

# Pattern of Liver Disease Admissions at a Tertiary Hospital in North Western Nigeria

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## ABSTRACT

**Background:** Liver diseases cause significant public health problems worldwide. They are associated with poor long-term clinical outcome resulting in 2 million deaths per year worldwide. The objective of this study was to determine the relative frequencies of liver diseases and evaluate the etiological factors among patients admitted to the medical wards in our centre.

**Materials and Method:** This was a retrospective descriptive analysis of digestive disease patients admitted from 1<sup>st</sup> January 2013 to 31<sup>st</sup> of December 2017 to the medical wards of Usmanu Danfodiyo University Teaching Hospital Sokoto state, Nigeria. This is a tertiary hospital situated in the North Western region of Nigeria and serves at least five states in the region namely Sokoto, Kebbi, Zamfara, Katsina and Niger states. Data were extracted from patients' case folders during the period under review. The data were validated using Microsoft excel version 13 and exported into SPSS version 23.0 (Chicago IL) for windows; for statistical analysis. The data were analyzed for demographic and other clinical characteristics as categorical variables. (Chi-square Fisher exact test and Bivariate spearman's correlation) was applied between demographic, clinical presentation (Independent variables) and liver diseases variant and Outcome as (dependent variables)  $P \leq 0.05$  is considered as statistically significant.

**Result:** Out of 1266 digestive disease patients admitted to the gastroenterology service on the medical wards during the five-year period, liver diseases accounted for 30.4% of all the digestive diseases in the same period. There were three hundred and eighty-five patients diagnosed with

liver diseases. There were 310(80.5%) males and 75(19.5%) females, with a male to female ratio of 4.1:1. The overall mean age of the patients and age range was  $46.3 \pm 15.5$  and 11-90 years respectively. Average age of male patients was  $(46.5 \pm 15)$  while for female patients' mean age was  $(45.6 \pm 16.4)$ . The peak age incidence occurred within the fourth decade of life accounting for 26.2%; there were more male patients 86(85.1%) within these age category than the counterpart gender 15(14.9%). The commonest liver diseases were; primary liver cell carcinoma which accounted for 176(45.7%), followed by liver cirrhosis 98(25.5%) and acute hepatitis 52(13.5%). HBV was the commonest risk factor for liver disease and accounted for 280(72.7%) cases, followed by HCV 70(18.2%), HIV/HBV 15(3.9%) alcohol consumption 11(2.9%), fatty liver disease 5(1.3%), while autoimmune diseases had 4(1%).

**Conclusion:** Our findings show that primary liver cell carcinoma was the commonest cause of admission among GIT diseases in our environment; also the majority of patients were male. In view of this, health education and public enlightenment on hepatitis B and C screening tests is the primary preventive strategy to be considered.

**Key word:** Liver Disease, Admissions, Tertiary Hospital, North western, Sokoto

## INTRODUCTION

Liver diseases cause significant public health problems worldwide with consequent poor long-term clinical outcome, including premature deaths from

liver failure, cirrhosis and hepatocellular carcinoma[1, 2]. Knowledge of the pattern of liver disease is useful, not only in formulating health policies and prioritizing health interventions and research, but may also aid in planning the structure and activities of gastroenterology units for provision of better and effective patient care. Very often; affected individuals are asymptomatic for a long period of time, making it very difficult to generate accurate incidence and prevalence data in the general population. The pattern of liver disease varies in different geographical locations[3]. Worldwide, Eight hundred and forty-four (844) million people have Chronic Liver Diseases (CLD) with a mortality rate of 2 million deaths per year[4, 5]. Liver diseases, including hepatitis B virus (HBV) and hepatitis C virus (HCV) infections, alcoholic liver disease (ALD), nonalcoholic fatty liver disease (NAFLD) and associated liver cirrhosis, liver failure (LF) and hepatocellular carcinoma (HCC), are major causes of illness and death worldwide[6]. Hepatocellular carcinoma (HCC) is the fourth most common cause of cancer-related death worldwide; >80% of HCC cases occur in low-resource and middle-resource countries, particularly in Eastern Asia and sub-Saharan Africa, where medical and social care resources are often constrained[7-9]. HBV infection affects at least 2 billion people worldwide; among these, 350-400 million are chronic HBV carriers[1]. In sub-Saharan Africa in 2010, liver diseases were the underlying cause of death in 186 373 individuals with more than 50% attributed to endemic hepatitis B or C. The mortality rate per 100 000 for liver cirrhosis stabilized between 1990 and 2010 from 12.5 to 12 per 100 000; decreased for liver cancer from 6.3 to 5 per 100 000 and for acute viral hepatitis from 6.2 to 4.5 per 100 000[10]. The contribution of non-alcoholic fatty liver disease as an important etiology should also be considered if obesity is used as a surrogate marker. Early malnutrition and growth stunting is associated with an increased risk of

metabolic syndrome and this is further exacerbated by increasing urbanization in adult life and the associated change from a traditional diet high in fibre to a more western diet high in calories, animal protein, saturated fat and sugar. There is also increasing availability of fast foods and soft drinks coupled with decreasing physical activity[11, 12]. Alcohol consumption, as measured in litres of pure alcohol per capita per year varies considerably and is influenced by cultural and religious beliefs in different countries. Low levels are seen in [Niger (0.3) compared to Angola (9), Nigeria (9.5), Uganda (9.5), South Africa (11) and Namibia (12.2)][13]. There is paucity of data on the causes and pattern of liver diseases in North Western Nigeria especially in Sokoto.

The objective of this study was to determine the relative frequencies of liver diseases and evaluate the etiological factors among patients admitted to the medical wards in our centre.

## **MATERIALS AND METHODS**

This was a retrospective descriptive analysis of patients admitted from 1<sup>st</sup> January 2013 to 31<sup>st</sup> of December 2017 to the medical ward of Usmanu Danfodiyo University Teaching Hospital Sokoto state Nigeria. Case folders of Patients admitted during the period under review were retrieved and data were extracted. The data include; demographical characteristic, such as [Age, Gender, Tribe], Clinical Manifestation, Diagnoses and Outcome of illness. All diagnoses were based on the final diagnoses made by the supervising consultants. These were arrived at using a combination of clinical and laboratory parameters of the patients. The data were validated using Microsoft excel version 13 and exported it into SPSS version 23.0 (Chicago IL) for windows; for statistical analysis. The data were analyzed for demographic and other clinical characteristics as categorical variables. Mean and the standard deviation were determined for quantitative variables.

Variables were coded as binary dummy variables. For example gender (males = 1, females = 2), and so on. Data were presented as frequency distribution and charts generated for all categorical variables, while Mean and standard deviation was determined for a quantitative variable. Descriptive and inferential statistics (Chi-square Fisher exact test and Bivariate spearman's correlation) was applied between demographic, clinical presentation (Independent variables) and liver diseases variant and Outcome as (dependent variables)  $P \leq 0.05$  was considered as statistically significant.

**RESULTS**

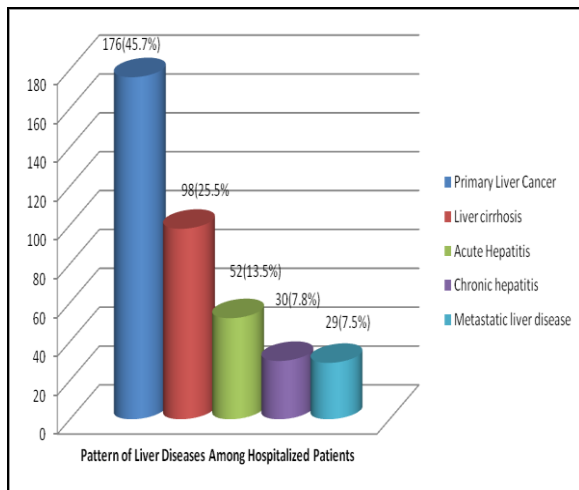


Figure 1: Pattern of Liver Diseases among Hospitalized Patients

Table 1: Socio-demographic characteristics of GIT patients admitted into the medical wards

Characteristics	No	Gender		P-value
		Male	Female	
<b>Age</b>				
11-20	17	13(76.5%)	4(23.5%)	0.752
21-30	54	43(79.6%)	11(20.4%)	
31-40	84	66(78.6%)	18(21.4%)	
41-50	101	86(85.1%)	15(14.9%)	
51-60	63	48(76.2%)	15(23.8%)	
61-70	48	39(81.3%)	9(18.8%)	
71-80	12	11(91.7%)	1(8.3%)	
>80	6	4(66.7%)	2(33.3%)	
<b>Tribe</b>				
Hausa/Fulani	345	275(79.7%)	70(20.3%)	0.557
Yoruba	5	4(80%)	1(20%)	
Igbo	5	5(100%)	0	
Others	30	26(86.7%)	4(13.3%)	

Out of 1266 cases of Digestive disease patients admitted to the gastroenterology medical beds during the five-year period, liver diseases accounted

for 30.4% (385) of all cases within the period. They consisted of 310(80.5%) males and 75(19.5%) females, with a male to female ratio of 4.1:1. The overall mean age of the patients was  $46.3 \pm 15.5$  and the age range of 11-90 respectively, the average age of male patients was  $(46.5 \pm 15)$  while for female patients' mean age was  $(45.6 \pm 16.4)$ . The peak age incidence occurred within the fourth decade of life and accounted for 26.2%; there were more male patients 86(85.1%) within these age category than the counterpart gender 15(14.9%) Table 1 The commonest liver diseases were; primary liver carcinoma which accounted for 176(45.7%), followed by liver cirrhosis 98(25.5%) and acute hepatitis 52(13.5%). See figure 1HBV was the commonest risk factor for liver disease and accounted for 280(72.7%), followed by HCV 70(18.2%), HIV/HBV 15(3.9%) alcohol consumption 11(2.9%), Non-Alcoholic fatty liver disease 5(1.3%), while autoimmune and other diseases had 4(1%) Table 2. Majority 305(79.2%) of the patients were admitted via the accident and emergency while 80(20.8%) through other various outpatients services  $P = 0.00$ . Out of 84 patients that presented with hematemesis, 67(78%) were male while 17(20.2%) were female. Sixty-four patients developed neuropsychiatric complications (hepatic encephalopathy) out of which 57(89.1%) were male, and 7(10.9%) were female. Fifty-nine participants presented with GIT complication of which 46(78%) were male while 13(22%) were female. The outcome of the admission showed that 147(38.2%) died on admission; by the gender they were 117(97.6%) males and 30(20.4) females. On the other hand 103(26.7%) were discharged home 82(79.60%) being males while 21(20.4%) were females. Those who signed against medical advice (SAMA) were 79(20.5%) 70(88.6%) males and 9(11.4%) females, Table 3. A correlation between the demographical parameter and liver disease; there was no significant correlation between gender and liver diseases ( $R = 0.026$ ,  $P = 0.617$ ). Out of 310 male patients identified

with liver disease 145(46.8%) were primary liver carcinoma, followed by liver cirrhosis which accounted for 81(26.1%). Of 75 females confirmed with liver disease 31(41.3%) were primary liver carcinoma. There was a significant correlation between age and liver diseases( $R = -0.203, P = 0.001$ ). The peak age incidence occurred within the fourth decade of life. Most 41(48.8%) of the cases of primary liver cell carcinoma occurred within the age range of 31-40 years, Table 4. Out of 251(65.2%) individual clinical presentations during the period of admission 84 patients presented with Haematemesis; among those cases, 45(53.6%) turned out to be primary liver cell carcinoma, 26((31%) liver cirrhosis, 8(9.5%) acute hepatitis, 3(3.6%) Metastatic

liver disease and 2(2.4%) chronic hepatitis Table 5. There was a strong correlation between the outcome of admission and liver disease categories ( $R = 0.116, P < 0.05$ ). Among those who died on admission, 83 (56.5%) were primary liver cell carcinoma cases, 33(22.4%) liver cirrhosis, 18 (12.2%) acute (fulminant) hepatitis, 9(6.1%) metastatic liver disease and 4(2.7%) chronic hepatitis. Table 6

**Table 2: Risk factors for liver disease**

Risk Factors	Frequency	Percent
HBV	280	72.7
HCV	70	18.2
HIV/HBV	15	3.9
Alcohol consumption	11	2.9
Fatty liver disease	5	1.3
Others	4	1
<b>Total</b>	<b>385</b>	<b>100</b>

**Table 3: Outcomes of patients admitted into medical wards**

Outcome	Total	Gender		Test Statistics	P-value
Route/source of Admission		Male	Female		
A&E	305	248(81.3)	57(18.7)	$X^2 38.863$ df= 4	0.001
EPU	2	1(50%)	1(50%)		
GEC	8	0	8(100%)		
MOPD	65	58(89.2%)	7(10.8%)		
SOPD	5	3(60%)	2(40%)		
Complications developed					
Cardiovascular	1	1(100%)	0	$X^2 6.453$ , df=7	0.488
Endocrine	8	5(62.5%)	3(37.5%)		
Genitourinary/Renal	34	25(73.5%)	9(26.5%)		
GIT	59	46(78%)	13(22%)		
Haematemesis	84	67(79.8%)	17(20.2%)		
Infectious Diseases.	1	1(100%)	0		
Neuro-Psychiatric	64	57(89.1%)	7(10.9%)		
None	134	108(80.6%)	26(19.4%)		
Outcome					
Absconded	3	3(100%)	0		
Died	147	117(97.6)	30(20.4)	$X^2 7.900$ , df= 6	0.246
Discharged	103	82(79.6)	21(20.4)		
Improved	4	3(75.0)	1(25%)		
SAMA	79	70(88.6)	9(11.4)		
Stable	47	33(70.2)	14(29.8)		
Transfer	2	2(100%)	0		

A&E = Accident and Emergency, EPU =Emergency Paediatric Unit, GEC= Gynaecology Emergency Clinics, MOPD= Medical Out Patients Department, SOPD= Surgical Out Patients Department, GIT = Gastrointestinal Track Diseases, SAMA =Sign Against Medical Advice

**Table 4: Bivariate Correlation between Demographical variable and Liver Disease variant**

Variables		Liver Disease variant					Total	P-value	R
		Primary Liver Cancer	Acute Hepatitis	Liver cirrhosis	Chronic hepatitis	Metastatic liver disease			
Gender	No	145	38	81	22	24	310	0.617	0.026
	%	46.80%	12.30%	26.10%	7.10%	7.70%	100.00%		
Female	No	31	14	17	8	5	75		
	%	41.30%	18.70%	22.70%	10.70%	6.70%	100.00%		
Age group									
11-20	No	3	2	4	0	8	17	0.001	-0.203
	%	17.60%	11.80%	23.50%	0.00%	47.10%	100.00%		
21-30	No	24	5	7	0	18	54		
	%	44.40%	9.30%	13.00%	0.00%	33.30%	100.00%		
31-40	No	41	5	21	17	0	84		
	%	48.80%	6.00%	25.00%	20.20%	0.00%	100.00%		
41-50	No	37	31	17	13	3	101		
	%	36.60%	30.70%	16.80%	12.90%	3.00%	100.00%		

**Table no.4 continued.....**

51-60	No	38	3	22	0	0	63		
	%	60.30%	4.80%	34.90%	0.00%	0.00%	100.00%		
61-70	No	20	6	22	0	0	48		
	%	41.70%	12.50%	45.80%	0.00%	0.00%	100.00%		
71-80	No	10	0	2	0	0	12		
	%	83.30%	0.00%	16.70%	0.00%	0.00%	100.00%		
>80	No	3	0	3	0	0	6		
	%	50.00%	0.00%	50.00%	0.00%	0.00%	100.00%		

**Table 5: Bivariate Analysis between Complication variable and Liver Disease variant**

Complication		Liver Disease variant					Total	P-value	R
		Primary Liver Cancer	Acute Hepatitis	Liver cirrhosis	Chronic hepatitis	Metastatic liver disease			
Cardiovascular	No	1	0	0	0	0	1	0.107	0.082
	%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%		
Endocrine	No	5	0	0	3	0	8		
	%	62.50%	0.00%	0.00%	37.50%	0.00%	100.00%		
Genitourinary/Renal	No	14	4	10	5	1	34		
	%	41.20%	11.80%	29.40%	14.70%	2.90%	100.00%		
GIT	No	28	8	12	4	7	59		
	%	47.50%	13.60%	20.30%	6.80%	11.90%	100.00%		
Haematemesis	No	45	8	26	2	3	84		
	%	53.60%	9.50%	31.00%	2.40%	3.60%	100.00%		
Infectious Diseases.	No	1	0	0	0	0	1		
	%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%		
Neuro-Psychiatric	No	36	6	13	3	6	64		
	%	56.30%	9.40%	20.30%	4.70%	9.40%	100.00%		
None	No	46	26	37	13	12	134		
	%	34.30%	19.40%	27.60%	9.70%	9.00%	100.00%		

**Table 6: Bivariate Analysis between Outcome variable and Liver Disease variant**

Out Come		Liver Disease variant					Total	P-value	R
		Primary Liver Cancer	Acute Hepatitis	Liver cirrhosis	Chronic hepatitis	Metastatic liver disease			
Absconded	No	1	0	0	0	2	3	0.023	0.116
	%	33.30%	0.00%	0.00%	0.00%	66.70%	100.00%		
Died	No	83	18	33	4	9	147		
	%	56.50%	12.20%	22.40%	2.70%	6.10%	100.00%		
Discharge	No	39	10	32	14	8	103		
	%	37.90%	9.70%	31.10%	13.60%	7.80%	100.00%		
Improved	No	1	1	2	0	0	4		
	%	25.00%	25.00%	50.00%	0.00%	0.00%	100.00%		
SAMA	No	31	13	22	7	6	79		
	%	39.20%	16.50%	27.80%	8.90%	7.60%	100.00%		
Stable	No	21	9	8	5	4	47		
	%	44.70%	19.10%	17.00%	10.60%	8.50%	100.00%		
Transfer	No	0	1	1	0	0	2		
	%	0.00%	50.00%	50.00%	0.00%	0.00%	100.00%		
Total	No	176	52	98	30	29	385		
	%	45.70%	13.50%	25.50%	7.80%	7.50%	100.00%		

## DISCUSSION

Liver diseases pose an enormous burden on Sub-Saharan Africa. Our finding of 30% of digestive disease admissions being due to liver diseases is higher when compared to findings by Nwokediuko et al in Enugu (9.7%)[3], Chijioko(11.3%) in Illorinkwara state[14] and Hadiza(8.6%) in Kano[15].The difference however, was due to study design. While our denominator was Digestive diseases, theirs was all medical admissions in this instance. In our study

HCC accounted for 45.7% of Digestive diseases which was similar to 52% from South-western Nigeria[16]and 44.3% from South-Eastern Nigeria[3]. Also, we found liver Cirrhosis to account for 25.5% while Adekanle et al[16]found 27.2% and Nwokediuko et al[3]. In Eastern Nigeria found 20.4%. Our 13.5% for acute hepatitis was quite similar to 10.38% South-western Nigeria. The male to female ratio in our study was 4:1 as against 3:1 Adekanle et al[16]. This suggested that males were more



prone to developing chronic liver diseases. This is in line with reports from Nigeria, Europe, and Asia that the majority of patients with liver diseases are male [17]. The variation is due to greater exposure to risk factors for liver disease such as HBV, alcohol, and cigarette smoking. Additionally, hormonal factors such as low levels of estrogen in males and high levels in women (which is a potent anti-oxidant) tends to protect women, estrogen suppresses hepatic fibrosis by inhibiting stellate cells [18].

The mean age of the study participants in our locality was 46.3 years. This finding was comparable to other local studies. Nwokediuko et al documented 46.4 mean age, [3], Ndububa et al 46.8 mean age [19] and Adekanle et al 46.7 mean age [17]. In this study, Primary liver cell carcinoma had a higher rate of admission 45.7%. Our findings differed from that by Mukherjee *et al.* in India where liver cirrhosis was the most common liver disease [20]. Also, our report was not in agreement with what was reported from two European countries [21,22]. The leading cause of HCC in Sub-Saharan Africa is HBV which is hyperendemic particularly Nigeria. A recent study within the vicinity of the current study location revealed a prevalence of HBV of 16.6% Yakubu et al [23] which is higher than the Nigerian National average of 13.6% Musa B et al [24]. Gabriel and Austin reported that about 18 million Nigerians are currently infected with hepatitis B virus [25], while alcohol aetiology is responsible for those in Europe [17]. The peak age incidence of HCC occurred in the 4<sup>th</sup> decade (26.2%) in our review. This is in keeping with documented reports, while HCC incidence peaks 1- 2 decades later in Europe and North America due to alcoholic liver disease [19].

Gastrointestinal and liver disorders were the fourth common cause of death after infectious agents in a report from another tertiary hospital in South-West Nigeria [16]. In our review, we recorded 147 (38.2%) deaths among patients with various

types of liver diseases. The reason for this high mortality was late presentation. Majority (79.2%) of the patients admitted via the accident and emergency unit were patients with end-stage liver diseases. Adekanle et al. from southwest Nigeria reported 47.6% mortality. Our proportion slightly differed (38.2%). Okoroiwu et al. documented 16.9% mortality however this proportion was mainly among those with malignant neoplasm of the liver [26].

## CONCLUSION

In conclusion, Primary cell carcinoma and liver cirrhosis in our hospital admissions were the commonest forms of liver diseases. We documented 38.2% of mortality cases in this study. With regard to these findings there is need for public awareness and universal HBV vaccination, discouragement of alcohol and *herbal* remedy consumption, will significantly reduce the rate of morbidity and mortality of the liver disease.

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