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Research Paper

Liver Cancer Incidence Trends In Tiruvalla, Pathanamthitta District, Kerala: Based On Pushpagiri Medical College Hospital Cancer Registry

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ABSTRACT: *Liver cancer is the second leading cancer killer globally and the sixth most prevalent disease worldwide. The present study is a preliminary attempt to report the liver cancer incidence pattern and trends, age and gender-wise, from 2013 to 2018 in Tiruvalla municipality of Pathanamthitta district, Central Kerala from the hospital-based cancer registry of Pushpagiri Medical College Hospital. The incidence of liver cancer in the region showed an increasing trend over the years, with a 300% increase in 2018 compared to 2013. Another significant observation was the increasing liver cancer incidence in men than women, irrespective of age. Out of the 251 cases reported 175 belonged to primary liver cancer types and 76 belongs to secondary liver cancer. The primary liver cancer types reported were Hepatocellular carcinoma constituting 53% with 93 cases, Cholangiocarcinoma 31% with 54 cases, and Angiosarcoma and Hemangiosarcoma 16% with 28 cases. No cases were reported for Hepatoblastoma. The liver cancer patients were also affected by other diseases, including Hepatitis B (HBV), Hepatitis C (HCV), Liver cirrhosis, Liver fluke infection, and Diabetics. Liver cirrhosis 81 cases, 32%, Liver fluke infection 65 cases, 26%; HCV 46 cases, 18%; HBV 33 cases, 13 %; and diabetics 14 cases, 6%.12 cases were reported without any of these diseases. LC patients affected by liver cirrhosis had a habit of heavy drinking. The study provides a framework for assessing the status and regional trends of cancer in India. This shall guide appropriate support for action to strengthen efforts to improve cancer prevention and control to achieve the National NCD targets and the sustainable development goals.*

KEYWORDS: *Primary liver cancer, incidence, Hepatocellular carcinoma, Liver cirrhosis, Hepatitis*

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I. INTRODUCTION

Liver cancer is the second leading cancer killer globally and the sixth most prevalent disease worldwide [1]. Eastern Asia, South-East Asia, Northern Africa, and Southern Africa have the greatest rates of this cancer [2]. Liver cancer (LC) had a standardized death rate of 9.5 per 100,000 individuals (14.3 in males and 5.1 in females) [1]. Primary liver cancer (LC) originates in the liver, while secondary liver cancer (LC), which is more prevalent, originates in other body organs and metastasizes to the liver. These malignancies include colorectal, breast, pancreatic, ovarian, and lung cancers. Hepatocellular carcinoma, cholangiocarcinoma, and sarcoma are a few primary liver tumours that make up roughly 6% of all cancers worldwide.

Hepatocellular carcinoma (HCC) is the most general cause of all liver cancers and accounts for 90% worldwide. 782,451 cases of LC were reported globally in total in 2012. There were 228082 female cases and 554369 male cases in total. The ASIR (Age-Standardized Incidence Rate) of LC was 10.1. (In males was 15.3 and in females was 5.3). Based on the division of the continents, Eastern Asia and Northern Europe had the greatest and lowest ASIR of LC, with 20.9 and 3.1, respectively [3]. The prevalence of HCC is rising in India, and the incidence of cirrhosis in India is 1.6% yearly. Hepatocellular carcinoma (HCC) has an age-adjusted incidence rate in India of 0.7 to 7.5 per 100,000 people per year for men and 0.2 to 2.2 per 100,000 people per year for women. In India, the male-to-female HCC ratio is 4:1. After the age of 45 the incidence of LC increases and becomes nearly constant after 65 years of age. The LC in men is generally 2–4 times higher than in women

as an outcome of men's increased exposure to cancer risk factors such as alcohol and smoking [4], [5], [6]. Men are more affected by the link between LC and obesity than women.

The most significant risk factors for liver cancer were persistent HBV and HCV infections [7], [8]. 54% of LCs are considered to be caused by HBV30 infection [5]. Compared to high-income nations, this rate was higher in low- and middle-income countries [9]. Other risk factors include aspartame, alcohol use, cigarette smoking, obesity, food contamination with aflatoxin, and non-alcoholic fatty liver disease (NAFLD) [3], [10], [11], [12].

According to the WHO data published in 2020, Liver Cancer Deaths in India reached 30,369 or 0.36% of total deaths. The Age-Adjusted Death Rate is 2.67 per 100,000 population, ranking India 175 in the world. A study using verbal autopsy in 1.1 million households across the nation found that the age-standardized death rate for HCC in India is 6.8/100,000 for males and 5.1/100,000 for women. [13]. The highest Age-Adjusted Rate is 269.4, and the death rate is 152.7 among males in the Aizawl district, Mizoram state in India. The Papum Pare district in Arunachal Pradesh has the highest AAR among females (219.8). In the remaining regions (apart from North East), Bangalore had the greatest AAR (146.8), followed by Delhi (146.8) among males and (141.0) among females. Delhi had the highest AAR (147.0), followed by the Thiruvananthapuram district in Kerala (137.8) [14]. The study by [15] provided the first results of the cancer incidence and mortality [Crude rate (CR) and age-standardized rate (ASR)] (world-standard population) of Trivandrum district, South India. They were compared with other registries within the system of the National Cancer Registry Programme (NCRP), Government of India.

Because cancer is not an apparent disease in India, registering for cancer presents several difficulties for data collection [16] [17]. The mortality registration system has several flaws, including insufficient and erroneous cause-of-death certification [18]. Despite a few studies on cancer incidence and mortality in the Thiruvananthapuram and Kollam districts of Kerala [15], no studies have been conducted in any other districts of Kerala about liver cancer. Population-based cancer incidence information is unavailable from the central and northern parts of Kerala [19].

With the help of cancer statistics obtained from the cancer registry of a particular locality, the incidence rate can be predicted using statistical formulas [20]. The present study is a preliminary attempt to report the liver cancer incidence pattern and trends, age and gender wise, of Tiruvalla municipality of Pathanamthitta district of Kerala during 2013-2018 from the hospital-based cancer registry of Pushpagiri Medical College Hospital, Tiruvalla. A future incidence prediction was also made based on the present statistical report. This study's results will help assess the status and regional trends of liver cancer in central Kerala. This will assist local-level stakeholders in implementing public health action to control liver cancer.

II. METHODS

The number of liver cancer patients recorded in the Cancer Registry of Pushpagiri Medical College Hospital, Tiruvalla, for six years from 2013-2018 was documented. The data for the analysis was specifically retrieved from the departments of Medical and Surgical Oncology, and Gastroenterology. The number of occurrences of liver cancer gender and age-wise was noted for further analysis. The future incidence prediction was done using statistical methods.

III. RESULTS AND DISCUSSION

The present analysis was based on 251 liver cancer cases,193 males and 58 females diagnosed during 2013-2018 in Pushpagiri Medical College Hospital, Tiruvalla, Pathanamthitta District, Kerala (Figure:1). The cases reported showed an increasing trend of incidence, with a 300% increase in 2018 compared to 2013 (Table.1). Another significant observation was the increase in liver cancer incidence in men than women, irrespective of age. (Figure.2) The present finding was per the increased worldwide occurrence of liver cancer in males than in females [3] and the regional occurrence reported in the cancer registries of the Trivandrum district of Kerala State [15].

Table 1. Liver Cancer cases reported in Pushpagiri Medical College Hospital from 2013-2018**.**

YEAR	NO. OF LIVER CANCER PATIENTS	% OF INCREASE
2013	19	
2014	21	11
2015	32	68
2016	51	168
2017	52	174

2018	76	300
TOTAL	251	

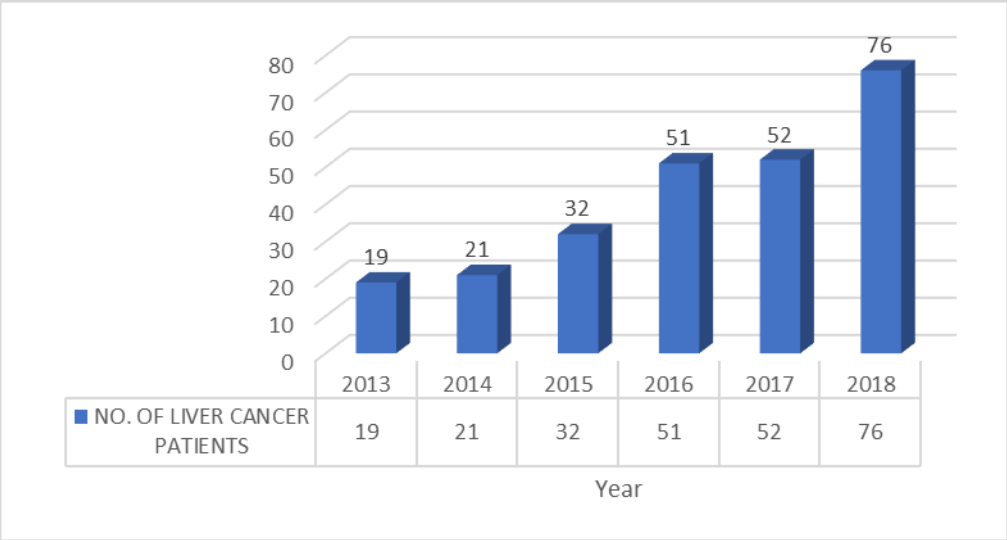

Figure 1: Liver Cancer cases reported in Pushpagiri Medical College Hospital from 2013-2018

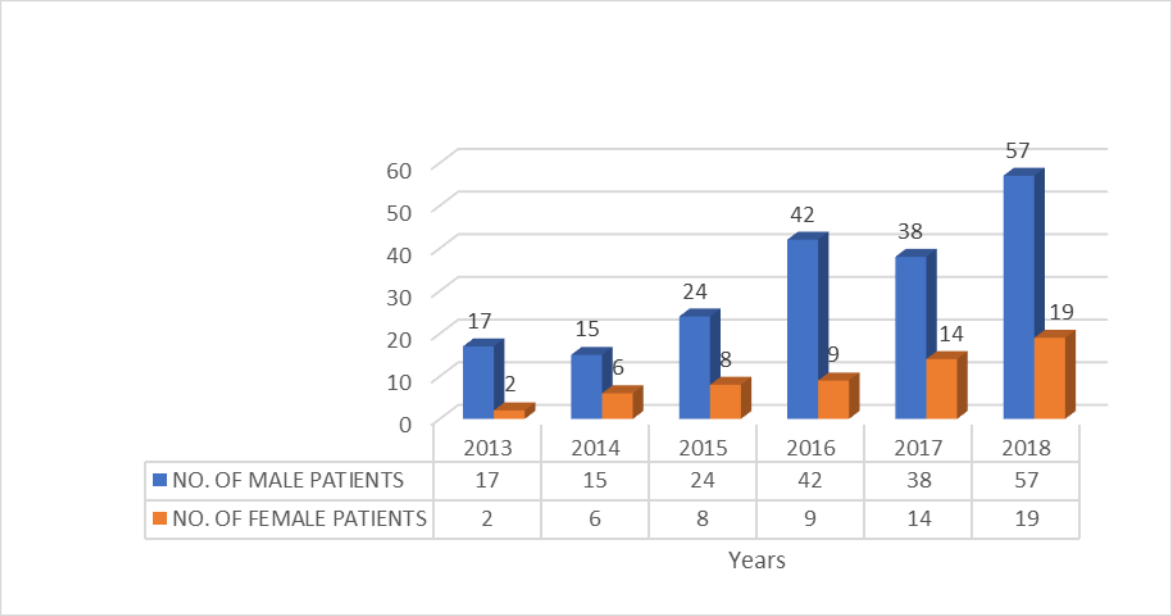

Figure 2: Number of liver cancer patients; gender-wise (2013-2018)

Another observation in this study was the higher incidence of liver cancer in males and females above 50. A maximum incidence of 37 cases in males and 11 cases in females were noticed in the age group of 50-57 category. (Figure 3). The incidence of primary liver cancer was higher than secondary liver cancer (Figure 4). Out of the different types of primary liver cancer reported in the study, Hepatocellular carcinoma constituted 53% with 93 cases, Cholangiocarcinoma 31% with 54 cases, and Angiosarcoma and Hemangiosarcoma 16%. with 28 cases. No cases were reported for Hepatoblastoma. (Figure 5). Other diseases reported in liver cancer patients in the present study were Hepatitis B (HBV), Hepatitis C (HCV), Liver cirrhosis, Liver fluke infection, and diabetics Liver fluke-induced cholangiocarcinoma was reported by [21]. In liver cirrhosis, 81 cases were reported at 32%, HCV 46 cases at 18%, HBV 33 cases at 13 %, Liver fluke infection 65 cases at 26%, diabetics 14 cases at 6%. Twelve cases were reported without any of these diseases (Table 2 and Figure 6). A perusal of the literature reveals that the incidence and mortality of liver cancer have different models in countries with various geographic, cultural, and socio-economic backgrounds [22]. Most liver cancer cases are reported annually from countries with a low socio-economic status where the people are more exposed to the risk factors

HBV, alcohol, and tobacco consumption. Their access to the health care system was lower, making the incidence and mortality of liver cancer high (98-102). According to the global report by [3], 54% of LC can be attributed to infection of HBV [5]. The estimated risk of developing hepatocellular carcinoma among patients infected by HCV compared to the uninfected ranges between 20 and 30 in epidemiological studies [23]. About 33% of LC was due to HCV, higher in lower and middle-income countries [9]. The present study reported that 32% of the patient diagnosed with LC was affected by liver cirrhosis and had a habit of heavy drinking. Heavy drinking increases the incidence of primary LC, as reported by [24], [25]. Several epidemiological studies have found that type 2 diabetes is correlated with an increased risk of HCC [26], [27].

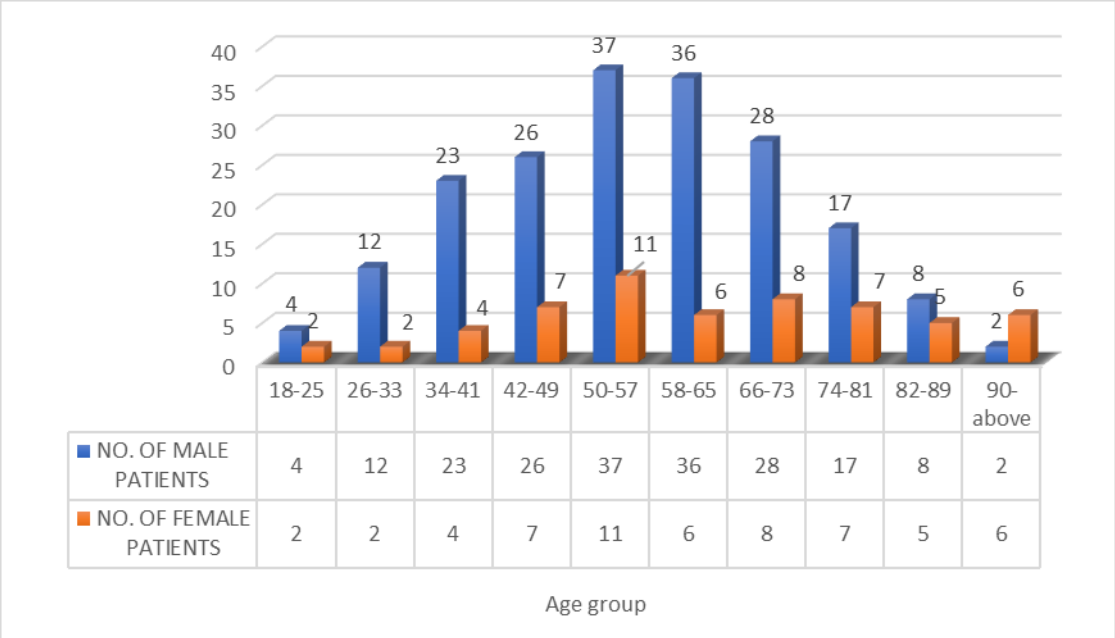

Figure 3: Liver cancer incidence in different age groups; gender-wise.

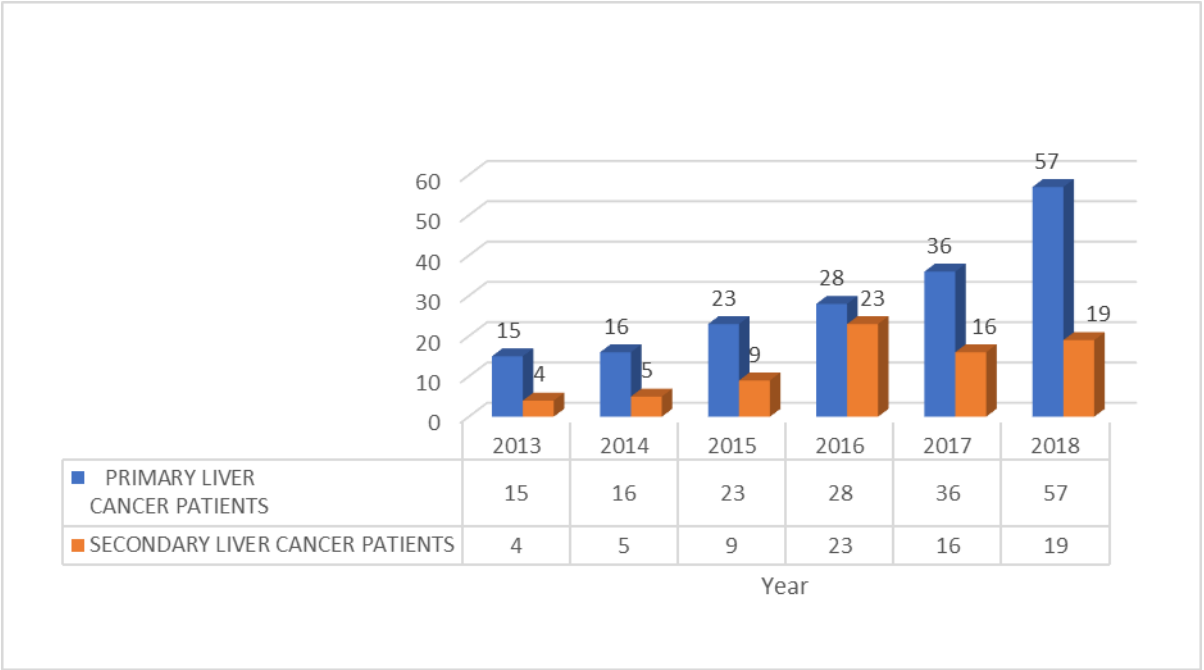

Figure 4: Primary and Secondary Liver Cancer cases.

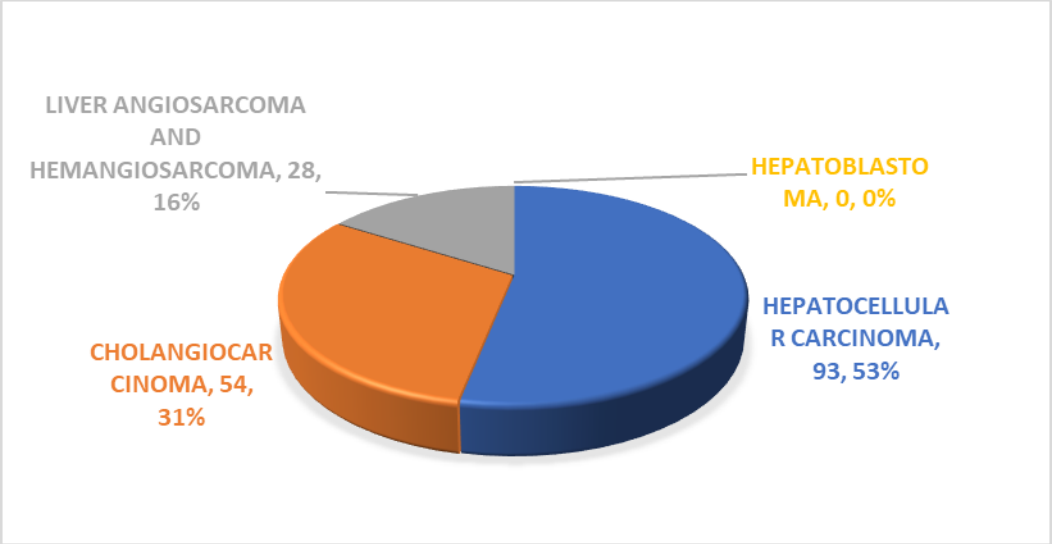

Figure 5: Different types of Primary Liver Cancer reported during the year 2013- 2018.

Table 2: Diseases reported in liver cancer patients during the year 2013- 2018.

DISEASES	HEPATITIS B	HEPATITIS C	LIVER CIRRHOSIS	DIABETES	LIVER FLUKE INFECTION	NO DISEASES
NO. OF PATIENTS	33	46	81	14	65	12

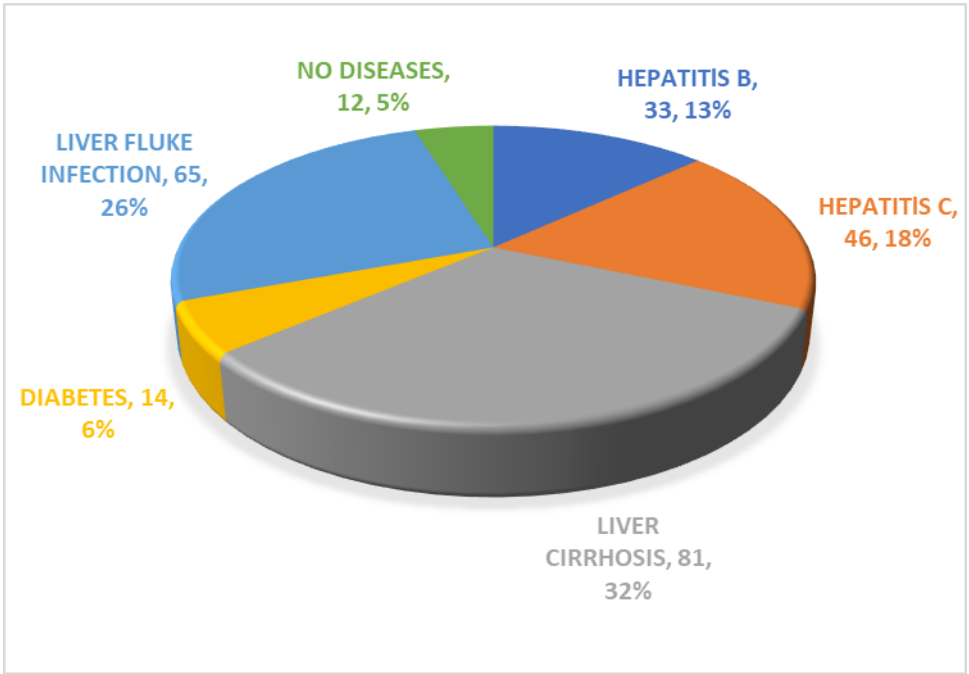

Figure 6: Diseases reported in liver cancer patients during the year 2013- 2018.

Based on the statistical analysis of the available data, the predicted number of liver cancer patients in 2023 will be in tune with 127 cases, which shows an increase of more than 6.6 times compared to 2013. (Table 3 and Figure 7)

Table 3: Future prediction of liver cancer patients

YEAR	NO. OF LIVER CANCER PATIENTS	% OF INCREASE
2013	19	
2014	21	11
2015	32	68
2016	51	168
2017	52	174
2018	76	300
2023	127	568*
*	Predicted figure based on the actual data	

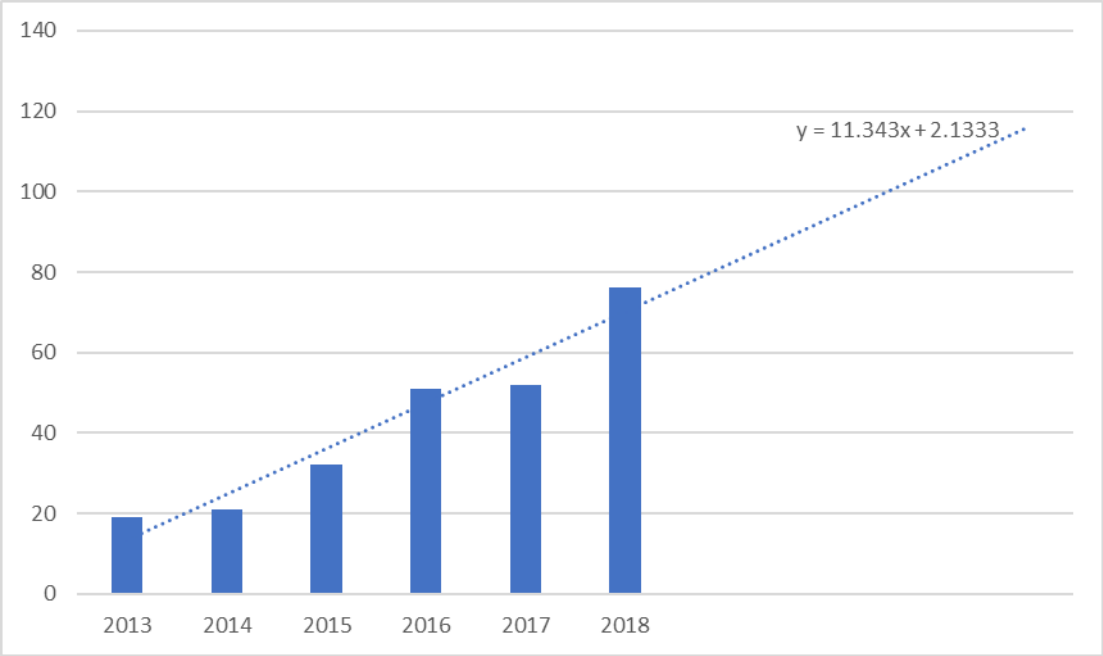

Figure 7: Future Projection of Liver Cancer incidence rate

Between 2020 and 2040, the number of new instances of liver cancer is expected to rise by 55.0%, with 1.4 million new diagnoses anticipated in 2040. In 2040, an estimated 1.3 million fatalities are anticipated, a rise of 56.4%. By the UN's four-tier Human Development Index, HDI group, high HDI countries could experience the highest absolute increases in cases and deaths, with 55.7% more cases (306,000 additional cases) and 57.6% more deaths (302,000 additional deaths) annually by 2040 [28].

IV. Conclusion

This study provides a foundation for assessing the status and regional trends of liver cancer in Kerala. This shall guide appropriate support for action to strengthen efforts to improve liver cancer prevention and control to achieve the National NCD targets and the sustainable development goals. In the coming 20 years, as the world's population grows, we expect an increase in illnesses and fatalities. Primary liver cancer, which is caused by several variables, is preventable if control measures are prioritized, and the predicted increase in incidence may increase the demand for resources to manage patient care.

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