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Original article

Malnutrition in patients with breast cancer during treatments (Algeria, 2016)

Dénutrition chez des patientes atteintes de cancer du sein en cours de traitements (Algérie, 2016)

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Abstract

Objective. – The aim of this study was to estimate the prevalence of malnutrition in Algerian patients with breast cancer during their treatments at an Anti-Cancer Center in Batna (Algeria).
Materiel and methods. – This was a cross-sectional, descriptive survey carried out during 7 months with patients with breast cancer during their treatments, regardless of the disease stage. The evaluation of their nutritional status was carried out according to three approaches: Nutrition Risk Index (NRI) or Buzby Index; objective assessment of nutritional status; Patients Generated-Subjective Global Assessment (PG-SGA).
Results. – One hundred and sixty-seven patients were included. One of two patients had a total first treatment access period ranging from five months to more than three years from the date of onset of the first symptom seen. More than four of five patients had cancer at invasive (presence of nodules) or metastatic stage. In our study, the NRI allowed to estimate to 53% the prevalence of severe or moderate malnutrition against 63.5% according to the objective method of evaluation. According to the PG-SGA score, 77.2% of the patients were at high risk of malnutrition and 97% needed interventions and/or nutritional recommendations.
Conclusion. – The high prevalence of malnutrition was, in part, due to the fact that patients presented to treatment at locally advanced or metastatic stages. In order of early detection of situations at risk of malnutrition, the assessment of nutritional status should be an integral part of the overall taken care of patients with breast cancer.

Keywords: Breast cancer; Malnutrition; NRI; PG-SG; Algeria

Résumé

Objectif. – L'objectif de cette étude était d'estimer la prévalence de la dénutrition chez des algériennes atteintes de cancer du sein durant leurs traitements dans un Centre Anti-Cancer de Batna (Algérie).
Matériel et méthodes. – Il s'agissait d'une enquête transversale à visée descriptive réalisée durant 7 mois auprès de femmes atteintes de cancer du sein durant leurs traitements. L'évaluation de leur état nutritionnel a été réalisée selon trois approches : Nutrition Risk Index (NRI) ; évaluation objective de l'état nutritionnel ; Patients Generated-Subjective Global Assessment (PG-SGA).

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Résultats. – Cent-soixante-sept patientes ont été inclues. Une patiente sur deux avait un délai total d'accès aux premiers traitements allant de quatre mois à plus de trois ans à partir de la date de survenue des premiers signes. Plus de quatre patientes sur cinq avaient un cancer au stade invasif ou au stade métastatique. Dans notre étude, le calcul du NRI a permis d'estimer à 53 % la prévalence de dénutrition sévère ou modérée contre 63,5 % selon la méthode d'évaluation objective. Selon le score PG-SGA, 77,2 % des patientes étaient à haut risque de dénutrition et 97 % avaient besoin d'interventions et ou de recommandations nutritionnelles.
Conclusion. – La prévalence élevée de dénutrition était certainement, en partie, due au fait que les patientes se présentaient aux traitements à des stades localement avancé ou métastatique. Dans le but de dépister précocement les situations à risque de dénutrition l'évaluation de l'état nutritionnel devrait faire partie intégrante de la prise en charge globale des patientes atteintes de cancer du sein.

Mots clés : Cancer du sein ; Dénutrition ; NRI ; PG-SGA ; Algérie

1. Abbreviations

TD	total delay
FTD	first treatment delay
DD	diagnostic delay
CAC	anti cancer center

2. Introduction

In 2015, the number of cancer cases worldwide was estimated at 17.5 million cases [1]. According to projections, the number of cancer cases per year is expected to reach 22 million in 2030 [2]. Cancer was the second leading cause of death in the world, with 8.7 million deaths in 2015 [1].

In Algeria, a country with epidemiological, demographic and nutritional transitions, the incidence of cancer is increased. In 2014, the standardized rate incidence of cancer was 118.4 males and 136 women [3].

For women, in the world in 2015, breast cancer was the most common cancer overall. It represented 29% (2.4 million incident cases) of all cancer localizations. It was the deadliest: 14.3% of all cancer deaths (523,000 deaths) [1].

In Europe, breast cancer was the most common with more than 464,000 cases diagnosed in 2012 (29% of total female cancers and 13% of all sexes combined) [4]. The highest standardized incidences were observed in the North of France (Lille) with 115.4 cases per 100,000 women and in Belgium with 109.1 cases per 100,000 women. Conversely, the lowest standardized incidences were observed in Russian Federation (Arkhangelsk) with 39.3 cases per 100,000 women and in Poland (Podkarpackie) with 41.2 per 100,000 women [5].

In Algeria in 2014, breast cancer was the first cancer of women with 59% of all female cancers. The standardized incidence rate of breast cancer was 65.2 per 100,000 women [3].

To face this situation, Algeria has adopted a first national plan to tackle cancer for the period 2015–2019. One of its strategic objective was "to enable the cancer patient, who was undergoing a difficult way, to be taken care, investigated, treated and followed up as soon as possible" [6].

Cancer treatment, especially breast cancer, included chemotherapy, surgery and radiotherapy [7]. The cancer itself and its treatment had negative effects on the nutritional status of the patient. These effects are partly caused by metabolic changes and by reduced food intake [8,9]. Cancer treatments could damage normal tissues and produce symptoms such as diarrhea, nausea, vomiting, impaired taste and smell, or anorexia. The resulting risk was the onset of malnutrition [7,10]. These symptoms and associated malnutrition are often ignored during the treatment and follow up of cancer patients [11–14].

The prevalence of malnutrition is a function of tumor localization and its extension. It ranged from 36% for breast cancer to more than 80% for stomach or pancreas cancers [15]. At advanced stages of cancer, weight loss (60% of cases > 10%), anorexia (64%), fatigue (67%) and asthenia (64%) affect the majority of patients regardless of tumor localization. The difference in the incidence and severity of weight loss may reflect differences in the natural history of different tumors [16]. In Algeria, 40% of patients with breast cancer consulted at a locally advanced or metastatic stage [6].

Malnutrition is assessed by a set of indicators including weight loss greater than or equal to 10% of the usual body weight for 6 months, greater than or equal to 5% of the usual body weight in a single month. In addition to the chronicity of the disease, this loss is explained by increased metabolic requirements and inadequate nutrition resulting from impaired ability to ingest or absorb food [17].

In Algeria, the assessment of the nutritional status, particularly malnutrition, in patients with breast cancer and undergoing treatment was not systematic. No objective information was available on the incidence and frequency of malnutrition and its risk factors.

Our aim was to estimate the prevalence of malnutrition in patients with breast cancer during treatment and to investigate the importance of the effects affecting malnutrition.

3. Material and methods

3.1. Study population

This study included women with breast cancer, regardless of the disease stage, intake care (chemotherapy and/or radiotherapy) at the medical oncology and radiotherapy department of the Anti Cancer Center (CAC) of the city of Batna (Algeria)

during the period from August 2015 to February 2016. These patients were aged from 25 to 65 years.

We excluded from the target population patients who could not be interviewed for various reasons: end of life, transmissible disease, impaired health status, deaf person and voiceless.

3.2. Methods and data collected

This was a cross-sectional descriptive survey. A questionnaire was filled using informations collected from interview and medical records. The study was conducted according to the Declaration of Helsinki (1964). The interview is done face-to-face. In order to obtain the informed consent of each patient, it has begun with a presentation of the interest, purpose and conduct of the investigation. Informed consent was obtained from all individual participants included in the study.

The questionnaire is subdivided in three parts, each one with several items:

- identification of patient and disease;
- objective assessment of the nutritional status of the patient;
- subjective assessment of the nutritional status of the patient.

This questionnaire was tested and validated during a survey initiated in 2014 (101 patients at the Anti-Cancer Center of Constantine city). It allowed us to test the feasibility of approaches to calculating the prevalence of malnutrition.

3.2.1. Patient identification and disease

The identification of the patient included age and marital status. The disease is characterized by stage, type of treatment, date of onset, nature of first signs, date of diagnosis and first treatment.

3.2.2. Nutritional Risk Index (NRI) or Buzby Index

The NRI is calculated using the following formula [18]:

$$NRI = 1.519 \times \text{albuminemia (g/L)} + 0.417 \times (\text{current weight/usual weight}) \times 100.$$

3.2.3. Objective assessment of nutritional status

We adopted the method described by Chambrier and Sztark (2011) [19]. The objective evaluation of the nutritional status of the patient included:

- the BMI (kg/m^2) calculated by the ratio between the current weight (kg) and the square of the height (meters);
- the percentage of weight loss calculated as follows: [(Current weight (kg)−usual weight (kg))/usual weight] × 100
- albuminemia (g/L).

3.2.4. Determination of anthropometric data

The current weight and height of the patients were measured by a single interviewer trained in accordance with WHO guidelines [20]. The scale (Seca TM 780) had a range of 200 kg and an accuracy of 100 g and the height (Seca TM 220) a measuring range of 60 to 200 cm, graduated in millimeters.

The usual weight and weight before 6 months were recorded as reported by the patient.

3.2.5. Determination of albuminemia

The serum albumin was tested by spectrophotometry. The albumin reacted with bromocresol green in acid medium (BioSystems, code: 11547 and 11573) to give a complex quantifiable by spectrophotometer (Mindray: Semi-auto Chemistry Analyzer, Model: BA-88A) [21,22]. The samples of blood were carried out by the nurses of the medical oncology department.

3.2.6. Patients Generated Subjective Global Assessment (PG-SGA)

We used the Patients Generated Subjective Global Assessment (PG-SGA). The PG-SGA was a tool for assessing nutritional status specifically developed for cancer patients [11,21,23]. It proposed 7 items: weight, food intake, symptoms, functional capacity, disease statement, metabolic stress and physical examination [21,22].

Regarding the item "Weight", it was scored from 0 to 4 points depending on the degree of weight loss during the last 6 months. An additional point was added if the patient lost weight in the last two weeks.

The item "Feeding" is scored from 0 to 4 points.

The item "Symptoms" included a list of 10 symptoms (funny taste or no taste, no appetite, nausea, vomiting, bother smells, diarrhea, mouth sores, constipation, stomach or abdominal pain and dry mouth) having a negative impact on the nutritional status of the patient. These symptoms might result from the tumor itself and/or any side effects resulting from the treatment leading to reduced food intake and deterioration in nutritional status [24,25].

Each of the symptoms identified was scored from 1 to 3 points depending on the relative impact of these signs on nutritional status [21,22]. According to the score obtained for the item "Symptoms", four severity grades were defined: Severe symptoms (score > 6), moderate symptoms (3 < score ≤6), mild symptoms (0 < score ≤3) and no symptoms for a score of 0 [14].

The item "Functional Capacity" was scored from 0 to 3 depending on the level of activity of the patient during the month preceding the study.

For the item "Disease Status", each of the following characteristics is scored by one point: Cancer, presence of trauma, pulmonary or cardiac cachexia, presence of decubitus, open wound or fistula [21,22].

Concerning the last two items "Metabolic Stress" and "Physical Examination", the survey conducted in 2014 at the Anti-Cancer Center of Constantine city showed that these two items could not be scored (practical difficulties).

The PG-SGA score is a subjective approach. It can be considered at all or in part (PG-SGA Short Form) according to the possibilities of evaluation of the items [12,26].

The PG-SGA Short Form (PG-SGA SF), calculated from the first four items (Weight, Feeding, Clinical Signs, Functional Capacities), reflected approximately 80–90% of the total

PG-SGA score [26]. Our calculated score was a PG-SGA SF score more the fifth item (Disease Status).

3.3. Analysis

3.3.1. Time to access diagnosis and first treatment

Three times of access to diagnosis and first treatment were calculated:

- Total delay (TD) defined by the number in days between the date of first symptom seen and the date of access to first treatment;
- Diagnostic delay (DD) defined by the number in days between the date of the first symptoms seen and the date of access to the diagnosis (result of the positive biopsy);
- the first treatment delay (FTD) defined by the number in days between the date of diagnosis and the date of access to first treatment.

3.3.2. Evaluation of nutritional status

In order to calculate the prevalence of malnutrition, the assessment of nutritional status was carried out according to three approaches.

3.3.2.1. Nutritional Risk Index (NRI) or Buzby Index:. It was a multiparametric index that allows to divide the patients into 3 classes [18]:

- no malnutrition if NRI is greater than 97.5;
- moderate malnutrition if NRI is between 83.5 and 97.5;
- severe malnutrition if NRI is less than 83.5.

3.3.2.2. Objective assessment of nutritional status:. According to Chambrier and Sztark (2011), the presence of only one of the following three criteria was sufficient to define malnutrition:

- Body mass index (BMI) of less than 18.5 kg/m^2;
- weight loss greater than 10%, and;
- albuminemia less than 30 g/L [19].

The classification of the BMI adopted in adults is that of WHO [27–29]. The weight loss is considered severe if it is greater than 10% [19,30]. Based on the values of these three criteria, patients were classified into three categories: no malnutrition, moderate malnutrition, severe malnutrition (Table 1).

3.3.2.3. Patients Generated Subjective Global Assessment (PG-SGA). According to Kubrak and Jensen (2007), the numerical score of the first 4 items could be used to triage patients requiring nutritional intervention. A score of 0 or 1 indicates that no intervention is required and that the patient should be reassessed on a regular basis. A score of 2 or 3 indicates that the patient requires nutritional education by a dietitian or nurse and pharmacologic management of symptoms. A score of 4 to 8 requires intervention by dietitian or nurse and pharmacologic management of symptoms. A score of 9 or more indicates a critical need for nutrition intervention by a dietitian [12].

3.4. Statistical analysis

EPI-Info version 3.3.2 was used for data entry, processing and analysis [31].

Descriptive reduction statistics including mean, median, standard deviation and frequency were used to characterize the study population.

The test $\chi 2$ was used in the comparison between the disease stage and the both approaches to assessment of nutritional status (NRI and the objective approach). The test of analysis of variance (ANOVA) was used to compare between the time to access diagnosis and first treatment (TD, DD and FTD), the PG-SGA score and the disease stage. Pearson's correlation was applied for relationship between BMI, nutritional impact symptoms and weight loss. A P-value of < 0.05 was considered significant.

The coefficient Kappa was used in the comparison between the both approaches: NRI and objective approach (Kappa = 0 poor; 0.01–0.2 slight; 0.21–0.4 fair; 0.41–0.6 moderate; 0.61–0.8 substantial; 0.81–1.0 almost perfect).

Before these procedures were used, it was checked that the numerical values obtained actually were normally distributed.

4. Results

Our study involved 206 women with breast cancer undergoing treatment. The main reasons for exclusion were: impaired health status (24 patients), end of life (8 patients), transmissible disease (5 patients), deaf person or voiceless (2 patients). At all, 167 patients were included.

Albuminemia was not dosed for 12 patients: 10 patients were treated for radiotherapy where the service did not have nurses and two patients refused blood sampling.

4.1. Characteristics of the population

The characteristics of the surveyed population are summarized in Table 2. The age of patients was between 26 and 64 years with an average of 44 ± 8.3 years. One of three patients (33.5%) was under 40 years of age. Two of three patients were married (66.5%).

As a first symptom seen at the onset of the disease, at least four of five patients (82.6%) reported tumor lump. Chemotherapy as the first anti-cancer treatment was prescribed for more than one patient in two (55.7%). More than four of five patients had cancer at the invasive (presence of nodules) or metastatic stage.

The time required for diagnosis and first treatment involved a population of patients less than 167 due to incomplete medical records and loss of memory:

- Total delay (TD): $n = 157$;
- Diagnostic delay (DD): $n = 149$;
- First treatment delay (FTD): $n = 165$.

Table 1
Different groups of malnutrition with objective assessment approach.

Indicators	Groups		
	No malnutrition	Moderate malnutrition	Severe malnutrition
BMI (kg/m^2)	≥ 18.5	≥ 18.5	< 18.5
Weight loss (%)	and < 3%	and [3,< 10[	or ≥ 10
Albuminemia (g/L)	and ≥ 30	and ≥ 30	or < 30

Table 2
Population characteristics. Batna (Algeria), August 2015–February 2016.

Characteristics	$n = 167$ (100%)
Age (years)	
< 40	56 (33.5)
≥ 40	111 (66.5)
Marital status	
Married	111 (66.5)
Single	40 (24)
Divorced	10 (5.9)
Widowed	06 (3.6)
First checkup	
Echography	100 (59.9)
Biopsy	44 (26.3)
Scanner	20 (12)
Scintigraphy	2 (1.2)
Not specified	1 (0.6)
First symptoms seen	
Tumor lump and others	138 (82.6)
Pain and others	9 (5.4)
Others	20 (12)
Current tumor stage	
Local	21 (12.6)
Locoregional	77 (46.1)
Metastatic	69 (41.3)
First treatment	
Chemotherapy	93 (55.7)
Surgery	71 (42.5)
Radiotherapy	3 (1.8)
Current treatment	
Chemotherapy	154 (92.2)
Radiotherapy	10 (6.0)
Chemo-radiotherapy	3 (1.8)

One in two patients had a total delay access (TD) period ranging from five months (153 days) to more than three years from the date of onset of the first symptoms seen.

A patient on two had a diagnosis delay (DD) ranging from one month (35 days) to more than three years. The median delay between the first biopsy (diagnosis) and the first treatment (FTD) was 59 days (Table 3). The disease stage was significantly related to TD and FTD ($P = 0.002$ and $P = 0.01$ respectively).

4.2. Frequency of nutritional status assessment parameters

Our findings are summarized in Table 4. About one of five (18%) patients had hypoalbuminemia (less than 30 g/L). More than 4% of patients had a BMI of less than 18.5 kg/m^2. Three out of ten patients (29.3%) had a weight loss of more than 10%. BMI was significantly linked to the percentage of weight loss ($P < 0.00$).

Table 3
First aid and diagnosis delay. Batna (Algeria), August 2015–February 2016.

Delays	Days
TD[a] ($n = 157$), median, [Min, Max]	153 [19, 1000[
DD[b] ($n = 149$) median, [Min, Max]	35 [0, 1000[
FTD[c] ($n = 165$)	59 [19, 1000[

[a] TD: Total Delay defined by the number of days between the dates of appearance of first symptoms and access to first treatment.
[b] DD: Diagnosis Delay defined by the number of days between the dates of first symptoms appearance and access to the diagnosis.
[c] FTD: First Treatment Delay defined by the number of days between the dates of result of the biopsy (diagnosis) and access to first aid.

4.3. Prevalence of nutrition impact symptoms

The most common nutritional impact symptoms leading to reduced food intake were taste impairment (69.5%), loss of appetite (67%), nausea (64.7%), vomiting (51.5%) and an bother smells (40.1%). Each patient might have more than one nutritional symptom. More than three of five (61%) patients had severe symptoms (Table 5). Nine of ten (93%) patients had at least one nutrition impact symptoms. Two-thirds (61%) reported four to eight symptoms. The nutritional impact symptoms were significantly related to the percentage of weight loss and to the disease stage ($P < 0.01$).

4.4. Prevalence of malnutrition according to NRI and objective assessment

According to the first approach (NRI), one of two patients (53.5%) suffered from severe or moderate malnutrition. For the second approach (objective classification of malnutrition), more than two thirds of the patients (63.5%) suffered from severe or moderate malnutrition (Fig. 1). The agreement between the both approaches of nutritional assessment reflected moderate agreement: kappa = 0.5.

4.5. Prevalence of high risk of malnutrition according to PG-SGA

According to the PG-SGA score, four of five (77.2%) patients were at high risk of malnutrition requiring symptom management and/or nutritional intervention (Table 6). The PG-SGA score showed a correlation with the percentage of weight loss ($P < 0.0001$).

Table 4
Frequency of parameters nutritional assessment. Batna (Algeria), August 2015–February 2016.

Index	Absolute frequency	Relative frequency	Total effective (100%)
Albuminemia (g/L)			
≥ 30	127	81.9	155
< 30	28	18.1	
BMI (kg/m²)			
< 18,5	7	4.2	167
[18.5–24.9]	57	34.13	
[25.0–29.9]	48	28.7	
≥30	55	32.9	
Weight loss			
>10	49	29.3	167
[6–10]	29	17.4	
[3–5]	21	12.6	
< 3	68	40.7	
Weight change			
Increase	26	15.6	167
No change	22	13.2	
Decrease	119	71.2	

Table 5
Prevalence of nutrition impact symptoms. Batna (Algeria), August 2015–February 2016.

Symptoms	$n = 167$ (100%)
Funny taste or no taste	116 (69.5)
no appetite	112 (67.0)
Nausea	108 (64.7)
Vomiting	86 (51.5)
Bother smells	67 (40.1)
Diarrhea	54 (32.3)
Mouth sores	40 (24.0)
Constipation	37 (22.1)
Stomach or abdominal pain	13 (17.8)
Dry mouth	0
No symptom	11 (6.6)

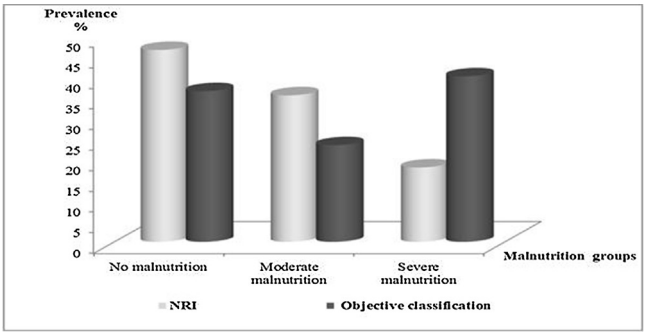

Fig. 1. Prevalence of malnutrition according to NRI ($n = 155$) and objective assessment Batna (Algeria), August 2015–February 2016.

Less than two-thirds (59%) of patients without malnutrition showed severe grade of nutrition impact symptoms (Table 7).

Half of the patients (47.8%) in the metastatic stage suffered from severe malnutrition (Objective approach) (Fig. 2). However, it has not been found a significant correlation between the stage of the disease and the three approaches to assessment of nutritional status ($P > 0.05$).

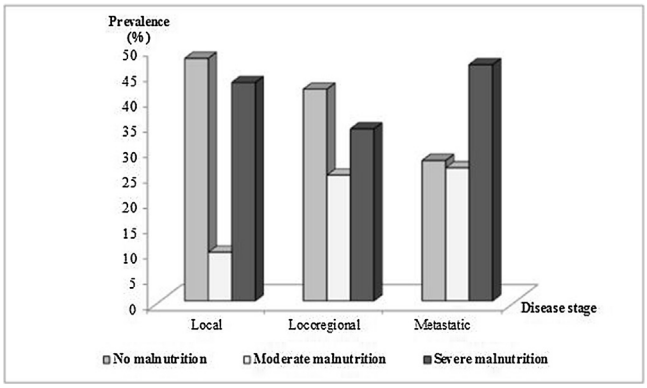

Fig. 2. Malnutrition by disease stage Batna (Algeria), August 2015–February 2016.

5. Discussion

This cross-sectional study allowed us to evaluate, according to three approaches, the nutritional status and to estimate the prevalence of malnutrition in breast cancer patients during their treatments at the Anti-Cancer Center (CAC) of the city of Batna (Algeria) during the period August 2015 to February 2016.

The first approach based on the NRI allowed us to estimate the prevalence of malnutrition at 53.5%: 35.5% of moderate malnutrition and 18% of severe malnutrition.

On the other hand, the second approach, objective assessment, based on BMI, percentage weight loss and albuminemia gave us a prevalence of malnutrition of 63.5: 23.4% of moderate malnutrition and 40.1% severe malnutrition, or 12 points more for the moderate malnutrition and 22 points more for the severe malnutrition than with the NRI approach.

Using the PG-SGA in our study, 77.2% of patients were at high risk of malnutrition and almost all patients (97%) needed nutritional recommendations and interventions. These frequencies could be higher if the scores of the items "Metabolic Stress" and "Physical Examination" were added.

Table 6
Malnutrition classes: Objective assessment vs. PG-SGA ($n = 167$). Batna (Algeria), August 2015–February 2016.

PG-SGA score	Objective assessment approach			Total
	No malnutrition	Moderate malnutrition	Severe malnutrition	
(2–3)	04 (6.6%)	0	1 (1.5%)	5 (3.0%)
(4–8)	13 (21.3%)	6 (15.4%)	14 (20.9%)	33 (19.8%)
>9	44 (72.1%)	33 (84.6%)	52 (77.6%)	129 (77.2%)
Total (100%)	61 (100%)	39 (100%)	67 (100%)	167 (100%)

Table 7
Malnutrition classes by symptom grade ($n = 167$). Batna (Algeria), August 2015–February 2016.

Symptom grade	Objective assessment approach			Total
	No malnutrition	Moderate malnutrition	Severe malnutrition	
Severe symptoms	36 (59.0%)	26 (66.7%)	40 (50.7%)	102 (61.1%)
Moderate symptoms	16 (26.2%)	11 (28.2%)	16 (23.9%)	43 (25.7%)
Mild symptoms	07 (11.5%)	02 (05.1%)	02 (03.0%)	11 (6.6%)
No symptoms	02 (03.3%)	0	09 (13.4%)	11 (6.6%)
Total	61 (100%)	39 (100%)	67 (100%)	167 (100%)

In Norway, Thorensen et al. (2002) compared the objective method with PG-SGA in assessing the nutritional status of a population of patients with cancer (Esophagus, stomach, colorectal, pancreas, lung, breast and others). According to the objective method, 60.9% ($n = 46$) of the patients had malnutrition compared to 65.2% with the PG-SGA or 5 points higher [32].

The prevalence of malnutrition is generally low in breast cancer patients [15,30]. In the study of Pressoir et al. (2010), this population represented 24% of the study sample, 18.3% of breast cancer patients were malnourished and 12.3% of whom had higher weight loss (> 10%) [33].

However, the study of Nouh et al. (2017) in Libya, showed in a population of 145 breast cancer patients (From March to May 2014) a malnutrition prevalence of 98.5% (25% severe malnutrition and 73.5% moderate malnutrition) [34].

In our study, the high prevalence of malnutrition, particularly severe malnutrition (40% according to the objective approach) and the high frequency of patients at high risk of malnutrition (77.2% according to the PG-SGA) are partially explained by the nature of healthcare (deficient) and the severity of the tumor. In fact, more than 87% of our patients had locally advanced or metastatic cancer at the time of their treatment. More than four out of five (86.6%) patients with severe malnutrition (according to the objective approach) had locally advanced or metastatic cancer.

The absence of early screening, the first symptom saw showing the presence of a tumor mass (82.6%), diagnosis relatively late (median DAD = 35 days) and access to first treatment relatively long (median FTD = 59 days), made that patients were at an advanced stage during their treatment.

The nature of the healthcare at the time of taken care was limited to oncological and surgical treatments. Psychological taken cares, treatment of pain and diet management were non-existent.

In our study, almost all patients (93.4%) presented nutrition impact symptoms (Funny taste or no taste, no appetite, nausea, vomiting). In the study of Bauer et al., cited earlier, the most common nutrition impact symptoms were similar to our findings. One of the most common symptoms affecting the food intake of cancer patients was loss of appetite. It was present in 15–25% of patients at the time of diagnosis and was common in patients with advanced stage [11].

In our study, 96% of our patients had a BMI > 18.5 kg/m^2. Weight loss was observed in 71.2% of patients, 29.3% of whom had a severe loss of more than 10%. This severe loss (29.3%) was predominantly observed in patients who had a normal or overweight BMI. According to Pressoir et al. (2010), a normal BMI was not considered sufficient to confirm the absence of malnutrition because of the relatively low sensitivity of this indicator [33].

Our results raise the problem of the need for regular weight control and the establishment of a strategy for nutritional interventions to prevent severe malnutrition.

In Algeria, there was no study on the nutritional status and prevalence of malnutrition in Algerian patients with breast cancer. Our study was the first on the subject.

Medical records were little informed and incomplete of the fact that the support of the patient is limited only to treatment of the tumor. The data found at the level of certain medical records, such as the usual weight and the one before 6 months, the journey made of the appearance of the first signs to the supported, have been recorded such as reported by the patients. These pose the problem of loss memory and therefore the reliability of the informations collected. A number of patients were excluded from the study because of their state of health thus limiting the size of sample. It is necessary to initiate others studies to reinforce our results.

6. Conclusions

In our study, the high prevalence of malnutrition was, in part, due to the fact that patients presented to treatment at locally advanced or metastatic stages.

It is necessary to sensitize women to the risk of breast cancer, to create the conditions for early detection and care as soon as possible (self-examination, investigation, treatment and follow-up).

In order to early detect malnutrition and situations at risk of malnutrition, nutritional status assessment should be an integral part of the overall taken care of cancer patients.

Contribution of authors

FM contributed to the conceptualization and design of the research, participated in the data collection and data analyses and data interpretation, drafted the manuscript.

DEM contributed to the analysis and interpretation of the data and drafted manuscript.

HK data analyses and data interpretation drafted manuscript.

LYB data analyses and data interpretation drafted manuscript.

RK data analyses and data interpretation drafted manuscript.

CCM data analyses and data interpretation drafted manuscript.

LN supervised the study, contributed to the analysis of the data, participated in its design and drafted the manuscript. All authors have read and approved the final manuscript. All authors discussed, edited and approved the final version.

Disclosure of interest

The authors declare that they have no competing interest.

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