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Prevalence of Alcoholic Liver Disease in Port Harcourt, Rivers State

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Alcoholic liver disease is a severe liver disease that affects substantial number of people in different parts of the world. However, there is low level of awareness regarding the disease and poor knowledge of the risk factors. The present study aimed to determine the prevalence of alcoholic liver disease among the residents of Port Harcourt, Rivers State, Nigeria, as this will both provide a clear picture of the incidence, as well as, aiding the diagnosis and management of the disease and distinguish it from other forms of liver impairment. This cross-sectional, descriptive study was conducted in the University of Port Harcourt Teaching Hospital; a tertiary health facility serving treatment, teaching, health research and referral purposes for primary and secondary health care facilities within Rivers State and its adjoining states. The relationship between gender

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and age to the assayed parameters were investigated, shows that age (0.793) and sex (0.591) were not statistically significant for the circulating level of aspartate, with age (0.000) significant and sex (0.217) non-significant for alanine amino transaminase, while age (0.830) and sex (1.52) were not statistically significant for gamma T. the prevalence of liver disease is low (8.1%) in the population and this may be attributed to factors such as poor healthcare-seeking attitude among the residents and effective diagnostic tools to detect the anomaly in the liver, especially, at the earliest stages of the disease condition.

Keywords: Alcoholic liver disease; Nigeria; healthcare-seeking attitude; disease.

1. INTRODUCTION

Alcoholic liver disease (ALD), also called alcohol-related liver disease, is a complex of liver dysfunctions that originate from prolonged excessive consumption of alcohol. It is simply damage to the liver due to alcohol overconsumption over prolonged duration [1]. The disease conditions include; fatty liver, alcoholic hepatitis and chronic hepatitis, and associated liver fibrosis or cirrhosis [2]. There is also a borderline ALD, between steatosis and hepatitis, which is characterized by hepatic injuries associated with steatosis. Information regarding ALD pathogenesis is unclear, including its clinical diagnosis [1]. However, there are certain factors that elicit the development of ALD, which according to O'Shea *et al*. [1], Mandayam *et al*. [3] and Menon *et al*. [4] include; the quantity of alcohol consumed, pattern of alcohol consumption, gender affects the female gender more), hepatitis C virus infection, genetics, iron overload and diet deficient in vitamins A and E.

Alcohol liver disease (ALD) is the second commonest cause of death globally and the commonest in industrialized climes [5]. While fatty liver (steatosis) is a common symptom in individuals that consume large volume of alcohol over prolonged period, the condition is usually transitory and reversible [2]. Kong *et al*. [1] argues that about 90% of individuals who consume huge volumes of alcohol over a long time will develop fatty liver, while 25% develop severe alcoholic hepatitis and 15% develop liver cirrhosis in their life time.

Liver diseases due to infections are prevalent in developing countries [6] with approximately 350-400 million people suffering the chronic form globally [7]. Specifically, about 2 billion people have serological evidence of hepatitis B virus globally (Nimat & Adedapo, 2020). However, there has been consistent decline in the number over the years owing, resulting in reduced viral transmission, in addition to behavioural adjustments and availability of vaccines [8]. The exact prevalence of liver disease in Nigeria is blurry due to the poor availability of data. Among the types of liver disease, hepatitis B viral infection has more available data, (national prevalence of 15%-20%), with some regions of the country having higher prevalence, 30% [9]. In the United States of America (USA), an estimated 75.0% of the population consumes alcohol, 7.4% meet the criteria for alcohol abuse, 100,000 die of alcohol-related disorders annually, 20% of such deaths are attributed to liver cirrhosis and the situation is higher in men and among non-blacks, although blacks have higher incidence of liver cirrhosis (Nimat and Adedayo, 2020).

In Europe, 6.5% of all deaths are due to alcohol consumption [10] with recent estimates reporting that one in seven deaths in men and one in thirteen deaths in women aged 15-64 years is due to alcohol consumption, while alcohol use disorders (AUD) accounts for the most frequent cause of liver cirrhosis, being responsible for the most cause of deaths among adults [11].

The pathway of ALD offers clue to its prevention, but knowledge of liver physiology reveals that 80% of consumed alcohol is metabolized in the liver through detoxification. The proposed pathway, according to Longstreth *et al*. [12] is that, chronic consumption of alcohol leads to secretion of pro-inflammatory cytokines, such as tumor necrosis factor- alpha, interleukins 6 and 8, oxidative stress, lipid peroxidation and acetaldehyde toxicity. Classification into the various stages, depend on its severity and is based on histological findings of liver biopsy [13], with the pathologic process overlapping each other [14] [15]. The aetiopathogenesis of ALD implicates the induction of stress in the liver, which leads to release of reactive oxygen species (ROS), that results in the accumulation of alcohol metabolites in the hepatocytes [16]. These lead to inflammation, apoptosis and subsequent fibrosis of hepatocytes.

Acetaldehyde, the primary metabolite of alcohol, produces toxic effects in the liver cells by damaging their microtubules and mitochondria [1], coupled with the up-regulation of the enzyme, CYP2EI in prolonged alcohol abuse, which ensures continuous conversion of alcohol to acetaldehyde [17] that further causes dysfunctional mitochondrial fatty acid β- oxidation and hepatocyte secretion [1], while also activating the transcription of SREBP- 1c to promote fatty acid synthesis and accumulation in the hepatocytes [18]. In chronic alcohol consumption, CYO2E1 excessively produces ROS, such as hydrogen peroxide and superoxide ions, which recruits immune cells and induces pro-inflammatory cytokines that permits the alcohol-induced liver damage [17] [19]. There is also inhibition of the signaling pathway-related proteins in the liver, such as AMPK, sirtuin-1 (SIRT1) and signal transducer and activator of transcription (STAT) [20].

Laboratory investigation of ALD mainly considers two enzymes; aspartate aminotransferase (AST) and alanine aminotransferase (ALT). The ratio of the enzymes will be greater than 2:1. This is attributed to the deficiency in the catalyzing enzyme, pyridoxine phosphate. In normal circumstances, the concentration of AST and ALT is less than 500 picograms. There is also the release of AST isoenzyme. Other laboratory findings include; macrocytosis of erythrocytes (the mean corpuscular volume will be greater than 100), elevated concentrations of gamma glutamyl transferase (GGT), alkaline phosphatase and bilirubin. The diagnosis of liver diseases in Nigeria is shrouded by numerous barriers [21], occasionally due to the varied clinical presentation of the individual. Thus, there is no definitive diagnostic test, but differentials.

Treatment of ALD can be achieved in two categories, depending on the stage of the disease. The first involves discontinuation of further alcohol consumption [22] and introduction of nutrient supplements [23], but in terminal or complete liver damage, a liver transplant can assuage the situation, especially, when liver cirrhosis or alcoholic hepatitis is being managed [24]. However, in the recent decades management of liver cirrhosis have included bone marrow cells and haematopoetic stem cells [25] [26]. The use of drugs to treat ALD was rested on corticosteroids, but current knowledge shows it is of little effect [27], especially, at the early stages of the disease. Corticosteroids use, is now indicated for severe liver inflammation [22]. Typically, the drugs used include; silymarin [28] [29] S-adenosyl methionine [30], infliximab and etanercept [31], pentoxifylline [22] [32] and propylthiouracil [33]. In Nigeria, there are two main drugs employed to treat hepatitis, lamivudine and interferon- alpha 2a [21].

It is important to determine the prevalence of alcoholic liver disease among residents of Port Harcourt, Rivers State, Nigeria, as this will provide a clear picture of the incidence, as well as, aid the diagnosis and management of the disease and distinguish it from other forms of liver impairment.

2. METHODOLOGY

This cross-sectional, descriptive study was conducted in the University of Port Harcourt Teaching Hospital; a tertiary health facility serving treatment, teaching, health research and referral purposes for primary and secondary health care facilities within Rivers State and its adjoining states. It is a multi-specialty facility in nursing, public health, medical records, internal medicine, surgery, radiology, laboratory medicine, pharmacy, dentistry, psychiatry and orthopaedics, among others. The participants are patients that presented at the Endocrine unit of the Medical Out-patient Clinic of the UPTH from January 4th to February 10th 2021. Structured, self-administered questionnaires with four sections was used (socio-demographic, knowledge of liver disease, prevalence of liver disease and attitude towards management of liver disease), while the sample size of 395 was calculated from the prevalence of a previous study in Nigeria by Nimat and Adedayo (2020).

3. RESULTS

The Table (1) shows that the respondents were mostly aged between 31-45 years, 143(60.6%), followed by 18-30 years, 50(21.2%), while the least were aged 61-75 years, 5(2.1%). They were also mainly females, 160(67.8%) and were married, 128(54.2%), while 103(43.7%) were unmarried and 5(2.1%) were widowed.

Table 2 above shows that 208(88.1%) have heard about ALD, majority, 175(84.1%) from a health facility and 2(1.0%) each from friends and other sources respectively, while 36(17.3%) know the treatment, 19(52.8%) and 13(36.1%) knew it can be treated in the hospital and traditionally respectively, 19(8.1%) knew someone that had the disease and it was mostly

managed in the hospital, 12(63.2%) and traditionally, 6(31.6%). 208(88.1%) know the causes of ALD, with 162(77.9%) and 33(15.9%) knowing the causes as infections and idiopathic respectively.

Table 1. Socio-demographic characteristics of the respondents

Variables	Frequency (n)	Percent (%)
Age (years)		
18-30	50	21.2
31-45	143	60.6
46-60	38	16.1
61-75	5	2.1
Sex		
Male	76	32.2
Female	160	67.8
Marital status		
Married	128	54.2
Single	103	43.7
Widowed	5	2.1

Table 3 above shows that 225(94.5%) respondents had normal aspartate values, with 5(2.1%) having low values, less than 8U/L, while 233(97.9%) had normal values for alanine amino transaminase, and the least being 1(0.4%), which had higher circulating value of the enzyme. Alanine phosphatase was mostly normal, 184(77.3%), followed by high, 51(21.4%), just as gamma GT was, 229(96.2%). The total protein was mostly normal, 177(74.4%), followed by high, 53(22.3%), and similar for creatinine with 227(95.4%) and the least being high, 3(1.3%).

The relationship between gender and age to the assayed parameters were investigated and presented in table 4 above. The result shows that age (0.793) and sex (0.591) were not statistically significant for the circulating level of aspartate, with age (0.000) significant and sex (0.217) non-significant for alanine amino transaminase, while age (0.830) and sex (1.52) were not statistically significant for gamma T. The study also reports that both age (0.993) and sex (0.777) are non-statistically significant for alanine phosphatase, and is similar to that of total protein (age; 0.793 ans sex; 0.639), but age (0.000) is statistically significant for creatinine, while it is not for sex (0.997).

The tabulated value was 2.5, while the calculated value is 3.3, thus, there is no statistical significance between the prevalence ALD and its management in the study area.

4. DISCUSSION

The study observed that 208(88.1%) respondents have heard about liver disease, majority, 175(84.1%) heard from a health facility and 18(8.7%) from school, which agrees with the finding of Kong *et al*. [1], but not with that of

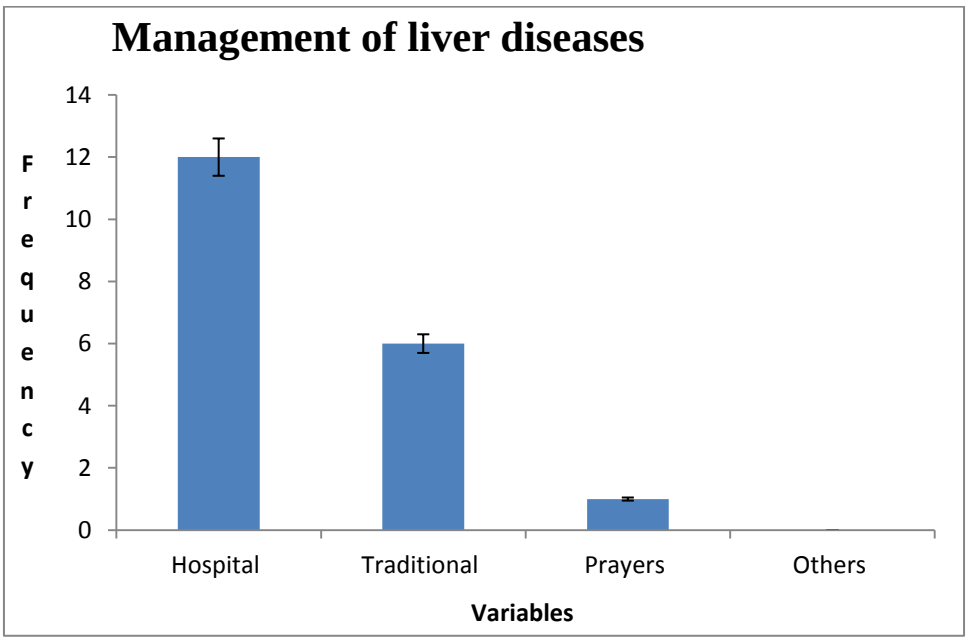

Fig. 1. Statistical significance of prevalence to management of liver disease

Table 2. Respondent's knowledge of alcoholic liver disease

Variables	Frequency (n)	Percent (%)
Have you heard of liver disease?		
Yes	208	88.1
No	28	11.9
If yes, how did you hear about it (n=208)		
Social media	7	3.4
Health facility	175	84.1
Church/mosque	4	1.9
School	18	8.7
Friends	2	1.0
Others	2	1.0
Do you know how liver disease is treated? (n=208)		
Yes	36	17.3
No	172	82.7
If yes to question above, how is it treated?		
In the hospital	19	52.8
Traditional	13	36.1
Prayer/spiritual	3	8.3
Others	1	2.8
Have you had/known anyone that had liver disease?		
Yes	19	8.1
No	217	91.9
If yes, how was it managed? (19)		
Hospital	12	63.2
Traditional	6	31.6
Prayers	1	5.3
Others	-	
Do you know the causes of liver disease(s)?		
Yes	208	88.1
No	28	11.9
If yes to question above, what are the causes? (208)		
Infections	162	77.9
Foods	4	1.9
It just occurs	33	15.9
Do not know	9	4.3

Menon *et al*. [4] who reported poor knowledge among their respondents, 39%. Also, 36(17.3%) knew the treatment of ALD disease, 19(52.8%) and 13(36.1%) knew it can be treated in the hospital and traditionally respectively, 19(8.1%) knew someone that had the disease and it was mostly managed in the hospital, 12(63.2%), just as 208(88.1%) knew the causes of ALD, with 162(77.9%) and 33(15.9%) knowing it to be infections and idiopathic respectively. This conforms with the studies by Kong *et al*. [1], Longstreth *et al*. [12] and Mandayam *et al*. [3] but disagrees with those of Miller *et al*. [34], Breitkodf *et al*. [35] and Rao [36]. The concurrence could be due to similarity in environment and level of awareness among the participants.

The observed prevalence of liver disease based on enzymes shows 225(94.5%) had normal values of aspartate, 5(2.1%) having low values and 233(97.9%) had normal values for alanine amino transaminase, with the least being 1(0.4%). The findings are in concordance with that of Gao and Bataller [18], but not with that of Breitkodf *et al*. [35]. The difference could be attributed to culture, environment and lifestyle among participants in the respective studies. Alanine phosphatase was mostly normal, 184(77.3%), followed by high, 51(21.4%), just as gamma-GT was normal, 229(96.2%). The observations agree with the findings of Breitkodf *et al*. [35] on the individual liver disease markers. The total protein was mostly normal, 177(74.4%) and similar for creatinine, 227(95.4%), while the least was high, 3(1.3%) and the findings corresponding to that of Kong *et al*. [1] and Breitkodf *et al*. [35] and pointing to the fact that similar risk factors enthrone the occurrence of a

particular disease condition, but for cases of deviation in the genetic and racial composition among individuals.

Table 3. Some liver parameters among the respondents

Variables	Frequency (n)	Percent (%)
Aspartate (8-42U/L)		
Low	5	2.1
Normal	225	94.5
High	6	2.5
Alanine amino transaminase (7-49U/L)		
Low	2	0.8
Normal	233	97.9
High	1	0.4
Alanine phosphatase (40-129U/L)		
Low	1	0.4
Normal	184	77.3
High	51	21.4
Gamma T (5-78U/L)		
Low	-	
Normal	229	96.2
High	7	2.9
Total protein (g/dl)		
Low	6	2.5
Normal	177	74.4
High	53	22.3
Creatinine (59-112U/L)		
Low	6	2.5
Normal	227	95.4
High	3	1.3

The relationship between gender and age to liver disease markers reveals that age (0.793) and sex (0.591) non-significant for aspartate, with age (0.000) being significant and sex (0.217) non-significant for alanine amino transaminase, while age (0.830) and sex (1.52) were not significant for gamma-GT, and the findings of ALT agreeing with that of Seth *et al*. [17] and Parola and Robino [19]. A possible explanation to this could be the fact that as individuals grows older, they tend to be more conscious about their health and avoid things that will jeopardize it, thus majority of the respondents, being adults and ageing population are better enlightened and cautious of good health. It could also be due to the fact that lifestyle and environment plays a role towards their health consciousness. It was further observed in this study that both age (0.993) and sex (0.777) were non-statistically significant for alanine phosphatase and similar to that of total protein (age; 0.793 and sex; 0.639), but age (0.000) is statistically significant for creatinine and not for sex (0.997). The observation of statistical significance in this study is in tandem with the report by Stickel *et al*. [24] and Abdelmegeed *et al*. [37] for age and [38-40] could have emanated from the fact earlier mentioned. However, [41-42] the findings of this study contradict those of Teschke [13], Chacko and Reinus [14] and Torruellas *et al*. [15].

Table 4. Relationship between age/sex and hepatic parameters

Variables		df	Chi-square
Aspartate	Age	84	0,793
	Sex	2	0.591
Alanine amino transaminase	Age	84	0.000
	Sex	2	0.217
Gamma T	Age	42	0.830
	Sex	1	1.52
Alanine phosphatase	Age	84	0.993
	Sex	2	0.777
Total protein	Age	84	0.793
	Sex	2	0.639
Creatinine	Age	84	0.000
	Sex	2	0.997

5. SUMMARY

Knowledge of liver disease shows that 208(88.1%) have heard about it and mainly from health facility, 175(84.1%) and 36(17.3%) knew its treatment, 19(52.8%) and 13(36.1%) know that it can be treated in the hospital and traditionally respectively, 208(88.1%) know its causes and 162(77.9%) as infections. The prevalence of liver disease was 225(94.5%), normal values of aspartate, 233(97.9%), normal values for alanine amino transaminase, normal circulating gamma-GT was 229(96.2%), circulating total protein was normal in 177(74.4%) respondents, high in 53(22.3%), and similar for creatinine, normal was most frequent, 227(95.4%) and high was the least, 3(1.3%). Finally, the relationship between gender and age to liver disease markers showed that age (0.793) and sex (0.591) were not significant for the aspartate, age (0.000) was significant and sex (0.217) non-significant for ALT, and age (0.830) and sex (1.52) not significant for gamma-GT, while both age (0.993) and sex (0.777) were not significant for ALP, and is similar for total protein (age; 0.793 and sex; 0.639), but age (0.000) is statistically significant for creatinine, but not for sex (0.997).

6. CONCLUSION

The study observed high knowledge of ALD among the respondents, with most biomarkers for liver disease being non-statistically significant in relation to age and gender, but for aspartate and total protein which strongly correlated with age of respondent. This may be due to the fact that they already have the condition and may not represent the general population. However, the prevalence of liver disease is low (8.1%) and may be due to factors such as poor healthcare-seeking attitude and effective diagnostic tools that detect liver anomaly early.

ETHICAL APPROVAL

Ethical approval obtained from the Legal department of the UPTH and the Department of Internal Medicine of the same facility.

CONSENT

Participants gave their consent.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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