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Quality of Life and Psychological Distress during Cancer: A Prospective Observational Study Involving Liver Cancer Patients

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Authors' contributions

This work was carried out in collaboration among all authors. Author MM designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors IPK and SR was collected data from the respondents. Author AH conducted statistical analysis of data. Author MBAZ carried the literature search on the topic. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Liver Cancer is aggressive cancer and patients are mostly screened and diagnosed when they become symptomatic at advanced. Disease severity, depression, fatigue, joint pain, and poor appetite have been reported as strong determinants of quality of life (QoL) among liver cancer patients.
Aims: The objective of the study was to assess the quality of life and depression among liver cancer patients in Pakistan.
Study Design: A descriptive cross-sectional study design was used.
Place and Duration of Study: The study was conducted in healthcare facilities of Islamabad and Rawalpindi, Pakistan between June 2020-December 2020.
Methodology: Two pre-validated questionnaires i.e. EORTC QLQ-C30 and HADS were self-

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administered to a sample of 100 liver cancer patients selected using a convenience sampling technique for measuring QoL and depression, respectively. After data collection, data was cleaned, coded, and entered in SPSS.

Results: The results highlighted that the lowest scores observed in the domain of symptom scale were: Nausea and Vomiting (23.72, ± 28.238), Dyspnea (25.27, ± 26.90), Constipation (26.03, ± 34.75) followed by Diarrhea (22.63, ± 28.42), whereas highest scores in the symptom scale were observed in the domain of fatigue (37.69, ± 20.06), pain (40.37, ± 18.44), insomnia (41.65, ± 32.37) and financial difficulties (60.33, ± 33.830). On the other hand, highest score on the functional scale was observed for physical functioning (64, ± 21.76) and the lowest score was observed in social functioning (53.19, ± 20.66).

Conclusion: The present study concluded that liver cancer had a negative impact on risk factors/past medical history, co-morbidities, and poor socio-economic of life across all domains along with moderate depression in liver cancer patients. Illiteracy, advanced liver cancer stage, risk factors/past medical history, co-morbidities and poor socio-economic status negatively affected functional and symptom scale. Appropriate health educational and psychological interventional programs targeting patients should be initiated to improve awareness and reduce depression among liver cancer patients.

Keywords: Liver cancer; quality of life; depression; EORTC QLQ-C30; HADS; Pakistan.

1. INTRODUCTION

Liver cancer has been reported to be the fifth most frequent cancer worldwide in accordance with incidence and fourth-most regular reason for cancer-related deaths [1]. The incidence of liver cancer is reported to be almost from 250,000 to 1,000,000 latest cases per year worldwide [2]. Elevated occurrence of liver cancer is reported in developing countries while low incidence is seen in developed countries. Hepatitis C virus (HCV) infection is one of the main reasons for liver disease globally. Liver Cancer is aggressive cancer and patients are mostly screened and diagnosed when they become symptomatic at an advanced stage [3]. Some HCV-affected individuals remain asymptomatic for long periods of time and may never develop progressive liver disease. However, few of these patients develop hepatic de-compensation and/or hepatocellular carcinoma [4]. Disease severity, depression, fatigue, joint pain, and poor appetite have been reported as strong determinants of health-related quality of life among liver cancer patients [5]. Poor quality of life in liver cirrhosis patients was found associated with the severity of the disease [6]. Chronic liver disease negatively impacts patients' utilities and health-related quality of life. Non-cirrhotic patients and Child's A cirrhotic patients had decreased utilities and heath relevant quality of life but Child's B and C cirrhosis patients had a more significant reduction in utilities in comparison [7]. Health-related quality of life in liver cirrhosis patients in Spain was found affected due to the presence of ascites, hypo-albuminemia, minimal hepatic encephalopathy, and anemia [8]. Depression was reported as a more important psychological problem than anxiety in cancer patients in China. Depression level was found to be higher among cancer patients. Predicting factors for depression were found to be low-level education, pain, old age and poor performance status [9].

The rising prevalence of hepatocellular carcinoma in Pakistan has been reported mainly due to Hepatitis C-related chronic liver disease [10]. Hepatitis C virus infection is found to be predominant risk factor for liver cancer in Pakistan. Less than 10% of liver cancer patients with risk factors are screened. Diagnosis of liver cancer is mostly done only when such patients become severely symptomatic at an advanced stage. Out of diagnosed patients, only a few fulfill the criteria for treatment options while the majority are provided only with supportive care [11]. Deprived health-related quality of life in liver cirrhosis patients has been reported in Pakistan. Association among health-related quality of life and hemoglobin, serum albumin, and previous history of encephalopathy and upper gastrointestinal bleed has been reported [12]. Another study from Pakistan reported that quality of life was severely affected due to socioeconomic status among hepatitis C patients. Most of the patients had poor quality of life. Unaffordable treatment increased the incidence of depression among patients and their families [13]. Hepatobiliary cancers might symbolize the most familiar malignancy in adult males and lies on available information; age consistent rate for males is 7.6 per 100,000

persons per year and 2.8 for females. In the absence of a national registry for cancer patients, data mainly comes from single-center experiences or widespread regional registries. Most of the studies have been conducted in Pakistan to identify the incidence, risk factors, and epidemiology of liver cancer in Pakistan. Few studies have been conducted on the evaluation of the quality of life among liver cancer risk factor groups such as hepatitis C, hepatitis B, and drug abusers. Most of the data is based upon the findings from risk factors groups, which are suggestive of the scarcity of data on quality of life in liver cancer patients in Pakistan. Thus, the current study was designed to assess quality of life and depression among Liver Cancer patients in Pakistan.

2. METHODOLOGY

A descriptive cross-sectional study design was used. The study site for the research included public and private healthcare facilities located in twin cities of Pakistan. The inclusion criteria for the study were the liver cancer patients aged above 18 years, both male and female while those with different stages except cancer were excluded. Patients with all other types of cancers and those aged less than 18 years were excluded from the study.

Determination of sample size was calculated by utilizing the Raosoft sample size calculator which gave an estimated sample size of 382 respondents (liver cancer patients) at a confidence interval of 95% and a margin of error of 5%. A convenience sampling technique was used to select the respondents. According to convenient sampling technique all the available respondents that were present at the time of data collection were included in study. Pre-validated questionnaires were used including the European Organization for Research and Treatment of Cancer QLQ-C30 (EORTC QLQ-C30) for assessment of QoL while Hospital Anxiety and Depression Scale (HADS) was used for evaluation of anxiety/depression among the liver cancer patients. Pilot testing of the tools was conducted on 10 % of the sample and the value of cronbach alpha for EORTC QLQ-C30 and HADS were 0.72 and 0.71, respectively. Data were collected during January- May 2021. Self-administered questionnaires were ensured for data collection to avoid biasness. Due to COVID 19 pandemic, the desired sample size could not be achieved and data from 100 liver cancer patients was collected. The response rate for the study was 26.18%. Data were cleaned, coded and analyzed statistically using SPSS version 21.

3. RESULTS

Out of 100 respondents, 65% (n=65) were males while 35% (n=35) were female patients. The age groups of the respondents were: 25-35 years (n=4, 4 %), 35-50 years (n=24, 24 %), 50 – 70 years (n=57, 57 %) and more than 70 years (n=15, 15 %). Of the total patients, 84 % (n=84) were married, 10 % (n=10) were widowed and 6 % (n=6) were single. Out of all the patients 53 % (n=53) had stage 3 of liver cancer and 28 % (n=28) had stage 4 liver cancer. Moreover, 46 %, (n=46) had no comorbidity, 23 % (n=23) were hypertensive and 28 % (n=28) were diabetic. Of all the patients, 23 % (n=23) had a past history of hepatitis B and 44 % (n=44) had hepatitis C. Of all the patients, 62 % (n=62) were treated through chemotherapy while 37 % (n=37) were on radiotherapy (Table 1).

The results highlighted that the lowest scores observed in the domain of symptom scale were: Nausea and Vomiting (23.72, ± 28.238), Dyspnea (25.27, ± 26.90), Constipation (26.03, ± 34.75) followed by Diarrhea (22.63, ± 28.42), whereas highest scores in the symptom scale were observed in the domain of fatigue (37.69, ± 20.06), pain (40.37, ± 18.44), insomnia (41.65, ± 32.37) and financial difficulties (60.33, ± 33.830). On the other hand, highest score in functional scale was observed for physical functioning (64, ± 21.76) and lowest score was observed in social functioning (53.19, ± 20.66). A detailed description is given (Table 2).

Comparison of HRQoL domains among both genders demonstrated a significant difference (p=0.014) with females more affected relatively in physical functioning reporting worse symptoms. Respondents receiving different treatments showed significant differences (p=0.045) indicating respondents receiving chemotherapy faced relatively more symptoms. Moreover, a significant difference ($p \geq 0.05$) in HRQoL was observed in different liver cancer stages and patients with past history of risk factors. No significant difference ($p \geq 0.05$) was observed in different marital, age, and educational groups of respondents (Table 3).

Out of all the respondents 40 % (n=40) felt tensed from time to time occasionally while 37 % (n=37) respondents reported that they had enjoyed the things only a little that they used to

enjoy. Of all the respondents, only 7 % (n=7) had a sort of frightened feeling very definitely and quite badly and 22 % (n=22) of the respondents had worrying thoughts a lot of the time. Moreover, 31 % (n=31) felt restless quite a lot and 20 % (n=20) of them got sudden feelings of panic quite often. Of all the respondents, 24 % (n=24) felt cheerful most of the time while 61 % (n=61) felt cheerful sometimes. Out of all the respondents, 48 % (n=48) often enjoyed a good book or radio or TV program (Table 4).

Table 1. Demographic characteristics of respondents

Indicator		n (%)
Gender	Male	65 (65 %)
	Female	35 (35 %)
Age	25-35Y	4 (4 %)
	35-50Y	24 (24 %)
	50-70Y	57 (57 %)
	>70Y	17(17 %)
BMI of patient	Normal	49 (49 %)
	Underweight	47 (47 %)
	Obese	4 (4 %)
City	Rawalpindi	12 (12 %)
	Islamabad	82 (82 %)
	Others	6 (6 %)
Setting	Urban	82 (82 %)
	Rural	18 (18 %)
Province	Punjab	76 (76 %)
	KPK	22 (22 %)
	Balochistan	2 (2 %)
Sector of treatment	Public	5 (5 %)
	Private	95 (95 %)
Marital Status	Single	6 (6 %)
	Married	84 (84 %)
	Widow	10 (10 %)
Level of Education	Illiterate	4 (4 %)
	Primary	19 (19 %)
	Secondary	45 (45 %)
	Bachelors	32 (32 %)
Professional status	Employed	41 (41 %)
	Unemployed	59 (59 %)
Monthly Income	None	18 (18 %)
	20,000-30,000PKR	6 (6 %)
	30,000-40,000PKR	28 (28 %)
	>40,000PKR	48 (48 %)
Type of Comorbidities	None	46 (46 %)
	Hypertension	23 (23 %)
	Diabetes mellitus	28 (28 %)
	Arthritis	3 (3 %)
Past History/Risk factor	Hepatitis B	23 (23 %)
	Hepatitis C	44 (44 %)
	Smoking	13 (13 %)
	Alcoholic	1 (1 %)
	None	19 (19 %)
Stage of Liver Cancer	Stage 1	2 (2 %)
	Stage 2	17 (17 %)
	Stage 3	53 (53 %)
	Stage 4	28 (28 %)
Type of Therapy	Chemotherapy	62 (62 %)
	Transplant/Surgery	0
	Radiotherapy	37 (37 %)
	None	1 (1 %)
Counselling by Doctor	Yes	97 (97 %)
	No	3 (3 %)
Counselling by Pharmacist	Yes	49 (49 %)
	No	51 (51 %)

Table 2. Domains of HRQoL using EORTC QLQ-C30

Indicator	Mean	Median	Standard Deviation (±)
Global Health Status	17.00	17.00	± 1.01
Composite Functional Health Score	61.88	63.00	± 16.709
Composite Symptom Scale	39.86	40.00	± 16.549
Functional Scale			
Physical Functioning	64.00	67.00	± 21.176
Role Functioning	63.38	67.00	± 21.350
Emotional Functioning	56.08	62.50	± 26.045
Cognitive Functioning	64.72	64.00	± 22.305
Social Functioning	53.19	50.00	± 20.663
Symptom Scale			
Fatigue	37.69	41.00	± 20.063
Nausea & Vomiting	23.72	17.00	±28.238
Pain	40.37	42.00	± 18.440
Dyspnea	25.27	33.00	± 26.904
Insomnia	41.65	33.00	± 32.370
Appetite Loss	45.68	33.00	± 37.873
Constipation	26.03	23.00	± 34.755
Diarrhea	22.63	19.00	± 28.429
Financial Difficulties	60.33	67.00	± 33.830

Table 3. Comparison of HRQoL domains among liver cancer patients by demographic characteristics

Demographics	EORTC QLQ-C30							
	Functional Scale				Symptom Scale			
	n	Mean rank	Test stats	P-value	n	Mean rank	Test stats	P -value
Gender	Male =65 Female =35	39.70 26.91	343.00[a]	**0.014**	Male =65 Female =35	30.90 44.89	324.50 [a]	**0.007**
Age	25-35Y =4 35-50Y =24 50-70Y=57 >70Y=17	41.25 33.00 39.51 22.55	6.483	0.082	25-35Y =4 35-50Y =24 50-70Y=57 >70Y=17	26.50 40.30 31.37 46.36	6.101	0.093
Marital Status	Single=6 Married=84	39.83 31.61	66.500	0.477	Single=6 Married=84	25.52 32.33	70.500	0.541
Level of Education	Illiterate=4 Primary=19 Secondary=45 Higher=32	24.50 32.73 37.78 42.59	4.364	0.230	Illiterate=4 Primary=19 Secondary=45 Higher=32	43.17 36.65 38.08 30.02	2.579	0.480
Monthly Income	None=18 20,000-30,000PKR=6 30,000-40,000PKR=28 >40,000PKR=48	27.25 28.50 30.50 41.47	6.582	0.082	None=18 20,000-30,000PKR=6 30,000-40,000PKR=28 >40,000PKR=48	41.79 42.83 41.50 29.63	6.198	0.100
Type of Comorbidities	None=46 Hypertension=23 Diabetes mellitus=28 Arthritis=3	40.73 26.90 34.89 14.00	7.24[b]	**0.055**	None=46 Hypertension=23 Diabetes mellitus=28 Arthritis=3	30.99 42.47 35.58 61.50	6.756	0.068
Past History/Risk factor	Hepatitis B=23 Hepatitis C=44	47.25 36.29	13.87 [b]	**0.003**	Hepatitis B=23 Hepatitis C=44	24.53 33.76	14.535 [b]	**0.003**

Demographics	EORTC QLQ-C30							
	Functional Scale				Symptom Scale			
	n	Mean rank	Test stats	P-value	n	Mean rank	Test stats	P -value
Stage of Liver Cancer	Smoking=13	26.79	18.77 [b]	0.001	Smoking=13	45.21	18.10 [b]	0.001
	Alcoholic=1	11.00			Alcoholic=1	63.50		
	None=19	21.68			None=19	49.95		
	Stage 1 =2	24.00			Stage 1 =2	53.00		
	Stage 2=17	47.96			Stage 2=17	25.00		
	Stage 3=53	38.65			Stage 3=53	31.63		
	Stage 4=28	16.87			Stage 4=28	54.00		
Type of Therapy	Chemotherapy=62	30.83	6.64 [b]	0.019	Chemotherapy=62	39.66	5.26 [b]	0.045
	Radiotherapy=37	44.00			Radiotherapy=37	28.02		
	None=1	41.50			None=1	28.00		

Mann-Whitney Test (p≥0.05)[a]; Kruskal Wallis Test (p≥0.05)[b]

Table 4. Assessment of depression among liver cancer patients

Indicators		n (%)
I feel tense or wound up	Most of the time	0
	A lot of the time	35 (35 %)
	From time to time occasionally	40 (40 %)
	Not at all	25 (25 %)
I still enjoy the things I used to enjoy	Definitely as much	28 (28 %)
	Not Quite so much	28 (28 %)
	Only a little	37 (37 %)
	Hardly at all	7 (7 %)
I get a sort of frightened feeling as if something awful is about to happen	Very definitely and quite badly	7 (7 %)
	Yes, but not too badly	30 (30 %)
	A little, but it doesn't worry me	39 (39 %)
	Not at all	24 (24 %)
I can laugh and see the funny side of things	As much as I always could	28 (28 %)
	Not quite so much now	30 (30 %)
	Definitely not so much now	41 (41 %)
	Not at all	1 (1 %)
Worrying thoughts go through my mind	A great deal of the time	12 (12 %)
	A lot of the time	22 (22 %)
	From time to time, but not too often	33 (33 %)
	Only occasionally	32 (32 %)
I feel cheerful	Not at all	0
	Not often	15 (15 %)
	Sometimes	61 (61 %)
	Most of the time	24 (24 %)
I can sit at ease and feel relaxed	Definitely	13 (13 %)
	Usually	34 (34 %)
	Not Often	46 (46 %)
	Not at all	7 (7 %)
I feel as if I am slowed down	Nearly all the time	17 (17 %)
	Very often	28 (28 %)
	Sometimes	51 (51 %)
	Not at all	4 (4 %)
I get a sort of frightened feeling like 'butterflies' in the stomach	Not at all	52 (52 %)
	Occasionally	20 (20 %)
	Quite Often	21 (21 %)
	Very Often	7 (7 %)
I have lost interest in my appearance	Definitely	8 (8 %)
	I don't take as much care as I should	15 (15 %)
	I may not take quite as much	44 (44 %)

Indicators		n (%)
	care	
	I take just as much care as ever	33 (33 %)
I feel restless as I have to be on the Move	Very much indeed	19 (19 %)
	Quite a lot	31 (31 %)
	Not very much	34 (34 %)
	Not at all	16 (16 %)
I look forward with enjoyment to Things	As much as I ever did	13 (13 %)
	Rather less than I used to	44 (44 %)
	Definitely less than I used to	35 (35 %)
	Hardly at all	8 (8 %)
I get sudden feelings of panic	Very often indeed	2 (2 %)
	Quite often	20 (20 %)
	Not very often	43 (43%)
	Not at all	35 (35 %)
I can enjoy a good book or radio or TV Program	Often	48 (48 %)
	Sometimes	30 (30 %)
	Not often	17 (17 %)
	Very seldom	5 (5 %)

Table 5. Comparison of depression among liver cancer patients by demographic characteristics

Demographics	n	Mean rank	Test statistics	P value
Gender	Male =65	31.95	388.5000[a]	0.074
	Female =35	41.11		
Age	25-35Y =4	23.50	6.192[b]	0.098
	35-50Y =24	35.60		
	50-70Y=57	31.37		
	>70Y=17	46.36		
Marital Status	Single=6	23.00	63.000[b]	0.428
	Married=84	31.93		
	Widow=10			
Level of Education	Illiterate=4	58.25	5.858[b]	0.108
	Primary=19	37.58		
	Secondary=45	37.20		
	Higher=32	28.16		
Monthly Income	None=18	40.42	2.247[b]	0.532
	20,000-30,000PKR=6	31.50		
	30,000-40,000PKR=28	38.11		
	>40,000PKR=48	31.93		
Type of Comorbidities	None=46	31.64	5.030[b]	0.163
	Hypertension=23	42.33		
	Diabetes mellitus=28	33.15		
	Arthritis=3	54.50		
Past History/ Risk Factor	Hepatitis B=23	25.47	9.503[b]	**0.032**
	Hepatitis C=44	35.27		
	Smoking=14	38.07		
	None=19	44.95		
Stage of Liver Cancer	Stage 1 =2	51.50	6.357[b]	0.076
	Stage 2=17	25.15		
	Stage 3=53	34.70		
	Stage 4=28	43.23		
Type of Therapy	Chemotherapy=62	38.08	4.963[b]	**0.054**
	Radiotherapy=37	28.40		
	None=1	58.00		

Mann-Whitney Test (p≥0.05)[a]; Kruskal Wallis Test (p≥0.05)[b]

Evaluation of depression among different demographic variables using Mann-Whitney and Kruskal-Wallis test showed a type of therapy (p=0.054) and past history/risk factors

(p=0.032). A detailed description is given (Table 5).

4. DISCUSSION

Liver Cancer is the fifth most frequent cancer globally in terms of incidence, being highly prevalent in developing and under-developed countries and ranks fourth in terms of mortality worldwide. Diagnosis of liver cancer in these countries is poor, as most of the patients are usually diagnosed at end stage when the disease becomes symptomatic. Liver cancer is a life-threatening illness affects the spiritual, social, physical, and psychological well-being of patients. Quality of life revolves around all these concepts and thus is now considered an important assessment parameter. Assessment of HRQoL is important in liver cancer, as it aids both physicians and patients in selecting good treatment choice and in return improving the health outcomes of patients. The outcomes of the current study revealed that less than half of the respondents supposed their general health as good and only a few supposed on the whole health as fine. Most of the respondents rated overall quality of their life as good. Global Health Status was poor with lowest mean scores, and social functioning was moderately affected. Most of the patients had a little trouble while doing any strenuous activity, and taking a long and short walk. Most of the respondents did not need to wait in bed or chair during the day or needed any sort of help while eating, dressing and washing. Most of the patients were a little restricted in doing either their work or other every day activities. Similar findings were reported from a study conducted in Taiwan which showed that liver cancer patients had reduced QoL in physical domains [14]. Moreover, the results of the current study showed that most of the respondents felt quite a bit tensed, worried, depressed and irritable, revealing poor emotional functioning. Cognitive functioning of the liver cancer patients was good as most of them did not have any difficulty in remembering things or while concentrating during reading or watching television. However, their social functioning assessment was found affected as most of the patients' physical condition interfered with their family life as well as social life. The same results were found from another research carried in Pakistan which shows poor quality of life among liver cancer patients especially was most deteriorated in the domain of physical health followed by psychological health [15]. With regard to symptom scale assessment, the results of the present study showed that quite a bit patients felt weak and tired and thus needed rest. Most of the patients felt nauseated. Pain scores were quite high in liver cancer patients and pain interfered with daily activities of the patients. Many respondents reported that they felt shortness of breath and had difficulty in sleeping as well. Diarrhea and constipation were the least reported symptoms by liver cancer patients. Moreover, the medical treatment caused them to face major financial difficulties. Similar findings were reported from another study conducted in Pakistan which showed high scores of pain affecting QoL of liver cancer patients and unaffordable treatment increased the incidence of depression leading to poor QoL of patients and their families [13].

Depression is a significant psychological issue in liver cancer patients [9]. The findings of current research reported a moderate level of anxiety and depression among liver cancer patients. Most of the patients felt tensed from time to time occasionally. Worrying thoughts, restlessness and panic attacks were experienced by most of the respondents. Few of the respondents also lost interest in their appearance. Similar findings were reported from another study which showed liver cancer patients with depressive symptoms had relatively poorer HRQoL in almost all domains [16]. Furthermore, the findings of the existing study highlighted that male liver cancer patients had relatively better physical functioning and less symptoms. These findings are in line with another study which showed better HRQoL scores among male liver cancer patients, they had relatively less complications and pain [17]. The current study results showed that no significant difference was found in functioning and symptom scale scores as well as mean depression scores between various marital statuses, age groups, and levels of education of patient. The same findings were reported from a study conducted in Germany which showed that reason of liver disease, harshness of disease (cirrhosis vs. no cirrhosis, Child-Pugh score) age, and social class had no effect on HRQoL [18]. The findings of the present study reported that liver cancer patients with no co-morbidities had relatively better functioning with high scores for the functioning scale. Physical and symptom scale was more affected in liver cancer patients with no past history. While those with a history of smoking were affected more on a symptom and had more depression. Same results were reported from a study conducted to investigate comparison with HBV and HCV related HCC

[19]. Furthermore, the results of the current research reported that patients with stage 2 of liver cancer were mostly affected in the functioning scale. Stage 4 patients had the worst functioning scale scores such as physical functioning along with worst symptoms scores. The results of the study were consistent with the study conducted by Fielding R in 2007 [20]. Moreover, the current study reported that liver cancer patients undergoing radiotherapy had better physical functioning while those receiving chemotherapy and no treatment were facing more symptoms and depression. The results of the study were consistent with the findings of another which reported better quality of life in patients on radiation therapy [21].

5. CONCLUSION

The present study concluded that liver cancer had a negative impact on health-related quality of life across all domains along with moderate depression in liver cancer patients. The lowest scores were observed for general symptoms scale including diarrhea and constipation while higher scores were observed for fatigue, pain, dyspnea and financial difficulties. Better scores were observed for physical and cognitive functioning. Illiteracy, advanced liver cancer stage, risk factors/past medical history, co-morbidities and poor socio-economic status negatively affected functional and symptom scale. Patients with stage 4 liver cancer, those who were not receiving any medical treatment, and patients with a past history of smoking were found relatively more depressed. Risk factor assessment and diagnostic tests should be part of gastroenterology and hepatology clinics and hospitals and free screening services should be provided. Appropriate health educational and psychological interventional programs targeting patients should be initiated to improve awareness and to reduce depression among liver cancer patients.

ETHICAL APPROVAL AND CONSENT

Study approval was taken from the Ethical Committee of Hamdard University (ERC-HUIC-86-5.1). Informed written consent was taken from the study respondents along with the confidentiality agreements to ensure that their personal information will not be disclosed and exploited, and all the information will be used for research purposes only.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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