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Restrictive Diets in Digestive Cancers: Prevalence, Contributing Factors, Foods Concerned and Patients' Beliefs (Prospective Study of 100 Cases)

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Abstract:- Cancer is a major cause of disease-related malnutrition; the prevalence of malnutrition and muscle loss is high in digestive cancers and is thought to be associated with a poor prognosis. The aim of this prospective study is to investigate changes in dietary habits following a diagnosis of gastrointestinal cancer that are likely to cause or aggravate malnutrition, to assess the existence of restrictive diets involving the permanent elimination of certain essential aliments (meat, dairy products, etc.), to identify the factors that influence patients to adopt them, and to assess the degree to which patients believe in the effectiveness of these diets in curing cancer.

- ***Materials and Methods:***

100 patients aged 18 and over, diagnosed with one of the following digestive cancers: colorectal, gastric, pancreatic, oesophageal, hepatocellular carcinoma or biliary tract cancer; were interviewed using an electronic questionnaire.

- ***Results:***

Among the patients we interviewed, 69% had adopted a restrictive diet following the diagnosis of digestive cancer. The products permanently eliminated included white sugar and/or sweetened foods in 83% of cases, red meat in 80%, tinned food in 77%, dairy products in 61%, spices in 54%, fried food in 49%, white meat and eggs not produced organically in 44%, processed meat in 33%, and all white meat and eggs in 17% and 14% respectively; This diet was recommended mainly by the patient's entourage (friends and family) in 81% of cases, by other patients and their relatives (58%) and by personal research on the internet in 36% of cases. In addition, 37% of patients believe that this type of diet contributes to curing cancer.

- ***Conclusion:***

69% of patients in the study were on a restrictive diet, and more than a third of them believed that this diet could help cure their digestive cancers. Raising awareness among patients and their families is essential to prevent malnutrition and muscle loss, and thus improve the outcome of the cancer.

Keywords:- *Digestive Cancer, Restrictive Diet, Malnutrition, Sarcopenia.*

I. INTRODUCTION

At the National Institute of Oncology in Rabat, We conducted a study on the emergence, among patients diagnosed with digestive cancers, of a socio-cultural phenomenon represented by changes in dietary behaviour, sometimes going so far as to adopt restrictive diets that permanently exclude certain essential nutrients.

Malnutrition and muscle loss are common in cancer patients, and are known to have harmful consequences on overall survival and on the frequency and severity of cancer-related complications [1-2-3-4]. They may result from inadequate food intake, a sedentary lifestyle or catabolic inflammatory phenomena linked to cancer, but also to the side-effects of anti-cancer treatments [5].

The study focuses on digestive cancers because they account for a large proportion of medical oncology patients and are associated with a high risk of malnutrition and muscle loss, which has a negative impact on the prognosis of the disease and tolerance of treatments, particularly chemotherapy [5-6-7-8]. This situation is exacerbated by the nature of the clinical manifestations of digestive cancers, which impair food intake (anorexia, nausea, vomiting) and/or intestinal absorption (diarrhoea).

The study was also prompted by the growing circulation of preconceived ideas claiming that certain foods feed cancer and digestive cancer in particular, and require definitive elimination. These beliefs have been identified by oncologists, radiotherapists and surgeons during consultations and by nursing staff, and are also conveyed by unregulated sources (internet sites, social networks) who present themselves to the public as specialists in nutrition and alternative medicine to sell the hope of a cure based on a restrictive diet.

- *The Objectives of the Study would therefore be:*

- Evaluate the changes in patients' eating habits following the diagnosis of digestive cancer, in particular the adoption of restrictive or deprivative diets without a medical prescription, and identify the foods most affected by this phenomenon.

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- To identify the factors motivating patients to follow these particular diets.
- Assess patients' belief in the effectiveness of these diets in curing their cancer.
- Examine the extent to which patients comply with the nutritional instructions given by their doctors.

In this article we also attempt to exploit data from the literature in order to study the association between malnutrition, muscle loss and digestive cancers, and their impact on the prognosis and toxicity of anti-cancer treatments. Then to analyse the data and studies concerning diets and the consumption of certain foods following the diagnosis of digestive cancer, and their impact on indicators of survival, recurrence and tolerance to treatment.

II. BACKGROUND

➢ *Malnutrition-Sarcopenia and Cancer:*

- *Physiopathology:*

Cancer is a frequent cause of disease-related malnutrition [4]. Unlike simple malnutrition, malnutrition in cancer is a multifactorial condition [5]. It is manifested by a combination of cachexia and anorexia [1-4]. Anorexia leads to a reduction in food intake, while the anti-tumour inflammatory response, accompanied by the release of cytokines, leads to various metabolic disorders. These disorders include insulin resistance and catabolic phenomena such as proteolysis and lipolysis, which lead to continuous, involuntary weight loss and a reduction in muscle mass, thus characterising sarcopenia [1-4-5-9-10].

The presence of the inflammatory component in the pathophysiology of cancer-related malnutrition makes it difficult to correct completely despite appropriate medical nutritional intervention [5]. Effective control of this malnutrition requires appropriate anti-cancer treatments to manage the underlying disease.

On the other hand, anti-cancer treatments may be the cause of muscle loss, particularly in the peri-operative period, which may be due to prolonged bed rest, stress-related catabolism or reduced dietary intake [11-12]. A study of patients undergoing colorectal cancer treatment showed that they had low muscle mass preoperatively and that this mass decreased even further postoperatively [12].

- *Sarcopenia:*

This modern term, first used in the early 80s [13], refers to muscular failure and pathology characterised by a deterioration in the quantity and quality of muscle mass, and a reduction in the function and performance of skeletal muscles. This definition is consistent with that updated by EWGSOP (the European Working Group on Sarcopenia in Older People) [6-14].

A distinction is made between physiological primary sarcopenia, which occurs in the elderly, and secondary sarcopenia, which occurs and/or worsens following cancer and chronic inflammatory conditions [6].

There are several methods for diagnosing sarcopenia, the first of which has been validated as the calculation of the skeletal muscle index using tomography [15-16], a method that is also considered the standard in digestive cancer, measuring appendicular muscle mass at L3/L4 [15-16-14]. Dual-energy X-ray absorptiometry (DXA) is a very accurate method and can also be used, but has a number of limitations: it is costly and involves significant radiation exposure. Other methods include bioimpedance analysis (BIA) and anthropometry [17].

There are several recommendations concerning the screening, diagnosis and treatment of malnutrition and in particular malnutrition and muscle loss linked to cancer, such as the GLIM criteria (Global Leadership Initiative on Malnutrition) [18], and international nutrition recommendations for cancer patients: for example, the ESPEN (European Society for Clinical Nutrition and Metabolism) guidelines [5].

Relevance of the GLIM criteria: A study carried out on patients followed for cancer of the upper digestive tract (oesophagus, stomach, pancreas) and head and neck cancers, as well as colorectal cancers, demonstrated that diagnosis of malnutrition using the GLIM criteria led us to predict the prognosis of the disease, in particular the occurrence of complications (more hospitalisations and infections, poorer pain control, more toxicities, etc.) as well as reduced survival at 6 months [1], making these criteria a good tool for diagnosing malnutrition and predicting prognosis and survival in these patients.

III. MATERIALS AND METHODS

This is a prospective study taking place at the National Institute of Oncology in Rabat, from 20 July 2023 to 22 February 2024.

- *Inclusion Criteria:*

Patients treated for digestive cancer (colorectal cancer, gastric cancer, oesophageal cancer, pancreatic cancer, cancer of the bile ducts, hepatocellular carcinoma) aged 18 and over, being diagnosed, being treated, being monitored or receiving exclusive support care.

- *Data Collection and Analysis:*

We interviewed the patients ourselves, mainly in the day hospital and in consultation, and then recorded the answers on the electronic questionnaire we had devised.

IV. RESULTS

The survey involved 100 patients, 56% of whom were men and 44% women. The age range was 18 to 39 in 10% of patients, 40 to 65 in 54% and over 65 in 36%.

Level of education: 35% of patients had never attended school, 23% had completed primary school, 22% secondary school and 20% university.

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The digestive tract tumour sites were distributed as follows: 54% colorectal cancer, 26% gastric cancer, 15% pancreatic cancer, 3% biliary tract carcinoma, one case of oesophageal cancer and one case of hepatocellular carcinoma.

Stage of care: 69% of patients were undergoing anti-cancer treatment, 20% were undergoing surveillance, 5% were undergoing assessment or diagnosis (pre-therapy stage) and 6% were undergoing exclusive support care.

Among the patients questioned, 67% had no personal medical history, 13% had hypertension, 19% diabetes, 6% heart disease, other histories were present: psychiatric pathology (2%), renal failure, epilepsy, osteoporosis, asthma (1% each) and 1 patient had a history of prostate cancer.

To the question: **Are you on a restrictive diet because of your cancer, including the permanent suspension of one or more specific foods**? 69% of patients answered yes (Figure1)

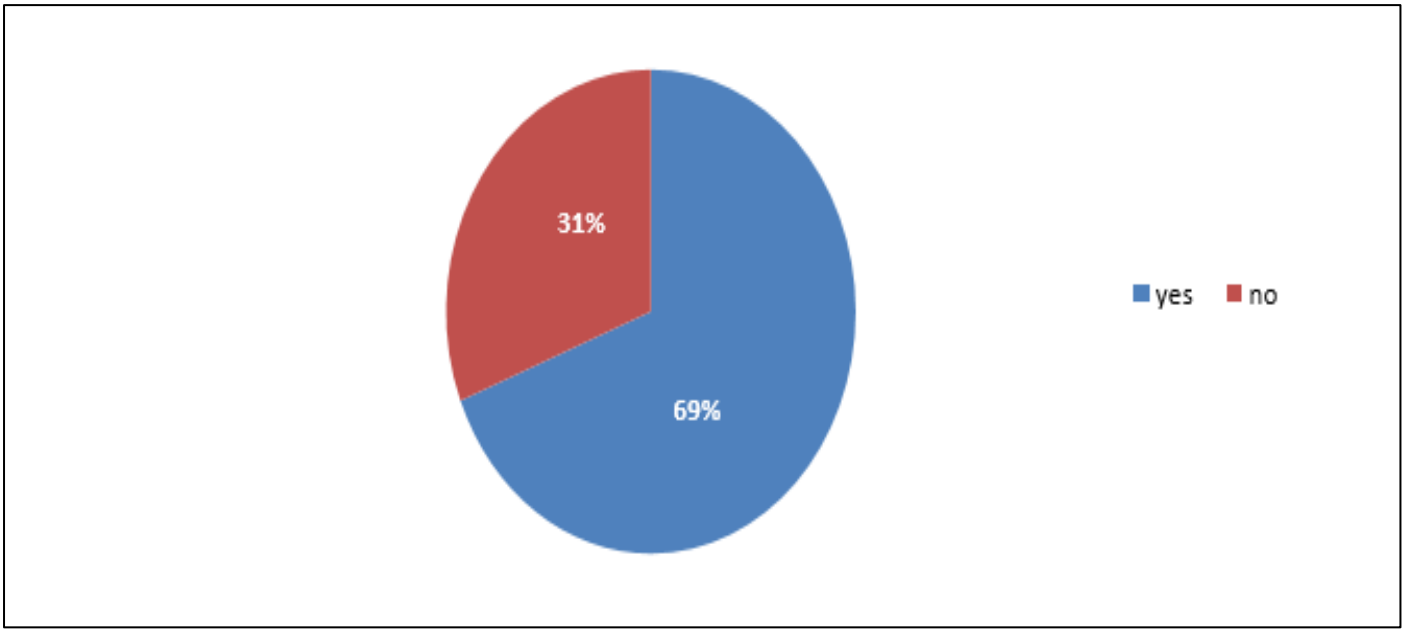

Fig 1 Percentage of Patients following or not a Restrictive Diet

➢ *For Patients who Answered yes to the Previous Question, **the Deprivation Diet included the Suspension of the following Foods**:*

At the top of the list are **white sugar and/or sweetened foods** (83%), **red meat** (80%), **tinned food** (77%), **dairy products** (61%), **spices** (54%), **fried food** (49%), **white meat and eggs that are not organically farmed** (44%), **processed meat** (33%), then all **white meat** and **eggs** (17% and 14% respectively).

The other foods suspended were coffee and chilli in 4.3% of patients, white flour bread in 2.8%, lemon and salt (1 patient) and dried and fresh fruit (1 patient), i.e. 1.4% of patients on a restricted diet.

➢ *NB:*

- The percentage of patients who stopped eating sugar did not include diabetic patients on a low-carbohydrate diet.
- The cessation of spices mainly concerned pepper.
- Patients who did not stop eating processed meats did not consume them before diagnosis.

➢ *Who has ever Advised or Recommended this Type of Diet to you?*

The responses are shown in the following graph (Figure 2), with the environment (family and friends) topping the list at 81%.

- *NB: Patients not on a Restricted Diet also Answered this Question.*

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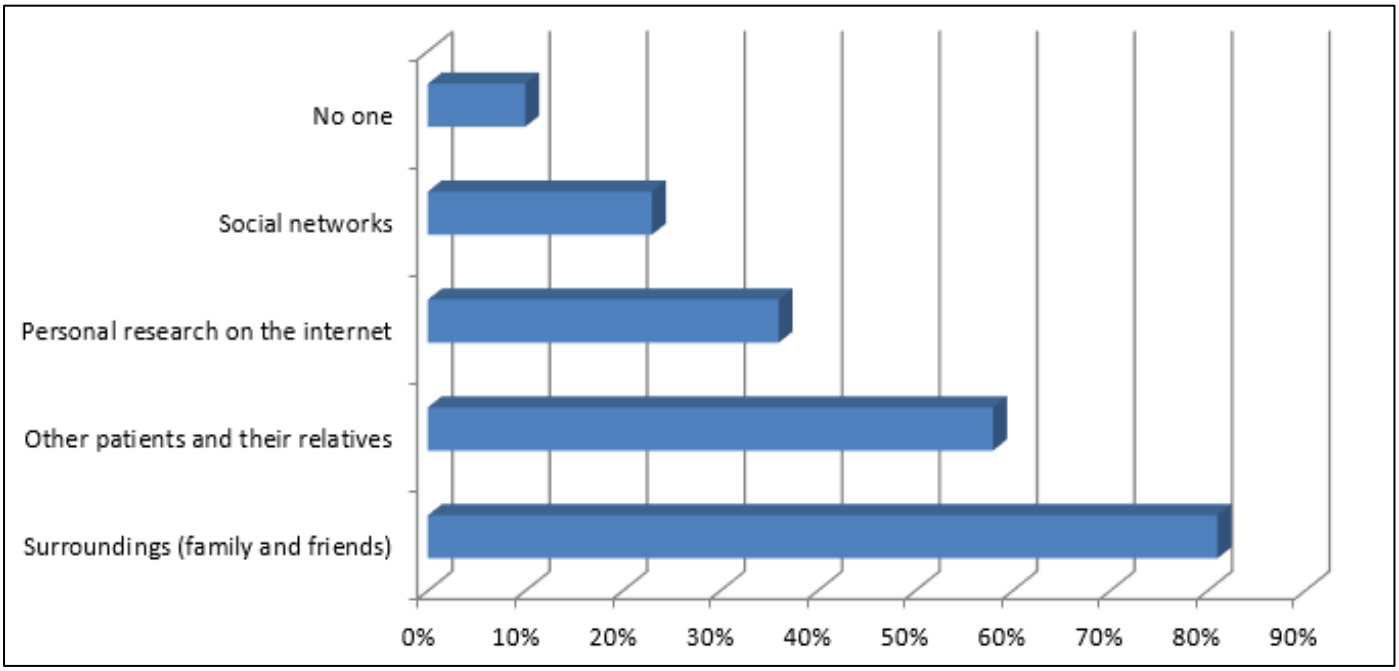

Fig 2 Percentage of Sources Recommending a Restrictive Diet

- To the question: **Do you believe that this type of diet will help cure cancer?**
- Responses were divided: 37% yes, 29% no, and 34% answered with: I don't know
- 28% of patients surveyed replied yes to the question**: Has your family ever forced you to follow this type of diet without a doctor's prescription?**

➢ *The Place of Nutrition in the Consultation of Patients with Digestive Cancer, 2 Questions were asked:*

- Have you ever asked your doctor questions about your nutrition? 70% of patients answered 'yes'.
- Has your doctor ever discussed nutrition with you? 40% answered 'yes'

➢ *Patient Compliance with Doctor's Advice:*

Despite the doctor's advice to adopt a varied and nutritious diet, 27.7% of patients on a restricted diet continued to do so.

V. DISCUSSION

The question of nutrition in digestive cancers is a very pertinent one, as digestive cancers are cancers at high risk of developing malnutrition and sarcopenia [15-19]. A systematic review of the literature assessed the relationship between sarcopenia and digestive cancers by analysing the database of 31 studies including 11651 patients followed for digestive cancer. The method used in these studies to diagnose sarcopenia was measurement of the skeletal muscle index at the 3rd lumbar vertebra by CT scan, This review showed that in these 11651 patients followed up for digestive cancer, the prevalence of sarcopenia was 43.68%; this prevalence was higher in oesophageal cancers, estimated at 70.4%, liver cancers at 60.3%, biliary tract cancers at 49.3%, pancreatic cancers at 45.7% and colorectal cancers at 42.83%; the prevalence of sarcopenia in gastric cancers was lower at 32.05% [6]. This study showed that patients treated for digestive cancer and diagnosed with sarcopenia had lower overall survival and progression-free survival, a higher risk of recurrence, more post-operative complications and more chemotherapy-related toxicities [6].

A recent meta-analysis, including 43 studies, concluded that the presence of sarcopenia increases the risk of major complications, prolongs hospital stay and increases 30-day mortality after gastrointestinal cancer surgery. These results underline the importance of assessing muscle mass pre-operatively to predict risk and intervene nutritionally [20].

Other data in the literature confirm the impact of sarcopenia on prognosis and tolerance to treatment in digestive cancer. A retrospective study of patients treated with gemcitabine as first-line therapy for metastatic pancreatic cancer showed that sarcopenia can be considered a prognostic factor, with patients suffering from sarcopenia experiencing more chemotherapy-related toxicities and reduced survival [21]. Another retrospective study of locally advanced anal canal cancer treated with radio-chemotherapy showed that patients with sarcopenia had an increased risk of mortality and a higher incidence of grade 3 leukopenia [22].

These data clearly demonstrate the need to implement preventive, diagnostic and therapeutic measures to combat malnutrition and sarcopenia in digestive cancer. This includes eliminating aggravating factors, such as restrictive diets, which can have a significant impact, particularly in the Moroccan socio-cultural context, which is characterised by illiteracy, the rapid circulation of rumours and the proliferation of several unregulated media sources which disseminate medical advice, particularly on nutrition and cancer, and which have a high degree of popular credibility.

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Surveys of patients undergoing treatment for cancer or at high risk of developing cancer show that 48% of them follow special diets such as vegan and macrobiotic diets in the hope of improving the prognosis of their disease by avoiding foods that 'feed cancer', rather than following scientific recommendations [23-24-25]. These are most often restrictive or suppressive diets of several foods with the intention of curing the cancer [11-26-27-28-29], this being attributed to poor nutritional education on the part of carers and inducing the search for information on the internet or following popular beliefs [23].

Patients undergoing treatment for cancer frequently tend to adopt a healthier lifestyle and change their diet [11-30]. This phenomenon, which can affect all cancers, has been studied in more detail in patients with colorectal cancer [31-29]. Two studies - one of which involved 1458 patients being followed for colorectal cancer - showed that the changes often included a reduction in meat consumption and an increase in the intake of plant-based foods [29-32].

The question is: does diet after the diagnosis of digestive cancer influence prognosis? Many studies have demonstrated a relationship between diet, lifestyle and the risk of developing digestive cancer, particularly colorectal cancer [33-34-35], but also pancreatic and gastric cancers [36-37-38]; however, very few studies have examined the optimal diet to adopt after a diagnosis of digestive cancer and its impact on the risk of recurrence and survival. As a result, there is no solid evidence on this subject. The few data available, mainly focusing on colorectal cancer, are ultimately inconclusive.

With regard to diets, and more particularly the Western diet characterised by excessive consumption of red and processed meats, fats, sugary foods and little fibre [39], its impact on the prognosis of colorectal cancers remains controversial. A prospective observational study of 1009 patients with stage III colon cancer who underwent surgery and were included in a randomised trial of adjuvant chemotherapy (CALGB 89803) showed that excessive consumption of this type of diet could be associated with a higher risk of recurrence and mortality [40]. In contrast, another study of women followed for stage I-III colorectal cancer found no association between this diet and overall survival [41]. Although the results of these studies were not significant, there is evidence to suggest that a high adherence to the Western diet may be associated with a poorer prognosis for colorectal cancer. This type of diet is known to be correlated with the secretion of obesity biomarkers such as insulin and IGF1, which are tumour growth factors and inhibitors of apoptosis [42-43]. A systematic review of breast, colorectal and prostate cancers in particular concluded that the Western diet was associated with a higher risk of mortality and that this diet should be banned for cancer patients, although foods such as red meat and dairy products should not be included [44].

In addition, some studies support the beneficial effect of a Mediterranean diet on overall survival after a diagnosis of colorectal cancer, indicating a reduced risk of death from all causes [44-45]. In addition, regular consumption of fibre-rich foods after the diagnosis of colorectal cancer would also reduce the risk of mortality, both from all causes and specifically from cancer [44-46-47], and the components of the Mediterranean diet, including polyphenols and anti-oxidants, would have an anti-tumour and anti-inflammatory effect, blocking the initiation and progression of colorectal cancer [48-49].

With regard to red meat, which was stopped by 80% of patients on a restrictive diet in our study, and processed meats, which were stopped by 32.9% (this low percentage can be explained by the fact that these patients did not consume this type of meat before being diagnosed with digestive cancer), the available data in the literature only concerned colorectal cancer, as mentioned in the studies already cited; A study of 2315 patients diagnosed with non-metastatic colorectal cancer assessed their consumption of red and processed meats before and after diagnosis, and its association with the risk of death. The conclusions of this study indicated that the risk of death was higher in patients with a high consumption of red and processed meats before diagnosis. However, consumption of these meats after diagnosis was not associated with risk of death [50].

These results are supported by a large study of 3122 patients diagnosed with all stages of colorectal cancer, which evaluated the association between baseline consumption of red and processed meats and 5-year survival. There was no association between consumption of these foods and survival [51].

Sugar topped the list of foods suspended in our study, with 83% of patients on a restricted diet (excluding diabetic patients). Excessive consumption of sugars and sweetened beverages after the diagnosis of colorectal cancer has been evaluated in two studies and is associated with a higher risk of recurrence and mortality from colorectal cancer [52-53]. However, the first study found an increased risk of death, but only after 5 years, a period during which there would appear to be more colorectal cancer-related deaths [52]. The second study found that progression-free survival was reduced in patients with excessive sugar consumption, but only in those with a body mass index (BMI) greater than 25% [53].

Concerning the consumption of dairy products, which was eliminated in 61.4% of patients on a restricted diet in our series, a prospective study including 2284 patients treated for non-metastatic colorectal cancer showed that a high consumption of dairy products after the diagnosis of colorectal cancer was associated with a lower risk of mortality [54].

Some data on pancreatic cancer has been found, but it is still far from conclusive. In vitro data support the effect of the ketogenic diet (high in fat and low in carbohydrates) in reducing tumour growth and increasing muscle mass, which could help prevent cachexia [44-55]. A preclinical study evaluated the association between the ketogenic diet and gemcitabine in mice with pancreatic cancer. This study suggests that this combination could have a potential

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preventive effect against cachexia associated with pancreatic cancer [56]. However, the impact of the ketogenic diet in pancreatic cancer remains controversial, requiring more extensive clinical trials before it can be recommended to patients [44-55].

In practice, and given the lack of evidence on the subject, it is necessary to follow the nutritional recommendations for patients being followed for digestive cancer in order to avoid malnutrition and sarcopenia and their deleterious effects.

In addition to these recommendations, a very interesting publication by a group of experts in the form of an opinion article confirms the importance of protein consumption 'especially that of animal origin' in patients being followed for cancer, and therefore banishes the idea of suspending the consumption of meat, eggs or dairy products [11]; This paper highlights that cancer patients have a higher protein requirement than healthy people, especially during active anti-cancer treatment. Consumption during active curative or palliative treatment should be between 1.2-1.5g/kg/day, more than 65% of which should be of animal origin [11]. The importance of proteins of animal origin stems from their high protein load and their greater muscle anabolic effect compared with proteins of plant origin [11-57-58], the aim being to guarantee good muscle composition in order to avoid the impact of muscle loss on disease prognosis and toxicity secondary to anti-cancer treatments [11-6]. Patients wishing to follow a vegan or vegetarian diet on the basis of ethnic or religious beliefs should be closely supervised during treatment to cover their protein requirements [11]. This paper insists that the theory that some foods feed the tumour is not supported by scientific evidence and should not lead cancer patients to change their diet [5-11].

VI. CONCLUSION

The prevalence of restrictive diets among patients with digestive cancers is 69% in our sample. The exclusion of basic food items such as meat, dairy products and eggs, etc, leads to a reduction in protein intake, which can cause or worsen muscle loss or sarcopenia. The latter is common in patients with digestive cancers and has a negative impact on survival, the risk of recurrence, complications associated with the disease and tolerance of anti-cancer treatments. 37% of patients surveyed believe that this diet could help to cure their cancers. This requires a nutritional management protocol to be set up, including screening, diagnosis and treatment of malnutrition, adapted to the status of the digestive cancer patient. In addition, it is crucial to regularly raise awareness among patients and their families, by recommending a rich and varied diet, in order to maintain optimal physical and emotional balance. Finally, there is a lack of clinical studies on the impact of consuming or stopping certain foods after the diagnosis of digestive cancers. This highlights the need for clinical research on this subject, as well as on other tumour sites at high risk of malnutrition.

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