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Research Article

Do Cancer Diagnosis Announcements Impact Eating Habits in Cancer Patients: Pilot Study Describing the Moroccan Experience

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Abstract

Introduction: The announcement of cancer is a primordial stage in the management of patients, consequently, it impacts in the majority of cases the daily lifestyle, in particular the eating habits and diet of certain patients, who find themselves confronted with the culture of non-medicalized communication of its environment being able to have a contradictory effect to the nutritional and therapeutic project proposed by the medical body.

Material and Methods: Survey of Moroccan patients during the first 2 years of a cancer diagnosis. Socio-demographic characteristics, nutritional advice received, and weekly frequency of intake of each of the foods before and after the cancer diagnosis were received through a dedicated questionnaire

Results: 85 patients were included in the study, 64.7% of whom were men with an average age of 55 years. 92.9% of the patients were in curative status, and 58.8% were being followed for colorectal cancer.

However, only 25.9% of the patients received nutritional advice from health personnel, while 54% of the patients changed their diet after the announcement. Analyzing the obtained results shows that 62.35% of patients reduced their consumption of red meat with a p-value < 0.001, and 52.94% of patients reduced their poultry consumption with a p-value < 0.001. Furthermore, there has been an increase in fruit consumption in 57.65% of patients, an increase in vegetable consumption in 52.94% of patients, and fish consumption in 47.06% with a p-value < 0.001.

Conclusion: Cancer patients report a significant and unsupervised change in dietary habits in the first few years after a cancer diagnosis, which opens up the prospect of implementing a personalized oncology nutrition protocol in tertiary health centers.

Keywords: Announcements; Cancer patients; Dietary changes; Eating habits

Introduction

Over the years, many epidemiologic studies, supported by experimental arguments, have linked certain types of foods to the occurrence of cancer. Although it has been proven that obesity is a cancer-inducing factor, malnutrition is considered to be an integral part of its progression. Thus, it is well-reported that malnutrition limits the tolerance and effectiveness of treatments, and its prevalence among patients is 40%. Weight loss exceeding 15% in cancer patients is constantly associated with a change in prognosis, regardless of the type of cancer involved. Malnutrition can also cause death in 5% to 25% of cancer patients [1]. The latest global cancer data estimates 18.1 million new cases and 9.6 million cancer deaths in 2018. Approximately one in six deaths worldwide are due to cancer. Of these deaths, 70% occur in developing countries [2]. This scourge is increasingly affecting populations in low- and middle-income countries, where poverty, inadequate health systems and training of health professionals, and poor health education dominates [3]. Morroco is also affected by this global scourge, and the estimated number of new cases of cancer per year is close to 50,000; despite the significant efforts made in recent years, mortality remains high, and tumors would be the 2nd cause of death in Morocco with 13.4% of deaths, after diseases of the cardiovascular system [4]. The GLOBOCAN database, compiled by the International Agency for Research on Cancer (IARC), is updated regularly, providing timely estimates of cancer incidence and mortality. In Morocco as in the world, breast cancer represents the most common cancer in 2020 with an incidence of 11,747 new cases (19.8%), followed by lung cancer with an incidence of 7,353 new cases (12.4%) and then colorectal cancer with 4,558 new cases (7.7%). The number of deaths from cancer reached 35265 cases in 2020 [5]. In light of this, it has become essential to associate nutritional support with the oncological management of patients adapted to the objectives of the treatment, under conditions absence of local studies or recommendations dealing with nutritional rehabilitation in oncology, especially since Morocco is part of a developing country with a percentage of illiteracy of 32% according to the latest statistics 2014 [6], so cancer patients may then be subject to a myriad of non-medical information coming from their environment.

Many studies tried to address the nutrition part in cancer care, however, very few reported the impact of changing habits in patients' cancer while receiving the diagnosis announcement. This study aims to analyze the trends of eating habits in cancer patients following the announcement of the cancer diagnosis and to determine the specific variation in Moroccan patients toward this situation.

Material and Methods

Data Collecting

We conducted a qualitative study in the National Institute of Oncology in Rabat, from January 2018-December 2019, including all adult patients over 18 years of age, undergoing treatment of an uncomplicated colorectal cancer (Occlusion, perforation, or hemorrhage) and gynecological cancer mainly breast cancer after the announcement of his cancer, taking into account that upper tract cancers directly impact enteral feeding, These cancers are also the most frequently treated in our institute which is the largest Anti-cancer center in the country [7]. Patients were anonymously approached and proposed inclusion in the study. Only patients accepting to participate were enrolled. The questionnaire: Nutritional impact in breast and CCR cancer was present in French and Moroccan Arabic versions according to the patient's request. The exclusion criteria were: Refusal to participate in the study, those not treated at the National Institute of Oncology, or those lost to follow-up [8]. The outcome criteria were the analysis of dietary changes according to demographic characteristics and the period since diagnosis, as well as to estimate of the proportion of cancer patients who have received adequate care from the health professionals supervising this change.

We used an anonymous questionnaire that included 70 questions divided into 2 chapters: 44 questions on the patients' socio-demographic and clinical characteristics. The second chapter included 26 questions on the frequency [9] of food consumption before and after the diagnosis. For the selection of the questions, we used foreign research and articles [10,11] that had already dealt with this topic.The study was approved by the institutional review boards of the national institute of Oncology in Rabat. It was exempt from ethics committee approval as participants gave their anonymous consent to participate in the survey, according to Morrocan law n°28-13 [12].

Statistical Analysis

The obtained results from the survey titled "The impact of nutrition in oncology" (Table 1) were analyzed using Jamovi software applying two methods: univariate analysis and multivariate analysis. The quantitative variables were expressed in statistical average and standard deviation, and the qualitative variables were expressed in numbers and percentages. We used the Chi-square test as well as the Fisher test to study the change in eating habits in comparison to the given instructions, disease location, socio-economic level, treatment strategy, and the type of treatment given.

Student's T-tests for independent groups and paired groups, or Mann Whitney's test, were used to study the dietary change in accordance with weight loss after cancer diagnosis announcement,

with age, as well as the number of different types of consumed food, preceding and following the announcement of a cancer diagnosis. The univariate and multivariate analysis of the data collected by the questionnaire was used to identify the factors incriminated in the dietary change of the patients at the time of the diagnosis of cancer to have an established problem motivating health promotion. The interdependence of the variables was considered statistically significant when p /< 0.05.

Results

Demographic Characteristics

Average age is 55.6 years give or take 13.9, with subjects being predominantly female at 64.7 %. 40% of patients are at an elementary level of education and 70.3% have an average socioeconomic status. The following Table 1 shows the characteristics of the study population.

The variables	N=85
Age*	55.6+/-13.9
Sex°	
• Female	55 (64.7%)
• Male	30 (35.3%)
Current weight (Kg)*	64.6 +/- 16.6
Usual weight (Kg)*	75.3 +/- 13.7
Weightloss (%)*	15.6 +/- 10.3
Height (cm)*	164 +/- 6.89
BMI (kg/m²)**	23.4 (19.3-27.3)
Level of education°	
Low	56 (65.9%)
High	29 (34.1%)
Marital status°	
Engaged	66 (77.6%)
Uncommitted	19 (22.4%)
Socio-economic level°	31 (36.5%)
Low	54 (63.5%)
Average	

*expressed as mean +/- standard deviation; **expressed as the median and quartiles; °expressed in the counts (percentage).

Table 1: Study population characteristics.

Clinical Characteristics

The most frequent location is colorectal with a percentage of 41.2%, followed by breast cancer location with 31.8%. The therapeutic strategy is curative in 92.5% of cases, either by surgical treatment in 36.5%, chemotherapy alone in 14.1%, or combined in 45.9%, either radio-chemotherapy or surgery/chemotherapy or the 3 components of treatment (Table 2).

The variables	N=85
Diabetes*	
Yes	14 (16.5%)
No	71 (83.5%)
Arterial hypertension *	
Yes	16 (18.8%)
No	69 (81.2%)
Obesity*	
Yes	26 (30.6%)
No	59 (69.4%)
BMI*°	
Underweight	17 (20%)
Normal	24 (28.2%)
Overweight	15 (17.6%)
Obese	29 (34.1%)
Site of the disease*	
Colorectal	50 (58.8%)
Breast	35 (41.2%)
Metastasis *	
Yes	18 (21.2%)
No	67 (78.8%)
Received treatment*	
Surgical	31 (36.5%)
Medical	15 (17.6%)
Combined	39 (45.9%)
Treatment strategy*	
Curative	79 (92.9%)
Palliative	6 (7.1%)

*expressed in the counts (percentage); ° Body mass index (BMI) Categories: Underweight = <18.5; Normal weight = 18.5–24.9; Overweight = 25–29.9; Obesity = BMI of 30 or greater

Table 2: Shows the clinical characteristics of patients.

Nutrition Advice

54.1% of patients changed their eating habits after the announcement of the diagnosis, either by increasing or decreasing the consumption of certain types of food, or stopping eating altogether. Even though 82.1% of these patients didn't consider their diet a risk factor for their cancer. However, only 25.9% of the patients received nutritional advice from health personnel, while 54% of the patients who changed their diet after the announcement was based on false information transmitted either by the patients among themselves in half of the cases or by the family in 13% of the cases or sometimes anxiety in 8.04% or complications of cancer (Table 3).

Did you receive nutritional information from health workers?	Yes	22 (25.9%)			
	No	63 (74.1%)			
Does your diet change during your illness?	Yes	46 (54.1%)	If so, it is due to	Anguish	4 (8.69%)
				Information transmitted by a patient	25 (54.34%)
				Information transmitted by the family	6 (13.04%)
				More than one of these causes	11 (23.91%)
	No	39 (45.9%)			
Do you think your diet was the source of your illness?	Yes	15 (17.9%)			
	No	69 (82.1%)			

Table 3: The percentage of receipt of nutrition advice and changing diet.

The Dietary Changes

The following Table 4 shows the amount of consumed types of food per day before and after announcing the diagnosis.

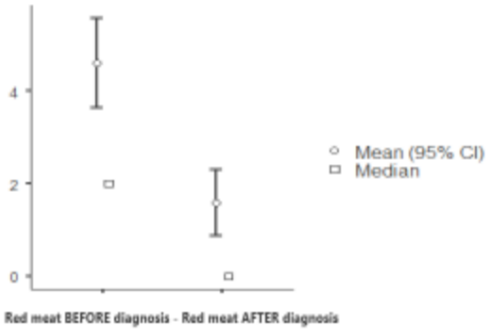
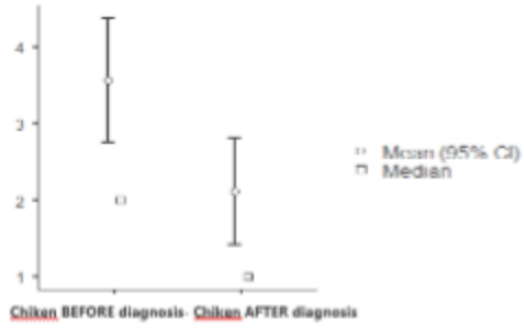
Different types of food	number of dishes BEFORE diagnosis*	number of dishes AFTER diagnosis*	After diagnosis Intake unchanged°	After diagnosis Intake increased°	After diagnosis Intake decreased°	Mean difference	95% Confidence Interval		p-value
							Lower	Upper	
Red meat	2 (1-7)	0 (0-1)	27 (31.77%)	5 (5.88%)	53 (62.35%)	4.00	3.000	5.500	<.001
Chicken	2 (2-4)	1 (0-2)	33 (38.82%)	7 (8.24%)	45 (52,94%)	2.00	1.500	3.000	<.001
Fish	2 (1-4)	4 (2-7)	34 (40%)	40 (47.06%)	11 (12.94%)	-3.50	-5.000	-2.000	<.001
Eggs	2 (0-3)	0 (0-2)	38 (44.71%)	14 (16.47%)	33 (38.82%)	1.50	0.500	2.500	0.011
Milk	6 (2-7)	0 (0-5)	33 (38.82%)	9 (10.59%)	43 (50.59%)	4.50	3.000	6.500	<.001
Dairy products	1 (0-5)	0 (0-4)	46 (54.12%)	13 (15.29%)	26 (30.59%)	1.00	-5.14e−7	2.500	0.077
Delicatessen	0 (0-1)	0 (0-0)	65 (76.74%)	1 (1.18%)	19 (22.35%)	4.00	1.500	6.500	0.001
Fruits	6 (2-10)	7 (7-14)	31 (36.47%)	49 (57.65%)	5 (5.88%)	-7.00	-8.500	-6.000	<.001
Vegetables	7 (5-12)	14 (7-14)	36 (42.35%)	45 (52.94%)	4 (4.71%)	-7.00	-9.000	-6.000	<.001
Preserves	0 (0-1)	0 (0-0)	62 (72.94%)	3 (3.53%)	20 (23.53%)	3.00	2.000	6.000	<.001
Sweet products	0 (0-6)	0 (0-1)	56 (65.88%)	6 (7.06%)	23 (27.06%)	6.50	3.500	9.500	<.001

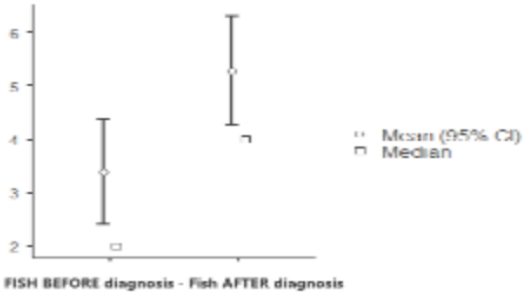
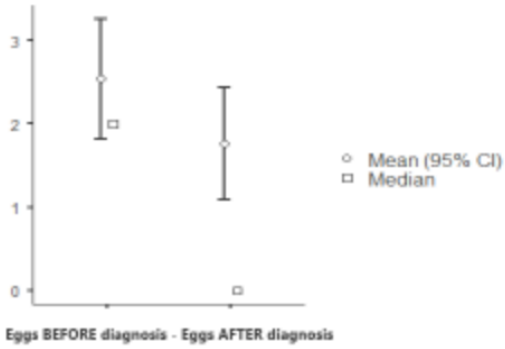
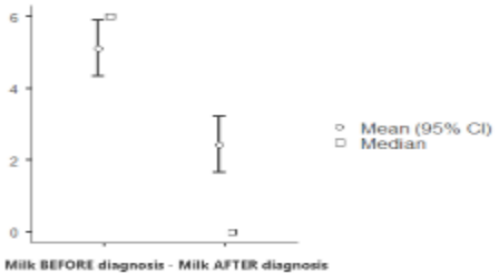
Starchy	14 (6-14)	14 (7-21)	55 (64.71%)	21 (24.7%)	9 (10.59%)	-4.00	-7.000	-0.500	0.020
Ready meals	0 (0-2)	0 (0-0)	62 (72.88%)	4 (4.71%)	19 (22.35%)	4.00	1.500	6.000	0.003

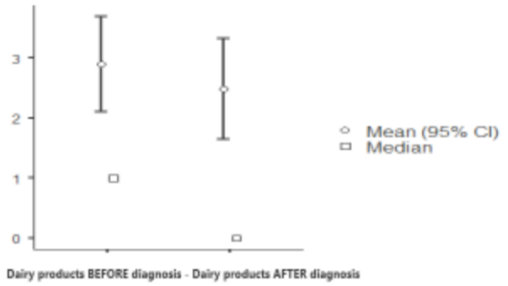
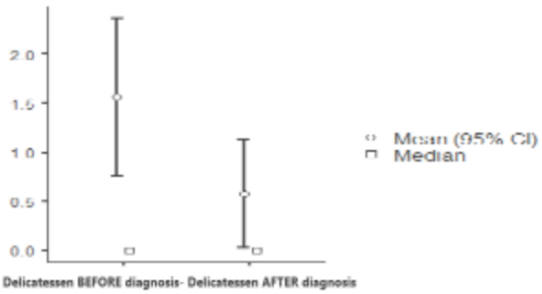
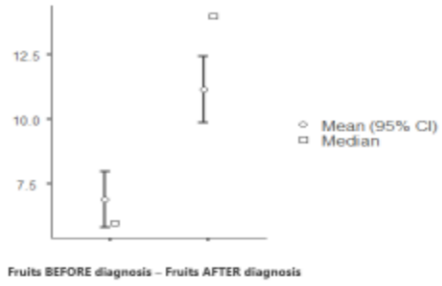
*expressed as the median and quartiles; ° expressed in the counts (percentage)

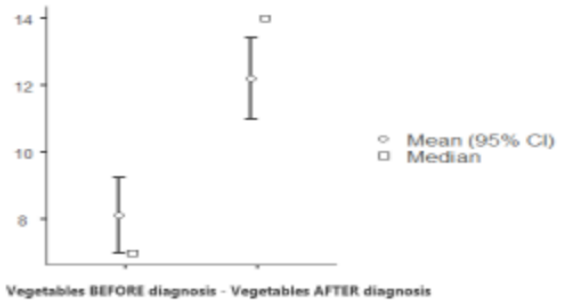
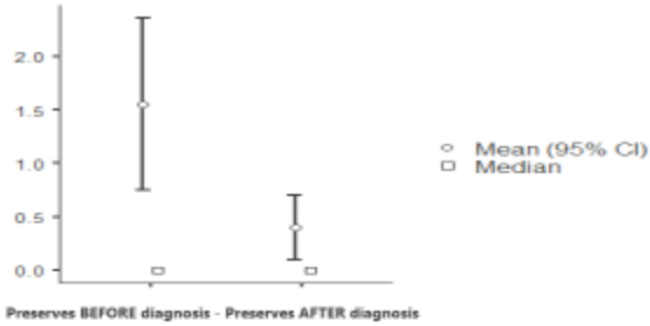
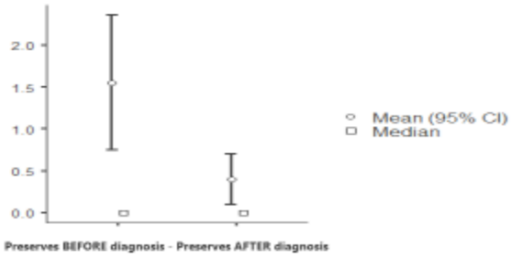
Table 4: the number of dishes consumed per day before and after the diagnosis with the average change.

Following the diagnosis, there has been an increase in healthy food consumption and a decrease in foods high in sugar, fat, and calories. Analyzing the obtained results shows that 62.35% of patients reduced their consumption of red meat with a p-value < 0.001, and 52.94% of patients reduced their poultry consumption with a p-value < 0.001. Furthermore, there has been an increase in fruit consumption in 57.65% of patients, an increase in vegetable consumption in 52.94% of patients, and fish consumption in 47.06% with a p-value < 0.001. The following Table 5 shows the histograms of all types of food consumed, statistically objectifying the different changes: increase, stability, or decrease.

Different types of food	Plots	p-value
Red meat	 Mean(95%CI) Médian Red meat BEFORE diagnosis- Red meat AFTER diagnosis	**<.001**
Chicken	 Mean(95%CI) Médian Chicken BEFORE diagnosis- Chicken AFTER diagnosis	**<.001**

Fish	Mean(95%CI) Médian  Fish BEFORE diagnosis- Fish AFTER diagnosis	**<.001**
Eggs	Mean(95%CI) Médian  Eggs BEFORE diagnosis- Eggs AFTER diagnosis	**0.011**
Milk	Mean(95%CI) Médian  Milk BEFORE diagnosis- Milk AFTER diagnosis	**<.001**

Dairy products	 □Mean(95%CI) □ Médian Dairy products BEFORE diagnosis-Dairy products AFTER diagnosis	**0.077**
Delicatessen	 □Mean(95%CI) □ Médian Delicatessen BEFORE diagnosis-Delicatessen AFTER diagnosis	**0.001**
Fruits	 □Mean(95%CI) □ Médian Fruits BEFORE diagnosis-Fruits AFTER diagnosis	**<.001**

Vegetable	 Mean(95%CI) Médian Vegetables BEFORE diagnosis-Vegetable AFTER diagnosis	**<.001**
Preserves	 Mean(95%CI) Médian Preserves BEFORE diagnosis-Preserves AFTER diagnosis	**<.001**
Sweet products	 Mean(95%CI) Médian Sweet products BEFORE diagnosis-Sweet products AFTER diagnosis	**<.001**

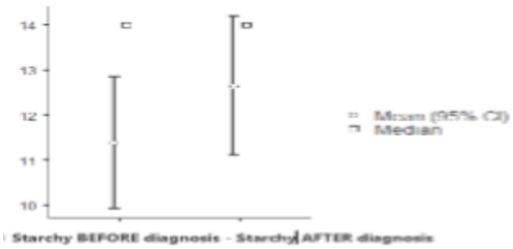
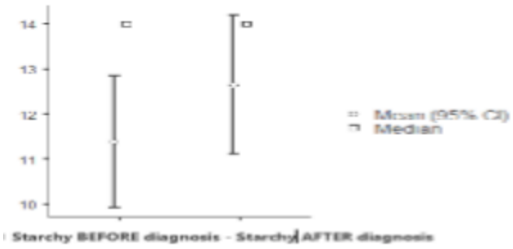
Starchy	 Mean(95%CI) Médian Strachy BEFORE diagnosis-Strachey AFTER diagnosis	**0.02**
Ready meals	 Mean(95%CI) Médian Ready meals BEFORE diagnosis-Ready meals AFTER diagnosis	**0.003**

Table 5: Histograms of dietary changes.

Discussion

This study aims to determine the prevalence of self-proclaimed dietary changes in recently diagnosed cancer patients. Many literature reviews related to this topic [13-16]. DietCompLyf; a cohort of 1560 patients with breast cancer in the United Kingdom, reports that fruit and vegetable consumption as well as that of whole grains and lean protein sources increased drastically after the diagnosis had been established, with a p-value < 0.05 each. In contrast, the consumption of foods rich in sugar and fat, and other foods such as red meat, coffee, certain alcoholic beverages, and refined grains, decreased with a significant p-value at p < 0,05 each [13]. A study published in the USA in 2002 by Cynthia A Thomson and Al [10], aimed to describe the diets of 3084 women treated for early-stage breast cancer with no recurrence. The results were consistent with the numbers obtained from the previous study and with our results. After the diagnosis had been established, the women who had breast cancer mentioned higher consumption of fruits, vegetables, and foods high in fiber (with an increase of 58%, 60%, and 38% respectively), and lower consumption of foods high in fat including fast-foods.

Our study also confirmed that 54.1% of the patients changed their diet after the diagnosis, mainly due to the wrong information given by the patients themselves, which leaves the question of nutritional advice in the management of cancer patients in the early days of diagnosis. Inappropriately, 25.9% of the patients received nutritional information about the type of diet to be followed: enteral, parenteral, or per os and the amount (in Kcal/d) to face the risks of undernutrition. The following Table 5 shows the results of univariate and multivariate logistic binomial regression analysis to identify other factors involved in dietary change in patients at diagnosis:

Covariable	Univariate analysis		Multivariate analysis	
	OR (95% CI)	**P Value**	**OR (95% CI)**	**P Value**
Age	1.015 (0.984-1.05)	0.345		
Levels of education				
Low	Ref	0.75		
High	1.157 (0.471-2.84)			
Socio-economic level				
Low	Ref	**0.211**	0.725 (0.230-2.284)	0.583
Average	0.566 (0.232-1.38)			
Do you think your diet was the source of your illness?				
Yes	Ref	**0.009**	12.210 (1.258-118.46)	0.03
No	16.18 (2.015-129.98)			
Have you received nutritional information?				
No	Ref	**0.001**	0.050 (0.005-0.472)	**0.009**
Yes	0.031 (0.003-0.248)			
Site				
Colorectal	0.545 (0.226-1.32)	**0.178**	0.624 (0.195-1.996)	0.427
Gynecologic	1.833 (0.759-4.43)			
Metastasis				
Yes	Ref	**0.089**	3.87 (1.007-14.939)	**0.04**
No	2.679 (0.859-8.35)			
Treatment received				

Medical	Ref			
Surgical	9.00 (1.727-46.90)	**0.009**	4.581 (0.619-33.870)	0.136
Combined	6.175 (1.227-31.069)	**0.027**	2.950 (0.401-21.682)	0.288
Therapeutic strategies				
Palliative	Ref	0.527		
Curative	1.762 (0.305- 10.18)			

*p-value <0.3 for the multivariate analysis.

Table 6: The results of univariate and multivariate analysis.

After the analysis of the results obtained and adjusting for other factors, it was found that the presence of metastasis, the location of cancer, the non-receipt of nutritional information, and the incrimination of the diet in the occurrence of the disease were statistically significant in the change of habits at the time of diagnosis, with p-values (0.04, 0.009 and 0.03) respectively. On the other hand, in our current practice, this phenomenon is often observed in patients with a low level of induction or belonging to a low economic class, which determines a particular entity of the patient, requiring additional efforts in their management. The secondary aim of this study is to promote health and to consider establishing a diagnosis as a crucial step in learning to change the attitude and behavior toward health.

Elizabeth Maunsell and al, noted in their study of 250 women who had nonmetastatic breast cancer that was diagnosed anew, that the lessening in psychological distress, in 0 to 12 months on average, was more important in women who reported changes (9 points) than in women who didn't report any change (4,7 points) (P= 0,03), though the decrease towards the average value cannot be excluded [15,16]. To face these damaging changes, a proposition was made in Slovenia, that was part of the global plan for cancer management, and that relies on primary healthcare facilities and general practitioners, also known as family doctors, while also coordinating with dietitians who are the best equipped for the followup and monitoring of the nutritional state of cancer patients, at their homes, before and after the treatment. This allows the patients to have traceable and optimal nutritional support, which in turn will have a positive impact on their quality of life. Notably, in our current Moroccan context, we will promote the activation of the national plan for the prevention and control of cancer, which will allow us at the institutional level, to establish a system of multimodal care for newly diagnosed cancer patients, including paramedical or medical interveners of primary health, dietician, nutritionist, psychologist, in collaboration with medical and surgical oncologists, to ensure a global therapeutic scheme personalized to the patient and taking into account his socio-economic limits, with monthly monitoring visits not only of the oncological status but also of the nutritional and psychological status, to improve the quality of care obtained which will have a positive effect on the quality of life.

Our research is the first in Low and Low Middle-Income Countries, done in a public institution, that aspires to determine the self-proclaimed changes by cancer patients after their diagnosis while correlating them to nutritional tips from healthcare professionals during all stages of patient care. However, there are still many limitations of this study, mainly the data regarding detailed food consumption in calories. Furthermore, more detailed studies are required to determine the real changes in eating habits and other life habits of cancer patients, after their diagnosis has been established, in a way that suits the way of life of patients in developing countries.

Conclusion

Our study opens the perspective of implementing a personalized oncological and nutritional care protocol for newly diagnosed patients provided by qualified health workers initiated in tertiary health structures and completed in primary health centers to ensure a close and complementary follow-up.

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