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EARLY DIAGNOSIS OF LIVER CANCER AMONG YOUNG ADULTS IN SOUTH SUDAN: AN INVESTIGATION INTO THE UNDERLYING CAUSES OF HIGH MORTALITY RATES

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ABSTRACT

Background: Liver disease is a significant public health problem in sub-Saharan Africa, but there is limited data on its prevalence and characteristics in South Sudan. **Objective:** To investigate the prevalence of liver enzymatic abnormalities and liver damage in a cohort of participants from South Sudan. **Methods:** A cross-sectional study was conducted among 300 participants from various states in South Sudan. Liver function tests (LFTs) were performed, and participants with abnormal LFTs underwent further investigation, including ultrasound and Fibro-Scan studies. **Results:** The study found a high prevalence of liver enzymatic abnormalities, with over 50% of participants exhibiting elevated liver parameters. Further investigation revealed evidence of tumors and cirrhosis in a subset of participants. **Conclusion:** This study highlights the significant burden of liver disease in South Sudan and underscores the need for increased awareness, screening, and treatment of liver disease in this population. Further research is needed to elucidate the underlying causes of liver disease in South Sudan and to inform the development of effective public health interventions.

KEYWORDS: Liver disease, liver enzymatic abnormalities, South Sudan, public health.

INTRODUCTION

The liver is a vital organ responsible for various critical bodily functions, including red blood cell formation.[1] drug metabolism, detoxification, and more. However, recent trends indicate a rise in liver-related risk factors, including liver cirrhosis, necrosis, and liver cancer. Liver cancer, in particular[2], has emerged as a leading cause of liver damage and mortality, accounting for over 90% of liver-related deaths worldwide, with a disproportionate impact on developing countries.[3]

The following genes are frequently mutated in liver cancer: TP53, CTNNB1, CDKN2A, TERT, IDH1, ARID1/2, MLL, BAP1, and EZH2. Treatment options for liver cancer include surgery (partial hepatectomy or liver transplantation), ablation, chemotherapy[4], targeted therapy, and radiation therapy. Notably, liver transplantation has demonstrated a high success rate among patients who have undergone this procedure in the past.[5] "South Sudan's porous borders render it vulnerable to unregulated imports, including drugs[6], food, and oil from neighboring countries. The unchecked influx of unlicensed medications, contaminated cooking oil, and harmful substances poses significant health risks. Furthermore[7], the indiscriminate disposal of petroleum products and the misuse of fertilizers exacerbate environmental pollution, all of which contribute significantly to the rising incidence of liver cancer in the country.[8]

MATERIALS AND METHOD

All patients participating in this study were randomly selected from various states in South Sudan.[9] Our study consisted of 10 groups, with 30 participants in each group. Informed consent was obtained from each participant prior to the study. Initially, we conducted random liver function tests (LFTs) on all participants across the groups.[10] Those who exhibited clinically significant differences or abnormalities in their LFT results were further stratified and underwent comprehensive clinical investigations.[11]

The blood parameters were analyzed at the Juba Teaching Hospital and the Juba Medical Research Center

in South Sudan. All blood samples were collected in specially designed tubes for preserving the samples, following standard medical laboratory procedures. The safety and protection of the technicians responsible for collecting and handling the samples were ensured through our standard operating procedures.[12]

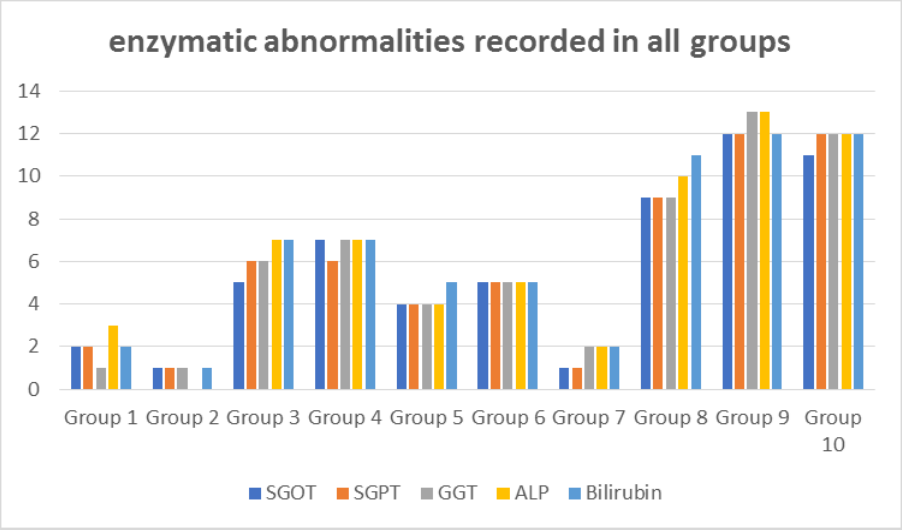
S. No	Male	Female	Female -Age	Male -Age
Group 1	15	15	20-30	22-30
Group 2	15	15	22-35	22-35
Group 3	15	15	23-35	23-35
Group 4	15	15	24-36	24-36
Group 5	15	15	25-37	25-37
Group 6	15	15	27-38	27-38
Group 7	15	15	29-40	29-40
Group 8	15	15	31-42	31-42
Group 9	15	15	32-44	32-44
Group 10	15	15	34-46	34-46

In the initial study design, we conducted blood sample investigations for all participant groups. The various liver parameters assessed included enzymatic markers such as SGOT, SGPT, bilirubin, ALP, and GGT.[13] We employed standard procedures for detecting liver enzymatic abnormalities using the LINX EVO POCT instrument. Participants exhibiting abnormalities in liver enzymes underwent further evaluation with ultrasound and Fibro Scan tests.[14]

RESULT

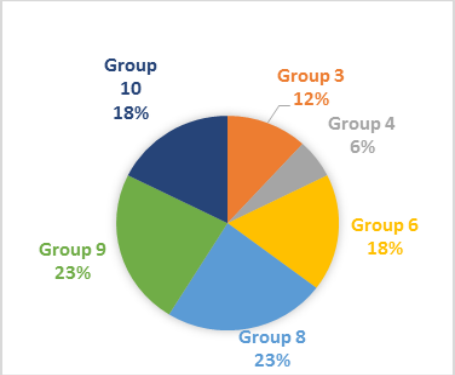
The table below shows the enzymatic abnormalities recorded in all groups, including both male and female participants**.**

S. NO	SGOT	SGPT	GGT	ALP	Bilirubin
Group 1	2	2	1	3	2
Group 2	1	1	1	0	1
Group 3	5	6	6	7	7
Group 4	7	6	7	7	7
Group 5	4	4	4	4	5
Group 6	5	5	5	5	5
Group 7	1	1	2	2	2
Group 8	9	9	9	10	11
Group 9	12	12	13	13	12
Group 10	11	12	12	12	12



Groups 3, 4, 6, 8, 9, and 10 exhibited higher abnormalities in liver enzymatic activities, affecting more than 50% of the subjects. Further investigations were conducted on individuals with elevated liver parameters, including ultrasound and Fibro-Scan tests to detect potential cirrhosis. The results are presented below:

S. No	Fibro-scan
Group 3	2
Group 4	1
Group 6	3
Group 8	4
Group 9	4
Group 10	3



Group 3, showed the presence of 2 participants with possible tumors and cirrhosis. In groups 8, 9, and 10, all participants who underwent Fibro-Scan studies exhibited evidence of tumors, similar to those found in group 3. The Fibro-Scan results also revealed liver enlargement and cirrhosis.

DISCUSSION

The present study aimed to investigate liver enzymatic abnormalities and potential liver damage in a cohort of participants from South Sudan. Our findings indicate a significant prevalence of liver enzymatic abnormalities, particularly in groups 3, 4, 6, 8, 9, and 10, where over 50% of participants exhibited elevated liver parameters.[15]

Further investigation using Fibro-Scan studies revealed evidence of tumors and cirrhosis in a subset of participants, particularly in groups 3, 8, 9, and 10. These findings are concerning, as they suggest a high burden of liver disease in this population.[16]

The high prevalence of liver enzymatic abnormalities and liver damage observed in this study may be attributed to various factors, including viral hepatitis, parasitic infections, and exposure to environmental toxins. Further research is needed to elucidate the underlying causes of liver disease in this population.[17]

The findings of this study have important implications for public health policy and practice in South Sudan. The high burden of liver disease observed in this study highlights the need for increased awareness, screening, and treatment of liver disease in this population.[18]

Limitations of this study include the relatively small sample size and the reliance on Fibro-Scan studies for diagnosis. Future studies should aim to recruit larger sample sizes and utilize more advanced diagnostic techniques, such as liver biopsy, to confirm the presence of liver disease.

In conclusion, this study provides evidence of a high burden of liver disease in a cohort of participants from South Sudan. Further research is needed to elucidate the underlying causes of liver disease in this population and to inform the development of effective public health interventions.

CONCLUSION

This study demonstrates a high prevalence of liver enzymatic abnormalities and liver damage in a cohort of participants from South Sudan. The findings of this study highlight the need for increased awareness, screening, and treatment of liver disease in this population. The study's results also underscore the importance of further research to elucidate the underlying causes of liver disease in South Sudan and to inform the development of effective public health interventions.

The study's findings have significant implications for public health policy and practice in South Sudan, and highlight the need for:

- Increased awareness and education about liver disease and its risk factors
- Improved access to screening and diagnostic services for liver disease
- Enhanced treatment and management options for liver disease
- Further research to elucidate the underlying causes of liver disease in South Sudan.[19.20]

Overall, this study contributes to the growing body of evidence on the burden of liver disease in sub-Saharan Africa, and highlights the need for urgent action to address this significant public health problem.

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