

Full Length Research Paper

Patient feeding experience during cancer chemotherapy in Ouagadougou

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This study describes the influence of chemotherapy on patients' eating habits in the context of resource-limited countries. This is a descriptive and analytical cross-sectional study of patients who have been prescribed chemotherapy and followed throughout this treatment at the Yalgado Ouedraogo University Hospital. We collected data on the initial eating habits and dietary coping strategies during chemotherapy during medical oncology consultations. One hundred and two patients were collected, aged 49.19 years on average. We compared the food consumption and dietary diversity scores before and during chemotherapy, the usual diet of our patients is local cereals and tubers accompanied by vegetables and animal proteins. During chemotherapy, 81.4% of patients experienced both quantitative and qualitative taste and olfactory changes. The mean food consumption score was 58.5 before and 57.5 during chemotherapy ($p = 0.005$). The mean dietary diversity score during chemotherapy is 5.27 versus 4.9 before chemotherapy ($p < 0.0001$). During chemotherapy, 50 patients had fewer meals, and 20 had increased their dietary intake. Making nutritionists and dieticians available to cancer patients would improve their food experience during chemotherapy.

Key words: Cancer, nutrition, chemotherapy, diet.

INTRODUCTION

Patient, during chemotherapy, is faced with the challenge of maintaining nutritional status while keeping the pleasure of eating (Bolton and Keast, 2012). Indeed, chemotherapy, or/and cancer, modifies sensory perceptions (taste, smell) either by altering them or by exacerbating them, which leads to a reduction in the pleasure of eating and, consequently, to reduced food

intake (Drareni et al., 2021). It can therefore influence eating habits. Eating habits can be defined as an eating routine, that is, a recurring choice that a person, or a group of people, make about what foods they eat, how often they eat, and how much they eat each time (McCarthy et al., 2017). It is a complex parameter to measure methodologically, as well as its variation over

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time and under certain circumstances (De Houwer, 2019). Several scores have been established to categorize the food consumption of households and individuals.

The World Food Program developed The Food Consumption Score to make the correlation between food diversity, food frequency, and food security which we used to describe patients' eating habits.

Burkina Faso is a very rural Sahelian country whose agriculture and livestock are the main economic activities, with very few natural resources. Cereals (sorghum, millet, maize, rice) which annually occupy more than 88% of the area sown (Herrera and Ilboudo, 2012), are mainly the basis of Burkina's agriculture.

The food system needs to be more diversified to ensure food security, nutrition, and the health of the population of Burkina Faso. Food insecurity is worsening in the northern part of the country due to the deteriorating security situation in the sub-region and the restrictive measures taken at the start of the Covid-19 crisis (Dugué et al., 2021).

Burkina Faso has a sizeable social protection deficit characterized by the low capacity of individuals and households to cope with the consequences of unforeseen events (illness, loss of employment, natural disaster, etc.) (Kadio et al., 2017). For example, residents bear 40% of total health costs when visiting health centers (Ridde et al., 2021). Cancer is a public health problem in this context.

The indigence of the populations and limited medical and technical resources further affect the prognosis of the disease.

Patients are often in psychological distress because they become aware of their vulnerability to their disease and extreme poverty to cope with it (Odland et al., 2021). Cancer is a public health problem because of its increasing incidence, aggravated by the frequent delay in diagnosis. Chemotherapy, therefore, occupies a relatively important place in the therapeutic arsenal. The side effects of this treatment are frequent due to a lack of prevention and proper management and impact the nutritional status of patients. To cope, they adopt coping strategies that lead to new eating habits and food experiences that become a more or less visible stigma of their experience of the disease.

As a result of the progressive medicalization of diet (Gaspar et al., 2021), especially in the field of cancer, the attention of doctors, dieticians, nutritionists, and patients has focused on the patient's eating experience during chemotherapy; the objective being to preserve the nutritional status of patients as well as the hedonic dimension of the diet. However, few studies have examined this in the context of countries with limited resources. In order to contribute to better management of patients undergoing chemotherapy, we conducted this study to highlight the influence of this treatment on patients' eating habits in our context.

MATERIALS AND METHODS

Type and population of the study

This study is a cross-sectional study with descriptive and analytical aims concerning all patients followed in the cancer department of the Yalgado Ouédraogo University Hospital (CHUYO) for confirmed cancer and benefiting from chemotherapy. Included were patients who were prescribed chemotherapy and followed throughout this treatment.

Sampling

A convenience sample included consecutive patients received in medical oncology outpatients at CHUYO from July 15 to September 15, 2021.

Method of data collection

Data for each patient included in the study was collected thanks to a standardized questionnaire. Patients were interviewed during outpatient visits as part of follow-up for their chemotherapy. The data was collected in a fitting room in complete privacy and confidentiality. Variables collected included: socio-demographic characteristics of patients, socioeconomic score, cancer data (tumor locations, stage of extension, treatment received, chemotherapy protocols administered), the initial eating habits of patients, the food consumption score (FCS) (Wiesmann et al., 2009) and the Dietary Diversity score (Ty et al., 2016) before starting chemotherapy and during chemotherapy. The main chemo-induced toxicities were collected from the patient's medical records. The assessment of taste and smell disorders was done subjectively, based on a questionnaire (Herrera and Ilboudo, 2012). The eating behavior of patients during chemotherapy was collected (dietary intakes, food evictions, new dietary preferences).

Data analysis

Excel and Epidata were used for data collection and statistical analysis using EPI info and Stata 11.0 software. The quantitative variables were described by means, standard deviation, and confidence intervals. Qualitative variables, on the other hand, have been described by proportions. The construction of socioeconomic score was based on the possession of the movable and immovable property. The methodology used for constructing the economic level of households was that used in demographic and health surveys, or DHS 18 (Demographic and Health Survey wealth index) (Bellows et al., 2020). The food consumption score (FCS), weighted by the frequency of consumption, was calculated based on the frequency of consumption of the different food groups consumed by a patient during the seven days preceding the interview.

With A = 2, B = 1, C = 3, D = 1, E = 4, G = 4, H = 0.5, and I = 0.5, the nutritional values of the food groups "cereals and tubers," "vegetables," "dried vegetables," "fruits," "animal proteins," "dairy products," "sugars" and "oils," respectively, and Fi, the frequency of consumption of each group during the seven days preceding the interview. The interpretation of the FCS score was as follows, a poor score (< 21), a limit score (21.5 - 35), and an acceptable score (> 35). The Food Diversity Score was calculated based on the number of food groups consumed in the previous seven days (Ty et al., 2016). The mean of these pre-chemotherapy scores was compared to those calculated during chemotherapy by the Student test for paired series. A significance threshold of 0.05 was used for this analysis.

Table 1. Patients' characteristics.

Features	Number	Percentage
Gender		
Feminine	76	74.5
Masculine	26	25.5
Profession		
Unemployed	37	36.3
Civil servant	23	22.5
Shopkeepers	14	13.7
Farmers	12	11.8
Retirees	11	10.8
Students	5	4.9
Socioeconomic status		
Low	34	33.3
Average	33	32.4
Elevated	35	34.3
Area of residency		
Urban	78	76.5
Rural	24	23.5
Tumor localization		
Breast	56	54.9
Digestive tract	19	18.6
Lung	6	5.9
Head and neck	5	4.9
Extremities	5	4.9
Other	11	10.8
Tumor extension		
Local	8	7.8
Locoregional	83	81.3
Metastatic	11	10.9

Source: Author

RESULTS

On average, 102 patients were collected, aged 49.19 years, with extremes of 15 and 84 years. The female sex accounted for 74.5%, a sex ratio of 0.34. Three-quarters (76.5%) of patients resided in urban areas. Professionally, 36.3% of patients were unemployed, 22.5% were public or private sector employees, 13.7% were traders, and 11.8% were farmers. Their socioeconomic level was high in 34.3% of cases, medium and low, respectively in 32.4 and 33.3% of cases (Table 1).

Pre-chemotherapy eating habits

Ninety-two patients, 90.2%, took three meals a day

regularly and 98.03% had no specific feeding schedule every week.

Patients usually eat local cereals and tubers with various vegetable-based sauces and animal protein. In 33.3% of cases, they consumed industrial or artisanal alcoholic beverages (cereal beers, palm wine) and non-alcoholic beverages made from local products (ginger, hibiscus, monkey bread) in 38.2% cases. Table 2 presents the foods patients consume, with their average weekly consumption frequency for each food group. The average food consumption score was 58.5 before chemotherapy, with extremes of 27 and 67.5. Four patients had a "limit" food consumption score, and 98 patients had an "acceptable" food consumption score. One patient had a dietary diversity score of 3, three patients had a score of 4, and 98 patients had a score of 5.

Table 2. Patient pre-chemotherapy eating habits.

Food group	Number of consumers	Average frequency of use (days)
Cereals and tubers (n=102)		
Tô (corn flour paste)	99 (97.1)	
Rice	93 (91.2)	
Pasta (wheat)	49 (48.0)	
Bread (wheat)	69 (67.7)	6.96
Couscous (wheat)	19 (18.6)	
Attiéké (cassava)	19 (18.6)	
Legumes (n=102)		
Beans	49 (48.0)	
Peanut	100 (98.0)	2.44
Vegetable		
Vegetables	90 (88.2)	
Okra	86 (84.3)	
Baobab leaves	83 (81.4)	
Sorrel	79 (77.5)	
Greens *	60 (58.8)	6.98
Corète leaves	56 (54.9)	
Kapok	37 (36.3)	
Tomatoes	36 (35.3)	
Spinach	16 (15.7)	
Animal protein (n=102)		
Fish, meat	98 (96.1)	6.45
Sugar and sweet products		
Sweet juices, sweets	98 (96.1)	1.98
Oils and fats		
Cooking oil, butter	100 (98.0)	7
Milk and milk products		
Fruits	0 (0.0)	0
	0 (0.0)	0
*Mixed leaves or greens		

Source: Author

Indications for chemotherapy

Breast cancer was the most represented (54.6%) in our sample, followed by cancers of the digestive tract (18.6%), gynecological cancers (5.6%), and lung cancers (5.6%).

Other cancer locations accounted for 15.6% of cases. Eighty-one percent of these cancers were at the locoregional stage, 10.9% were at the metastatic stage, and 8% were at the localized stage. Doxorubicin-Cyclophosphamide and Paclitaxel were the most administered (50%), followed by capecitabine-oxaliplatin (10.8%).

Chemo-induced toxicities

During chemotherapy, 83 patients (81.4%) had quantitative and qualitative taste changes, and 48 (47.1%) had olfactory changes, such as quantitative dysosmia, associated with qualitative dysosmia in 35 patients. Other chemo-induced toxicities were dominated by nausea-vomiting, anorexia, and diarrhea (Table 3).

Food adaptation strategies

Patients reported adopting new eating habits to cope with the side effects of chemotherapy. Forty-eight patients

Table 3. Adverse effects of chemotherapy.

Side effects	Number	Percentage
Taste alteration (n = 83)		
Global hypogeusia	76	91.6
Selective hypogeusia	7	
Heterogeusia	59	73.8
Phantogesia	12	15.0
Cacoguesia	9	11.3
Impaired sense of smell (n = 48)		
Global hyposmia	40	83.3
Anosmia	3	6.3
Selective sensitivity		
Elective hyposmia	2	83.3
Parosmia	20	57.1
phantosmia	9	25.7
Digestive toxicities (n = 86)		
Vomiting	48	47.1
Nausea	47	46.1
Anorexia	26	25.5
Diarrhea	24	23.5
Constipation	10	9.8
Abdominal pain	10	9.8
Hypersialorrhea	6	5.8
Mucositis	2	2.0
Xerostomia	1	0.9
Asthenia	31	30.4

Source: Author

removed food or beverages from their diet. Alcoholic beverages were the most suppressed (22.9%), followed by cereals (18.8%). Twenty-two patients added food, condiments, or beverages to their diet. Spices accounted for 59.1% of these cases, and fruit juices for 13.6% (Table 4).

Fifty-two patients reported having unusual pleasure with certain foods during chemotherapy. These were maize flour paste (tô), accompanied by leaf-based sauces (40.4%), salad vegetables (19.2%), cereal porridge (17.3%), fruit and fruit juices (11.5%), and animal proteins (7.7%). Thirty-one patients had developed an aversion to certain foods. These were cereals (35.5%), vegetables and fruit (22.6%), animal protein (19.4%), dairy products (12.9%), sugar (9.7%), legumes (6.5%), tubers (6.5%) and alcoholic beverages (6.5%).

The average food consumption score was 57.5 during chemotherapy, with extremes of 27 and 67.5. This average is significantly lower than the food intake score before chemotherapy started (58.5 versus 57.5; $p = 0.005$). The mean dietary diversity score during chemotherapy is 5.27, with extremes of 4 and 6. This average is significantly higher than that before

chemotherapy (5.3 versus 4.9; $p < 0.0000$) (Table 5).

In terms of dietary intake, 50 patients (49%) had quantitatively fewer meals, 32 patients (31.4%) had an unchanged diet in quantity, and 20 patients (19.6%) increased their dietary intakes. Qualitatively, 96 patients (94.1%) had a diet of unchanged consistency, four patients (3.9%) had weak meals, and two patients (1.9%) had only liquid meals.

DISCUSSION

This study showed the influence of chemotherapy on patients' diet at CHU Yalgado Ouédraogo. Our sample consisted of patients who shared the same socio-demographic characteristics as the general population of Burkina Faso. We had a clear female predominance. This female predominance in our series is due to the high prevalence of breast and cervical cancers in Burkina Faso (Bray et al., 2018). Breast cancer is first cancer in Burkina Faso and the first reason for consultation in medical oncology at CHUYO. Due to the advanced stages of diagnosis, chemotherapy is often given for

Table 4. Chemotherapy-related dietary adaptation.

Eating habits	Staff	Percentage
Suppressed food/beverages (n = 48)		
Alcoholic beverages	11	22.9
Cereal	9	18.8
Vegetables	8	16.7
Animal proteins	5	10.4
Legumes	5	10.4
Tubers	3	6.3
Dairy products	3	6.3
Sweets	3	6.3
Spices	1	2.1
Favored food/beverages (n = 22)		
Spices	13	59.1
Fruits	3	13.6
Porridge	2	9.1
Vegetables	2	9.1
Bread	1	4.6
Fish	1	4.6

Source: Author

Table 5. Food consumption score and dietary diversity score before and during chemotherapy.

Score	Parameter	Before chemotherapy	During chemotherapy	Value p
SCA	Average	58.5	57.5	0.005
	Standard deviation	7.0	7.5	
	IC95%	[57.1; 59.9]	[56.0, 59.0]	
SDA	Average	4.9	5.3	< 0.0001
	Standard deviation	0.3	0.6	
	IC95%	[4.9; 5.0]	[5.1, 5.4]	

SCA: Food Consumption Score. SDA: Food Diversity Score. 95% IC95: 95% confidence interval.

Source: Author

neoadjuvant or palliative purposes. The combination Doxorubicin-Cyclophosphamide and weekly Paclitaxel in monotherapy were the most used protocols in our series. The prevalence of breast cancer in our sample explains the high frequency of these associations. These chemotherapy protocols have become standards in the management of breast cancer. The same is true of Capecitabine-Oxaliplatin in digestive cancers, the second most common in our study.

The diet of patients before the onset of the disease was dominated by local cereals, in line with household eating habits in Burkina Faso. These patients face food insecurity linked to the global context of countries with limited resources, characterized by poor populations, low educational attainment, and a lack of universal health coverage (Millogo et al., 2020). In our study, we calculated scores usually used by the Food and Agriculture Organization of the United Nations (commonly

known as FAO for the Food and Agriculture Organization). These scores were established to study household food access, but we found them relevant to describe the eating habits of the individuals in our study. The food consumption score of almost all patients was acceptable, while the food diversity score showed that they consumed about five food groups per week out of the nine groups considered in the calculation of these scores. However, these scores reflect a week's consumption and do not consider seasonal variations in eating habits. Indeed, our study took place at a time of the year known as the "lean period." It represents the period between the end of last year's crop consumption and the arrival of new crops (Thiombiano et al., 2012). Households are then faced with food restrictions in quantity and quality, as evidenced by the absence of fruits and dairy products in the diet of patients during our study.

Cancer chemotherapy was the cause of many side

effects in our study. We have identified a broad spectrum of quantitative and qualitative taste and smell disorders. Hypogeusia was the most common disorder, often associated with a qualitative taste alteration such as heteroguesia. Their high frequency is consistent with literature evidence that taste disorders occur in more than two-thirds of patients during chemotherapy (Welge-Lüssen et al., 2011; Nolden et al., 2019; Pugnali et al., 2020). Other chemotherapy toxicities were dominated by nausea, vomiting, and asthenia, impacting the patient's quality of life.

Chemotherapy significantly influenced the eating habits of patients in our study. Indeed, the food consumption score has significantly decreased since the start of this treatment. Although this decrease is only 1 point, it is statistically significant, indicating a decrease in the diet's nutritional value. Food evictions are the leading cause. For some patients, these evictions concerned cereals, vegetables, legumes, and animal proteins, which constitute the basis of the population's diet in our context. These evictions are related to several factors. First, taste and smell disorders can be global or selective, reducing the pleasure of eating [2]. They are associated with lower dietary intakes (Nolden et al., 2019; Pugnali et al., 2020) and affect patients' quality of life (Ponticelli et al., 2017). Secondly, nausea and vomiting are significant adverse effects of chemotherapy. They are responsible for weight loss, malnutrition, and various disorders, such as hydro electrolytic disorders (Jovenin et al., 2019). They can cause a spontaneous quantitative or qualitative dietary restriction or on hygienic and dietary advice provided by the health care staff. Third, other digestive toxicities (anorexia, diarrhea, constipation, abdominal pain) can motivate the eviction of foods that promote them. Finally, other factors, such as psychological distress and sociocultural context, may contribute to this (Fontas et al., 2014), but these factors still need to be addressed in this study.

Cancer chemotherapy alters the ability to detect flavors, odors, and aromas and affects the eating behavior of patients (Postma et al., 2020). For example, hyposmic patients tend to add condiments to their dishes to make them taste good (Fontas et al., 2014). Strategies for dietary adaptations correspond to all the means used by patients, and their families, in some cases, to feed themselves following cancer diagnosis and chemotherapy administration (Fontas, 2017). These include both the choice of food and how it is prepared. Patients will seek either an enrichment of their meal (preference for healthy nutritional meals such as fruits and vegetables) or easily ingested foods or forms of meals (liquid or semi-liquid foods).

On the other hand, some foods, once prized, can be the cause of aversion either because of the gastrointestinal disorders they cause (nausea, vomiting, diarrhea) or by psychogenic mechanism (for example, foods consumed during a chemotherapy session) and finally, sensory disturbances related to chemotherapy

(Fontas et al., 2014). In our study, almost a third of patients developed aversions to foods that formed the basis of their usual diet (cereals, vegetables, animal proteins). This further complicates their food adaptation by needing alternative foods with equivalent nutritional value.

Due to the lack of nutritionists and dieticians at CHUYO, cancer patients, especially those undergoing chemotherapy, do not receive specific assistance to preserve an effective and pleasant diet. Their food experience is, therefore, painful, making chemotherapy repulsive.

Conclusion

Cancer chemotherapy is responsible for many side effects that affect patients' quality of life. We conducted a descriptive and analytical study of 102 patients treated with chemotherapy in the Cancer Department of Yalgado Ouédraogo Hospital. Their eating habits before and during chemotherapy were analyzed. This diet loses in nutritional power but gains in diversity. Patient coping strategies are empirically based without professional assistance, making chemotherapy a nutritionally painful experience. The mean food consumption score was 58.5 before and 57.5 during chemotherapy ($p = 0.005$). The mean dietary diversity score during chemotherapy is 5.27 versus 4.9 before chemotherapy ($p < 0.0001$). During chemotherapy, 50 patients had fewer meals, and 20 had increased their dietary intake.

Hence, there is need to make available to cancer patients competent and accessible nutritionists and dieticians throughout their care journey.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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