



A STUDY OF SOCIODEMOGRAPHIC DETERMINENTS AND CLINICAL OUTCOME IN PATIENTS WITH LIVER ABSCESS

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INTRODUCTION

Liver abscess remains an important clinical problem with a significant mortality rate in both developing and developed countries. The two most common varieties of liver abscess are pyogenic and amoebic. Amoebic liver abscess is an important cause of space-occupying lesions of the liver; mainly in developing countries accounted for 3-9% of all cases of amoebiasis. This infection is caused by the protozoa *E. histolytica*, which ascends the portal venous system. Liver abscesses are the most common type of visceral abscess[1].

The annual incidence of liver abscess in the world has been estimated at 2.3 cases per 100,000 populations and is higher among men than women (3.3 versus 1.3 per 100,000); substantially higher rates have been reported in Taiwan (17.6 cases per 100,000). India has 2nd highest incidence of liver abscess in the world[2-4].

The last estimate on the global magnitude of this disease was made more than two decades ago. According to WHO fact sheet, it is prevalent throughout the under developed and developing nations of the tropics with up to 50 million true *E. histolytica* infections and approximately 100,000 deaths occur each year mostly from liver abscesses or other complications[5,6].

India being a tropical country, the incidence of liver abscess is quite high. Every year we get large number of patients with liver abscess, both amoebic and pyogenic. There are only few studies done on sociodemographic determinants and clinical outcome in patients with liver abscess in India.

Uttarakhand being the hilly region with most of the people belonging to lower socioeconomic class, living in poor sanitation and majority of people being chronic alcoholics, the incidence of liver abscess in this region is very high. Various studies have demonstrated that liver abscess is associated with low socioeconomic status, rural habitat, poor sanitation, excess intake of alcohol and impaired host defense mechanism.

The approach to liver abscess has changed drastically in the last few decades with the advent of newer diagnostic approaches and drugs. The management and the approach is largely governed by the sociodemography and the prevalent risk factors. This study in a tertiary care centre assumes significance as it caters both the hill region and plain. It may also further help to modify the existing guidelines as per the local needs and outcome.

MATERIAL AND METHOD

This study is conducted at SGRR Medical College, which is a tertiary care center in Dehradun. 101 hospitalized patients from July 2015 to October 2017 who had been diagnosed to have liver abscess were enrolled in the study. These patients had either been diagnosed elsewhere and referred to the hospital for management or detected to have liver abscesses on presentation in this hospital.

All 101 patients in our study were subjected to detailed history taking, clinical examination, routine investigations and various specialized investigations where ever indicated.

All information including clinical and sociodemographic information was recorded using questionnaires and data recording sheets.

All Patients who came to the OPD with chief complaints of fever, right hypochondrium pain and other features suggestive of liver abscess were screened using USG abdomen and their routine samples were sent for analysis. Presence of space occupying lesion in the liver detected by ultrasound imaging and CT substantiated initial clinical suspicion for liver abscess, which was later confirmed by aspiration of the abscess and microbiology and pathology.

Inclusion criteria

1. All cases of liver abscess diagnosed clinically and/or Ultrasonographically.
2. Both the sexes.
3. Age > 18 yrs

The duration of the study was 18 months. Informed consent was taken from all patients and data were collected on a standard form that included:

- Demographic characteristics,
- Clinical presentation of liver abscess,
- Risk factors of liver abscess,
- Laboratory tests [i.e. CBC, RFT, LFT, microbiological culture from blood and/or aspirate, amoebic serology],
- Type of imaging study,
- Abscesses characteristics [i.e., site, size and numbers of abscesses], type of interferences and duration of admission.

The choice of interventions was delegated to the consultants in charge of the patient's treatment. The patients were examined daily for clinical improvement. Improvement in pain, fever, anorexia and hepatomegaly were considered criteria for successful treatment.

Blood cultures were drawn from all patients in the first 24 hours after admission. Two sets of blood were collected for culture from two different venipuncture sites as well as a single set of blood cultures consisted of aerobic and anaerobic samples. In addition, all patients had ELISA test for *Entamoeba histolytica*. Aspiration of abscess was done under USG and CT guidance and aspirated pus was sent for gram stain and culture.

A pyogenic liver abscess was defined as a hepatic lesion demonstrated at Ultrasound [US] and/or computed tomography [CT] in a patient with a compatible clinical picture [various combinations of features of sepsis, right upper quadrant pain, and abnormal liver function], plus one or more of the following: [a] a positive culture result from aspiration of the lesion, [b] a positive blood culture result, or [c] clinical response to antibiotic treatment. On the other hand, amoebic liver abscess was defined as a hepatic lesion demonstrated at US and/or CT-scan in a patient with a compatible clinical picture [various combinations of features of sepsis, right upper quadrant pain, and abnormal liver function], plus one or more of the following: [a] recovery of amebas from the aspirate, or [b] a positive ELISA test, with clinical response to anti-amoebic treatment.

Complicated liver abscess were defined as:

1. Patients having pleural effusion,
2. Ruptured liver abscess.
3. Large left lobe abscess with impending rupture.

All other abscess were defined as simple abscess.

We have defined alcoholics as a person taking more than 180gm/day of alcohol daily.

Illiterate was defined as a person who is not able to read and write. We divided patients on the basis of socioeconomic status as per Prasad's classification using per capita income.

Table 1 : Prasad's Classification of socioeconomic status.

Upper class	Rs 4860 and above
Upper middle class	Rs 2406-4859
Middle class	Rs 1424-2405
Lower middle class	Rs 737-1423
Lower class	<Rs 736

The patients were classified as rural and urban.

The definition of urban area is as follows:

- [a] All statutory places with a municipality, corporation, cantonment board or notified town area committee, etc.
- [b] A place satisfying the following three criteria simultaneously:
 - i] a minimum population of 5,000;
 - ii] at least 75 per cent of male working population engaged in non-agricultural pursuits; and
 - iii] a density of population of at least 400 per sq. km. [1,000 per sq. mile].

An area is considered 'Rural' if it is not classified as 'Urban' as per the above definition.

Abscess were divided into right lobe, left lobe or multiple liver abscess and their correlation with sociodemographic characteristics were made. Right lobe was further divided into segments. Segments I, II, III, IVa, IVb are present in the left lobe and segments V, VI, VII, VIII are present in the right lobe.

Correlation of abscess volume with Hb, TLC, ALP and albumin was made and their significance was checked with p value.

Correlation of sociodemographic determinants to the gravity of illness (complicated and noncomplicated liver abscess) was made using the p value.

Results and observation

Table 2 Baseline Characteristics of patients with liver abscess(N=101).

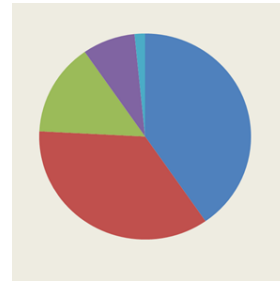
Variables	N(%)
Gender	
Male	91(90.9)
Female	10(9.9)
Male:female ratio	9.1:1
Mean age in years	42.89±12.54
Socioeconomic class	
Upper class	6 (5.94)
Upper middle class	12 (11.8)
Middle class	13 (12.8)
Lower middle class	29 (28.7)
Lower class	41 (40.5)
Habitat	
Urban	31(30.6)
Rural	70(69.3)
Alcoholic	73(72.2)
Non Alcoholic	28(27.7)
Occupation	
Driver	33(32.6)
Vender	20(19.8)
House wife	5(4.95)
Army men	7(6.93)
Shopkeeper	24(23.7)
Student	12(11.8)

Table 3 Distribution of patients according to their districts(N=101).

Place	N=101	%
Saharanpur	45	44.5
Dehradun	32	31.6
Uttarkashi	15	14.8
Pauri Gharwal	8	7.92
Pithoragarh	1	0.99

Distribution of patients according to their districts.

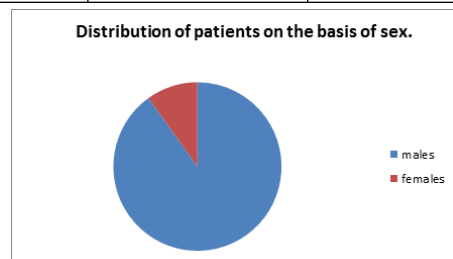
Saharanpur
Dehradun
Uttarkashi
Pauri Gharwal
Pithoragarh



Our study showed that maximum number of patients were from Saharanpur followed by Dehradun. Only 1 patient belonged to Pithoragarh.

Table 4 Distribution of patients on the basis of sex(N=101).

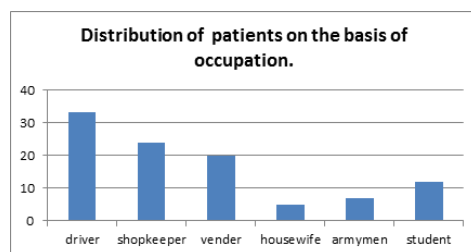
Age	Male	Female
<35	45±7.17	0
35-65	46±10.20	9±11.21
>65	0	1



Our study showed that mean age of the population was 42.89±12.54. Total no of males were 91(90.09%). Total no of females were 1(9.9%). In our study liver abscess was more common in men than in women.

Table 5 Distribution of patients on the basis of occupation (N=101).

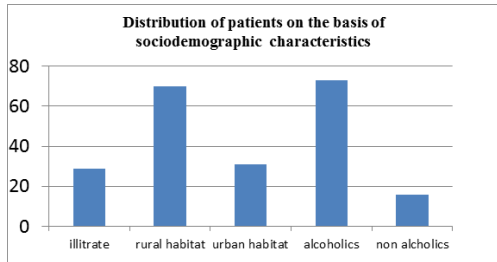
Occupation	N=101	%
Driver	33	32.6
Shopkeeper	24	23.7
Vender	20	19.8
Housewife	5	4.95
Army men	7	6.93
Student	12	11.8



Our study showed that maximum number of patients(32.6%) were driver by occupation followed by shopkeeper (23.7%)and venders(20%). Only 5 (4.95%)were housewives.

Table 6
Distribution of patients on the basis of sociodemographic characteristics (N=101).

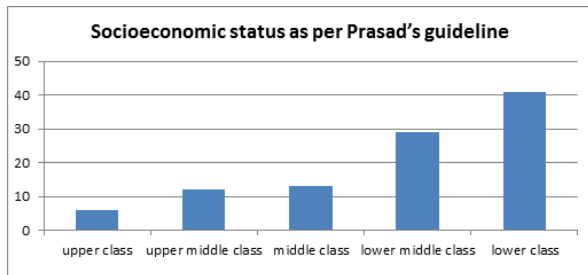
Socioemographic characteristics	(N=101)	%
Illiterate	29	28.7
Rural habitat	70	69.3
Urban habitat	31	30.6
Alcohol abusers	73	72.2
Non alcoholics	28	27.7



Our study showed that maximum number of patients (72.2%) were alcoholics and 69.3% belonged to rural habitat. Only 28 (27.7%) patients were non alcoholics and 29(28.7%) patients were illiterate.

Table 7 Socioeconomic status as per Prasad’s guideline(N=101).

	(N=101)	%
Upper class	6	5.94
Upper middle class	12	11.8
Middle class	13	12.8
Lower middle class	29	28.7
Lower class	41	40.5

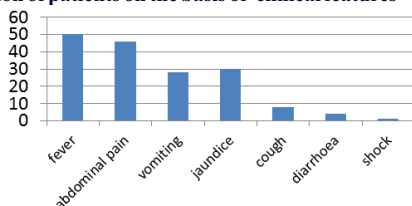


This table shows that maximum number of patients 41(40.5%) were from lower socioeconomic class and 29(28.7%) patients belonged to lower middle class. Only 6 patients(5.94%) belonged to upper class.

Table 8 Distribution of patients on the basis of clinical features(N=101).

Symptoms	[N=101]	%
Fever	80	79.2
Abdominal pain	46	45.5
Vomiting	28	27.7
Jaundice	30	29.7
Cough	8	7.92
Diarrhea	4	3.96
shock	1	0.99

Distribution of patients on the basis of clinical features

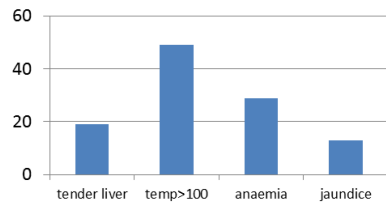


Our study showed that maximum no of patients(79.2%) had fever followed by abdominal pain(45.5%).27.7%patients had vomiting and only 1 patient went into shock.

Table 9
Distribution of patients according to clinical signs(N=101).

Signs	N=101	%
Enlarged tender liver	19	18.8
Temp>100	49	48.51
Anaemia	29	28.71
Jaundice	13	12.8

Distribution of patients according to clinical signs



Our study showed that maximum number of patients(48.51%) had raised body temperature. 29(28.7%) patient had anemia. 19(18.8%) patients had tender liver.13(12.8%) patients had jaundice .

Table 10 Correlation of sociodemographic characteristics with abscess location(N=101).

Sociodemographic characteristics	Rightlobe	Left lobe	Both right and left lobe
Rural	27	1	20
Urban	12	2	6
Male	88	3	22
female	10	0	4
Driver	30	3	8
Shopkeeper	24	0	5
Vender	20	0	6
House wives	5	0	2
Army men	7	0	2
student	12	0	3
Upper class	6	0	0
Upper middle class	12	0	0
Middle class	13	0	1
Lower middle class	29	1	8
Lower class	41	2	17

Our study showed that right lobe abscess is more common in the rural populations ,alcoholics and lower socioeconomic class.

Table 11 Laboratory parameters of patients presenting with liver abscess(N=101).

Lab parameters	N=101	Mean/SD	%
Hb<10	29	11.6±2.26	28.7
TLC>12000	70		69.3
SGPT>2UNL	56	110±337.07	55.4
ALP>70	60	170 ±310	59.4
GGT>50	26	40 ±34	25.7
Albumin<2	4	1.6 ±0.41	3.96
2-3	32	2.6 ±0.42	31.6
>3	29	3.6±0.46	25.7
INR>2	19	1.7±0.3	18.8
Urea>40	20	87.73±63.18	19.8
Creatinine>1.6	16	1.1±0.77	5.94

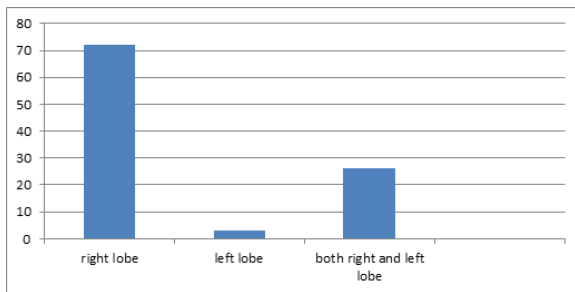
Our study showed that 29(28.7%) patients had Hb less than 10. Mean Hb was 11.6 with SD +2.26.70(69.3%) patients had TLC more than 12000. 56 (55.4%)patients had SGPT more than 2 times the upper limit. Mean SGPT was 110. 60(59.4%) patients had raised ALP .Mean ALP was 170 with SD +310.26(25.7%) patients had raised GGT >50 mean GGT was 40 with SD +34.16(15.8%) patients had creatinine of more than 1.6 and 20(19.8%) patients had urea more than

40. 19(18.8%) patients had INR more than 2. 4 (3.96%) patients had Albumin less than 2. 32(31.6%) patients had albumin between 2-3. 26(25.7%) patients had albumin more than 3.

Table 12 Distribution of patients on the basis of location of liver abscess (N=101).

Location	N=101	%
Right lobe	72	71.2
Segment V	34	33.6
segment VIII	23	22.7
Segment VII	15	14.85
Left lobe	3	2.97
Segment II	2	1.98
Segment III	1	0.99
Segment Iva,IVb	0	0
Both right and left lobe	26	25.74

Distribution of patients on the basis of location of liver abscess.



Our study showed that 72 (71.2%) patients had abscess in the right lobe with 34 (33.6%) in segment V ,23(22.7%) in segment VIII and 15 (14.85%) in segment VII and 3(2.97%) patients had abscess in the left lobe with 1(0.99%) in segment II and 2(1.98%) in segment IV.

Table 13 Correlation of laboratory values with abscess volume(N=101)

	No of patients(N=101)	Mean Abscess volume	P value
Hb<10	29	400.24 +123	>0.05
Hb>10	72	250.12 +110	
TLC>12000	70	810.21 +260	>0.05
TLC<12000	31	456.56 +110	
ALP>60	60	850.76 +218	<0.05
ALP<60	41	350.48 +113	
Albumin<3	34	950.69 +256	<0.05
Albumin>3	67	245.90 +234	

Our study showed that low albumin and high ALP is associated with large abscess size with P value of less than 0.05.

Table 14 Correlation of sociodemographic determinants to the gravity of illness.

Determinants	Complicated liver abscess	Non complicated liver abscess	Odds ratio	95%CI	P value
Gender					
Male	33(32.67%)	58(57.42%)	0.53	0.05-5.36	>0.05
Female	01(0.99%)	9(8.91%)			
Habitat					
Rural	32(31.68%)	38(37.6%)	13.75	2.99-63.04	<0.05
Urban	2(1.98%)	29(28.71%)			
Alcohol					
alcoholic	29(28.7%)	44(43.5%)	16.95	2.15-133.62	<0.05
Non alcoholic	5(4.95%)	23(22.7%)			

Our study showed that complicated liver abscess cases showed significant odds ratio (P < 0.05) for major determinants like rural habitat and alcohol consumption in comparison to 67 non-complicated ones.

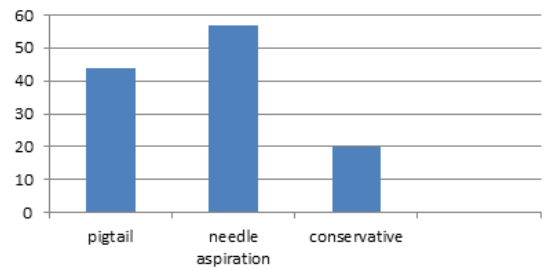
Table 15 Distribution of patients on the basis of abscess size , characteristics and treatment.

Abscess size	N=101	%	Mean/SD
>300	44	43.5	700.12+70.1
<300	57	56.4	127.21+85.3

Abscess Characteristics	N=101	%
Multiple Abscess	26	25.74
Liquified Abscess	31	30.6

Treatment	N=101	%	Mean abscess size/SD
Pig tail insertion	44	43.5	302.23+122
Simple aspiration	57	56.4	249.12+121
conservative	20	19.8	

Distribution of patients on the basis of treatment

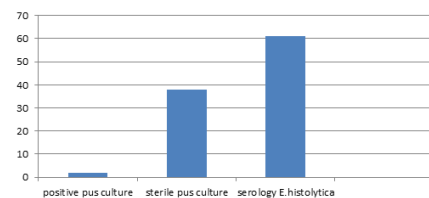


Our study showed that mean size of the abscess more than 300 cc was 700.12 and less than 300cc was 127.21. There were 26(25.74%) patients who had multiple liver abscess and 31(30.6%) patients had liquefied liver abscess. The average size of abscess in our study was 302.23+122 mL and 249.12+121 mL for the pig tail insertion and percutaneous needle aspiration group respectively.

Table 16 Distribution of patients on the basis of microbiology of the abscess (N=101).

	N=101	%
Positive pus culture	2	1.98
Sterile pus culture	38	37.6
Serology for E.Histolytica	61	60.39

Distribution of patients on the basis of microbiology of the abscess

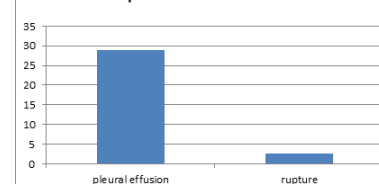


Our study showed that maximum number of patients 61(60.39%) of patients with liver abscess were positive for Entamoeba histolytica and only 2(1.98%) patients had positive bacterial pus culture. 38(37.6%) patients had sterile pus culture.

Table 17 Distribution of patients on the basis of complications of liver abscess(N=101)

Complication	N=101(%)
Pleural effusion	29 (28.71%)
Rupture of liver abscess	5 (4.95%)

Distribution of patients on the basis of complications of liver abscess



Our study showed that 34 patients had complicated liver abscess out of which 29(28.71%) patients presented with pleural effusion and 5 (4.95%) patients presented with ruptured liver abscess.

Conclusion

1. Present investigation has documented that liver abscess is prevalent and endemic in the region of Uttrakhand and nearby areas.
2. In the present study none of the patients had any features suggestive of pyogenic abscesses like biliary stones, worms or portal pyemia. This is in sharp contrast to findings to the studies done from Kashmir, where 70 % of the abscesses were noted to be pyogenic.
3. Majority of patients in our study were in their third and fourth decade and most of them belonged to low socioeconomic status. In our study liver abscess was common in patients who were alcoholic and belonged to rural habitat. In our study right lobe abscess was more common than left lobe abscess.
4. We had no mortality in our study due to timely management and intervention and no complications were seen with percutaneous needle aspiration or catheter drainage.
5. USG and CT helped us in establishing the diagnosis of liver abscess and serology was the most important investigation.
6. Illiteracy, rural habitat, low socioeconomic condition, and alcohol abuse are important sociodemographic determinants for liver abscess and majority of these factors has significant association with morbid complications in liver abscess. It leads to a significant number of morbidities and a few mortality, so early diagnosis and timely intervention are essential measures to reduce the detrimental outcomes. It is expected that findings of present investigation would help to bridge knowledge gap in regards to the epidemiology, risk factors and clinical outcomes of liver abscess.
7. With proper treatment and timely intervention liver abscess is a curable disease.

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