Sociodemographic and Clinical-Functional Characteristics of Women Treated at a Gynecologic Oncology Physiotherapy Clinic

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Características Sociodemográficas e Clínico-Funcionais de Mulheres Atendidas em um Ambulatório de Fisioterapia em Oncologia Ginecológica

Características Sociodemográficas y Clínico-Funcionales de Mujeres Atendidas en un Consultorio de Fisioterapia en Oncología Ginecológica

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ABSTRACT

Introduction: Gynecological cancers account for 15% of cancer cases among women worldwide, significantly affecting reproductive health and quality of life. Although technological advances have contributed to increased survival, patients frequently experience comorbidities and pelvic floor dysfunctions resulting from treatment, such as vaginal stenosis, fibrosis, pain, and genitourinary alterations. These issues highlight the importance of identifying and managing such complications appropriately. **Objective:** To characterize the sociodemographic and clinical-functional profile of women undergoing brachytherapy in a cancer rehabilitation physiotherapy outpatient clinic of a reference hospital and to analyze associations between treatment types, clinical factors, and functional outcomes. **Method:** A retrospective study was conducted with women treated in a physiotherapy outpatient clinic after brachytherapy at a specialized hospital in Porto Alegre, Brazil. Participants were characterized according to clinical treatment data and physical-functional assessments recorded in medical charts. **Results:** A total of 106 women with gynecological cancer who underwent brachytherapy were included. Uterine cancer was the most prevalent (85.8%), and most participants also received chemotherapy and/or external radiotherapy. Regarding sexuality, 37.7% were sexually active, while 52.2% had already discontinued sexual activity before brachytherapy. Urinary dysfunctions were frequent: 29% had stress urinary incontinence, 41% urgency incontinence, 23.6% mixed incontinence, and 21.7% reported incomplete bladder emptying. Pain complaints included pelvic pain at rest (21.7%), pain during urination (13.2%), pain on palpation (31.4%), and burning on urination (31.1%). **Conclusion:** A high prevalence of urinary, sexual, and pain-related dysfunctions was observed after gynecological cancer treatment. These findings reinforce the multifactorial nature of pelvic floor dysfunctions in women with gynecological cancer, emphasizing the need for a comprehensive physiotherapeutic assessment that considers both oncological treatment effects and prior gynecological and obstetric history.
Key words: Brachytherapy; Genital Neoplasms, Female; Fibrosis; Physical Therapy Modalities.

RESUMO

Introdução: Os cânceres ginecológicos representam 15% dos casos de câncer entre mulheres no mundo, impactando a qualidade de vida e a saúde reprodutiva. Embora avanços tecnológicos contribuam para o aumento da sobrevida, as pacientes enfrentam comorbidades e disfunções pélvicas decorrentes do tratamento, o que ressalta a importância da identificação e manejo adequados das complicações. **Objetivo:** Caracterizar o perfil sociodemográfico e clínico-funcional de mulheres submetidas à braquiterapia em ambulatório de fisioterapia oncológica de um hospital de referência, e analisar associações entre tipos de tratamento, fatores clínicos e repercussões funcionais. **Método:** Estudo retrospectivo com mulheres acompanhadas em ambulatório fisioterapêutico pós-braquiterapia, em hospital especializado de Porto Alegre. As participantes foram caracterizadas conforme dados clínicos do tratamento e avaliações físico-funcionais registradas em prontuário. **Resultados:** Foram incluídas 106 mulheres com câncer ginecológico submetidas à braquiterapia. O câncer de útero foi o mais prevalente (85,8%), e a maioria recebeu quimioterapia e/ou radioterapia externa. Em relação à sexualidade, 37,7% estavam sexualmente ativas, enquanto 52,2% já não mantinham atividade antes da braquiterapia. Disfunções urinárias foram frequentes: 29% de incontinência de esforço, 41% de urgência, 23,6% mista e 21,7% sensação de esvaziamento incompleto. Queixas dolorosas incluíram dor pélvica em repouso (21,7%), ao urinar (13,2%) e à palpação (31,4%), além de ardência ao urinar (31,1%). **Conclusão:** Observou-se alta prevalência de disfunções urinárias, sexuais e dolorosas pós-tratamento do câncer. Esses achados reforçam o caráter multifatorial das disfunções pélvicas em mulheres com câncer ginecológico, evidenciando a necessidade de avaliação fisioterapêutica abrangente que considere tanto repercussões do tratamento oncológico quanto antecedentes ginecológicos e obstétricos dessas pacientes.
Palavras-chave: Braquiterapia; Neoplasias dos Genitais Femininos; Fibrose; Modalidades de Fisioterapia.

RESUMEN

Introducción: Los cánceres ginecológicos representan el 15% de los casos de cáncer entre las mujeres a nivel mundial, afectando la salud reproductiva y la calidad de vida. Aunque los avances tecnológicos han contribuido al aumento de la supervivencia, las pacientes suelen presentar comorbilidades y disfunciones del suelo pélvico derivadas del tratamiento, como estenosis vaginal, fibrosis, dolor y alteraciones genitourinarias. Estos aspectos destacan la importancia de identificar y manejar adecuadamente tales complicaciones. **Objetivo:** Caracterizar el perfil sociodemográfico y clínico-funcional de mujeres sometidas a braquiterapia en un servicio ambulatorio de fisioterapia oncológica de un hospital de referencia, y analizar las asociaciones entre los tipos de tratamiento, los factores clínicos y las repercusiones funcionales. **Método:** Estudio retrospectivo realizado con mujeres atendidas en un servicio ambulatorio de fisioterapia después de la braquiterapia, en un hospital especializado de Porto Alegre, Brasil. Las participantes fueron caracterizadas según los datos clínicos del tratamiento y las evaluaciones físico-funcionales registradas en las historias clínicas. **Resultados:** Se incluyeron 106 mujeres con cáncer ginecológico tratadas con braquiterapia. El cáncer uterino fue el más prevalente (85,8%), y la mayoría recibió quimioterapia y/o radioterapia externa. En cuanto a la sexualidad, el 37,7% estaba sexualmente activo, mientras que el 52,2% ya no mantenía actividad sexual antes de la braquiterapia. Las disfunciones urinarias fueron frecuentes: el 29% presentó incontinencia de esfuerzo, el 41% de urgencia, el 23,6% mixta y el 21,7% sensación de vaciamiento incompleto. Las quejas dolorosas incluyeron dolor pélvico en reposo (21,7%), al orinar (13,2%), a la palpación (31,4%) y ardor al orinar (31,1%). **Conclusión:** Se observó una alta prevalencia de disfunciones urinarias, sexuales y dolorosas después del tratamiento del cáncer ginecológico. Estos hallazgos refuerzan el carácter multifactorial de las disfunciones del suelo pélvico en mujeres con cáncer ginecológico, evidenciando la necesidad de una evaluación fisioterapéutica integral que considere tanto las repercusiones del tratamiento oncológico como los antecedentes ginecológicos y obstétricos de las pacientes.
Palabras clave: Braquiterapia; Neoplasias de los Genitales Femeninos; Fibrosis; Modalidades de Fisioterapia.

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INTRODUCTION

Gynecological cancers encompass neoplasms affecting pelvic structures as the body of the uterus and cervix, ovary, vulva, vagina and endometrium, an important public health challenge due to the negative impact over the Quality of Life (QoL), reproductive health and sexual functions of women[1]. It is estimated that these neoplasms correspond to approximately 15% of the cancers affecting the world female population[2]. Cervical cancer in Brazil is particularly relevant, nearly 17 thousand new cases were anticipated for the triennium 2023-2025[3].

In general, the first line of oncologic treatment is surgery, including total or partial hysterectomy, conization, vaginectomy, vulvectomy, lymphadenectomy, cytoreduction and pelvic exenteration according to the type and extension of the tumor[4]. In addition to surgeries, systemic therapies as chemotherapy or local as teletherapy and brachytherapy are widely utilized[5]. Teletherapy or external-beam radiotherapy consists in the application of ionizing radiation close to the source of the tumor and brachytherapy administers high doses of radiation into or very close to the tumor, allowing the preservation of adjacent tissues[6].

Although effective to control the disease, these treatments are associated with important adverse events as dysfunctions of the pelvic floor that can emerge in the short and long term[2]. Alterations involving gastrointestinal and genitourinary tracts are frequent[7]. The radiation imposed by radiotherapy, for instance, is associated with damages to the vaginal epithelium and reduction of lubrification, in addition to inflammation on the mucosa of the rectum and bladder that can evolve to fibrosis, stenosis or radiodermatitis[6,7]. Hysterectomy is associated with high prevalence rates of fecal and urinary incontinence in addition to negatively impacting the sexual activity of the patients[8]. Dyspareunia is a highly prevalent condition among the complications, affecting until 67% of women post cervical cancer treatment. These dysfunctions require specific approach since they impact the QoL compromising the functional rehabilitation and the overall health condition of the patients post-oncologic treatment[2,9].

Given this context, physiotherapy follow-up is an essential part of the multiprofessional care, contributing to preserve, restore or optimize the kinetic-functional function, in addition to preventing and treat oncologic treatment related dysfunctions[10,11]. However, the available evidences are still limited in regard to the characterization of these variables and their inter-relations. Therefore, the objective of the present study is to characterize the sociodemographic and clinical-functional profile of women submitted to oncologic treatment at the outpatient physiotherapy unit of the radiotherapy service of "*Hospital Santa Rita da Irmandade Santa Casa de Misericórdia de Porto Alegre (ISCMPA)*" in addition to analyzing the associations among types of treatment, clinical factors and functional repercussions.

METHOD

Retrospective, cross-sectional study enrolling women diagnosed with gynecological cancer and submitted to concomitant physiotherapeutic follow-up or post antineoplastic treatment at the physiotherapy outpatient of the radiotherapy service of "*Hospital Santa Rita da ISCMPA*", under the purview of the National Health System (SUS) between 2016 and 2024.

Charts of women older than 18 years of age submitted to oncologic treatment for gynecological neoplasms and who attended at least one physiotherapy visit after the conclusion of brachytherapy have been selected. Charts of women unregistered for physical evaluation were excluded.

Sample size was calculated with the tool PSS Health (Power and Sample Size for Health Researchers, online version). The required size to ensure a confidence level of 95% with statistical power of 80% was 110 participants.

Sociodemographic variables (date of birth, marital status), anthropometric (weight, height, body mass index – BMI) and information related to clinical and physiotherapeutic treatment have been collected. Regarding physical treatment, clinical diagnosis and neoplasm staging classified by the International Federation of Gynecology and Obstetrics (Figo)[12], date of start and end of insertions of brachytherapy and associated antineoplastic treatments as chemotherapy, surgery or teletherapy were also obtained.

The physiotherapeutic evaluation was performed upon medical referral and conducted by the institution's physiotherapists. Although some patients have attended more than one visit, the data analyzed are referenced exclusively to anamneses and physical exam registered in the first visit of pelvic physiotherapy in order to standardize the collection and present the women's initial clinical conditions. At anamneses, life habits (alcohol use and smoking), obstetric history (number of pregnancies and birth pathways), contraceptive methods, sexual history (activity and interest at the moment of evaluation and pre-brachytherapy), menstrual period pre-brachytherapy, comorbidities (systemic arterial hypertension, asthma, overweight/obesity, rheumatism), practice of physical activity, clinical symptoms (feeling of incomplete emptying, hematuria, types of urinary incontinence) have been obtained. Habits and symptoms were evaluated by self-report.

The physical examination included palpation uni or bi-digital of the vaginal canal and region of the perineum, evaluation of the pelvic floor based on the scale PERFECT[13] and evaluation of vaginal stenosis. The scale PERFECT evaluates: Power (P) – muscle strength according to the modified Oxford scale where: Grade 0, lack of muscle response, Grade 1, flicker or pulsation felt by the finger of the examiner, Grade 2, increase of tension with no perceptible elevation, Grade 3, more accentuated muscle tension and characterized by the elevation of the posterior muscular wall, Grade 4, increase of tension and good contraction able to elevate the posterior wall against resistance, Grade 5, application of strong resistance to the elevation of the posterior vaginal wall; the examiner's finger is gripped and pushed inside the vagina; endurance (E) – how long the pelvic muscle floor can hold a maximal voluntary contraction in seconds; repetition (R) – how many contractions timed at the endurance can be performed; fast (F) – how many fast consecutive muscle contractions can be performed in ten seconds; timing (T): whether there is involuntary contractions of the pelvic floor muscles before coughing (present or absent)[13].

In addition, fibrosis, pain/burning (visual analogue scale) at rest, while urinating and palpation were analyzed yet. Vaginal stenosis was evaluated through the size of the speculum – small (S), medium (M), large (L) – mode of insertion of the speculum (scale developed by the physiotherapy team: speculum enters regularly, enters tight but painless, does not enter due to pain/burning, does not enter due to mechanic restriction). Vaginal width was measured through the number of turns of the speculum (opening limited due to mechanic restriction or pain, each half turn clockwise was counted) and the length of the vaginal canal with hysterometer (in cm, initiating at the posterior fornix of the vagina and hymenal ring and final spot). Because of absence of literature consensus of the cutoff to define vaginal stenosis, both criteria described in previous studies were considered, adopting the length of < 8 cm and < 9 cm[14,15].

Further to the characterization of the sample, analyzes of association and correlation among sociodemographic, clinical and physical-functional variables have been conducted.

The software SPSS[16] version 30.0.0 (Statistical Package for the Social Sciences, Inc., Chicago EUA) was utilized to analyze the data. Normality of the variables was checked with the Kolmogorov-Smirnov test. Given the non-parametric distribution of the data, they were expressed as median and interquartile range (continuous variables) or in absolute and relative frequencies (categorical variables). The Mann-Whitney[17] test was applied to compare the data and for associations among categorical variables, the chi-square test. The level of significance adopted was 5% (p<0.05).

The Ethics Committee of ISCMPA approved the study, report number 6853084 (CAAE (submission for ethical review): 78313624.4.0000.5335) in compliance with Directive 466/2012 of the National Health Coucil[18]. All the participants that have been contacted were briefed about the study and potential causalities and signed the Informed Consent Form (ICF). Data were collected from June to August 2024 through review of charts in the system Tasy and registered in Google Forms according to procedures approved by the institution's Ethics Committee and with the General Data Protection Regulation (GDPR)[19].

RESULTS

Initially, 142 charts have been identified and after the application of eligibility criteria, 106 remained in the final sample. The variables not informed in the charts were defined as "not informed". Table 1 shows the characteristics of the sample.

There was predominance of cervical cancer in 91 patients (85.8%). Endometrium cancer was identified in 12 women (11.3%), the second most frequent type. Isolated cases included fungal mycosis as tumor (0.9%) and cancer of the vaginal canal (0.9%). One of the charts did not register the type of neoplasm.

Most of the study participants did not smoke (86.8%) or used alcohol (92.5%) and the majority had no history of systemic arterial hypertension (61.3%), diabetes *mellitus* (93.4%), rheumatism (96.2%) or asthma (93.4%). 37.7% claimed they were sexually active while 51.9% where not having sexual relations during the evaluation and 10.4% did not inform. Prior to brachytherapy, 52.2% claimed they had no sexual relations while 43.4% kept regular sexual activities and 4.4% did not inform. In addition, 61.3% did not use contraceptives and 50% denied previous menstrual cycles prior to treatment.

Table 2 presents oncology treatment information

Table 3 describes the clinical and physical-functional variables of the participants. 29% of the women of the cases analyzed were diagnosed with stress urinary incontinence, 41% of urgency urinary incontinence and 23.6%, mixed urinary incontinence. In addition, 21.7% reported urinary retention and 5.7% referred hematuria. 21.7% reported pain at the pelvis at rest, 13.2% while urinating and 31.4%, during palpation. 5.7% of the women reported burning at rest, 31.1% while urinating and 17% at palpation.

Sociodemographic, clinical and functional variables were analyzed, including time from the end of brachytherapy and

Table 1. Sociodemographic and clinical characteristics of the women

Variables	Description	Participants (n=106)
Marital status, n (%)	Single	41 (38.6)
	Married	48 (45.3)
	Not informed	17 (16.0)
Age, years (*)		41 (37.5-44.7)
BMI, kg/m³ (*)		26.79 (24.9-29.8)
Overweight, n (%)	No	37 (34.9)
	Yes	44 (41.5)
	Not informed	25 (23.6)
Pregnancies (*)		2 (1-4)
Natural births (*)		1 (0-4)
C-section (*)		0 (0-2)
Clinical diagnosis, n (%)	Cervical cancer	91 (85.8)
	Endometrium cancer	12 (11.3)
	Others	3 (2.9)
Staging, grades (%)	Stage I	11 (10.4)
	Stage II	42 (39.6)
	Stage III	29 (27.4)
	Stage IV	3 (2.8)
	Not informed	21 (19.8)
Physical activity, n (%)	No	66 (62.3)
	Yes	19 (17.9)
	Not informed	21 (19.8)
Sexual interest, n (%)	No	32 (30.2)
	Yes	72 (67.9)
	Not informed	2 (1.9)

Caption: BMI = Body Mass Index
Note: The values are presented as absolute frequency (n) and percent (%) or as median and interquartile range (*).

physiotherapeutic evaluation, in addition to findings of pain, burning, cicatricial adherence and alterations at palpation. Possible connections among pain, burning, palpable findings and feeling of incomplete emptying with sexual desire have also been evaluated. Additionally, possible associations among alterations of pelvic floor and factors as age, combined treatments (surgery, teletherapy and/or chemotherapy), staging, comorbidities, smoking and alcohol use were investigated as well, in addition to connections of clinical symptoms (feeling of incomplete emptying and hematuria) with major alterations of pelvic floor.

Statistically significant associations are presented in Table 4, for other variables analyzed, these associations were not found.

DISCUSSION

The sociodemographic and clinical-functional characteristics of women diagnosed with gynecological cancer assisted at a physiotherapy outpatient of a referral hospital have been described. The profile of pelvic dysfunctions was constructed upon the analysis of 106 women submitted to brachytherapy, further to the analysis of associations among types of treatment, clinical factors and functional repercussions.

The median of the sample was 41 years, consistent with the profile observed in women with cervical cancer, the majority of the study participants. Cervical cancer is rare up to the third decade of life, according to the National

Table 2. Oncology treatment information

Variables	Description	Participants (n=106)
Number of insertions of brachytherapy, n (%)	2	1 (0.9)
	4	105 (99.1)
Chemotherapy, n (%)	No	16 (15.1)
	Yes	88 (83.0)
	Not informed	2 (1.9)
Teletherapy, n (%)	No	16 (15.1)
	Yes	88 (83.0)
	Not informed	2 (1.9)
Surgery, n (%)	No	73 (68.9)
	Yes	32 (30.2)
	Not informed	1 (0.9)

Note: Values are presented as absolute (n) frequency and percent (%).

Cancer Institute (INCA), but mortality increases from the fourth decade of life onwards. A national study on the sociodemographic profile of 175 women diagnosed with cervical cancer concluded that 56% of the sample was formed by women between 40 and 59 years[20]. According to Silva et al., age is a diagnostic predictor of gynecological cancer since incidence rates increase after 40 years. The cervical cancer peaks in the age-range of 45-50 years while ovary, vagina and endometrium neoplasms tend to affect mostly post-menopausal women, especially from the sixth decade of life on[21].

45.3% of the women were married and 38.6% single, in line with previous data where stable union or marriage predominate[20-22]. Interestingly, marital status is a predictor of survival of patients with neoplasms as discussed by Krajc et al.[2], who analyzed different marital status and cancer survival rates, where married individuals survive more than single or widowed possibly due to social and financial support, better access to treatments, high likelihood of finding the disease at initial stages and better mental health. Rozario et al.[24] reported that the majority of the sample had no chronic diseases (comorbidities) in line with the present study, but overweight in 41.5% of the women is a known risk factor for uterus and endometrium neoplasms.

Most of the women did not smoke (85.6%) or consumed alcohol (92.5%), reflecting patterns observed in previous studies on gynecological cancer survivors[20,22]. At the evaluation, 62.3% did not practice physical activities, corroborating a former study that observed that many women are inactive or kept low levels of activity after being diagnosed with gynecological cancer, either post-treatment or in the long term[25].

Cervical cancer was the most prevalent (85.8%) with predominance of cases diagnosed at stages II and III (Figo)[12]. The treatment indicated for stage II usually combines radiotherapy (teletherapy and brachytherapy) with cycles of chemotherapy, while for stage III, total surgical resection associated with adjuvant therapies[4]. 83% of the participants received external chemotherapy and/or radiotherapy and 30.2% were submitted to surgery associated with brachytherapy. The prevalence of stages II and III in this study reflects a bias of admission to the physiotherapy service since brachytherapy was one of the inclusion criteria. Therefore, the low frequency of stage I does not necessarily suggest that the institution concentrates more advanced diagnoses, but that the patients referred to physiotherapy are those who have been submitted to radiotherapy treatment indicated for intermediate and advanced stages of the disease. This bias should be considered in the interpretation of the results because it limits the sample profile to women with high risk of radiotherapy-related pelvic complications.

Pelvic neoplasms can generate several complications resulting from disease aggressiveness or treatments that can appear in short and long term, affecting physical, functional, sexual, social and psychological aspects and compromise the QoL[15]. Mostly genitourinary alterations have been observed in the study sample, including pain at rest and urinating, vaginal stenosis, urgency urinary incontinence, decline of sexual interest and reduction of the power and resistance of the pelvic floor muscle.

Table 3. Clinical and physical-functional variables

Variables	Description	Participants (n=106)
Time from end of brachytherapy and evaluation, days (*)		40.5 (35.8-58.7)
Number of turns of the speculum (*)		6 (5.3-6.7)
Vaginal length measured by hysterometer, cm (*)		8.8 (8.3-9.0)
Prevalence of vaginal stenosis (hysterometry < 8 cm), n (%)		28 (26.4)
Prevalence of vaginal stenosis (hysterometry < 9 cm), n (%)		61 (57.5)
Size of speculum, n (%)	Small	3 (2.8)
	Medium	16 (15.1)
	Large	1 (0.9)
	Not informed	86 (81.1)
Insertion of speculum, n (%)	Enters regularly	40 (37.7)
	Enters tight but painless	11 (10.4)
	Enters with pain	19 (17.9)
	Does not enter due to pain/burning	4 (3.8)
	Does not enter due to mechanic restriction	1 (0.9)
	Not informed	31 (29.2)
Presence of scars and fibrosis, n (%)	No	80 (75.5)
	Yes	26 (24.5)
Power (P), n (%)	Grade 0	3 (2.8)
	Grade 1	9 (8.5)
	Grade 2	22 (20.8)
	Grade 3	25 (23.6)
	Grade 4	26 (24.5)
	Grade 5	7 (6.6)
	Not informed	14 (13.2)
Endurance (E), seconds (*)		10 (8.0-12.7)
Number of fast repetitions during ten seconds (F) (*)		8 (6.7-8.6)
Timing (T), n (%)	Absent	4 (3.8)
	Present	95 (89.6)
	Not informed	7 (6.6)

Note: Values presented as absolute frequency (n), percent (%), or median and interquartile range (*). Muscle strength: presence and intensity of maximum voluntary contraction of pelvic floor muscle (PFM) graded according to the modified Oxford scale. Timing: fast contraction of PFM. Endurance: time of sustained contraction of PFM.

Table 4. Associations among clinical factors and functional repercussions

Variable evaluated	Result observed	*p*
Women with scars and fibrosis	Least sexual interest	< 0.034[a*]
Age of the women	Least sexual interest	< 0.001[b*]
Women with least endurance	High incidence of urgency urinary incontinence	< 0.037[b*]
Number of vaginal births	Reduction of muscular strength of the pelvic floor	< 0.022[b*]

Note: Values of *p* obtained from statistical tests: chi-square (a) and Mann-Whitney (b). *Values of $p<0.05$ were statistically significant. Endurance: time of sustained contraction of the pelvic floor muscles.

Although the majority of the participants had no feeling of incomplete emptying or hematuria, 38.7% reported urgency urinary incontinence, 29.2% of stress urinary incontinence and 23.6% of mixed incontinence. These results are aligned with a systematic review of Ramaseshan et al.[26] who analyzed 74 studies and revealed high prevalence of pelvic floor dysfunctions in women with gynecological cancer. Genitourinary, gastrointestinal and vaginal mucosa alterations as scars, drying and edema are among the most severe effects. These symptoms, frequently compared with menopause's, are associated with hypoestrogenism provoked by oncologic treatments by surgical removal of ovaries or chemotherapy, radiotherapy and/or hormone therapy effects[27]. According to Crean-Tate et al.[28], hypoestrogenism has significantly contributed to the genitourinary syndrome of menopause with symptoms of dryness, burning, and vulvar and vaginal irritation, poor lubrification, dyspareunia, urinary urgency, dysuria and recurring urinary infections.

The functional evaluation of pelvic floor muscle revealed predominant moderate strength, median of endurance and eight repetitions of ten seconds. According to Cyr et al.[2], women submitted to oncologic treatment present alterations of tonus, power, endurance and timing. However, there are scarce literature on how these alterations evolve in short-term post-treatment as in the present study sample. The participants with least endurance during physical evaluation reported high frequency of urgency urinary incontinence ($p<0.037$). In addition, the decline of the strength of pelvic floor muscle was associated with higher number of vaginal deliveries ($p<0.022$). Similar finding was described by Blomquist et al.[29] who, while comparing the incidence of pelvic disorders among women submitted to vaginal delivery or c-sections observed that 69.4% of those with at least one vaginal delivery had declined muscle strength and more propension for dysfunctions of the pelvic floor. These results suggest that obstetrics characteristics prior to cancer can contribute to the functional profile identified post-surgical treatment. Even in a cross-sectional and retrospective study, it is relevant to consider the gynecological and obstetrics history during anamneses and physiotherapeutic evolution of women survivors of gynecological cancer.

Alterations as loss of libido, dyspareunia and orgasmic dysfunction can occur due to oncologic treatment-related changes of vaginal epithelium as decline of the sensitiveness of the clitoris and vaginal mucosa, of the elasticity, diameter and vaginal length, leading to reduction of function and sexual satisfaction[30-33]. In the present study, 67.9% of the participants kept their sexual interest although great part of them were not sexually active. Having continued sexual interest results from low prevalence of stenosis soon after treatment and low rate of pelvic pain at palpation (31.4%) and at rest (5.7%). Furthermore, association between older age and low sexual interest ($p<0.001$) has been observed as well as between the presence of scars and fibrosis and decline of sexual desire ($p<0.034$). The literature indicates that ageing and local tissue damage are related to decline of lubrication, vaginal elasticity and sexual response, possibly directly affecting the quality of life of these women. According to Crean-Tate et al.[28], oncologic treatment-related hypoestrogenism and anatomic changes are determinants of female sexual dysfunction.

Radiotherapy treatment can cause physical-functional complications as vaginal stenosis characterized by the reduction of the length and vaginal diameter[10]. According to Damast et al.[32], women submitted to radiotherapy, either brachytherapy or teletherapy may develop vaginal stenosis with incidence rates ranging from 2.5% to 88%. The severity and occurrence of this pelvic dysfunction are influenced by several factors, including individual characteristics (age and clinical diagnosis), type of treatment performed (radiotherapy, chemotherapy and/or surgery) and post-treatment care (use of dilators or hormones)[33]. There is a gap in the

literature regarding the standardization of the method of evaluation and classification of vaginal stenosis, especially in relation to vaginal length and width of the vaginal canal. One of the methods proposed to measure vaginal width is the insertion of a vaginal dilator as wider as possible, keeping in the vaginal canal for at least three minutes without pain or bleeding. Cerentini et al.[34] suggested the conversion of the height and width of the dilator to calculate the vaginal area; however, the heterogeneity of the dimensions of the available dilators hinders the standardization and comparative analysis. In counterpart, vaginal length is frequently evaluated in centimeters with an hysterometer. The literature lacks thorough investigations about the methods of evaluation post-brachytherapy since there is no validated method to evaluate the narrowing of the vaginal width further to the great variability of classifications of narrowing by length, limiting the diagnosis and monitoring of the evolution of vaginal stenosis. This inconsistency justifies the choice of some authors in utilizing only the vaginal length as criteria of diagnosis of stenosis[10,35]. In addition, Silva et al.[36] highlight the lack of studies that propose objective methods to measure the vaginal area and the necessity of this approach for more accurate diagnosis.

The prevalence of vaginal stenosis of the study sample varies according to the criteria adopted in the literature. Flay[37] reports that 8 cm and 10 cm is the regular vaginal length, while Quinn et al.[38] indicate that the mean healthy vaginal length is between 9 cm and 10 cm. The median of the vaginal canal investigated herein (8.8 cm) and the median of six turns of the speculum are dissimilar to the study of Cerentini et al.[34] who analyzed the effects of the use of vaginal dilators post brachytherapy in 88 women, revealing a mean of 7.7 turns of the speculum and 6.6 cm of vaginal canal in the control group evaluated post-brachytherapy. The prevalence of stenosis in this sample was 26.42% considering shorter lengths than 8 cm. However, after applying the criteria of Quinn et al.[38], this prevalence increased to 57.5%. This difference proves the importance of objective and universal measures for the diagnosis of vaginal stenosis since it modifies the diagnosis of large part of the sample.

Previous studies indicate that the prevalence of vaginal stenosis post-radiotherapy may vary between 30.7% and 78.6% consistent with the current findings. It is a late adverse event of oncologic treatment with moderate to severe stenosis more frequent between one and three years post treatment[33,39]. Kirchheiner et al.[40] indicates that in the first three months of brachytherapy, most of the women with locally advanced cervical cancer did not present vaginal stenosis or presented a mild grade reinforcing that vaginal stenosis is usually a late treatment related adverse event.

Brennen et al.[9] reported that the regular use of dilators helps to reduce the vaginal complications resulting from the treatment and encourages patients to resume their daily activities for rehabilitation of the pelvic floor. Monteiro and Gouveia[41] have also highlighted that the specialized consultation for gynecological cancer survivors prevents both dysfunctions of the pelvic floor, improving strength and resistance, reducing edemas and fibrosis and vaginal stenosis. Seland et al.[42] observed that women without access to rehabilitation in the first year post gynecological treatment were more stressed, presented psychological problems and physical symptoms, drawing attention to the importance of this type of continuous care. Pergolotti et al.[35] indicated that specialized services of outpatient rehabilitation of oncologic patients reduced the impact of cancer side effects and its treatment, improved aspects of functional independence, social participation and QoL of these patients at low cost. In that sense, it is clear the importance of oncological specialized outpatient units to prevent complications.

The study limitations are data collected only during the initial evaluation and did not include post-intervention physiotherapy or late effects of the treatment toxicity. In addition, validated questionnaires to evaluate sexual desire were not utilized which hampers the comparison with other studies. It was not possible to evaluate the impact of antineoplastic treatment on the QoL because specific questionnaires as of the European Organisation for Research and Treatment of Cancer (EORTC) were not applied. The component R (repetitions) of the protocol PERFECT was not applied for the functional evaluation of the pelvic floor, which hinders the full analysis of the capacity of repetition of the sustained contractions.

Furthermore, the evaluation of the power of the pelvic floor and presence of scars and fibrosis is an additional limitation because it relies on the experience and perception of the evaluator with potential compromise of the accuracy and reproducibility of the clinical finding. Future interventions should utilize validated scales applied consistently in different moments of the physiotherapy evaluation to understand comprehensively the effects of the oncologic treatment over the clinical and functional variables of these patients.

CONCLUSION

The sociodemographic profile of women with gynecological cancer submitted to brachytherapy at the physiotherapy outpatient unit of "*Hospital Santa Rita da ISCMPA*" indicates median age of 41 years, predominantly married, non-smokers, non-alcohol users and irregular practice of physical activities. Cervical cancer was the most

frequent neoplasm among the cases analyzed, commonly treated with a combination of external chemotherapy and radiotherapy. The main changes identified involved genitourinary tract, specifically dysfunctions of the pelvic floor, as pain and pelvic burning, urinary incontinence, feeling of incomplete emptying, hematuria, in addition to decline of the muscle strength and resistance and elevated prevalence of vaginal stenosis. Among the statistically significant associations, it has been observed that the presence of scars and fibrosis was associated with reduction of sexual desire as well; least endurance was correlated with high occurrence of urgency incontinence and high number of vaginal deliveries was associated with decline of the power of the pelvic muscle floor. These findings reinforce the multifactorial aspect of pelvic dysfunction in women with gynecological cancer, showing the necessity of a comprehensive physiotherapeutic evaluation of gynecological and obstetric history of these patients.

CONTRIBUTIONS

All the authors contributed substantially to the conception and design of the study, acquisition, analysis and interpretation of the data, writing and critical review. All the authors approved the final version to be published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

DATA AVAILABILITY STATEMENT

Data utilized and analyzed were obtained from patients' charts and are not publicly available to protect the privacy and confidentiality. Additional data can be requested to the corresponding author with justification and approved by the institution's ethics committee.

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