Epidemiology of Colorectal Cancer in Algeria

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Abstract:

Every year, nearly one and a half million new cases of colorectal cancer are diagnosed worldwide. North America and Europe have the highest incidence rates. Algeria has average incidence rates lower than the average incidence in Europe but the highest in Africa, the increase in the annual percentage of colorectal cancer is estimated by Algerian epidemiological experts at +7% . In Algeria, colorectal cancer is the 2nd most common cancer after breast cancer. The standardized annual incidence rates are 23 per 100,000 in men and 16 per 100,000 in women. Around 2,984 people with colorectal cancer died in 2018 according to Globocan 's estimate of the same year. In both sexes, the incidence has increased every year for a decade, while in France and in Europe in general, the incidence has been decreasing and mortality has been decreasing since registry statistics existed, and more markedly in both sexes. According to the most recent estimates, net survival five years after diagnosis of colorectal cancer is 60% in France. The vast majority of studies consider that a diet rich in red meat, high in calories, high in fat and low in fiber is linked to an increased risk of colorectal cancer. Conversely, a diet combining sustained consumption of fruits and vegetables, fish, white meat and whole grains is associated with a reduction in risk. Body mass index is positively correlated with colorectal cancer risk. Studies show a protective effect of physical activity, with a risk reduction of 40 to 50% with a dose-response effect.

Keywords: Incidence, Mortality, Colorectal cancer, Risk factors.

Introduction

The International Agency for Research on Cancer (**IARC)** estimates that the global burden of cancer reached 18.1 million new cases and 9.6 million deaths in 2018. lung, female breast and colon-rectal cancers are the three main types of cancer in terms of incidence and rank among the top five in terms mortality (first, fifth and second, respectively). Taken together, these three types of cancer are responsible for a third of cancer incidence and mortality in the world. Colorectal cancer ranks 3rd after lung cancer and the breast of all sexes combined with a global incidence of 849,518 new cases. This which corresponds to 10.2% among all cancer locations, and is in 2nd position in terms of mortality with 880,792 deaths (9.2%) globally in 2018 [1] . These descriptive epidemiological data are provided by the various registers set up by several countries around the world **.** The First Tumor Registry was established in 1935 in the USA, then in Europe, in Denmark in 1942. In Algeria, before 2015, there were 12 population registers, including 3 validated and internationally recognized (the one of Sétif in the East, that of Algiers in the Center, and that of Oran in the West of the country), and 9 registers in the process of consolidation (Annaba, Batna, Blida, Constantine, Mostaganem, Saïda, Sidi Bel Abbes, Tizi ouzou , Tlemcen, Bejaïa). The first validated cancer registry population in Algeria is that of Sétif set up in 1989, followed by the registers of Algiers, then from

Oran. The national register network was created in 2015, as part of the plan cancer 2015-2019 **[5]** , and its strategic axis number 6 concerns the development of cancer information and communication system. Thanks to this work carried out, we can improve our descriptive knowledge of cancers in Algeria.

I Descriptive epidemiology of colorectal cancer
I. 1 Incidence and Prevalence of colorectal cancer

Colorectal cancer is common in industrialized countries, particularly in Europe. the West and North America, and Oceania. It is less common in South America, in Africa and Asia. In the USA, colorectal cancers (CRC) represent 9.7% of cancers, or 179,771 new cases estimated in 2018. **[2].** In Europe, it represents 27% cancers with 499,667 new cases the same year. The highest incidences have been observed in Slovakia, Hungary, with 60 new cases per 100,000 each year residents. The researchers then point out that 60% of deaths due to colorectal cancer occur in countries with high, or even very high, human development index (HDI), a reference which takes into account the chances of living a long life in good health, the years of schooling, as well as the average standard of living, linked to gross national income.
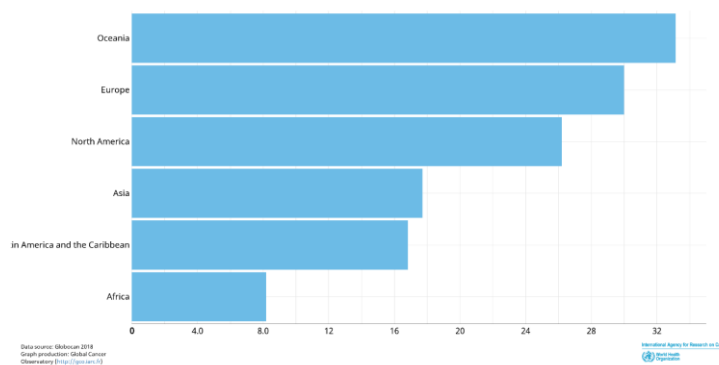**Figure 1**

Figure 1: Incidences of colorectal cancer by continent [1]

Image from Data source: Globocan 2018 Graph production: Global Cancer Observatory Data analysis shows slight increase in cancer incidence rates of the colon in both sexes during the last two decades, more marked in regions with low incidence rates. The incidence tends to increase in countries with low risk for rectal cancer, as for colon cancer. On the other hand, in countries with high risk, the incidence rate of rectal cancer is stable or even slightly decreasing.
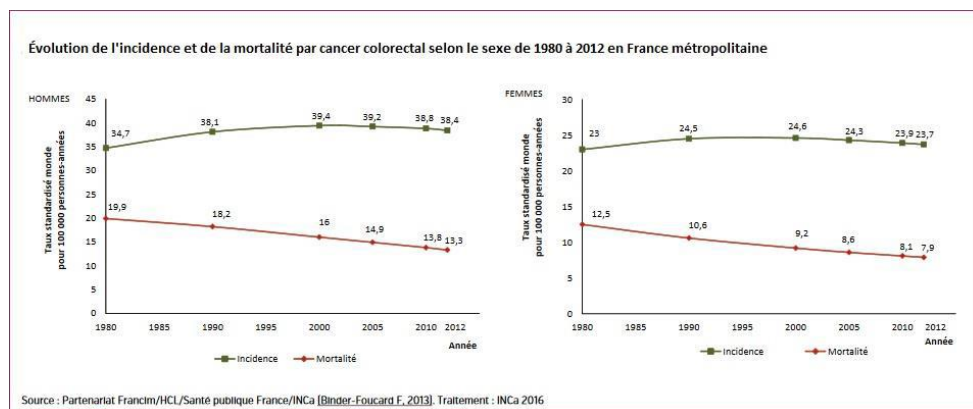

Figure 2: The evolution of the incidence and mortality of colorectal cancer in France [3]
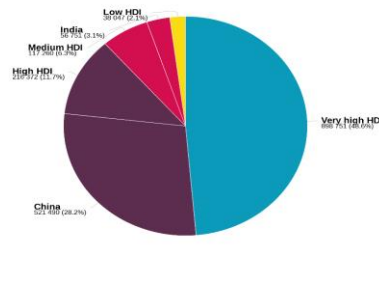
Figure 3: Incidence of colorectal cancer estimated in 2018 according to the HDI (Human Index)

Image from Data source: Globocan **2018** Graph production: Global Cancer Observatory In Africa, colorectal cancer remains a disease that ranks first among cancers. The highest incidence is observed in South Africa with 6,937 new cases estimated in 2018 by the Globocan network ; in Niger, an incidence in the same year was estimated at 6,690 per 100,000 inhabitants; in Egypt, the incidence is estimated at 5393; Morocco records 4,118 new cases. Algeria is placed the 3rd country in terms of incidence in Africa and the first in North Africa with 5,537 new cases in 2018, according to the same **Globocan 2018** estimation sources .
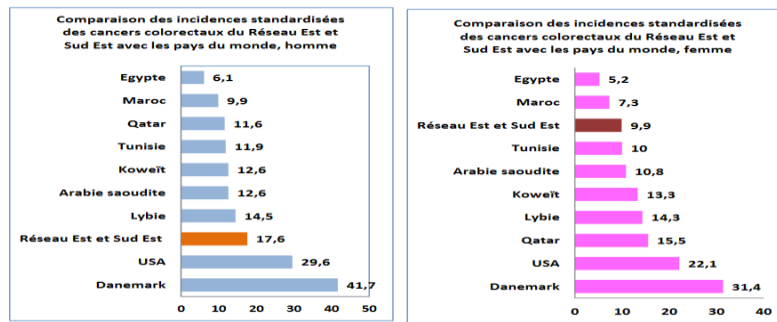

Figure 4: Comparison of standardized incidences of colorectal cancers in Algeria with the countries of the world [5, 6, 7,8]

In Algeria, the incidence of colorectal cancer in 2016 is 13.7 in men and 14 in women per 100,000 inhabitants (**Table 1)** . Analysis of disease progression shows an increasing trend with an APC of +7 **Figure 5** each year, and also increases with age **Figure 7, 8 [6, 7,8].** The highest incidence is observed in the wilaya of Bejaïa where it is 16 in women and 23.5 in men per 100,000 inhabitants, followed by the wilaya of Constantine with an incidence of 14.6 in women and 17.4 among men per 100,000 inhabitants. The lowest incidence is observed in Ouargla and Skikda with respective incidences of 4.6 -7.4 among women and 9.5-7.5 among men per 100,000 inhabitants, according to the Network East and South East, Algeria 2015 **Figure 10** .

Table 1 : Incidence data for colorectal cancers in Algeria, 2014-2016

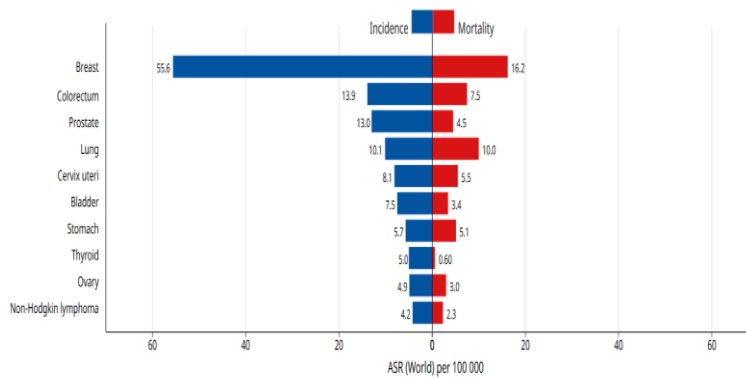|	2014		2015		2016	
	♂	♀	♂	♀	♂	♀
Taux brut /100,000 hab.	10,9	8,2	14,2	13,7	13,7	14,0
Taux Standardisé /100 000 Pop. Réf. Mondiale	14,1	9,9	17.6	15,7	16,8	16,7
% / autres cancers	16,0	8,7	14,5	10,6	13,4	10,7

Table 2: Estimation data for colorectal cancer incidence and mortality by age and per 100,000 inhabitants, Algeria (May 2019) [6, 7,8]
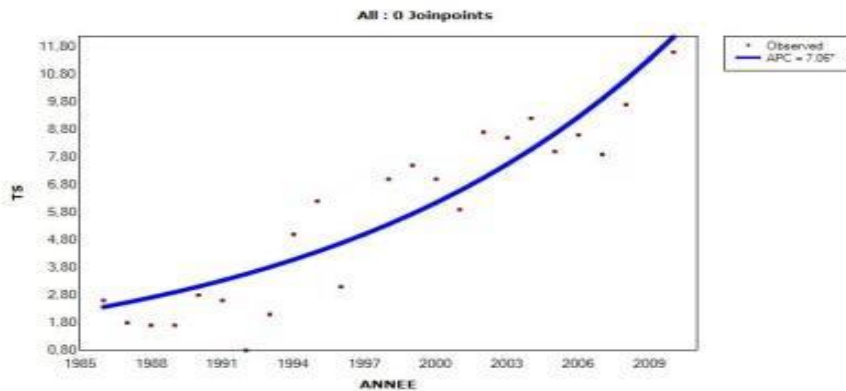
Figure 5: Trend of colorectal cancers in Algeria, APC =+7.0 .
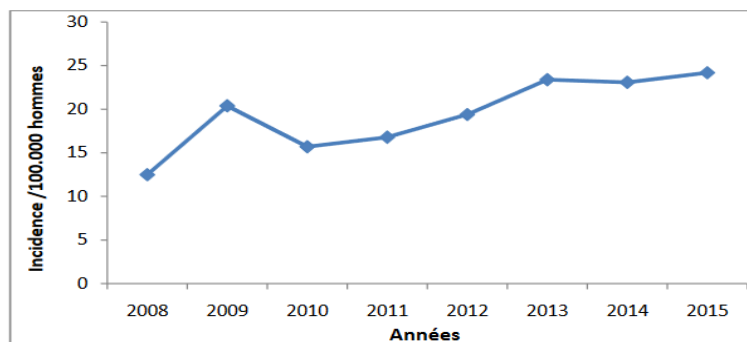
Figure 6: Trend of colorectal cancer (Men) 2008-2015 Algeria [4]

Figure 7: Trend of colorectal cancer (Women) Years 2008 -2015 Algeria [4]

Figure 8: Incidence of colorectal cancer by age group (male) - Algeria 2015[4]

Figure 9: Incidence of colorectal cancer by age groups (Women) – Algeria 2015 [4]

Figure 10: Comparison of standardized incidences of colorectal cancers of Main registers of the East and South East network, 2015

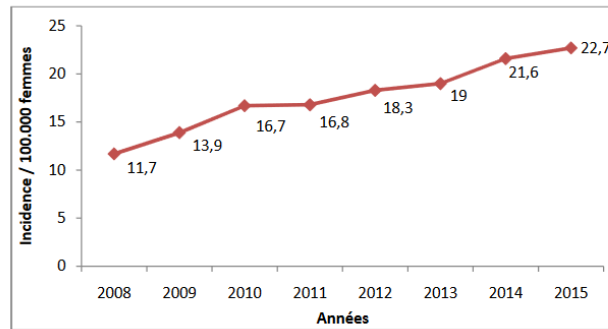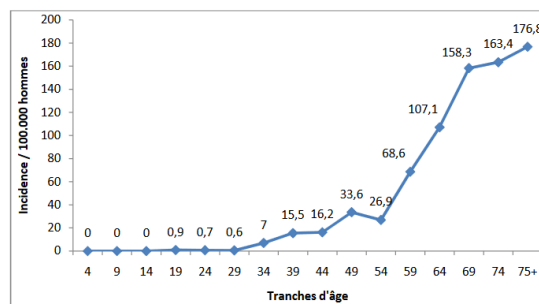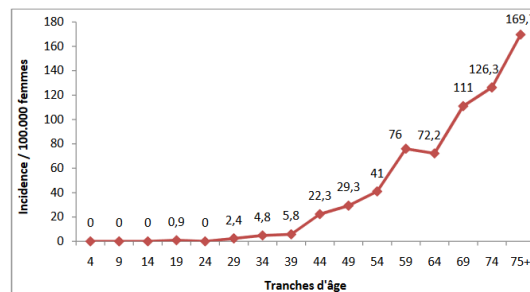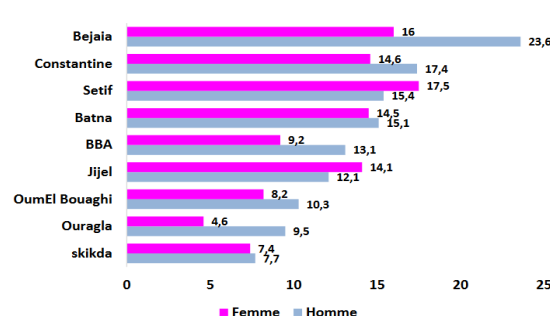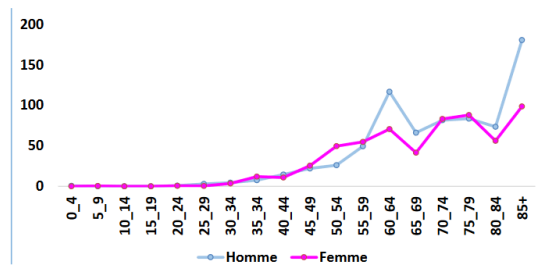**Figure 11: Distribution of the standardized incidence of Colorectal Cancers By age group, East and South East Network, Algeria 2015 [4]**

The incidence according to age and Gender

Throughout the world, male predominance is more marked for rectal cancer as for colon cancer. The sex ratio is between 1.5 and 1.6 for rectal cancer, and between 0.8 and 1.4 for colon cancer. [**3,4**] The incidence is identical in both sexes up to 65 years, then a predominance appears in men, linked to a greater frequency of cancers of the descending and sigmoid colon **[1]** . The cumulative risk of developing colon cancer between the ages of 30 and 74 is 3.4% in men and 1.6% in women **[2]** .

I.2 Colorectal cancer mortality

Colorectal cancer survival: According to data from Inca (2015) and InVS, survival worldwide has improved over the time in men and women in the same way. All stages combined, 5-year survival increased from 53% and 55% respectively in men and women for people diagnosed between 1989 and 1993 at 63% in men and women for people diagnosed between 2005 and 2010. It is closely linked to the stage at diagnosis. It goes from 90% at 5 years for early stages of the disease to 13% at 5 years for disease advanced to the metastatic stage **[3,4,5].** Globocan 's estimates of cancer mortality were more than 9 million deaths. CRC ranks 3rd with 9.2% of deaths, after lung cancer (18.4%). Mortality decreased regularly in both men and women between 1980 and 2012 (thanks to access to screening and resection of precancerous lesions among others)
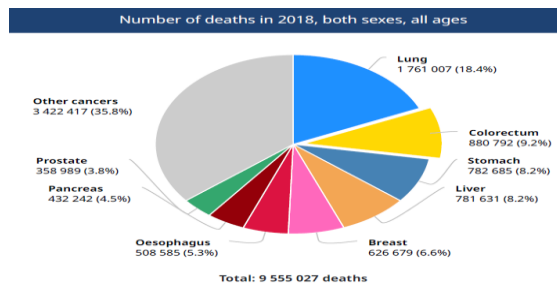
Figure 12: Number of deaths in 2018 for all sexes combined

Image from Data source: Globocan **2018** Graph production: Global Cancer Observatory

II Risk factors for colorectal cancer: Colorectal cancers are sporadic in 80% of cases, occur in a family context in 15% of cases and are linked to a genetic predisposition in approximately 5% of cases. Age over 50 years is the main risk factor for colorectal cancer as well as male gender whose relative risk (RR) is equal to 2. In 90% of cases, colorectal cancers are diagnosed from the age of 50. The risk of having colorectal cancer in the population aged 50 to 74 years without other risk factors than age was estimated

at 3.5%. **[9]** Clearly identified hereditary forms such as Lynch syndrome and familial adenomatous polyposis (forms determined by well-characterized genetic anomalies) are responsible for less than 4% of colorectal cancers. Subjects with one or more first-degree relatives (father, mother, brothers, sisters, children) with colorectal cancer have a higher risk of developing colorectal cancer themselves than the rest of the general population. **[11].** This risk is all the greater if the cancer has occurred in a young relative. There is also an increased risk of cancer in siblings and children of a person who has had a family history of an adenomatous polyp larger than 1 cm. In a man or woman who has had a complete resection of colorectal cancer, the risk of new colorectal cancer is significantly higher in the first five years following treatment of the initial colorectal cancer [9] **.** In a man or woman who has had an adenoma resection, the risk of a new colorectal adenoma is multiplied by four if the adenoma had a villous structure or was of a diameter > 10 mm, and is multiplied by seven if the adenomas were multiple **[9].** Colorectal cancer (CRC) developed from chronic colitis (ulcerative colitis or Crohn 's disease) is a very distinct subgroup of sporadic CRC representing 1 to 2% of all colorectal cancers. A meta-analysis of 116 studies published in 2001 showed that the cumulative risk of developing CRC in cases of UC was 2% after 10 years of disease progression, 8% after 20 years and 18% after 30 years [**14**]**.** The average age of onset is approximately twenty years earlier and the natural history of the disease is different from the classic *adenoma-cancer sequence* of sporadic CRC, replaced by the *colitis-dysplasia-cancer sequence,* the cancer goes therefore occur most often on flat lesions, more rarely on raised lesions called DALMs (Dysplasia Associated Lesions or Masses), this different sequence is partly due to the existence of an inverted mutational sequence between the two types of CRC **[15].** The various studies carried out have demonstrated that the increased risk of colorectal cancer in IBD depends on the extent of the colitis, the age of onset of symptoms, the duration of progression of the disease, the presence of primary sclerosing cholangitis or even a family history of colorectal cancer [15] **.** Consumption of red meat (beef, veal, mutton, lamb, pork, goat) and cold meats (meats preserved by smoking, drying, salting or adding preservatives) increases the risk of colorectal cancer. The risk is increased by 29% per portion of meat consumed of 100 g/d and by 21% per portion of 50 g of cold meats/d. Alcohol consumption increases the risk of colorectal cancer. The risk increases with quantity and the effect depends on the total amount of alcohol consumed, not the type of alcohol. (RR = 1.2 for consumption greater than 30 g per day vs. Abstinence). Tobacco (RR = 1.06 per 5 pack-years) is a factor independent of alcohol for the risk of adenoma and colorectal cancer. The risk of colorectal cancer is higher when the number of years of smoking, the number of cigarettes/day and the number of packs/year are high. The combined tobacco-alcohol risk among heavy consumers of alcohol (> 60 g/day) and tobacco is 8.6 times higher than that of non-smokers drinking less than 10 g of alcohol/day [**9**] The risk of occurrence of colorectal cancer is also increased in the case of diabetes, (RR = 1.27) this could be explained by hyperinsulinemia but also by a longer intestinal transit time leading to a greater time of exposure to potentially carcinogenic agents for the intestinal mucosa **[20]** . High concentrations of bile acids in the intestinal lumen have also been observed in diabetic patients which could promote oncogenesis. **[21]** (RR = 1.1 for an increase in body mass index of 8 kg/m2). A significant increase in risk is also observed with increasing abdominal adiposity (whether measured by the waist/hip circumference ratio or simply by waist circumference). The link between high blood pressure and cancer in general has been the subject of multiple studies, with data from the prospective study conducted on 7 groups of participants in Norway, Austria and Sweden, which included a total of 289,454 men and 288,345 women (average age 44 when entering the cohort) are clear: blood pressure higher than normal significantly increases the risk of developing cancer by 10 to 20% in men. In a large cohort conducted in London by

Van Hemelrijck M et al **[22]** in which the investigators took into account the average arterial pressure as well as other cancer risk factors such as BMI, age or possible smoking. After a follow-up of 12 years on average, the results had found that the general risk of developing cancer, whatever the type, was increased by 29% between men in the first and fifth quintiles: these were mainly cancers of the ENT, colorectal, **lung** , bladder, kidney, melanoma or other skin cancers, it has also been hypothesized that it is possible that hypertension reflects a lifestyle that could promote cancer in certain predisposed people . Among the protective factors identified for the occurrence of colorectal cancer are physical activity (RR = 0.88 for an increase in the physical activity score at 2 standard deviations), *calcium consumption* (RR = 0.92 per 300 mg/day), *chronic use of aspirin* with a reduction in risk of around 20 to 30% **[14,15].** Some data also suggest a protective effect of *diets rich in fiber* (RR = 0.90 per 10 g per day of fiber) especially when it comes to diets rich in *whole grains* (RR = 0.83 per 3 servings of cereals). complete meals per day), but also *diets rich in fruits* (RR = 0.85 for 3 servings per day), *vegetables* (RR = 0.86 for 5 servings per day), and *dairy products* (RR = 0.83 for 400 g/day of dairy products, 0.91 for 200 g/day of milk, RR = 0.96 for 50 g/day of cheese) **[16].** Epidemiological studies have also repeatedly shown an inverse relationship between the level *of vitamin D* in the blood and the risk of colorectal cancer, but the causal relationship has not yet been established. Studies have also demonstrated the protective role of fish and omega 3 consumption against CRC. **[17] .** The same goes for the consumption of turmeric with the powerful anti-inflammatory and antioxidant role of curcumin **[18]** . People who adopt the Mediterranean-style diet have around 15% less risk of being affected by cancer. According to a 2015 study **[19]. olive** oil plays a key role in this protection due to its ability to quickly kill cancer cells . Other risk factors: Acromegaly, in a man or woman with acromegaly, the risk of adenoma and colorectal cancer is multiplied by two to three. The mechanisms at play are linked to the excess secretion of growth hormone (somathormone) which stimulates the production of the growth factor IGF1 and cell proliferation.

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