

# Cancer incidence and risk factors in republic of mauritius



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## 1. Discussion

Set up in 1989, the National Cancer Registry of the Republic of Mauritius attained population-based level in the registration of cancer cases since 1997. All newly diagnosed cases and/or those under treatment of cancer in hospitals, public laboratories and the sole Cancer Centre of Mauritius have been recorded. From 2000, cancer cases from the private sector were also registered in the NCR (Manraj *et al.*, 2006). We have used data from the NCR to analyse the incidence, mortality and survival of pancreatic cancer patients in the Republic of Mauritius so as to have a better understanding of its situation.

### 4. 1 incidence

The ASR for the period 2009-2012 was 2.15 per 100000 persons (2.98 for males and 1.51 for females) in Mauritius. The ASR was much lower than in USA (8.64 males and 6.54 females), in UK (6.83 males and 5.75 females), in South African Republic (5.82 males and 3.88 females) and in China (4.50 males and 2.81 females) but it was higher than in India (1.31 males and 1.02 females) and in Pakistan (0.50 males and 0.43 females). Our observed ASR for men and women were in an almost similar range as in Indonesia (3.02 males and 2.43 females), in Malaysia (2.82 males and 1.96) and in Saudi Arabia (2.64 males and 2.18 females) although our female rates were slightly lower. Our rates were nearer to the ASR of less developed countries (3.3 males and 2.4 females) than more developed ones (8.6 males and 5.9 females) (GLOBOCAN, 2012).

For the 24 year period, there was a 157.9% rise in the crude incidence rate of pancreatic cancer. However, this increase has been more drastic in males (219.3%) than females (98.4%). This gender discrepancy can also be seen in the ASR where males' ASR almost doubled from 1989 to 2012 (1.35 to 2.98 per 100000) while females' ASR only increased by 1.2 times. In the year period 2005-2008, men were around 31% more affected than women (ASR 1.63 in men and 1.12 in women). This disparity was comparable to Shaib et al. (2006) study in USA from 1977 to 2001, in which they found that 30% of males were more affected than females. The stability of the ASR observed in our female population from 1989 to 2012 was comparable to the rather steady ASR in females in Ireland from 1994 to 2010 (NCR Ireland, 2012).

The median age at diagnosis in Mauritius from 1997 to 2012 was 58.4 years in men and 56.6 years in women lower than UK (74 years), USA (71 years) and Shanghai (72 years) (Coupland *et al.*, 2012, Luo *et al.*, 2013; SEER, 2013a). As observed in Ireland (NCR Ireland, 2012), 70% of patients diagnosed with pancreatic cancer from 1989 to 2012 in Mauritius were in the 50-79 years age group. Increasing age is a strong risk factor for pancreatic cancer (Pancreatic cancer action, 2013) as seen with the increasing ASIR with growing age (Coupland *et al.*, 2012). Comparable trend is observed in our study with the peak occurring in the 70+ age group in most 4-year intervals for both sexes. The age specific incidence rates started to rise as from the 45+ years. Below the age of 35 years, very few cases were identified. Similarly the age specific rates tend toward zero for the 0-49 age group in England (Cancer Research UK, 2013). The trend in incidence could also be explained through the aging population of our country. Indeed,

according to Statistics Mauritius (2013), the proportion of people aged 65 years and above has increased from 5.4 % in 1990 to 7.7 % in 2012.

Another factor influencing the high age specific incidence rate in men in the elderly, which might have given overestimation, is the fact that male population in the elderly was lower compared to their female counterpart: women's population for the 80+ age group from 1989 to 2012 was slightly more than twice as much as men's population.

Cigarette smoking is the most well established risk of pancreatic cancer with a 2.1 fold increase in risk among smokers (Silverman *et al.*, 1994).

According to NCD report, in 2009, 21.7% of the Mauritian population were smokers, among which 40.3% were men and only 3.7% were women. Also, it was pointed out that more than a quarter of men aged 65 and above was current smokers in 2009. The higher prevalence of smoking in male population in Mauritius as compared to women could explain the higher incidence rates in this gender. Increasing duration of smoking were associated with increased risk of developing pancreatic cancer (less than 10 years= Odds Ratio 1.1 compared to less than 30 years= Odds Ratio 2.3, p-value <0.001) (Schulte *et al.*, 2014). The study also points out a relative risk reduction of 25% every 10 years since withdrawing from smoking (p <0.001). Anti-smoking campaigns, tax increment on tobacco, cessation therapies as well as other anti smoking policies should be adopted to reduce the incidence of pancreatic cancer. Restriction of smoking in public places, banning advertisement favouring cigarette and displaying pictorial health warnings on cigarette packets are among the policies that Mauritius has already implemented.

The overall rising trend in incidence may be due to better diagnostic sensitivity and early notification of the cancer in recent years as new sophisticated tools have been developed including CT, MRI, echo-enhanced power Doppler sonography, ERCP, MRCP, EUS, and PET amongst others (Fumihiko *et al.*, 2006; Müller *et al.*, 1994; Rickes *et al.*, 2002; Takhar *et al.*, 2004; Tummala *et al.*, 2011 ).

Although cases from private sector were included in the NCR of Mauritius from the year 2000, females' crude incidence rate dropped slightly in the year period 2001-2004.

From various studies, it has been shown that increased caloric intake (p value= 0. 019 in men), refined sugar (relative risk of 2. 21), soft drink (hazard ratio 1. 87), red meat (p value= 0. 01) only to mention a few were related to the risk of developing pancreatic cancer (Baghurst *et al.*, 1991; Larsson *et al.*, 2006; Mueller *et al.*, 2010). The rise in incidence rates in Mauritius could be the results of adopting an unhealthy western diet consisting mainly of high caloric content which in turn leads to obesity (WHO, 2013) and diabetes (Frank, 2011), both being risk factors of pancreatic cancer (Li *et al.*, 2009; Silverman *et al.*, 1999). Indeed, obesity and diabetes were highly prevalent in Mauritius accounting for 43. 3 % and 23. 6% respectively of the total population aged 25-74 years in 2009 (NCD, 2009). Numerous studies have shown a positive association between diabetes mellitus and the risk of developing pancreatic cancer (Ben *et al.*, 2011; Silverman *et al.*, 1999). Moderate physical activity were considered to reduce the risk of pancreatic cancer particularly in overweight individuals (p-value trend = 0. 04) (Michaud *et al.*, 2001). According to Pan *et al.*, (1997) <https://assignbuster.com/cancer-incidence-and-risk-factors-in-republic-of-mauritius/>

exercise decreases the risk of developing diabetes by 46% ( $p < 0.0005$ ).

The high prevalence of diabetes and obesity and the low prevalence of moderate or vigorous physical activity [16.5% in 2009, (NCD, 2009)] among Mauritians could be among the reasons behind the increasing incidence rate of pancreatic cancer observed in our study.

Heavy alcohol consumption ( $\geq 9$  drinks per day) is a risk factor for promoting pancreatic cancer (Lucenteforte *et al.*, 2012). In Mauritius, as per NCD (2009), 14.5% men had more than 5 drinks per day while only 1.1% women consumed that much of alcohol daily in 2009. Men's higher incidence rates could be partly attributed to the fact that they consume more alcoholic drinks than women.

All the cases of pancreatic cancer for the 12 year period were exocrine pancreatic cancer confirming the rarity of endocrine pancreatic cancer as demonstrated by many studies (Correa *et al.*, 2005; Haugk, 2013).

Pancreatic ductal adenocarcinoma, the most common histological type of all pancreatic cancers, accounted for 85-90% of all neoplasm of this site (Haugk, 2013). In our study, this histological type was present in only 26% of the patients diagnosed from 2001 to 2012. 58% were classified as only malignant neoplasm (NOS). Similar findings were obtained in Ireland (NCR Ireland, 2012) where 52% and 34% of pancreatic cancers were reported as malignant neoplasm (unspecified) and adenocarcinoma (unspecified) respectively but when these were verified histologically, only 4% were found to be malignant neoplasm and over 70% were adenocarcinomas. The lower percentage obtained in our study may be due to misclassification of morphological types or lack of in-depth histological analysis.

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We found a statistical difference in incidence of pancreatic cancer and the area of residence (P value= 0. 026). The adjusted incidence rate in rural areas and urban areas increased from 0. 95 to 1. 33 to 3. 21 and 0. 59 to 1. 27 to 1. 57 respectively for 2001-2001, 2005-2008 and 2009-2012 indicating a higher rural incidence rates in all 3 year groups. The greater increase in adjusted incidence rate found in rural areas in our country was in accordance with the results reported in a Chinese study for the period 1998 to 2007 (Ma *et al.*, 2013). On the other hand, the trends in USA did not match ours as they reported higher age-adjusted incidence in urban regions than rural regions (p <0. 01) (Howe, 2005). The incidence rates were also lower in rural and provincial areas in Denmark in the year period 1994-2003 as compared to Capital areas (Baastrup *et al.*, 2008).

There was no significant difference between incidence and the ethnic/religious group of the patients (p value= 0. 0722). Other studies have shown the contrary. According to SEER (2013a), the incidence rates from 2006 to 2010 in Black Americans (17. 6 males and 14. 3 female) were higher than White Americans (13. 8 males and 10. 7 females). Shaib *et al.*, (2006) observed that pancreatic cancer was more common in blacks than whites and other ethnic groups in USA by 50% with an incidence rate of 16. 4 in blacks, 10. 8 in whites and 9. 8 in other ethnic groups. A study carried out by Silverman *et al.* (2003) showed that establish risk factors such as cigarette smoking, diabetes mellitus and alcohol consumptions, more prevalent in blacks than whites (46 % versus 37%), justified the higher incidence rate in this ethnic group. The incidence rates of Chinese have to be interpreted

carefully as it was a minority group (3%) among the Mauritian population and a few cases could have drastic effect in the incidence rate.