



Public Awareness of Liver Cancer Among the Egyptian Population; A Cross-Sectional Study

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ABSTRACT

Background: Hepatocellular carcinoma (HCC) is the sixth most common malignancy globally and a leading cause of cancer-related deaths, particularly in Egypt, where it is the most prevalent cancer among men. Early detection and public awareness are critical for early detection and management of HCC. **Objective:** to assess the awareness of liver cancer risk factors and symptoms among the Egyptian population. **Methods:** A cross-sectional survey was conducted among 690 Egyptians aged ≥ 18 years. Participants completed a structured, self-administered online questionnaire assessing their awareness of liver cancer risk factors and symptoms. The threshold for good awareness was set at 60% of the maximum score ($\geq 12/21$ correct responses). **Results:** Among the 690 participants, 59% were males, and 76.7% were university graduated. Approximately 31.2% reported family history of either liver cancer or liver cirrhosis and only 2.6% had liver disease. Approximately 55.1% demonstrated good awareness of liver cancer risk factors and symptoms. Higher awareness was significantly associated with female gender (62.9%, $p < 0.001$), postgraduate education (96.4%, $p=0.001$), and participation in national liver health initiatives (60.8%, $p=0.005$). Major recognized risk factors included cirrhosis (83.6%), aflatoxins exposure (76%), and chronic hepatitis (71.4%). Commonly identified symptoms included fatigue (78%), jaundice (72.1%), and hematemesis (65%). **Conclusions:** The study reveals a moderate level of awareness regarding liver cancer risk factors and symptoms among participants, with notable gaps in specific demographic groups. Continued public health education efforts are needed to ensure widespread understanding of liver cancer risks and the importance of early detection.

INTRODUCTION

Globally, hepatocellular carcinoma (HCC) ranks as the sixth most common malignancy and the third leading cause of death from cancer. In Egypt, it is the most diagnosed cancer in men and second most common in women, after breast cancer, while also being the leading cause of cancer deaths.¹ There are multiple risk factors for HCC such as chronic viral hepatitis, cirrhosis, heavy alcohol use, non-alcoholic fatty liver disease, inherited metabolic diseases, tobacco use,

obesity, type 2 diabetes, aflatoxins and anabolic steroids.²

Infected liver cells expressing hepatitis C virus (HCV) proteins undergo mutations that drive malignant transformation, culminating in the formation of HCC.³ The recurring process of inflammation, tissue damage, and regeneration is considered the main catalyst for this transformation.⁴

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HCC often progresses silently, with symptoms typically appearing at an advanced stage of the disease. The classic triad of right upper quadrant pain, palpable mass, and weight loss is present in 90-95% of cases. Additional manifestations may include jaundice, hepatic encephalopathy, ascites, variceal bleeding, diarrhea, paraneoplastic syndromes, skin changes, and abnormal lab results.⁵ In patients without cirrhosis, HCC can present with abdominal distention, loss of appetite, enlarged liver, muscle wasting, and right upper quadrant discomfort. These diverse clinical presentations highlight the importance of vigilant screening and early detection strategies for at-risk populations.⁶

Enhancing public awareness of HCC risk factors and clinical features can facilitate the early identification of cases, thereby reducing disease progression and its associated complications.⁶ This study aims at to assess the level of public awareness regarding liver cancer risk factors and clinical presentation.⁷

METHODS

A cross-sectional study was conducted including the entire Egyptian population, encompassing participants 18 years and older, who agreed to participate, complete the questionnaire, had internet access, and are able to read. Individuals who opted out of participation were excluded from the sample.

Albish and colleagues⁸ reported that 35.1% of their study participants had good level of awareness about liver cancer. A total sample size of 350 participants were needed to provide 95% confidence level for a single proportion and with 5% margin of Error. This sample was increased by 10% to account for expected non-responses, so the total sample needed was 385 participants. Sample size calculation was done using Epi Info 7 program. The sampling method for the online questionnaire was non-probability-based, specifically a convenience sampling method. Participants were selected based on their accessibility and willingness to complete the survey.

The researchers created a structured questionnaire based on extensive literature review and advice from experts in the field. This self-administered questionnaire had 2 parts; the first included participants' data (age, sex, residence, education, occupation, participation in the National Hepatitis C and Non-Communicable Disease Screening Initiative launched in 2018, having liver disease, other co-

morbidities, family history of liver cirrhosis or cancer and source/ sources of medical information). The second included questions to evaluate participants' information about liver cancer risk factors (e.g chronic viral hepatitis (B and C), aflatoxins, non-alcoholic steatohepatitis (NASH), alcohol, obesity, diabetes, cirrhosis, and smoking) and symptoms (weight loss, nausea and vomiting, fatigue, jaundice, pain in right upper abdomen, ascites, bleeding, and itching). Participants' consent was implied through their completion of the questionnaire.

The whole questionnaire was in Arabic and a pilot study was implemented involving 20 participants to determine its clarity, time consumption and to identify any difficulties and was modified accordingly. The survey instrument was distributed online via social media platforms. Awareness assessment consisted of 21 items, with each correct response earning one point. The threshold for good awareness was set at 60% of the maximum score, equivalent to 12 points. Participants scoring below this threshold were classified as having poor awareness, while those achieving 12 points or more were deemed to have good awareness. The questionnaire's reliability was evaluated using Cronbach's alpha, yielding a robust coefficient of 0.894, indicating high internal consistency and reliability of the measurement tool.

Statistical analysis

Statistical analysis was carried out using SPSS version 23 (IBM, Armonk, New York, United States). Descriptive statistics for numerical data comprised means with standard deviations or medians with interquartile ranges, as appropriate. Categorical variables were presented as frequencies and percentages. Group comparisons employed chi-square tests or Fisher's exact tests, as suitable. All analyses were two-tailed, with statistical significance set at $p < 0.05$. This comprehensive analytical approach aimed to provide a thorough examination of the data, ensuring a robust interpretation of the study findings.

RESULTS

The study comprised 690 participants, aged between 18 and 70, with median age being 32 years. Most of the subjects were males (59%; 407) and were university graduated (76.7%). Only 18 (2.6%) participants had liver disease and 215 (31.2%) reported family history of either liver cancer or liver cirrhosis.

Table 1: Personal characteristics of the participants

	N	%
Age (year), median and range (n = 660)	32 (18-70)	
Sex (n=690)		
Male	407	59.0
Female	283	41.0
Residence (n = 664)		
Greater Cairo	225	33.9
Others	439	66.1
Level of education (n = 687)		
Read and write	4	0.9
Secondary	33	4.8
University	527	76.7
Postgraduate	121	17.6
Participation in the national initiative to screen for Hepatitis C virus and non-communicable diseases, launched in 2018 as part of the broader 100 million Healthy Lives Presidential Initiative (n = 688)	329	47.8
In 2022, the Egyptian Ministry of Health and Population initiated a national program aimed at the early detection and treatment of liver cancer (n = 688)		
Know	373	54.2
Don't know	315	45.8
Having liver disease (n = 688)	18	2.6
Family history of cirrhosis or liver cancer (n=690)	215	31.2
Source of information (n = 671) *		
Scientific websites	404	60.2
Social media sites	342	51.0
Newspapers	70	10.4
Television/radio	152	22.7
Family and relatives	240	35.8
Colleagues	177	26.4
Applications on the phone	105	15.6

* Participants selected more than one source.

Nearly 48% of participants mentioned their involvement in the national initiative that began in 2018 to screen for Hepatitis C virus and non-communicable diseases, which is a part of the

overarching 100 million Healthy Lives Presidential Initiative. More than half of the participants were aware of the national initiative for the early detection and liver cancer treatment, launched by the Egyptian Ministry of Health and Population in 2022. Their sources of information were mostly from scientific websites or social media (Table 1).

The survey revealed high awareness of liver cancer risk factors among participants. Cirrhosis was recognized as a major risk by 83.6% of respondents, followed by prolonged exposure to toxins like aflatoxins and certain chemicals (76%). Alcohol abuse, known to cause cirrhosis, was identified by 75% as a potential risk. Chronic viral hepatitis B and C were acknowledged by 71.4% as significant contributors. Other recognized risk factors included smoking (67.9%), non-alcoholic fatty liver disease (55.9%), autoimmune diseases (57.6%), and obesity (52.5%). This data suggests a generally good understanding of various HCC risk factors among the surveyed population (Table 2).

Tiredness was the most commonly reported symptom by the participants (78%), jaundice (72.1%), Hematemesis (65%), Loss of appetite and nausea (64%), ascites (60.2%), unintentional weight loss (59.9%), Pain in right hypochondrium (50.6%), easily bleeding or bruising (49.7%), there are often no symptoms until the liver is severely damaged (44.9%) and itchy skin (31.9%) (Table 3). Among the participants, 385 individuals (55.1%) exhibited a good understanding of liver cirrhosis and cancer.

Table 4 illustrates the distribution of participants' awareness levels concerning liver cancer based on their personal data. Age had no significant effect on participant awareness ($p=0.816$). Females had good awareness level (62.9%) than males (49.6%) ($p<0.001$). Postgraduate participants exhibited a strong awareness level of 96.4%, compared to only 43.6% among respondents with pre-university education ($p=0.001$). Furthermore, individuals who took part in the national initiative for Hepatitis C virus screening and non-communicable diseases, launched in 2018 under the 100 million Healthy Lives Presidential Initiative, had a higher awareness rate of 60.8% in comparison with those who did not participate ($p=0.005$). Also, they who know about The Egyptian ministry of health and population has launched national initiative for liver cancer early

Table 2: Awareness about liver cancer risk factors

Characteristics	Total Number	N (%) of correct answer
Chronic viral hepatitis	671	479 (71.4)
Long-term exposure to certain toxic substances (e.g. Aflatoxins) and some chemicals	667	507 (76.0)
Non-alcoholic fatty liver disease (fatty acid deposition in the liver)	657	367 (55.9)
Obesity	650	341 (52.5)
Type 2 diabetes	640	216 (33.8)
Alcohol abuse (Heavy alcohol use)	653	490 (75.0)
Cirrhosis	657	549 (83.6)
Smoking	644	437 (67.9)
Some inherited metabolic diseases	645	262 (40.6)
Some types of autoimmune diseases	649	374 (57.6)
Anabolic steroids (male hormones) used by some athletes	643	320 (49.8)

Table 3: Awareness about signs and symptoms of liver cancer

Characteristics	Total number	Number (%) of correct answer
There are often no symptoms until the liver is severely damaged	657	295 (44.9)
Jaundice	656	473 (72.1)
Loss of appetite and nausea	653	418 (64.0)
Feeling tired	654	510 (78.0)
Ascites	655	394 (60.2)
Unintentional weight loss	643	385 (59.9)
Hematemesis	649	422 (65.0)
Easily bleeding or bruising	638	317 (49.7)
Itchy skin	643	205 (31.9)
Pain in right hypochondrium	646	327 (50.6)

detection and treatment in 2022 had a good awareness about liver cancer than those who didn't know (62.2% versus 46.3% respectively, $p < 0.001$). No statistically significant difference in awareness levels was found between participants with liver disease and those without ($p = 0.311$). Those who had family history of liver cancer had a good awareness level than those who had not (63.7% vs 51.2%) ($p < 0.001$).

DISCUSSION

The current study aimed to assess public awareness regarding the risk factors for liver cancer, especially those that can be prevented. Lifestyle modifications and hepatitis B vaccination are vital in decreasing the incidence of primary liver cancer.⁹ Individuals at high

risk, including those with cirrhosis, a family history of HCC, or hepatitis B, are recommended to undergo liver ultrasound screenings every six months.¹⁰ The American Association for the Study of Liver Diseases (AASLD) advocates for surveillance in adults with cirrhosis, as this approach has been shown to improve overall survival rates.¹ By emphasizing these preventive strategies and screening guidelines, the study aimed to evaluate the population's comprehension of essential methods for liver cancer prevention and early detection.¹¹ In accordance with the present investigation, only about one-third of participants had a family history of HCC, indicating a low prevalence.

Table 4: Distribution of participants awareness level regarding liver cancer based on their personal data

	Poor (< 60%) (n = 310)	Good (≥ 60%) (n = 380)	p-value
	Number (%)	Number (%)	
Age (years, n=660)			
< 30	108 (46.2)	126 (53.8)	0.816
30 - 60	181 (44.0)	230 (56.0)	
> 60	6 (40.0)	9 (60.0)	
Sex (n=660)			
Male	205 (50.4)	202 (49.6)	< 0.001
Female	105 (37.1)	178 (62.9)	
Level of education (n = 687)			
Pre-university education	22 (56.4)	17 (43.6)	0.001
University	250 (47.4)	277 (52.6)	
Postgraduate	37 (30.6)	84 (69.4)	
The national initiative for screening Hepatitis C virus and non-communicable diseases, launched in 2018, had a total participation (n=688)			
Yes	129 (39.2)	200 (60.8)	0.005
No	179 (49.9)	180 (50.1)	
The Egyptian ministry of health and population has launched national initiative for liver cancer early detection and treatment in 2022 (n = 688)			
Know	141 (37.8)	232 (62.2)	< 0.001
Don't know	169 (53.7)	146 (46.3)	
Having liver disease (n = 688)			
Yes	6 (33.3)	12 (66.7)	0.311
No	304 (45.4)	366 (54.6)	
Family history of cirrhosis or liver cancer (n=690)			
Yes	78 (36.3)	137 (63.7)	0.002
No	232 (48.8)	243 (51.2)	

More than half of the participants exhibited good awareness of HCC. In terms of information sources, the internet—particularly scientific websites and social media—was the most reported, followed by family and relatives, and then television and radio.¹²

As for risk factors of HCC, long-term exposure to certain toxic substances (e.g. Aflatoxins) and some chemicals, alcohol abuse, chronic viral hepatitis (Band C), smoking, Non-alcoholic fatty liver disease (fatty acid deposition in the liver) are all risk factors.¹³ The most frequently reported causes among participants were certain types of autoimmune diseases (57.6%) and obesity (52.5%).

Considering signs and symptoms, feeling tired, jaundice, hematemesis, loss of appetite and nausea, ascites, unintentional weight loss, Pain in right

hypochondrium, easily bleeding or bruising were reported by most participant meaning that there is a good level of awareness of participant regarding signs and symptoms of HCC.¹⁴

Higher education emerged as the most significant predictor of awareness levels ($p=0.001$), those who Participate in the national initiatives for early detection of liver cancer ($p=0.005$, 0.001) those with positive family history of cirrhosis or liver cancer ($p=0.002$).

In agreement with our findings, A comparable study by Albishi et al. ⁸ in Saudi Arabia revealed similar findings regarding family history of liver cirrhosis and HCC, with less than a quarter of participants reporting such history. Approximately one-third of respondents demonstrated good awareness of HCC. Over 75% of

participants were familiar with liver cirrhosis and HCC. Commonly identified causes included alcohol consumption, unsafe blood transfusions and injections, and sharing instruments with cirrhotic individuals. Jaundice, loss of appetite, and hematemesis were frequently recognized symptoms. The internet was the primary information source. Significant predictors of greater awareness comprised advanced age ($p=0.009$), higher education ($p=0.001$), and healthcare professionals or medical literature as information sources ($p=0.001$).

Notably, 35% of participants in Albishi's ⁸ study revealed good knowledge, in comparison with 55% in the present investigation, indicating a greater level of HCC awareness among the present study's participants. This may be due to liver cancer one of the most common cancers in Egypt so the government has implemented a mass screening program for the detection and treatment of HCV, and this strategy is anticipated to result in a future decline in the incidence of HCC and also increase public awareness regarding the criticality of early liver cancer detection.¹⁵ In addition, a national initiative for the liver cancer early detection and treatment has been launched by the Egyptian Ministry of Health and Population.¹⁶

CONCLUSIONS

The study suggested that the public was generally well-informed regarding liver HCC, particularly in terms of its signs and symptoms, which function as early warning signals for liver disorders. Nevertheless, there is a continuing requirement for additional educational programs and preventive measures that concentrate on lifestyle modifications to mitigate the overall cancer risk among the Egyptian populace. Expanding viral hepatitis screening and integrating liver cancer prevention initiatives into all public health programs is a crucial step toward early detection and management of liver cancer rates across Egyptians.

Limitations: The study's cross-sectional design presents a limitation, and utilizing a self-administered questionnaire could result in recall bias. Additionally, non-random sampling may be another source of bias, which may limit generalizability. It is possible that responders had a greater awareness level than non-responders.

Ethical Consideration

Ethical approval for the study was obtained from the Institutional Review Board (IRB) before its commencement (Approval number: EB2312-304-075). To ensure privacy and confidentiality, data collection and presentation were conducted anonymously, adhering to the highest level of security standards.

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Conflict of interest

All authors have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author contributions

Mohamed Bendary: Idea, literature search, and writing; Amira Ismaiel: Idea, literature search, and writing; Nora Atef: analysis, critical review, and literature search.

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