saudi Arabia**

Domain	Items	No.	Percentage (%)
General awareness	Know about cancer liver	752	78.70%
	Know about liver cirrhosis and its causes	719	75.20%
	Hepatitis B (C) infection can lead to cirrhosis and then liver cancer	568	59.40%
Causes of liver cirrhosis and cancer	Cirrhosis is one of the most important causes of liver cancer	632	66.10%
	Non-alcoholic fatty liver disease (fatty acid deposition in the liver) is a cause of cirrhosis and hence later liver cancer	422	44.10%
	Diabetes is one of the causes of cirrhosis and liver cancer	259	27.10%
	Cirrhosis and liver cancer can be linked to obesity	391	40.90%
	Drinking alcohol may increase your incidence of liver cancer by causing cirrhosis	713	74.60%
	Smoking is not associated with an increased risk of liver cancer	126	13.20%
	Patients with high blood pressure are at risk of developing cirrhosis and should see their doctors to control blood pressure	348	36.40%
	Family history of liver cancer is not considered a factor in the future of liver cancer	131	13.70%
	There is no vaccine against hepatitis C virus	242	25.30%
	Unsafe injection practices and unsafe blood transfusions can lead to hepatitis B and C transmission to healthy individuals	705	73.70%
	Epidemic hepatitis B can be transmitted from the mother to her child, and she must inform the gynaecologist of her HBV infection on the first visit of pregnancy	532	55.60%
	Sharing shavers, toothbrushes, etc. with Hepatitis B patients can spread the disease to healthy people	631	66.10%
	If there is a family history of liver cancer, then the other family members should see the doctor	699	73.10%
Protective and treatment measures	No need to quit smoking in order to prevent cirrhosis and then liver cancer	73	7.60%
	Quitting alcohol helps prevent cirrhosis and then liver cancer	795	83.20%
	Eating healthy, fresh meals with fresh fruits and vegetables will prevent cirrhosis and liver cancer later on	730	76.40%
	Exercise is important to get rid of fatty deposits on the liver and then reduce the risk of cirrhosis and liver cancer later	824	86.20%
	It is strictly prohibited to share shavers, toothbrushes, etc. with other individuals	794	83.10%
	Control of diabetes and high blood pressure can prevent cirrhosis and later liver cancer	616	64.40%
	The hepatitis B virus vaccine is important for people at risk of infection (such as doctors and the family of a patient with HIV)	625	65.40%
	The hepatitis B virus vaccine is available for newborn	478	50.00%
	Hepatitis B can be transmitted through the marital relationship, so the healthy partner should receive the hepatitis B vaccine	417	43.60%
	Most patients at risk of developing liver cancer, such as patients with cirrhosis or who have a family history of liver cancer, should have an ultrasound examination of the liver every 6 months	520	54.40%
	There is no treatment for liver cancer yet	258	27.00%
Liver transplant is the first option for treating liver cancer if the disease is detected early and the patient meets the criteria for transplantation	591	61.80%	

Table 3 General population awareness regarding liver cirrhosis and cancer

Domain	Items	No.	Percentage (%)
Sign and symptoms of liver cirrhosis	Mostly no signs and symptoms	649	67.60%
	Jaundice	156	16.30%
	Loss of appetite with nausea	133	13.90%
	Hematemesis	102	10.70%
	Weight loss	95	9.90%
	Malaise	67	7.00%
	Abdominal pain	60	6.30%
	Abdominal distention	14	1.50%
	Ascites	1	0.10%
	Abdominal mass	1	0.10%
Precautions to cirrhosis and liver cancer	Stop smoking and alcohol intake	630	65.90%
	Have HBV vaccine	625	65.4%
	Weight loss and practice exercise	613	64.10%
	Periodic check-up for viral hepatitis	612	64.00%
	Periodic U/S for patient with positive family history	535	56.0%
	Control of DM and HTN	529	55.30%
	Proper treatment of viral hepatitis	503	52.60%
	Follow-up with hepatology specialist	496	51.90%
Overall awareness level	Poor (0-26)	620	64.90%
	Good (27-42)	336	35.10%

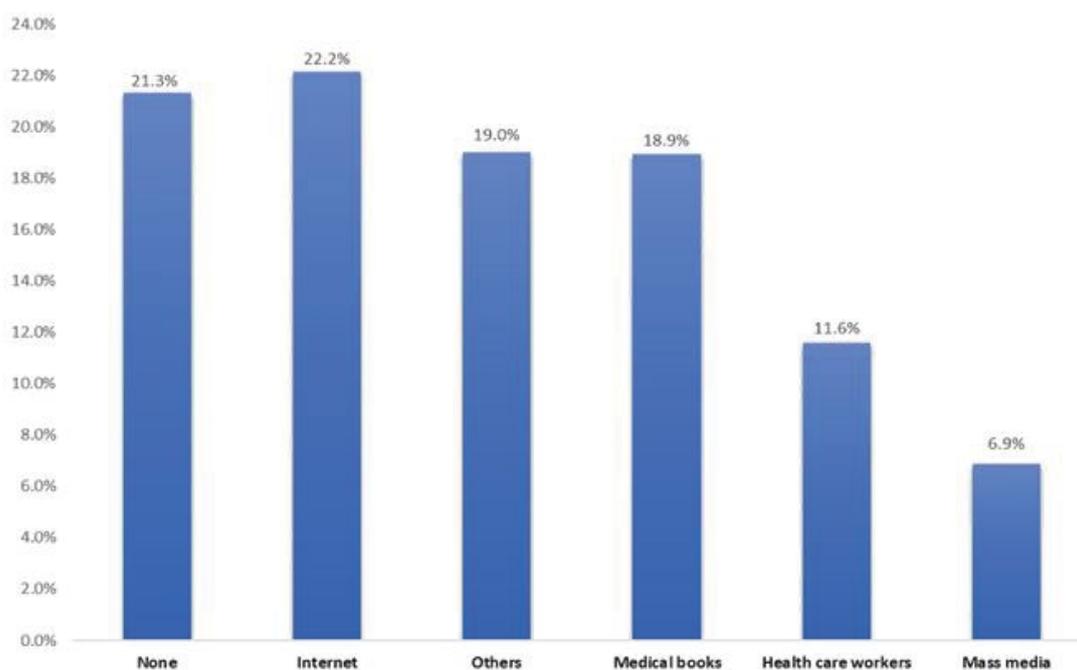


Figure 1 Source of information regarding liver cirrhosis and cancer in Southern region, Saudi Arabia

Table 4 Distribution of participants awareness level regarding liver cancer by their personal data

Personal data		Awareness level				p-value
		Poor		Good		
		No.	Percentage (%)	No.	Percentage (%)	
Gender	Male	462	66.00%	238	34.00%	0.22
	Female	158	61.70%	98	38.30%	
	<20 years	35	83.30%	7	16.70%	
	20-39	394	62.20%	239	37.80%	
Age in years	40-60	184	68.90%	83	31.10%	0.009*
	>60 years	7	50.00%	7	50.00%	
	Primary	13	76.50%	4	23.50%	
	Intermediate	18	64.30%	10	35.70%	
Level of education	Secondary	178	78.10%	50	21.90%	0.001*
	University	411	60.20%	272	39.80%	
Had family history of liver cancer	Yes	101	67.80%	48	32.20%	0.42
	No	519	64.30%	288	35.70%	
Had family history of liver cirrhosis	Yes	99	63.10%	58	36.90%	0.61
	No	521	65.20%	278	34.80%	
Want to know more about liver cirrhosis and cancer	Yes	544	63.80%	308	36.20%	0.06
	No	76	73.10%	28	26.90%	
	None	187	91.70%	17	8.30%	
	Internet	137	64.60%	75	35.40%	
	Mass media	47	71.20%	19	28.80%	
Source of information	Health care workers	53	47.70%	58	52.30%	0.001*
	Medical books	66	36.50%	115	63.50%	
	Others	130	71.40%	52	28.60%	

P: Pearson X<sup>2</sup> test; \*p<0.05 (significant)

## DISCUSSION

The current study target was to assess the awareness of general population for HCC and its risk factors, some of these risk factors can be preventable. Hepatitis B vaccines and lifestyle modification is important to decrease the exposure of primary liver cancer [14]. Periodic Ultrasound screening of liver every 6 months should be done for patients with high likelihood to have Hepatocellular carcinoma (HCC) like cirrhotic patient or family history of HCC or Hepatitis B [15]. The American Association for the Study of Liver Diseases (AASLD) recommends surveillance of adults with cirrhosis because it improves overall survival [16].

The current study revealed that family history of liver cirrhosis and HCC among study participants was not high (less than one quarter). Regarding public awareness, nearly one out of each three participants were aware regarding HCC (One third had good awareness). In more details, generally, more than three quarters of the study population heard about liver cirrhosis and HCC. As for causes of HCC, drinking alcohol, unsafe blood transfusion and injections, and sharing instruments with cirrhosis were the most reported causes by the participants. Regarding protective and treatment methods, more than 80% of the participants reported for getting rid of body fats through exercise and activity. Also, stop alcohol intake, avoid sharing instruments with others will minimize getting infectious hepatitis and liver cirrhosis which are the main predisposing factors for HCC. Periodic check-up for those with positive family history of cancers in general and liver cancer in private was also recommended by nearly three quarters of the respondents. Nearly two thirds of the participants reported liver transplantation as the most appropriate treatment method in cases

of early detection of HCC. Considering signs and symptoms, the surprising finding was that about two thirds of the participants reported that mostly HCC and liver cirrhosis had no signs or symptoms which are an important conclusion and recommendation for health care providers. Lack of awareness regarding signs and symptoms will be the main barrier against early detection of cases causing advanced stages diagnosis with irreversible changes. Jaundice, loss of appetite, hematemesis was the most recorded signs and symptoms among those who know. Only one participant told about abdominal mass with pain. The study also revealed that stopping smoking and alcohol intake with periodic check-up for viral hepatitis with receiving the proper management will prevent developing HCC.

As for source of information, internet was the most reported source followed by medical books, and health care providers but about 20% had no specific source mentioned. The most significant predictors for awareness level were old age ( $p=0.009$ ), higher education ( $p=0.001$ ), and health care staff as a source of knowledge with medical books ( $p=0.001$ ).

Public Awareness of the Link between Alcohol and Cancer in England was studied by Buykx, et al. [17]. The study revealed that the awareness of general population in England about the relation between hepatic cancer and alcohol consumption was low. He, et al. [18], assessed inpatients' knowledge about primary liver cancer and hepatitis. The study revealed that The mean knowledge scores were:  $6.47 \pm 3.03$  (maximum possible score=14) for risk factors of HCC and HBV,  $5.21 \pm 3.38$  (maximum possible score=11) for symptoms and signs of HCC,  $5.21 \pm 3.38$  (maximum possible score=11) for preventive strategies of HCC,  $1.73 \pm 1.25$  ( maximum possible score=5) for management of liver cancer,  $2.68 \pm 1.25$  (maximum possible score=5) for transmission mode of hepatitis B, and  $3.70 \pm 1.41$  (maximum possible score=5) for prevention of hepatitis. Hepatitis B and liver cancer knowledge and preventive practices among Asian Americans in the San Francisco BayArea, California were assessed by Charlotte, et al. [19]. The researcher reported that knowledge regarding HBV transmission, prevention, symptoms, risks, and occurrence was low. Fewer than 60% reported having been tested for HBV, only 31% reported having been vaccinated against HBV, and only 44% reported having had their children vaccinated. Asians, especially those born in China or Southeast Asia, had significantly poorer knowledge regarding HBV and liver cancer than non-Asians. In Saudi Arabia, Alshammari, et al. [20], conducted a cross-sectional study was conducted in North Saudi Arabia (Hail Region). Data was collected as a part of a community-based cancer's awareness movement that covered an area inhabited with approximately 500,000 individuals. In conclusion, the study revealed that about 79.3% and 80.7% believed that tobacco smoking and smokeless are not a risk of cancer development. Also, (87.2% of the study population believe that exposure to diverse occupational or non-occupational chemicals has no role in cancer development. Furthermore, about 59% of the study participants believed that repeated exposure to insecticidal chemicals does not influence the risk of cancer [20].

### CONCLUSION AND RECOMMENDATIONS

The study revealed that public awareness regarding liver cirrhosis and HCC were low especially for signs and symptoms which are the early alarming noise for having liver disorder. Health care staff were not the main source of knowledge regarding HCC and liver cirrhosis. There is an urgent need for awareness educational programs and preventive measures towards lifestyle modification that can modulate the overall risk of cancer among Saudi population. Widening viral hepatitis screening and liver cancer prevention programs among all public health programs is a vital step in decreasing liver cancer rates in the Saudi population.

### DECLARATIONS

#### Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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