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Full Length Research Paper

Epidemiological characteristics of liver cancer in Niger (1992 - 2006)

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The present work aims to bring out the epidemiological characteristics of liver cancer in Niger, especially as no previous studies have worked on the national epidemiology of cancer in Niger. This is a retrospective study in the period 1992 to 2006. The data were collected from the Laboratory of Pathological Anatomy and Cytology of the Faculty of Health Sciences of Niamey, which receives all the swabs intended for the histological analysis from all the Nigerien territory. Among the 5238 cases of cancer, the liver cancer represented 12.3% and came in the second position behind the breast cancer. 242 deaths were registered among liver cancer patients, which makes a specific lethality of 37%. The sex-ratio for males to females of liver cancer cases was 2.3 and the difference was highly significant. However, the specific lethality, which was 37.03% in male patients and 37.69% in female ones, did not display any significant sex difference. The mean age of liver cancer patients was 47.67 ± 14.20 years, and the comparison of the means of age did not display any significant difference between males and females in terms of age. The farmers were the socio-professional group the most affected by liver cancer with 61% of all cases. The patients practicing household activities showed the highest specific lethality, followed by farmers. The study of the repartition of patients according to their origin showed that the major part was from Niamey region with 69%. Because of the seriousness of the liver cancer problem in Niger, the health authorities should pay more attention to this pathology through efficient fight strategies.

Key words: Cancer, liver, epidemiological profile, lethality, Niger.

INTRODUCTION

Primary liver cancer is the fifth most common cancer in the world and the third most common cause of cancer mortality (Bosch et al., 2005; Llovet et al., 2003). Approximately 560 000 cases are diagnosed each year and 550 000 deaths due to liver cancer occur. Survival rates of primary liver cancer are uniformly poor in both high-rate and low-rate areas (Ibara et al., 1999; Katherine et al., 2005; Parkin et al., 2001).

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In most countries, 75 to 90% of liver cancers are hepatocellular carcinomas (HCC), thus trends in liver cancer incidence and mortality tend to reflect trends in HCC incidence and mortality (McGlynn and London, 2005). There is wide geographic variability in HCC incidence. The great majority of liver cancer (more than 80%) occurs in either sub-Saharan Africa or in Eastern Asia, with one country alone, China, accounting for over 50% of cases. With some exceptions, countries in North America, South America, Northern Europe and Australia tend to have low incidence rates while countries in Central and Southern Europe tend to have intermediate rates (Merle, 2005).

In most cases, liver cancer is the consequence of liver cirrhosis caused by alcohol consumption or B and C hepatitis viruses (McGlynn and London, 2005) . In France, the incidence of liver cancer is estimated at 5 000 new cases each year (Merle, 2005), whereas in Morocco, according to a study carried out in 2008, this type of cancer is infrequent and represents 0.7% of all cancers (Arfaoui, 2007). Nevertheless, in tropical areas, especially sub- Saharan Africa, liver cancer constitutes a real concern of public health. Thus, it ranks first with 20% of all cancers in Cameroon (Mbakop et al., 1997), and represents 43% of cancers in the Congo (Luwawu, 2008). In Niger, a three-year retrospective study, led by Nouhou et al. (1994), showed that the liver cancer was the commonest type of cancer with 15.5% (Gbedahi, 2008; Nouhou et al., 1994).

The aim of the present work is to bring out the epidemiological characteristics of liver cancer in Niger knowing that no previous studies have worked on the national epidemiology of cancer in this country. In order to reach this objective, we carried out a retrospective study based on the data collected from the Laboratory of Pathological Anatomy and Cytology which receives all the swabs intended for the histological analysis from the whole Nigerien territory.

PATIENTS AND METHODS

The present study occurred in Niger which is a landlocked country located in Western Africa, covering a land area of almost 1 267 000 Km^2 (Figure 1) . Niger's subtropical climate is mainly very hot and dry, with much desert area. The population is estimated at 13 044 973 inhabitants (INS, 2006). 90% of the total population lives in the agricultural South whereas 2.3% is urban. The Nigerien population is mainly young (66% are less than 25 years old) and life expectancy is around 44 years (INS, 2006).

Data collection was done from the registries of the Laboratory of Pathological Anatomy and Cytology of the Faculty of Health Sciences of Niamey and those of the different hospitals. When the anatomo-cyto-pathological diagnosis reveals a malignant tumour, a cancer registry file is created for the patient. It contains data relating to the patient (Sex, Age, Geographic origin and Profession), to the disease (Diagnosis date, Diagnosis type and Primary tumour site) and to the prognosis (Death, Date of death and Cause of death).

We analysed 5238 files of cancer patients diagnosed from 1992 to 2006, 653 of which belong to liver cancer patients. The number of valid data (active n) is mentioned for each variable in the results section.

We used the Excel® (Microsoft, USA) and the Statistical Program for Social Sciences (SPSSInc., USA) for the keyboarding and the statistical analysis of data. The descriptive statistics finds out the characteristics and frequencies of the studied variables in order to bring out the epidemiological profile of liver cancer in our series. Whereas the analytic statistics are based on association tests such as chi -square (χ^2) used for the comparison of absolute frequencies, Z-test (ε) used for the comparison of relative frequencies; and odds ratio (OR) used to measure the degree of association between the presence or absence of a factor and the occurrence of an event.

The specific lethality for a variable is calculated by dividing the number of deaths in a given category by the total number of cases in this same category, and multiplying this ratio by 100. We employed the geographic information system ArcGIS (ESRI, USA) to represent the geographic distribution of liver cancer frequency and lethality.

RESULTS

Among the 5238 studied cases of cancer, the liver cancer represented 12.3% with 653 cases and came in the second position behind the breast cancer, which was dominant with 14.1%. 242 deaths were registered among liver cancer patients, that makes a specific lethality of 37%.

The obtained results were organized according to the age, sex, professional activity and geographic origin of the patients.

Repartition according to the sex of patients

Our study showed that 69.4% of liver cancer patients were males whereas 30.6% were females (Figure 2). The sex-ratio, of 2.3, was highly significant in favour of males ($\chi^2 = 97.70$; $p < 0.001$).

Repartition of deaths according to the sex of patients

Among the deaths due to liver cancer, 69% were males and 31% were females with a sex-ratio of 2.2, highly significant in favour of males ($\chi^2 = 34.97$; $p < 0.001$). However, the specific lethality, which was 37.03% in males and 37.69% in females, did not display any significant sex difference ($\varepsilon_{obs} = 0.19$; $p > 0.05$).

The calculation of the odds ratio of death according to the sex showed no statistical significance, which means that men and women with liver cancer present the same risk of death (OR = 0.97; $CI_{95\%}$ = 0.69 - 1.37).

Repartition according to the age

The study showed that the mean age of liver cancer patients was 47.67 ± 14.20 years. The age group 40 - 49 years was the most affected by liver cancer with 156 cases (23.9%).

The mean age of death due to liver cancer was 48.07 ± 13.92 years. In terms of specific lethality, we noticed that the patients whose age was between 50 and 59 years were the most concerned with 40.4%, followed by those who were between 20 and 30 years old with 38.8%. The minimum specific lethality was observed in children and adolescents less than 20 years old with 30.8% (Figure 3).

Repartition according to age and sex

The mean age of liver cancer patients was 47.92 ± 13.61

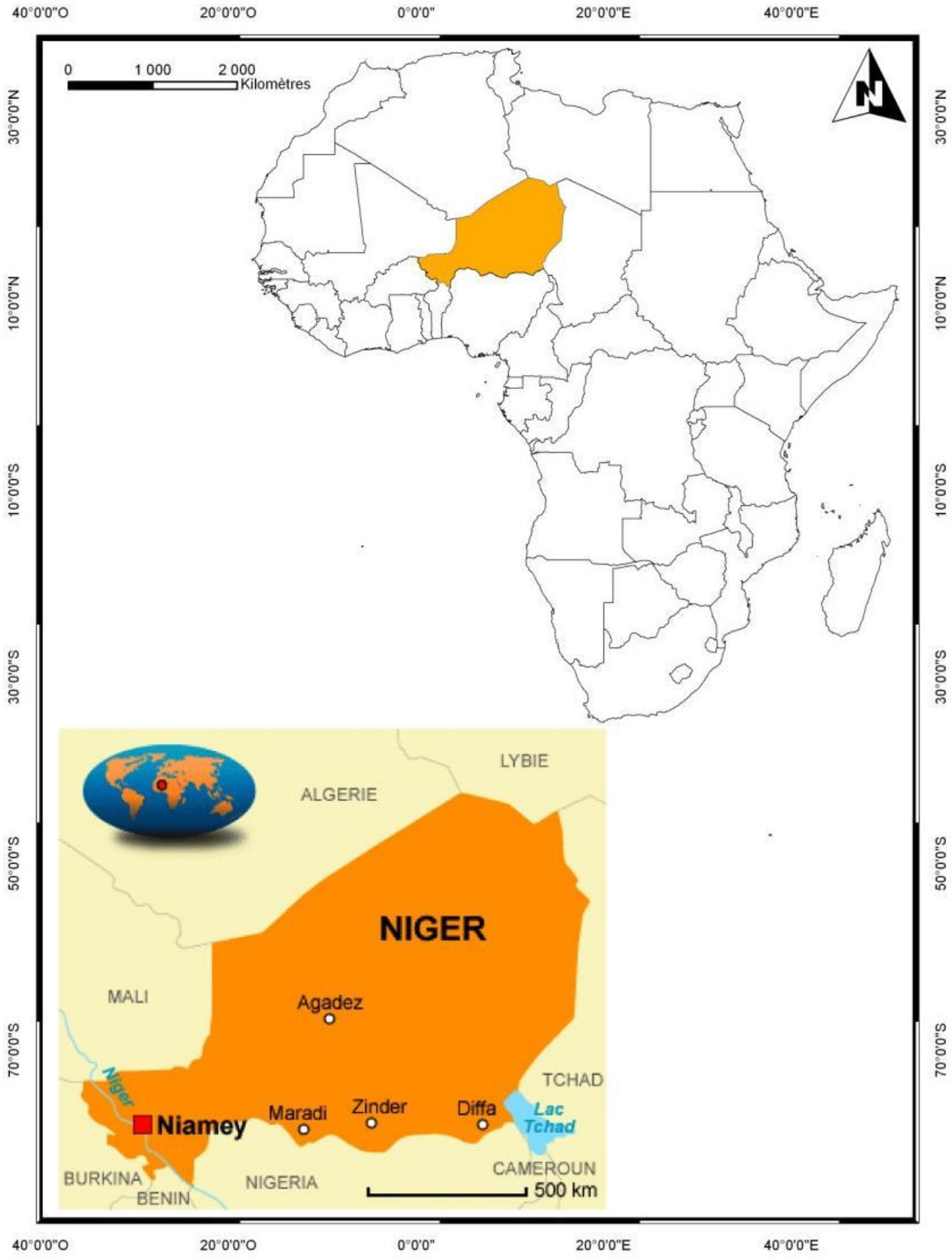

Figure 1. Geographic location of Niger and administrative apportionment.

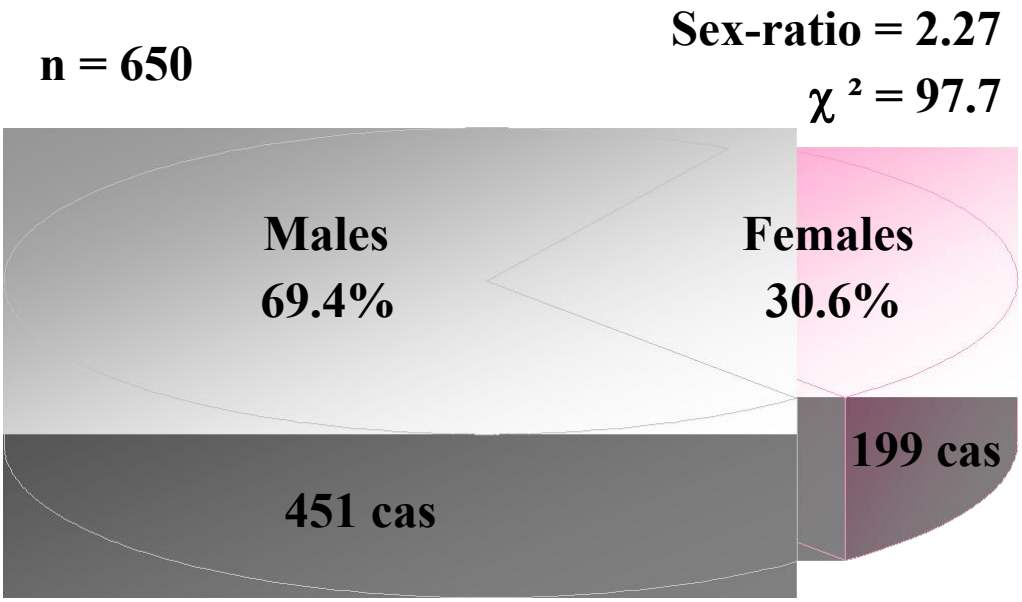

Figure 2. Repartition of liver cancer cases according to the sex of patients in Niger (1992 - 2006).

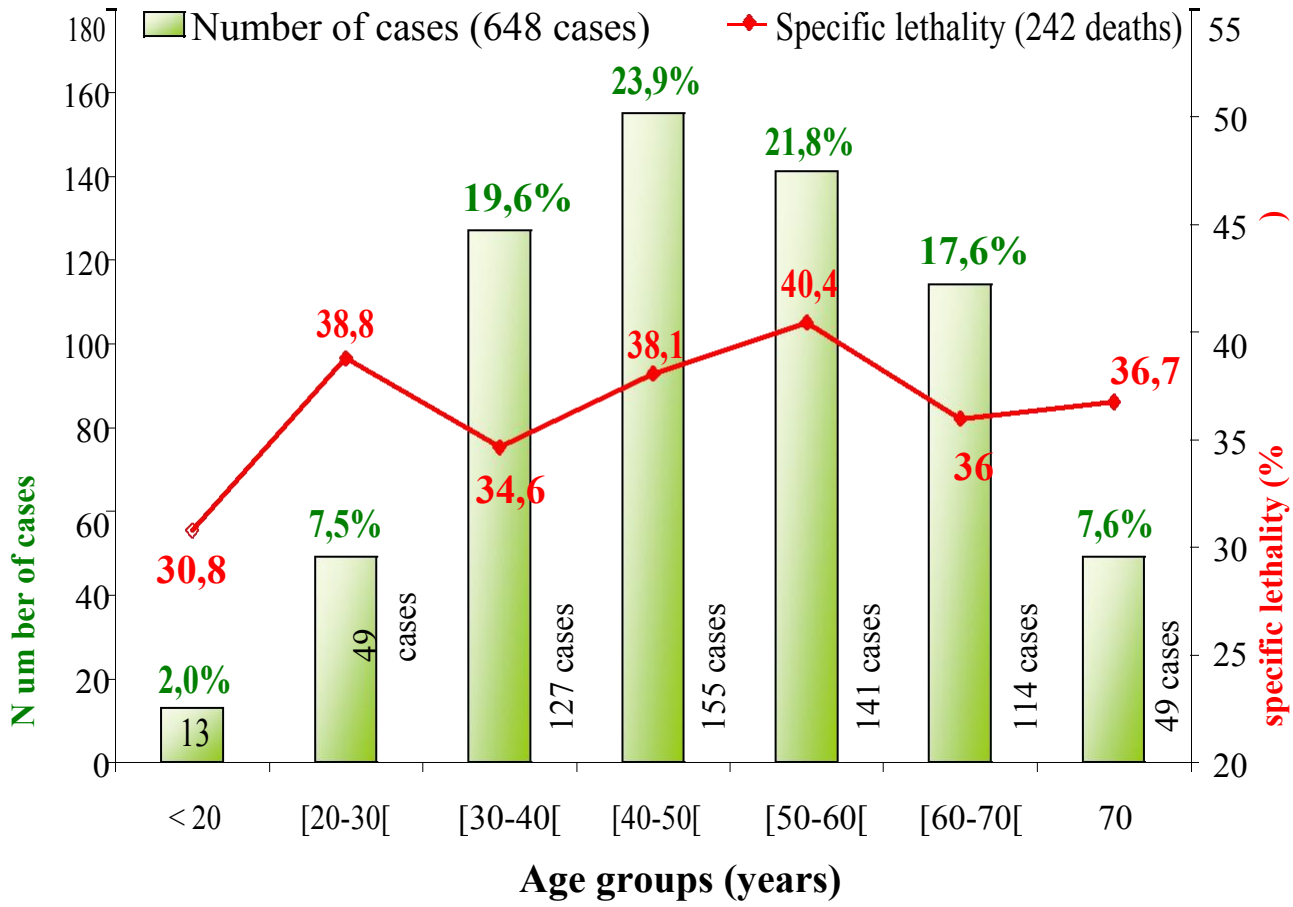

Figure 3. Repartition of cases and specific lethality according to the age groups of liver cancer patients in Niger (1992 - 2006).

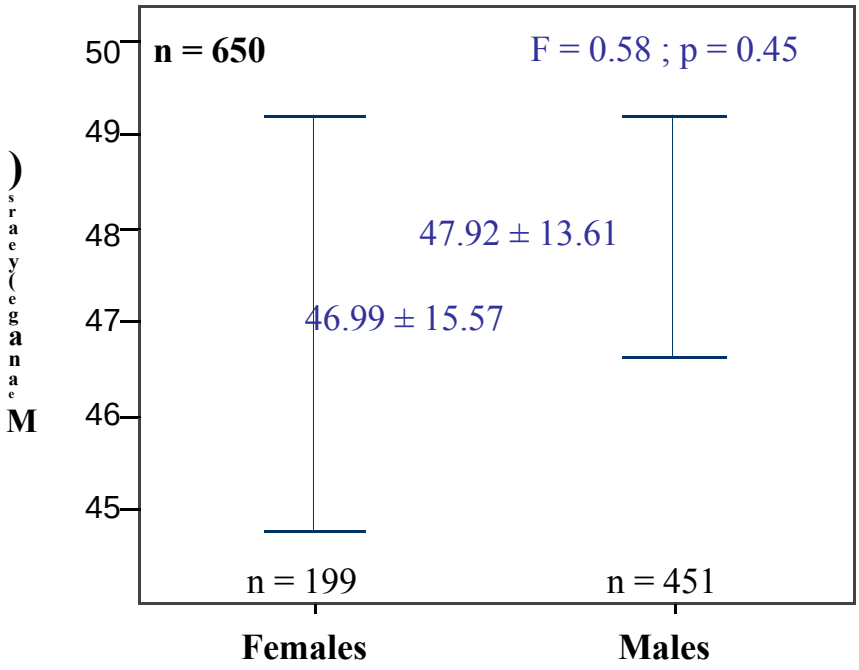

Figure 4. Repartition of the mean age according to the sex of liver cancer patients in Niger (1992 - 2006).

years old in males and 46.99 ± 15.57 years old in females (Figure 4) with no significant difference between them (F = 0.58; p = 0.45).

Repartition of deaths according to age and sex

The mean age of death due to liver cancer was 48.07 ± 13.50 years old in males and 48.05 ± 14.91 years old in females with no significant difference between them (F < 0.001; p = 0.99).

Repartition according to the socio-professional activity

The farmers were the socio-professional group, and where the most affected by liver cancer with 61% of all cases (381 cases). The patients practicing domestic activities came in the second position with 32% (197 cases) (Figure 5).

Repartition of deaths according to the socio-professional activity

The highest specific lethality was observed in patients practicing household activities (39.6%), followed by farmers (38.3%). Nevertheless, the calculation of the odds ratio for each socio-professional group showed that there was no significant difference between them in terms of risk of death due to liver cancer (Table 1).

Repartition according to the geographic origin

The study of the repartition of patients according to their origin showed that the major part was from Niamey region with 450 cases that makes 69%. Tillabéry region was in the second place with 21% (138 cases) (Figure 6). These two regions presented a specific lethality of 37.36 and 38.24%, respectively. The comparison of the different regions geographic origins showed no significant difference between them in terms of specific lethality.

DISCUSSION

During a fifteen-year period, we registered 653 cases of liver cancer originating from all the Nigerien territory that makes an average annual frequency of 43 cases. The results showed that the liver cancer affects males more than females, which is in agreement with what was found by some studies carried out in Africa and in the world (At Tali et al., 1985; Boutin et al., 1990; Denoix and Schlumberger, 1957; Ebara and al., 1999; Luwawu, 2008; Parkin et al., 2005; Sefiani et al., 1999).

A couple of explanations could be attributed to this sex difference. The first is that males are more affected by B and C hepatitis viruses than women, and are more predisposed to infection by these viruses (Patrick et al., 2006); especially as Niger is located in sub-Saharan

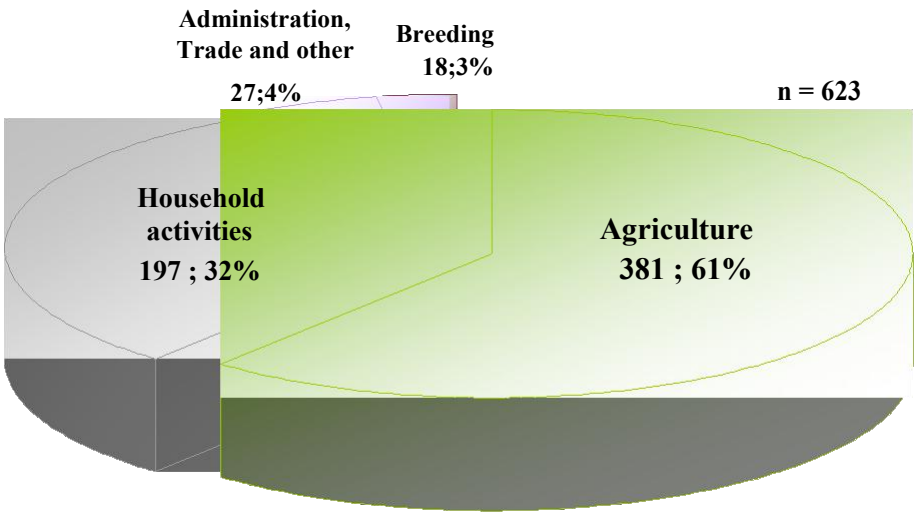

Figure 5. Repartition of liver cancer patients according to the socio-professional activity in Niger (1992 - 2006).

Table 1. Repartition of the odds ratio of death (OR) and the specific lethality (SL) according to the socio-professional group in liver cancer patients in Niger (1992 -2006).

Socio-professional activity	Total	Deaths	SL (%)	OR	95% Confidence interval
Agriculture	381	146	38,32	0.98	0.70 - 1.36
Household activities	197	78	39,59	1.07	0.76 - 1.51
Administration, Trade and other	27	10	37,04	0.94	0.42 - 2.08
Breeding	18	6	33,33	0.79	0.29 - 2.14

Africa which is an endemic area of hepatitis virus (Patrick and al., 2006; Tubiana, 2009) and many studies have shown that the risk of developing a liver cancer is 10 to 100 times higher in chronic carriers of hepatitis B virus (Boutin et al., 1990; Buendia, 1991; Francis and Smith, 1972; Gendron et al., 1974; ILLE, 2007). Furthermore, ILLE (2007) reported that hepatitis B is associated with liver cancer in 10% of cases. It should be noted that this study presents the drawback that hepatitis B and C markers were not done on patients with HCC.

The second explanation would be alcohol consumption. Indeed, Men in Niger consume alcohol, adulterated or traditionally made, more than women. Moreover, many studies demonstrated the toxic effect of alcohol on hepatic cells; it increases their proliferation and leads to alcoholic cirrhosis which promotes the development of liver cancer (Itoua and Gombe, 1981; Tubiana, 2009; Zarski et al., 1992).

The age group 40 - 49 years was the most represented in our series. The same result was obtained by some studies led in Cameroon and in the Congo (Luwawu, 2008; Mbakop et al., 1997). The young adult is the most affected by liver cancer in Africa with a mean age of 47 years old (Itoua and Gombe, 1981). However, in Morocco and Europe, the most concerned population is 60 years old or more (Arfaoui, 2007; Llovet et al., 2003). According to the socio-professional activity, people working in agriculture are the most affected by liver cancer, which would be attributable to the high risk of hepatitis virus transmission because of the high rate of illiteracy and the bad hygiene conditions in this social group. These results do not differ from those found by Diarra et al. (2006) and Gbedahi (2008).

In terms of geographic repartition of liver cancer cases, the high frequency of patients coming from the Niamey region is simply due to the concentration of reference hospitals in the capital and its surrounding areas. Lwawu (2008) reported the same observation.

Conclusion

The results of the present work reflect the epidemiological situation of liver cancer in Niger given that the laboratory from which we collected our data is the only laboratory that receives all the swabs intended for the histological analysis from all the Nigerien territory. The liver cancer is prevalent in Niger, as in many countries in Africa and elsewhere, because of the high prevalence of hepatitis B and C, especially in tropical

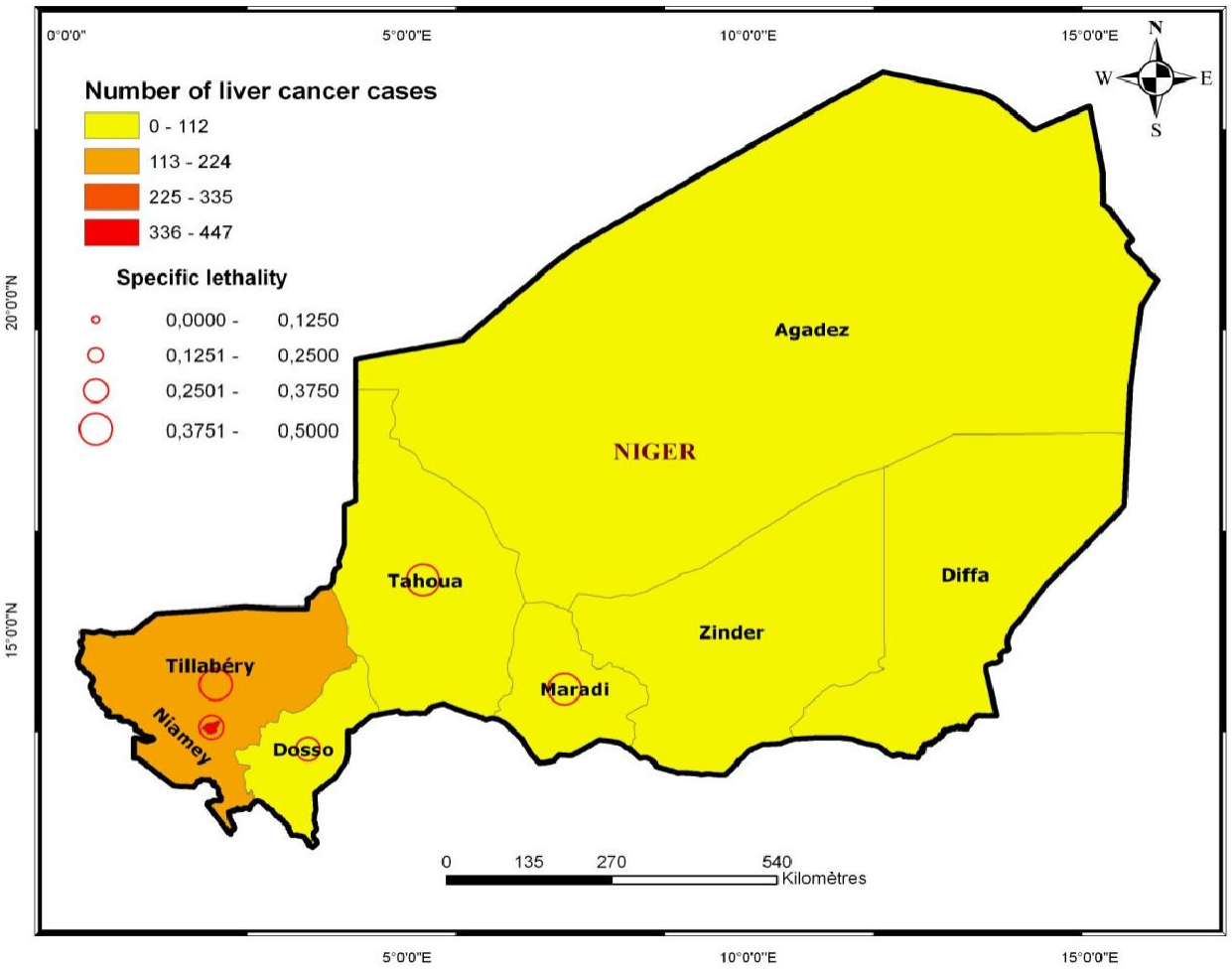

Figure 6. Repartition of liver cancer patients according to their geographic origin in Niger (1992 – 2006).

areas. This type of cancer remains a major problem of public health in many African countries by its bad prognosis and the complexity and the multiplicity of its etiologic factors.

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