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Research Article

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Lymphedema: A Significant Complication Among Cancer Patients in Kinshasa, Democratic Republic of the Congo

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ABSTRACT

Introduction: Cancer is a major global public health concern. In resource-limited countries, cancer-related mortality is particularly high, prompting healthcare teams to pay special attention to this issue. Among the various types of cancer, breast cancer is currently the leading cause of cancer-related death in women. Breast cancer is associated with numerous complications, one of which—lymphedema—significantly impairs patients' autonomy.

Materials and Methods: Data were collected through two studies conducted during the periods 2016–2018 and 2022–2023, respectively. The first study took place in several university and general hospitals in the city of Kinshasa, while the second was conducted at a hospital specializing in cancer treatment. The data analyzed were derived from both the examination and follow-up of subjects and the medical records of patients who sought care at the targeted hospitals. The analysis of these records aimed to:

- Identify the types of cancer diagnosed;
- Determine the frequency of cancer-related complications, specifically the prevalence of lymphedema associated with breast cancer;
- Analyze the management of breast cancer and its complications, with a focus on the treatment of breast cancer-related lymphedema.

Results: In the study conducted across the general and university hospitals, 60 cases were identified over the three years from 2016 to 2018. The subjects' ages ranged from 10 to 89 years. There was a higher proportion of women than men (73% vs. 27%). Thirty-two subjects were over the age of 50. These are patients who underwent rehabilitation for various cancer-related complications. In this sample, breast cancer cases account for 43.3%. The remaining cases consist of prostate cancer (26.7%), lung and respiratory tract cancers (16.7%), and digestive tract cancers (13.3%). Frequently observed complications in these patients include lymphedema, pain, and physical deconditioning.

In the second phase of the study, 129 cancer cases were diagnosed within a specialized oncology facility. Females were predominant (89 vs. 40). The majority of subjects were over 50 years of age (63%). Several types of cancer were identified within the sample, with breast cancer being the most common (37 cases, 28%). Various complications were observed during the course of treatment for the cases monitored and the medical records analyzed. An analysis of the two samples reveals that the prevalence of lymphedema was 92% in 2022–2023 and 43.3% in 2016–2018.

Conclusion: Vascular disorders, such as lymphedema and other forms of venous edema, are significant complications of cancer. Lymphedema appears to be particularly associated with breast cancer. These vascular complications generally arise as a result of the progression of the cancer or the treatments administered to address it. It is therefore essential that healthcare professionals remain attentive to all potential complications, ensuring comprehensive and holistic care for individuals with cancer, particularly those with breast cancer.

Introduction

Cancer, regardless of its type, is often accompanied by various complications. These include pain, physical deconditioning, and respiratory insufficiency. In recent years, international scientific literature has reported the occurrence of vascular disorders such as lymphedema and venous edema—in individuals with cancer. All such complications significantly impair patients' quality of life and necessitate a multidisciplinary approach to care. Consequently, a range of healthcare professionals is essential to address the multifaceted problems associated with cancer. As

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cancer progresses, it disrupts a patient's organic, physiological, physical, and psychological capacities. This process leads to a gradual decline in functional status and a reduction in the quality of life for those living with cancer. In developed nations, there are trained medical and paramedical personnel, as well as adequate equipment, to facilitate earlier and more precise diagnoses and to provide comprehensive patient care. Furthermore, public authorities in these countries are well-informed about these issues, and the general population—possessing a sufficient level of education—is generally able to engage effectively with the recommended management strategies [1-9].

Although information regarding the cancer burden in Africa is fragmentary, it is important to acknowledge the efforts being made in certain African countries to address this issue. Bray have published World Health Organization statistics that outline the situation in African countries. It is also noted that "cancer mortality in Africa and Asia is disproportionately higher than the corresponding incidence". This reflects both the specific distribution of cancer types and higher case-fatality rates on these continents—partly due to diagnoses being made at an advanced stage. Furthermore, these publications highlight disparities in cancer care between developed nations in Europe and the Americas, compared to those in Asia and Africa. The situation described for the African continent as a whole is mirrored in the Democratic Republic of the Congo (DRC), where a multidisciplinary approach to cancer care—including for breast cancer—is virtually non-existent. The management of cancer-related complications within healthcare facilities is inconsistent, which prevents adequate care for cancer patients. Several factors contribute to this situation, namely: insufficient training of healthcare personnel, a lack of diagnostic and treatment equipment, and an absence of specialized hospital infrastructure. Given these significant shortcomings in the care provided to cancer patients—particularly women with breast cancer—at certain hospitals in Kinshasa, DRC, we decided to undertake this study. In this article, we present data collected over two distinct periods. This work encompasses observations and analyses conducted between 2016 and 2018, as well as those carried out between 2022 and 2023 [10-12].

The Study has a Twofold Objective

1. First, a survey of all types of cancer cases diagnosed at several hospitals in the city of Kinshasa, DRC, was conducted. This data collection took place over two periods:
   - From 2016 to 2018, across three general and university hospitals.
   - From January 2022 to March 2023, at a hospital specializing in cancer care.
2. Second, an analysis of breast cancer cases was performed to assess the prevalence of lymphedema as a complication in patients with this type of cancer. Finally, existing rehabilitation protocols for lymphedema were analyzed in light of the relevant scientific literature.

Materials and Methods

In the first phase of the study, 60 cancer cases were identified across three hospitals in Kinshasa. This was achieved by reviewing patient medical records and gathering information from rehabilitation professionals (physiotherapists) using a specifically designed questionnaire. These records pertain exclusively to patients who were referred for physiotherapy as part of their rehabilitation.

During the second phase of the study, a retrospective review was conducted by examining patient records at a hospital in Kinshasa that specializes in cancer treatment. The research involved identifying all cases diagnosed during 2022 and the first three months of 2023. This work was carried out in collaboration with the hospital's medical and paramedical staff, through an examination of patient medical records. A final meeting was held with the staff to verify the validity of the information collected. One hundred and twenty-nine records were analyzed to obtain the data required for this second phase of the study.

Results

In the study conducted within general and university hospitals, 60 cases were identified over three years, from 2016 to 2018. The subjects' ages ranged from 10 to 89 years. There were more women than men (73% vs. 27%). Thirty-two subjects were over the age of 50. These patients underwent rehabilitation for various cancer-related complications. Within this sample, breast cancer cases accounted for 43.3%. The remaining cases consisted of prostate cancer (26.7%), lung and respiratory tract cancers (16.7%), and digestive tract cancers (13.3%). The complications frequently observed in these patients' included lymphedema, pain, and physical deconditioning (Table 1).

In the second phase of the study, 129 cancer cases were diagnosed at a specialized oncology center. Females were predominant (89 vs. 40). The majority of subjects were over 50 years old (63%). Several types of cancer were diagnosed within this sample. Breast cancer was the most common, accounting for 37 cases (28%). In addition to breast cancer (Table 1), the following were noted:

- 30 cases of cervical and endometrial cancer
- 23 cases of digestive tract cancer
- 13 cases of prostate cancer
- 18 cases of cancer of the connective tissues and blood
- 8 cases of cancer of the respiratory system organs

Table 1: Types of Cancer Screened

	2016-2018	2022-2023
Cancer types	N=60 (100%)	N=129 (100%)
Breast cancer	N=26 (43,3%)	N=37 (28,6%)
Prostate cancer	N=16 (26,7%)	N=13 (10,1%)
Lung and respiratory tract cancers	N=10 ((16,7%)	N=8 (6,2%)
Digestive tract cancers	N=8 (13,3%)	N=23 (17,8%)
Cervical cancers	-	N=30 (23,3%)
Blood and connective tissue cancers	-	N=18 (14%)

An analysis of subjects within this group—who were diagnosed in a specialized facility during the second study—reveals that lymphedema was the most frequent complication among patients undergoing rehabilitation (Tables 2 and 3). Specifically, a review of the records of 13 female patients admitted to the rehabilitation department in the first quarter of 2023 following breast cancer showed that twelve of them had lymphedema, representing a

92% probability of this complication occurring within this group (Tables 2 and 3).

Table 2: Characteristics of the Studied Samples and Complications Following Cancer Treatment

Parameters and complications	2016-2018	2022-2023
Age	X=51 (10-89)	X=51 (1-83)
Number of cases	N=60	N=129
% Men	27%	31%
% Women	73%	69%
% Breast cancers	43,3	28%
% Lymphoedema	43,3%	92% (n=13)
Pains	43,3%	100% (n=13)
Physical deconditioning	33,3%	100% (n=13)
Functional impairment	23,3%	100% (n=13)
Respiratory problems	-	76% (n=13)
Above of 50 years	32 (53%)	63%
Under 50 years	28 (47%)	37%
With rehabilitation	100%	10%

Table 2 Shows that the Prevalence of Lymphedema In the Two Studies Is 43.3% In The First Study (2016–2018) And 92% In The Second Study (2022–2023).

Table 3: Record of Complications Following Cancer Treatment

Parameters and complications	2016-2018	2022-2023
Age	X=51 (10-89)	X=51 (1-83)
Number of cases	N=60	N=129
% Mens	27%	31%
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Respiratory problems	-	76% (n=13)

Regarding the age of the patients, it is observed that the majority—57%—in the group studied at general and university hospitals were 50 years old, whereas this proportion was 63% in the group from the specialized hospital (Table 2). Furthermore, it is noted that one patient, aged one year, was diagnosed with throat cancer, and six out of the 129 patients were under the age of twenty. The treatment provided involved standard interventions for such cases, as recommended in international literature: pressotherapy, manual lymphatic drainage, compression garments, and both passive and active mobilization (Table 4).

Table 4: Rehabilitation Methods for Post-Breast Cancer Lymphedema

Diagnosis/ Complications	Number	Rehabilitation Techniques
Breast cancer/ Lymphedema	N=129	PD – MLD – Bandaging – AM-PM-Manual therapy – Reconditioning for physical exertion
Breast cancer/ Thrombophlebitis of the limbs	N=13	MLD – Manual therapy – Reconditioning for physical exertion - Exercise training/ TM

PD: pneumatic devices, **MLD:** manual lymphatic drainage, **AM:** active mobilization, **PM:** passive mobilization, **TM:** treadmill

Discussion

The management of breast cancer-related lymphedema is a concern for oncology care teams worldwide.

The Frequency of Breast Cancer

In every country, cancer is a major contributor to mortality and a significant barrier to increasing life expectancy. By 2050, the number of new cases and deaths is projected to rise by 38% and 68%, respectively, with a disproportionate impact on countries with a low Human Development Index (HDI). High-quality data on cancer and vital status—along with ongoing progress in early diagnosis and access to treatment—are essential in low- and medium-HDI countries to combat inequalities and meet cancer control objectives. Breast cancer is the leading cause of cancer-related mortality among women in 104 countries, followed by cervical cancer in 44 countries, lung cancer in 29 countries, stomach cancer in several countries, and liver and colorectal cancers in a few others. In 2020, breast cancer in women became the most frequently diagnosed cancer globally for the first time, with approximately 2.26 million new cases recorded. Consequently, breast cancer stands as one of the primary causes of cancer-related death among women. It is highly prevalent among the cancers detected within the population. The results obtained from two studies conducted at several hospital institutions in Kinshasa confirm this trend. Specifically, findings from our 2016 and 2023 studies show that 43% and 28%, respectively, of the cancer cases diagnosed at the hospitals analyzed were breast cancer. Although these results do not provide an objective reflection of the national situation, they may nonetheless serve as an indicator of the circumstances in many other hospitals across the country. Furthermore, the lack of national statistics obscures the reality, making it impossible to determine the true extent of breast cancer in the nation. Our publication may help shed light on the tragedy experienced by women affected by breast cancer in resource-limited countries such as the Democratic Republic of the Congo [13,14].

The Presence of Complications Following Breast Cancer Treatment.

The management of breast cancer is based on surgery, chemotherapy, and radiotherapy. Surgery typically involves a unilateral or bilateral mastectomy. Recent research has introduced pharmacological interventions—administered either before or after surgery—to reduce the risk of recurrence [3]. It

is well documented that various complications can arise as a result of breast cancer treatments [3]. These may be vascular, dermatological, physical, or psychological in nature. Among vascular complications, lymphedema is the most frequently observed issue associated with breast cancer. This complication significantly impairs patients' autonomy. In developed countries, breast cancer care follows a comprehensive approach that integrates both medical and paramedical interventions; oncology teams there work to combat both the cancer cells and the complications resulting from treatment. In contrast to this multidisciplinary therapeutic model, the management of breast cancer in hospitals in Kinshasa is exclusively medical. Little attention is paid to post-operative complications, the aftereffects of radiotherapy, or the functional impact of chemotherapy on women with breast cancer. Yet, scientific literature confirms that cancer treatments, in general, lead to a range of motor, vascular, dermatological, and respiratory complications. Consequently, by documenting motor complications (33%–100%), vascular complications (43%–93%), respiratory complications (76%), and pain-related issues (43%–100%), our findings align with those reported in the international scientific literature. They also call upon medical teams managing cancer cases to review their therapeutic approach and to address the complications arising from both the cancer itself and its treatments. In this way, medical teams will be able to seek the input of other professionals who specialize in the management of these complications.

This is particularly the case for lymphedema associated with breast cancer, which impairs the function of the affected limb in patients. Numerous publications document its occurrence following cancer treatment. Indeed, a 10% increase in the volume of limbs affected by this complication has been observed following breast cancer [15-22].

The Prevalence of Lymphedema

Several studies have reported a high prevalence of lymphedema among patients who have undergone treatment for breast cancer. This prevalence varies across studies. Van Gemert report that all patients in their cohort developed lymphedema, regardless of the type of treatment received—whether surgery, chemotherapy, radiotherapy, or hormone therapy. Kedar, in their examination of women undergoing treatment for breast cancer, found that 20% of patients presented with lymphedema. They further explain that these figures are relatively low because there was a preference for using radiotherapy over invasive surgery. These publications confirm that lymphedema remains a significant complication of breast cancer treatments. The high prevalence of lymphedema observed in our two studies in Kinshasa aligns with the findings of the aforementioned studies. According to recent research, the pathogenesis of what is termed "breast cancer-related lymphedema" (BCRL) is explained by three hypotheses, relating respectively to lymphatic insufficiency, hemodynamic changes, and interstitial disturbances [1,23-27].

The Management of Lymphedema

Ideally, during the initial stages of breast cancer care—and before surgery—the assessment of risk factors and the selection of therapeutic approaches (whether pharmacological or surgical) should aim to prevent the development of lymphedema. Studies indicate that the incidence of lymphedema is lower in patients who have undergone a lumpectomy (removal of the cancerous tissue) compared to those treated with a mastectomy [17]. Furthermore, reducing the number of lymph node dissections—or potentially avoiding them altogether, a strategy currently under evaluation—can further lower the risk of lymphedema. It has also been reported that immediate breast reconstruction and the performance of microsurgical lymphovenous anastomoses in the axillary region, carried out concurrently with lymph node dissection, significantly reduce the risk of lymphedema [1,17]. The diagnosis of breast cancer-related lymphedema relies on a combination of factors, including risk assessment, clinical status, and a series of essential diagnostic examinations. Clinical evaluation is generally based on the following subjective symptoms: pain, swelling, numbness, a feeling of heaviness in the arm, stiffness in the affected areas, and impaired joint mobility [1,25]. However, not all patients exhibit these symptoms. Consequently, more in-depth investigations can be used to diagnose lymphedema even before such symptoms become apparent. The techniques employed to diagnose lymphedema primarily include the following [1]:

- Bioimpedance spectroscopy (BIS)
- Magnetic resonance imaging (MRI)
- Computed tomography (CT)
- Color Doppler imaging
- Lymphoscintigraphy and indocyanine green (ICG) lymphography

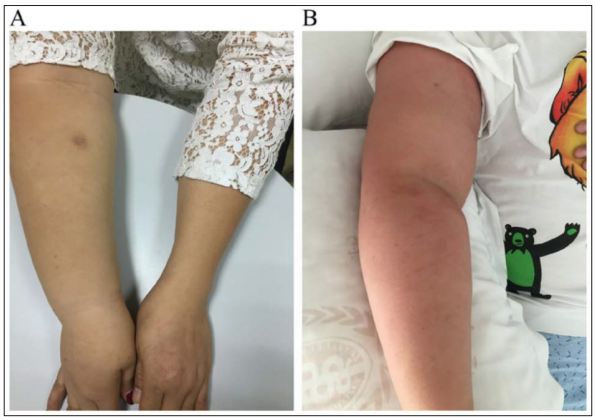


Figure 1: Breast Cancer-Related Lymphedema of the Upper Limbs [1].

Clinically, the diagnosis is based on the difference in limb circumference measurements, as well as an analysis of fluid displacement within the limbs. It is acknowledged that these results can vary, as they depend on the subjective assessment of the examiner. This demonstrates that circumference measurement alone is insufficient for diagnosing breast cancer-related lymphedema. However, in resource-limited settings—such as the Democratic Republic of the Congo—the lack of the aforementioned technical resources makes circumference measurement the most accessible method for diagnosing lymphedema, in accordance with the classification system of the International Society of Lymphology (ISL).

Management of breast cancer-related lymphedema is possible through Complex Decongestive Therapy (CDT). This therapeutic approach is administered by a physical therapist and includes manual lymphatic drainage, physical exercise, compression bandaging, the use of compression garments, and skin care. Furthermore, patient self-management and therapeutic

education can contribute to improving the management of lymphedema [27,28].

What do Our Studies Reveal about the Management of Lymphedema in the Dr Congo?

As mentioned above, the lack of technical resources and equipment in rehabilitation departments does not preclude the management of breast cancer patients who have developed lymphedema. Despite these circumstances, our analysis shows that the therapeutic solutions employed are consistent with published scientific recommendations [27,28]. Specifically, postural drainage, bandaging, physical activity, and pneumatic devices are used to manage lymphedema in breast cancer patients. Thus, the findings from our two studies indicate that physical therapists have utilized the same techniques documented in the scientific literature to address breast cancer-related lymphedema.

The Relevance of the Role of Physical Therapy in Managing Breast Cancer Complications

Cancer treatments in general—and breast cancer treatments in particular—can lead to a wide range of complications. As noted in several publications, beyond destroying neoplastic cells, anticancer treatments can disrupt the functioning of various organ systems, resulting in frequent complications [17]. Physical therapy is often indicated for the management of vascular, dermatological, motor, and respiratory complications, to improve patients' quality of life. The International Society of Lymphology recognizes the vital role of manual lymphatic drainage, multilayer bandaging, pneumatic compression, muscle-strengthening exercises, general muscle exercises, and reconditioning/exercise training in the management of breast cancer-related lymphedema [27,28].

Conclusion

Lymphedema is a frequent complication of breast cancer. It significantly affects patients' autonomy following cancer treatments. It is necessary to manage this complication by incorporating physical therapy to improve the quality of life for women with breast cancer.

Conflicts of Interest: none

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