

Attitudes and Practices Contributing to Vaginal Stenosis in Women with Cervical Cancer Following Brachytherapy at Cancer Diseases Hospital in Lusaka, Zambia. A Cross Sectional Study

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Abstract

Background: Vaginal stenosis is an important adverse effect of brachytherapy for cervical cancer. This study aimed to determine attitudes and practices contributing to vaginal stenosis following brachytherapy at the Cancer Diseases Hospital in Lusaka—Zambia. **Methods:** An analytical cross-sectional study design was employed, where 163 respondents were randomly selected after meeting inclusion criteria. A researcher-administered questionnaire was used to collect data and SPSS version 25 was used for data analysis. **Results:** Out of the 163 women enrolled in this study, 42.3% had developed vaginal stenosis while 57.7% did not with age range 15 - 60+ years. 76% exhibited good practices to measures against vaginal stenosis while majority (93.9%) of the respondents demonstrated poor attitudes towards measures to prevent the condition. Women with poor practices versus good practices (OR = 1.07, CI = 0.52 - 2.21, p = 0.855), poor attitudes versus good attitudes (aOR = 1.28, CI = 0.29 - 5.71, p = 0.746) and those employed versus unemployed (aOR = 1.76, CI = 0.73 - 4.27, p = 0.210) had increased odds of vaginal stenosis. However, these increasing effects were not significant at 5% level of significance. Although length of brachytherapy showed no significant effect independently, the odds of

having vaginal stenosis were over 2 times higher for women who had been on brachytherapy between 6 and 12 months compared to those on brachytherapy for less than 6 months (OR = 2.45, CI = 1.03 - 5.82, $p = 0.042$). **Conclusions:** Failure to practice recommended measures and poor attitudes towards therapy contributes to vaginal stenosis. Efforts should be channeled towards overcoming religious, traditional, cultural and personal impediments contributing to vaginal stenosis in women with cervical cancer receiving brachytherapy.

Keywords

Attitude, Practices, Cervical Cancer, Brachytherapy

1. Introduction

Brachytherapy is a specific form of radiation therapy used to treat cancer. It consists of placing sealed, radioactive sources directly into or next to the tumor to be treated, either directly or by means of catheters [1]. A commonly observed side effect of pelvic radiotherapy is radiation-induced vaginal stenosis (VS), defined as abnormal tightening and shortening of the vagina due to the formation of fibrosis [2]. Vaginal stenosis may occur following external beam radiation therapy (EBRT) or brachytherapy or both delivered in the definitive, adjuvant or palliative setting. Vaginal stenosis has negative impacts on patient well-being, in particular sexual dysfunction and dyspareunia and implications for limiting physical examination in the post-treatment period [3].

Multiple risk factors for the development of brachytherapy-induced vaginal stenosis include patient age, radiotherapy dose and volume of vagina treated, combination of EBRT and brachytherapy and tumour extension to the vagina [2]. Age > 50 years has been associated with an increased risk of Vaginal stenosis in patients treated with pelvic and/or vaginal radiotherapy for cervix cancer [3]. Pallor reaction of vaginal tissues has also been proposed as a predisposing factor for late vaginal stenosis as both have a pathophysiological basis related to mucosal thinning and dryness, atrophy, inflammation and fibrosis [2].

Prevention of vaginal stenosis involves the use of penile prosthesis called vaginal dilators, penetrative sex and regular reviews [4]. Consistent use of these measures can reduce chances of developing stenosis and minimize the extent in cases where it develops. Compliance with dilatation therapy has been associated with increasing vaginal comfort and control of pelvic floor muscles, and preserving overall vaginal health and sexual function. Dilator use compliance also enables adequate pelvic examinations to monitor for any recurring changes in vaginal tissue, an important element of cancer surveillance.

Regardless of the reported benefits of vaginal dilation therapy, the low level of compliance of women has remained a problem [5]. Further, studies have shown that women experience undesirable emotions while using the dilator, including embarrassment, anxiety, and fear; they also anticipate pain, loss of modesty, and

experience a recollection of bad memories ranging from painful cancer treatments to sexual violence [5]. This affects their attitude towards therapy, the workers and use of vaginal dilation and frequent sexual penetration to prevent vaginal stenosis. The exploration on the experiences of gynaecological cancer patients undergoing brachytherapy was found to be of a difficult nature [6]. Poor attitudes towards therapy cancer patients such as fear, sexual inactivity, guilty from breaking religious and traditional, experience anxiety when going to the radiotherapy department because of a lack of knowledge of, and/or misconceptions about the treatment [6] contributed to vaginal stenosis.

The International Atomic Energy Agency [7] publication revealed that there were myths around cervical cancer treatment and outcomes to the extent that many resort to visiting traditional healers and the use of herbs. Radiation-induced vaginal stenosis is a commonly observed side effect following treatment with pelvic radiotherapy pelvic cancers. There should be care to prioritize and recognize the potential negative impact of vaginal stenosis on the physical and psychological well-being of patients. This study therefore aimed at determining attitudes and practices that contribute to poor adherence to preventive measures against vaginal stenosis in women with cervical cancer following brachytherapy at the Cancer Diseases Hospital (CDH) in Lusaka, Zambia.

2. Material and Methods

This cross sectional study was conducted between September and December 2021 among 163 participants at CDH in Lusaka Province of Zambia. The CDH was chosen as it is the only Hospital offering cancer treatment in the country. Total enumeration of patients on brachytherapy was done from which sampling was generated. Systematic sampling was employed in selection of the study participants who were all patients that received services at CDH. Data were collected from willing participants to determine the attitudes and practices that contributed to poor adherence to preventive measures against vaginal stenosis in women with cervical cancer following brachytherapy. Data for 163 participants were analyzed using SPSS version 25 to establish the attitude and practices contributing to poor adherence to preventive measures against vaginal stenosis in women with cervical cancer following brachytherapy.

Study Design: Analytical cross sectional study.

Study Location: Cancer Diseases Hospital (CDH) in Lusaka Province of Zambia.

Study Duration: September to December 2021.

Sample size: 163 patients.

Sample size calculation: Sample size of 163 was calculated using the Gosh formula (Gosh, 2013) from a population of patients treated with brachytherapy in 2019 = 1602 (CDH 2019 statistics).

Subjects & selection method: Systematic sampling was used for participants receiving brachytherapy at CDH. From the patient size of 1602 and calculated sample size of 163, the sampling interval was 10 ($1602/163 = 10$). Therefore,

every 10th patient was selected from the patient list until the desired sample size of 163 was reached.

Inclusion criteria: for someone to be a suitable respondent to participate in this research, she must have been a patient suffering from cervical cancer and was currently receiving brachytherapy as a result of cervical cancer or had received brachytherapy in the past 12 months prior to the interview. The inclusion criteria did not consider the presence or absence of vaginal stenosis in the respondent.

Exclusion criteria: any sign of recurrent or metastatic cancer, medical or psychological problems and all those with vaginal stenosis not linked to cervical cancer radiation therapy were excluded from the study.

2.1. Procedure Methodology

Two trained Field Research Assistants were involved in reaching out to participants at CDH. Questionnaires were used collect data from individual participants using face to face approach.

2.2. Statistical Analysis

Data were entered in Microsoft excel and exported to SPSS V.25 for analysis. After cleaning, descriptive statistics were calculated and presented as frequencies and proportions. Chi square and Fisher's exact statistical tests were used to compare the distribution of vaginal stenosis across baseline characteristics at 5% level of significance. The binomial logit model was used in model estimation using an investigator-led backward stepwise approach, guided by various fit statistics. The best-fit model had a correct-classification score of 70%, sensitivity of 49%, and specificity of 85%. The ROC area was at 69 percent.

3. Ethical Consideration

The approval to conduct the study was obtained from University of Zambia Research Ethics Committee (REF. 1770-2021) and National Health Research Authority (NHRA). Informed consent was sought from each study participant prior to enrolment. In situations where the respondent desired to withdraw and it was outside the control of the interviewer, they were freely allowed to do so and all their information shredded immediately, however, no patient withdrew from the study. Information that was obtained during the study was treated with utmost confidentiality as it bordered on personal information. Written permission from study site was also be obtained.

4. Result

A total of 163 patients participated in the study over one third of the respondents were aged between 40 to 49 years 57 (35%) and at least 50 years old 56 (34.3%). More than half of the respondents 93 (57.1%) were single while 79 (42.9%) of women were married at the time of the study. Over one-third 70 (42.9%) of the

respondents were from within Lusaka province, while the rest 93 (57.1%) were referred from outside Lusaka province. The majority 96 (58.9%) lived over 10 kilometres from the Cancer Diseases Hospital whereas, under a third 50 (30.7%) resided within 5 kilometres of the health facility.

All study respondents were Christians, of which over a quarter 45 (27.6%) belonged to the catholic and Pentecostal faiths each, while 34 (20.9%) of them belonged to the Seventh-Day Adventist faith. Over one-third 57 (35%) of the respondents attained secondary education followed by those who have had only primary education 53 (32.5%). The majority 126 (77.3%) of the respondents were unemployed. The mean reported length of therapy at the time of the study was 5.1 (± 3.3) months ranging from as low as 3 months to as high as 40 months. (Table 1).

Table 1. Comparison of baseline characteristics between levels of vaginal stenosis.

Characteristic	Vaginal stenosis			P-value
	Overall, n (%)	Yes, n (%)	No, n (%)	
Age in years				
15 - 25 years	8 (4.9)	4 (50.0)	4 (50)	0.309 ^F
26 - 39 years	42 (25.8)	22 (52.4)	20 (47.5)	
40 - 49 years	57 (35.0)	24 (42.1)	33 (57.9)	
At least 50 years	56 (34.4)	19 (33.9)	37 (66.1)	
Marital status				
Single	93 (57.1)	34 (37.6)	58 (62.4)	0.200 ^C
Married	70 (42.9)	34 (48.6)	36 (51.4)	
Distance from CDH				
Under 5 km	50 (30.7)	17 (34.0)	33 (66.0)	0.295 ^C
5 - 10 km	17 (10.4)	9 (52.9)	8 (47.1)	
Over 10 km	96 (58.9)	43 (44.8)	53 (55.2)	
Religion				
Catholic	45 (27.6)	12 (26.7)	33 (73.3)	0.019 ^C
Adventist	34 (20.9)	18 (52.9)	16 (47.1)	
Pentecostal	45 (27.6)	25 (55.6)	20 (44.4)	
Others	39 (23.9)	14 (35.9)	25 (64.1)	
Highest education level				
None	11 (6.7)	7 (63.6)	4 (36.4)	0.223 ^F
Primary	53 (32.5)	21 (39.6)	32 (60.4)	
Secondary	57 (35.0)	20 (35.1)	37 (64.9)	
Tertiary	42 (25.8)	21 (50.0)	21 (50.0)	
Employment status				
Employed	37 (22.7)	20 (54.1)	17 (45.9)	0.101 ^C
Unemployed	126 (77.3)	49 (38.9)	77 (61.1)	
Length on brachytherapy				
Under 6 months	124 (76.1)	76 (61.3)	48 (38.7)	0.184 ^F
6 - 12 months	36 (22.1)	16 (44.4)	20 (55.6)	
Over 12 months	3 (1.8)	2 (66.7)	1 (33.3)	

C = Chi-squared test; F = Fisher's exact test.

As shown in **Table 2**, common reported signs/symptoms of vaginal stenosis included vaginal pain 129 (79.1%), unexplained vaginal bleeding 77 (47.2%), pain during sex 74 (45.4%) and experiences of a tight vagina 91 (55.8%). Other common signs/symptoms reported were bloody discharge 20 (27.4%) and watery vaginal discharge 52 (71.2%). Under half, 69 (42.3%) of the respondents reported having signs/symptoms indicative of vaginal stenosis whereas 94 (57.7%) had no signs/symptoms indicating vaginal stenosis.

Under two thirds 98 (60.1%) of the respondents were sexually active and among these, just over half 50 (51%) engaged in sexual activity weekly whereas over one third 34 (34.7%) engaged in sexual activity twice a week. Almost all 162 (99.4%) respondents reported using vaginal dilators always and being in control of their use. Over half 94 (57.7%) of the respondents often skipped dilator use, while over two thirds 110 (67.5%) reported often forgetting to use the dilator. Many 114 (69.9%) of the respondents used dilators as a method of preventing vaginal stenosis, whereas a quarter 41 (25.2%) reported using penetrative sex as a preventive measure under a quarter, 39 (24%) of the respondents had poor practices while the majority, 124 (76%) reported good practices (**Table 3**).

Table 4 shows that all respondents 163 (100%) would skip the use of a dilator when they felt better and because of discomfort from the dilator. Similarly, most respondents reported that they would skip use of dilators because of feeling sick 155 (95.1%), pain from the dilator 157 (96.3%), interference with sexual life 160 (98.2%), considering the practice as sinful/embarrassing and because their religion/tradition forbids use of vaginal dilators 159 (97.5%). The majority 150 (93.9%) of the respondents expressed poor attitude towards vaginal stenosis preventive measures, whereas 10 (6.1%) had good attitude.

Table 5 shows odds ratio estimates at univariable and multivariable logistic regression analysis. Women with poor practices compared to those with good practices (OR = 1.07, CI = 0.52 - 2.21, p = 0.855), poor attitudes compared to good attitudes (aOR = 1.28, CI = 0.29 - 5.71, p = 0.746) and those employed compared to unemployed (aOR = 1.76, CI = 0.73 - 4.27, p = 0.210) had increased

Table 2. Prevalence of vaginal stenosis (n = 163).

Signs of vaginal stenosis experienced	Always n (%)	Often n (%)	Sometimes n (%)	Rarely n (%)	Never n (%)
Vaginal pain	22 (13.5)	4 (2.5)	129 (79.1)	5 (3.1)	3 (1.8)
Vaginal bleeding	2 (1.2)	77 (47.2)	12 (7.4)	72 (44.2)	
Pain during sex	29 (17.8)	3 (1.8)	74 (45.4)	3 (1.8)	54 (33.1)
Tight vagina	91 (55.8)	8 (4.9)	48 (29.4)	4 (2.5)	12 (7.4)
Other signs/symptoms	Frequency (n)		Percent (%)		
Bloody discharge	20		27.4		
Watery discharge	52		71.2		
Yellowish discharge	1		1.4		

Table 3. Practices contributing to vaginal stenosis (n = 163).

Characteristics	Category	Frequency (n)	Percent (%)
Sexually active	Yes	98	60.1
	No	65	39.9
Frequency of sex	Weekly	50	51.0
	Twice a week	34	34.7
	≥3 times	14	14.3
Frequency of dilator use	Always	162	99.4
	Often	1	0.6
Control over dilator use	Yes	162	99.4
	No	1	0.6
Skipping dilator use	Always	69	42.3
	Often	94	57.7
Forgetting use of dilator	Always	53	32.5
	Often	110	67.5
Method of preventing vaginal stenosis used	Dilators	114	69.9
	Herbs	8	4.9
	Penetrative sex	41	25.2

Table 4. Attitudes contributing to vaginal stenosis (n = 163).

Statement	Category	Frequency (n)	Percent (%)
Would skip use of the dilator when feeling better	Agree	163	100
	Strongly agree	8	4.9
Would skip use of the dilator when feeling sick	Agree	155	95.1
	Strongly agree	6	3.7
Would skip use of the dilator because of pain from the dilator	Agree	157	96.3
	Strongly agree	3	1.8
Would skip use of the dilator because it interferes with sexual life	Agree	160	98.2
	Strongly agree	163	100
Would skip use of the dilator because of discomfort	Strongly agree	50	30.7
	Agree	113	69.3
Avoids use of the dilator because of feeling sinful/embarrassed	Strongly agree	3	1.8
	Agree	160	98.2
Tradition forbids use of dilators as it is a taboo	Strongly agree	4	2.5
	Agree	159	97.5
Religion forbids use of dilators	Strongly agree	4	2.5
	Agree	159	97.5

Table 5. Univariable and multivariable logistic regression analysis for the outcome, vaginal stenosis.

Variables	Univariable estimates			Multivariable estimates		
	OR	CI (95%)	p-value	aOR	CI (95%)	p-value
Religious affiliation						
Catholic	Ref			Ref		
Seventh day adventist	3.09	1.20, 7.95	0.019	3.52	1.27, 9.51	0.015
Others	1.54	0.61, 3.90	0.363	1.82	0.68, 4.87	0.235
Pentecostal	3.44	1.42, 8.32	0.006	3.92	1.49, 10.3	0.005
Education level						
None	Ref			Ref		
Primary	0.38	0.10, 1.44	0.153	0.43	0.11, 1.78	0.246
Secondary	0.31	0.08, 1.18	0.087	0.41	0.10, 1.69	0.218
Tertiary	0.57	0.15, 2.25	0.423	0.65	0.14, 2.99	0.583
Employment status						
Unemployed	Ref			Ref		
Employed	1.85	0.88, 3.87	0.103	1.76	0.73, 4.27	0.210
Practices						
Good	Ref			Ref		
Poor	1.07	0.52, 2.21	0.855	0.92	0.40, 2.12	0.854
Attitude						
Good	Ref			Ref		
Poor	1.77	0.44, 7.11	0.421	1.28	0.29, 5.71	0.746
Length on brachytherapy						
Under 6 months	Ref			Ref		
6 - 12 months	1.98	0.93, 4.19	0.074	2.45	1.03, 5.82	0.042
Over 12 months	0.79	0.07, 8.97	0.850	0.71	0.06, 9.10	0.795

OR = unadjusted odds ratio, CI = confidence interval; aOR = adjusted odds ratio.

odds of vaginal stenosis. However, there was not enough evidence of a real effect on odds of vaginal stenosis associated with these variables at 5% level of significance. The effect of increasing the level of education compared to having no formal education was to decrease the odds of vaginal stenosis at univariable and multivariable analysis. Similarly, this predictive effect was not significant at both levels of analysis. On the other hand, the odds of having vaginal stenosis were over 2 times higher for women who had been on brachytherapy between 6 and 12 months compared to those on brachytherapy for less than 6 months (OR = 2.45, CI = 1.03 - 5.82, p = 0.042) and this effect was significant at 5% significance

level.

5. Discussion

This study determined the attitudes and practices contributing to vaginal stenosis in women with cervical cancer following brachytherapy at the CDH. Vaginal Stenosis continuously develops with time, meaning that mild VS occurs in the first year, and moderate or severe VS—three years after the treatment is finished [2]. Further, studies have reported that VS present high prevalence women undergoing pelvic radiotherapy treatment, around 3% to 33%, interfering with quality of life [7] [8]. The situation in Zambia is very similar to many other countries where VS cases are recorded leaving several women vulnerable.

The findings of this study revealed that the older a woman would be the more likely to have been diagnosed with cervical cancer. This however, was contrary to a study by Funston *et al.* [9] who reported most incident age range of 25 to 49 years and reported that most women, when diagnosed with the disease, do not require brachytherapy, which is indicated when the disease is in more advanced stages. It is also noteworthy that the results of the present study congruent to a study carried out in southern Brazil including women undergoing brachytherapy, which showed a minimum age of 44 years and a maximum of 77 years, with a mean age of 51 years and a more incident age range of 50 - 59 years. However, the same investigation showed that most women were married (72%), unlike the findings of this study [10]. The study found that women' educational status is associated with VS with the highest incident among women without any form of education. This implies that low education poses a risk for women to develop VS. The results from the study also showed that VS was common among women who were unemployed than those with an employment. However, the study could not compare this result with other studies because from the best of our knowledge the first study that assessed the relationship between RTIVS and socio-demographic characteristics considered in the study. The study found that women who received chemo radiation were more prone to VS than those who received radiotherapy only. This is consistent with a study conducted in which reported that among women treated with image-guided brachytherapy for cervical or endometrial cancer, vaginal dose and volume were also associated with an increased risk of VS [11] [12].

This study found that majority (89.6%) of the respondents demonstrated a more positive attitude toward usage of vaginal dilators. This is contrary with a systematic review conducted on the patients' perception and adherence to vaginal dilator therapy which reported negative perceptions toward VD were frequently mentioned as a major barrier to VD therapy [5]. Some women perceived VD as arduous, annoying, or bothersome chore [13]. In a study by Edmond *et al.* it was reported that women emphasized positive perspectives toward VD as a facilitator of the therapy similar to our findings. For these women, VD was an important therapy that made them feel better and retain a sense of normality

[14].

Vaginal dilation therapy is frequently recommended to prevent and reduce the abovementioned side effects. Its functions include minimizing vaginal stenosis and scarring, preventing adhesions, promoting improved vaginal healing, relaxing pelvic floor muscles, and preventing pain [15]. This study found that there was good usage of VD among women. This is supported by [15] who strongly recommended either the use of a vaginal dilator or frequent sexual intercourse after completion of radiotherapy for cervical cancer survivors to maintain a healthy vaginal canal. However, a systematic review by Miles and Johnson concluded that there is no concrete evidence that routine regular vaginal dilation during RT treatment prevents stenosis or improves quality of life [16]. Several authors have cited vaginal dilation as the major therapeutic strategy to prevent and treat Radiotherapy-induced VS [16] [17] [18].

6. Conclusion

Radiation-induced VS is a commonly observed side effect following treatment with pelvic RT for uterine, cervical, vaginal and anorectal cancers. Survivorship care should prioritize and recognize the potential negative impact of VS on the physical and psychological well-being of patients. However, there is a paucity of high-level evidence of the attitudes and practices on prevention and management strategies for VS, and more up-to-date empirical data are required. The effect of increasing the level of education compared to having no formal education was to decrease the odds of vaginal stenosis. However, this predictive effect was not statistically significant at both levels of analysis in this study. Similarly, women with poor practices compared to good practices, poor attitudes compared to good attitudes and those employed compared to unemployed had increased odds of vaginal stenosis. On the other hand, although length n brachytherapy showed no significant effect, the odds of having vaginal stenosis were 2.45 times higher for women who had been on brachytherapy between 6 and 12 months compared to those on brachytherapy for less than 6 months. Failure to practice recommended measures and poor attitudes towards therapy contributes to vaginal stenosis. Efforts should be channelled towards overcoming religious, traditional, cultural and personal impediments contributing to vaginal stenosis in women with cervical cancer receiving brachytherapy [19] [20] [21].

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Declaration

I, Matipa Roydah, do hereby declare to the Senate of University of Zambia that

this dissertation is my own original work and has neither been submitted nor been concurrently submitted for degree award in any other Institution.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from the University of Zambia Biomedical Ethic Committee (REF N0...1770-2021....) and the National health research committee.

Availability of Data and Material

The datasets used and/or analyzed during the current study are available from the corresponding author and the University of Zambia on reasonable request.

Authors' Contributions

CMN, SM, VMK, CS, NNT AND MB contributed to the conception of the project, proposal writing, data collection and study supervision, data analysis and manuscript writing.

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Competing Interests

The authors declare that they have no competing interests in this study.

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