

Self-reported oral hygiene habits and gingival bleeding in women with breast cancer: evidence from an observational and prospective study

Hábitos de higiene oral e sangramento gengival autorrelatados em mulheres com câncer de mama: evidência de um estudo observacional e prospectivo

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Abstract

Objectives: to describe and examine oral hygiene habits and self-reported gingival bleeding in women with breast cancer undergoing chemotherapy.

Methods: in an observational and prospective study, 140 women were evaluated during chemotherapy between 2017 and 2019. **Results and Conclusion:** more than 40% of participants reported gingival bleeding at some point during chemotherapy. Flossing was unsatisfactory at baseline and in the intermediate cycle as well as did not affect self-reported gingival bleeding. The amount of tooth brushing per day was a predictor of self-reported gingival bleeding at the end of chemotherapy.

Keywords: Breast Neoplasms; Chemotherapy; Oral Health.

Resumo

Objetivos: descrever e examinar os hábitos de higiene bucal e o autorrelato de sangramento gengival em mulheres com câncer de mama em quimioterapia.

Métodos: em um estudo observacional prospectivo, foram avaliadas 140 mulheres ao longo da quimioterapia, entre 2017 e 2019. **Resultados e Conclusão:** mais de 40% das participantes relataram sangramento gengival em algum momento da quimioterapia. O uso de fio dental foi insatisfatório no baseline e ciclo intermediário, bem como não afetou o autorrelato de sangramento gengival. A quantidade de escovação dentária por dia foi um preditor para o autorrelato de sangramento gengival ao fim da quimioterapia.

Palavras-chave: Neoplasias da Mama; Quimioterapia; Saúde Bucal.

The oral health of breast cancer patients or survivors is a concern for dentistry. Systemic treatment, such as chemotherapy, can impact oral health and cancer treatment. Furthermore, oral health care during cancer treatment is often unsatisfactory as well as adverse effects are often underdiagnosed and untreated. Although it is impossible to eliminate the occurrence of adverse effects in the oral cavity, it is possible to prevent and reduce the impact^{1,2}.

Hence, understanding self-reported oral hygiene habits, such as tooth brushing and flossing, is a useful investigation for the oral health of women undergoing treatment for breast cancer¹. As discussed by Willershausen et al. (2019), reports of adverse effects of cancer therapies on periodontal tissue are rare. In this investigation, there was a statistically significant difference suggesting more bleeding in the gingival sulcus in women who underwent breast cancer treatment when compared to women without breast cancer. However, the breast cancer group was not homogeneous for the treatment factor³. This outcome is different from what was observed by Taichman et al. (2015), in

which having breast cancer did not affect periodontal health⁴. It is noteworthy that both investigations were carried out after breast cancer treatment.

There is a need to provide periodontal therapy in patients who will undergo cancer treatment, as well as a follow-up during and after treatment⁵. In this context, gingival bleeding is an indicator of gingival inflammation and periodontal diseases, such as gingivitis and periodontitis. It is possible to investigate this condition by self-report (gingival bleeding during oral hygiene) or by probing the gingival sulcus in a clinical setting. Also, there may be a difference in the impact of self-reported and probe-stimulated gingival bleeding on quality of life^{6,7}.

Thus, the objective of the study was to longitudinally describe oral hygiene habits and self-reported gingival bleeding in women with breast cancer undergoing chemotherapy exclusively (with or without surgery), examining how they may interact during cancer therapy. The hypothesis was that oral hygiene habits could influence the self-report of gingival bleeding during

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chemotherapy treatment for breast cancer.

An observational and prospective study was carried out to investigate the quality of life and toxicity in women with breast cancer during chemotherapy treatment. Secondly, oral hygiene habits and self-reported gingival bleeding were evaluated, reporting these outcomes as a short communication. Ethically, the study project was appreciated and approved by the Ethics Research Committee (CAAE: 63009616.4.0000.5393), based on ethical guidelines, such as the Declaration of Helsinki (1964) and 466/12 from the Brazilian National Health Council. Each participant was duly informed about the study and how to participate, freely agreeing in writing.

Between March 2017 and February 2019, 140 women from three cancer treatment centers participated in the study (included for convenience). The participants were women diagnosed with breast cancer, who had never undergone cancer treatment. All had the cognitive ability to participate and none had diabetes mellitus. Participants had data collected from their clinical records, as well as answered questions about the variables of interest in a private space. Each participant was evaluated before treatment (baseline), at the intermediate chemotherapy cycle (IC), and the end of chemotherapy (EC).

All participants were asked about daily brushing and flossing.

It was recorded whether they brushed/ flossed at least once a day (yes or no), as well as the daily amount, assigning zero to participants who answered "no". In addition, all participants were asked if they observed gingival bleeding when cleaning their teeth (yes or no).

Using the jamovi software (1.6.16), the relative and absolute frequencies of each variable were described. Correlations were based on Spearman's test and associations on Pearson's chi-square test, including odds ratio and 95% confidence interval, if applicable. To examine whether the daily amount of tooth brushing and flossing could predict gingival bleeding, a binomial logistic regression was used. Comparisons were based on the Mann-Whitney test, followed by rank biserial correlation as an effect size measure. Socioeconomic status was categorized by age (< 50 versus ≥ 50), race (black or mixed versus white), occupation (yes versus no), income (≤ 1 versus > 1 Brazilian minimum wage), and schooling (incomplete versus complete secondary education).

Table 1 shows the frequency of self-reported oral hygiene habits and gingival bleeding. It is possible to observe that all participants reported brushing their teeth in all segments. However, flossing was not frequent in BL and the IC segment, as well as more than 40% of participants reported gingival bleeding during some point of chemotherapy.

Table 1. Self-reported oral hygiene habits and gingival bleeding. Aracaju, Sergipe, Brazil, 2017 à 2019.

Variable	Baseline		Intermediate cycle		End of chemotherapy		Overall	
	N	%	N	%	N	%	N	%
Tooth brushing								
Yes	140	100.0	140	100.0	140	100.0	140	100.0
1-2	41	29.3	24	17.1	43	30.7		
3 or more	99	70.7	116	82.9	97	69.3		
Flossing								
Yes	57	40.7	59	42.1	133	95.0	138	98.6
No	83	59.3	81	57.9	7	5.0	2	1.4
1-2	36	25.7	40	28.6	109	77.9		
3 or more	21	15.0	19	13.6	24	17.1		
Gingival bleeding								
Yes	26	18.6	30	21.4	26	18.6	57	40.7
No	114	81.4	110	78.6	114	81.4	83	59.3

N: absolute frequency. %: relative frequency.

Significant and positive correlations were observed after Spearman's test between the amount of daily tooth brushing in the study segments (all $p < 0.001$): BL versus IC ($\rho = 0.574$), BL versus EC ($\rho = 0.754$), and IC versus EC ($\rho = 0.475$). Regarding flossing, only between BL and IC ($\rho = 0.849$). Also, significant and positive correlations were observed between the amount of daily tooth brushing and daily flossing in BL ($p < 0.001$ and $\rho = 0.345$) and IC ($p = 0.030$ and $\rho = 0.184$) segments, but not

in the EC ($p = 0.081$). This suggests that there is a connection between self-reported tooth brushing and flossing in the BL and IC segments.

However, there was no significant association after Pearson's chi-square test between flossing at least once a day and gingival bleeding in all segments (all $p > 0.05$). Also, the amount of daily tooth brushing and daily flossing were not significant predictors

for gingival bleeding after binomial logistic regression in BL and IC, as well as flossing in EC (all $p > 0.05$) segments. In the EC, the amount of daily tooth brushing was a significant predictor ($p = 0.024$, OR: 2.48 [1.12, 5.48]), suggesting that self-report of a higher daily amount of tooth brushing may predict self-report of gingival bleeding.

Comparing the daily amount of tooth brushing and flossing between participants with and without gingival bleeding, there was no difference at baseline ($p = 0.179$ and 0.160), and in the intermediate cycle ($p = 0.419$ and 0.054), respectively. At the end of chemotherapy, there was no difference in flossing ($p = 0.780$), but participants with self-reported gingival bleeding had a higher amount of daily tooth brushing ($p = 0.036$ and effect size = 0.226).

Table 2. Association between socioeconomic status, flossing (at least once a day) and gingival bleeding. Aracaju, Sergipe, Brazil, 2017 à 2019.

Variable	Age	Race	Occupation	Schooling	Income
Baseline					
Flossing	$p = 0.755$	$p = 0.141$	$p = 0.091$	$p = <0.001^*$	$p = 0.001^*$
Gingival bleeding	$p = 0.007^*$	$p = 0.792$	$p = 0.936$	$p = 0.855$	$p = 0.131$
Intermediate cycle					
Flossing	$p = 0.752$	$p = 0.190$	$p = 0.043^*$	$p = <0.001^*$	$p = 0.001^*$
Gingival bleeding	$p = 0.746$	$p = 0.242$	$p = 0.930$	$p = 0.742$	$p = 0.400$
End of chemotherapy					
Flossing	$p = 0.727$	$p = 0.410$	$p = 0.229$	$p = 0.906$	$p = 0.342$
Gingival bleeding	$p = 0.342$	$p = 0.792$	$p = 0.936$	$p = 0.113$	$p = 0.131$

*: statistically significant

Before applying these results, it is important to consider that these are measures from self-report. As discussed by Melo, Marques, and Silva (2017), there is a response bias to a question that involves social acceptability⁸. Thus, it is possible that self-reports were overrated to some degree. Still, in the baseline and intermediate cycle segments, most participants did not use dental floss at least once a day. Also, flossing was modifiable by socioeconomic status in these segments. It has been widely investigated and described how socioeconomic factors impact breast cancer treatment and survival⁹. However, as far as we know, the impact of socioeconomic status on self-report oral hygiene habits during chemotherapy treatment for breast cancer was not previously described.

This leads us to issues in oral health care during and after adjuvant chemotherapy for breast cancer, considering gingival bleeding and periodontal disease. Oral health care should provide patients with instructions on oral hygiene and possible oral side effects, in addition to the need for dental follow-up. In the literature, it is necessary to recognize the oral health and dental needs of women with breast cancer, integrating medical and dental care during cancer treatment¹⁰.

Table 2 shows the association between socioeconomic status, flossing (at least once a day), and gingival bleeding. At baseline, there was an association between using dental floss once a day and incomplete secondary education (OR: 0.22 [0.11, 0.46]), and family income less than one Brazilian minimum wage (OR: 0.31 [0.15, 0.64]), as well as between self-reported gingival bleeding and age equal or more than 50 years (OR: 0.28 [0.11, 0.73]). In the intermediate cycle, there was an association between flossing once a day and not having an occupation (OR: 0.49 [0.25, 0.98]), incomplete secondary education (OR: 0.22 [0.10, 0.46]) and family income less than one Brazilian minimum wage (OR: 0.31[0.15, 0.63]). At the end of chemotherapy, there was no association.

Regarding tooth brushing and self-reported gingival bleeding, a French study on non-cancer patients had interesting results. Veynachter et al. (2020) described the overall prevalence of gingival bleeding as 63.2%, mostly seen after tooth brushing and in women. Also, younger women had a higher frequency of self-reported gingival bleeding¹¹, similar to what was observed in our investigation in the baseline segment. However, we asked whether women under age 50 were more likely to see gingival bleeding (if any) than women age 50 and over, which would change the association.

An interesting result of this investigation was the amount of tooth brushing as predicted to report gingival bleeding at the end of chemotherapy. On the other hand, it is possible to question whether "social acceptability"⁸ modified the self-report (overrating) since at this stage, all the participants were already familiar with the questions and knew they would be asked about gingival bleeding. On the other hand, it is possible to hypothesize that brushing more often was a way to deal with gingival bleeding, or even the etiological factor, as trauma¹². The report of this investigation also corroborates the outcome

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of García-Chías et al. (2019), in which periodontal status was associated with oral side effects in cancer patients¹³, portraying the importance of prospectively examining oral hygiene and periodontal health.

Lastly, it is possible to conclude that self-reported gingival

bleeding affected a significant number of women with breast cancer throughout chemotherapy treatment, despite high self-reported daily tooth brushing, which acted as a predictor at the end of chemotherapy. Daily flossing was unsatisfactory at baseline and in the intermediate cycle but did not affect self-reported gingival bleeding.

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