

Original article

Don't forget the dentist: Dental care use and needs of women with breast cancer



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ABSTRACT

Purpose: Patients with breast cancer may develop dental problems due to treatment. We examined the prevalence of their dental care use and needs, compared the prevalence of use with that of the general population, and examined which factors predict patients' dental care use.

Methods: Patients with primary breast cancer completed a questionnaire at 6 and 15 months post-diagnosis. Medical data were retrieved from medical records. The prevalence of dental care use and needs was examined with descriptive analyses. Associations between predictors and dental care use were examined with multivariate analyses.

Results: Twenty-one percent of 746 participants visited their dentist at least once in the past three months at 6 months, and 23% at 15 months post-diagnosis. The estimated percentage of women with at least one contact with their dentist in 12 months was low compared to the general female population (31.9% versus 79.5%). One to two percent of the respondents wanted more contact. Having dental care insurance (odds ratio 1.80; 95% CI, 1.08–3.00), chemotherapy (odds ratio 1.93; 95% CI, 1.21–3.06), and clinical distress 6 months post-diagnosis (odds ratio 2.53; 95% CI, 1.70–3.79) predicted use of dental care 9 months later.

Conclusions: Up to 15 months post-diagnosis, breast cancer patients' dental care use is lower than warranted. Oncologists and cancer nurses are recommended to inform patients about dental risks, and to encourage them – particularly those without insurance – to visit their dentist. Occurrence of dental problems should be monitored, especially in patients who receive chemotherapy or who are clinically distressed.

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Introduction

Breast cancer survivors face a range of disease- and treatment related difficulties, including fatigue, distress, lack of physical fitness, and menopausal problems [1,2]. It is less recognized that they may also suffer from dental problems, primarily after

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adjuvant systemic chemotherapy [3–12] and less after radiotherapy [4,8]. Reported dental problems include bleeding, periodontal infection, caries, dry mouth, and especially oral mucositis. Oral mucositis is defined as inflammatory or ulcerative lesions of the oral tract [13]. Symptoms range from having taste loss, pain and infections to problems with eating solid foods. The condition may become severe enough to interfere with scheduled treatments, which in turn may lead to higher health care use and costs [14–17]. Of all cancer patients who receive conventional chemotherapy, between 20 and 40 percent develops mucositis [18]. For patients with breast cancer, the prevalence of mucositis is particularly high among those who receive TAC (docetaxel, doxorubicin and cyclophosphamide) chemotherapy [19].

There is some evidence that anti-estrogen treatments can also have a negative impact on the oral health of women with breast cancer. A pilot study demonstrated that women with postmenopausal breast cancer on aromatase inhibitors more often experienced periodontitis, with more oral sites that bled on probing, more sites with hardened dental plaque, and higher maximum attachment loss, compared to women without a breast cancer diagnosis [20]. Treatment with Tamoxifen or an aromatase inhibitor possibly also increases the risk for other dental problems [4], but, as for yet, these effects have to be further examined [21] (see also [5]).

In order to prevent or restrict the range and severity of dental problems, patients with breast cancer may benefit from a visit to their dentist before starting adjuvant therapy [4,12,22–24]. Clinicians, nurse practitioners, and cancer nurses may advise them to do so. The better the condition of the mouth and teeth, the less likely the chance that dental infections and problems will occur or intensify when treatment weakens the patients' immune system. If needed, the dental care provider may offer additional information about treatment-related dental problems, give instructions about appropriate self-care oral hygiene practices, or – depending on the type of treatment – recommend additional visits during treatment. However, to date, little is known about breast cancer patients' actual dental care use and predictors thereof. Oncologists and cancer nurses have limited insight into whether and which patients with breast cancer visit their dentist.

In this multicenter study we prospectively investigated Dutch breast cancer patients' dental care use and needs, and compared the patients' dental care use to that of women in the Dutch general population. There were two assessment points: 6 months post-diagnosis, and 9 months later when most patients have had their primary surgery and have completed adjuvant radio- and chemotherapy. We also investigated whether dental care use is associated significantly with age, educational level (as a proxy for income), having dental care insurance, cancer stage, treatment type, and clinical distress. Our goal was to determine which patients are at increased risk of underutilization of dental care services over time. Distress was included as a potential risk factor for underuse of dental care because it has been suggested that women with breast cancer who have high distress levels, may be less likely to see such care as a priority [25].

Methods

Participants and design

Women with primary breast cancer who had been diagnosed up to six months earlier in one of nine hospitals in the Netherlands were eligible for the study, irrespective of type of treatment. Patients younger than 18 years, not literate in Dutch, or with a prognosis of three months or less were excluded. Participating centers could also exclude patients who were already participating

in a concurrent study. Inclusion took place between March, 2011 and March, 2013.

The study had a prospective, observational design. Participants received a questionnaire at 6 months (time window 5–7 months) and 15 months (time window 14–16 months) post-diagnosis. Medical data were retrieved from the medical records. Following Dutch guidelines and regulations regarding ethics review, the study was exempted from formal ethical review by the institutional review boards of the participating centers, based on its purely observational nature.

Construction of the questionnaire and pilot study

The questionnaire was constructed by three of the co-authors (DNNL, MAGS, JCMdH); one junior and two senior Medical Psychology researchers. The assessed study variables and answer modalities were described in a study protocol, which was sent to a study steering group, and at least one involved health care provider of each participating hospital for evaluation. Nurse practitioners, oncologists, radiation oncologists, medical psychologists, and a breast cancer surgeon were represented. The resulting questionnaire was pilot tested for content, comprehension and ease of completion in a group of ten women, of whom five had had breast cancer. Based on their responses, a few minor textual revisions were made.

Procedure

Eligible patients were identified and informed about the study by their oncologist, nurse practitioner, or cancer nurse, and subsequently invited to participate. The investigator then approached interested patients. Participants could choose between a web-based questionnaire and a paper questionnaire sent by regular mail. Formal agreement to participation involved signing an informed consent form. If necessary, patients received e-mail or telephone reminders after two and four weeks.

Measures

Outcome measures

To assess dental care use, respondents were asked to indicate how often in the past three months they had contact with a dentist to prevent or treat dental problems (answer categories: 0, 1, 2, 3, 4, 5, >5). To assess dental care need, respondents were asked to indicate whether they found the number of contacts satisfactory (answer categories: needed fewer contacts, number of contacts was sufficient, needed more contacts). These questions were posed at both time points.

Sociodemographic and clinical characteristics and distress

Age at diagnosis (open ended question), nationality (response categories: Dutch and/or other), educational level (8 multiple choice response categories, including the option 'other'), living situation (5 multiple choice response categories: with partner/with partner and child(ren)/with child(ren)/alone/other), employment status (5 multiple choice response categories: paid work/home-maker/retired/no work or unpaid/(partly) work-disabled due to breast cancer), and having dental insurance (y/n) were assessed with the self-report questionnaire that was administered 6 month post-diagnosis.

Type of breast cancer (ductal carcinoma in situ and/or invasive breast cancer), cancer stage via pTNM-classification, and types of treatment received (y/n) were retrieved from patients' medical records.

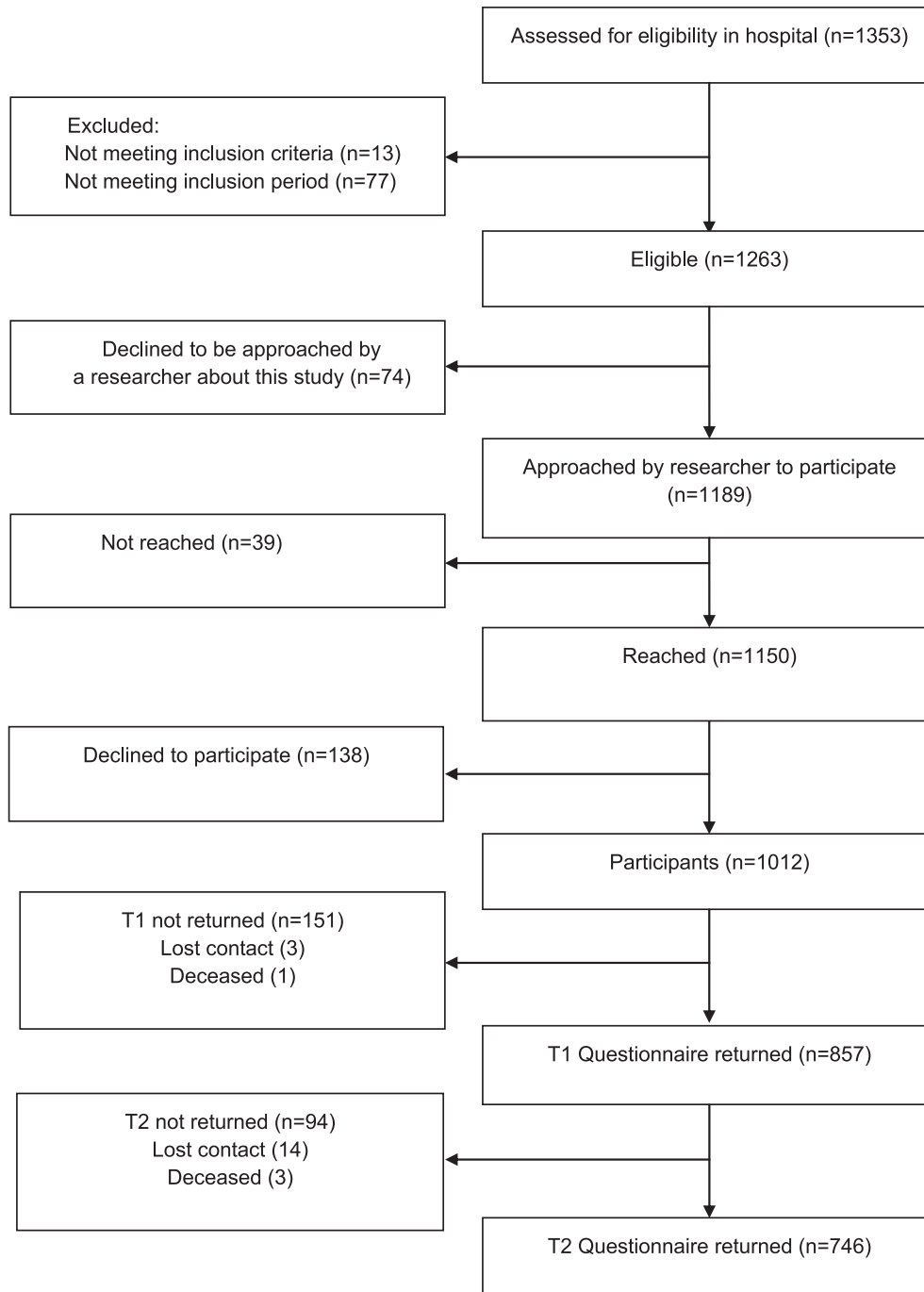


Fig. 1. Flowchart.

Psychosocial distress was assessed with the validated Dutch version of the Distress Thermometer [26–28], which was included in the self-report questionnaire at 6 months post-diagnosis. The Distress Thermometer measures the level of distress over the past week (score 0–10). Based on the Dutch validation study, a cut-off score of five was used to identify women with clinically relevant levels of distress [27].

Statistical analyses

Prior to the main analyses, missing data patterns were examined with descriptive analyses and Little's missing completely at random test with a chi-square statistic ($p < .05$). To attain an estimation of

the dental care use over a period of 12 months, a sum score of dental care use between 3 and 6 months (assessment 1) and 12 and 15 months (assessment 2) was calculated and multiplied by two. The estimated percentage of patients with at least one contact in 12 months was compared to the percentage of women in the general population with at least one contact in the same period, as reported by the national Statistics Netherlands Agency [29], by use of chi-square ($p < .05$).

The prevalence of dental care use and needs at 6 and 15 months post-diagnosis was examined with descriptive analyses.

Associations of age at diagnosis, educational level, having dental insurance, cancer stage, types of treatments received and clinical distress at 6 months post-diagnosis with dental care use at 6 and 15

months post-diagnosis were investigated with multivariate Generalized Estimating Equations analyses. This type of analysis takes into account within-subject correlations in longitudinal data. The unstructured correlation structure was used. Significance of the individual factors was tested with the Wald chi-square statistic ($p < .05$). Odds ratios (OR) are presented.

Results

Sample

Of 1353 women with breast cancer assessed for study eligibility, 1263 (93.3%) were eligible. Of these women, 1012 agreed to participate (80.1%). The current analyses were restricted to the 746 women who completed both the first and second questionnaire (73.7% of the participants) (see Fig. 1).

Most women had stage 1 or 2 invasive breast cancer and were treated with breast-conserving surgery and radiotherapy (Table 1). Participants did not significantly differ in age (groups based on median split) or cancer stage from non-respondents (chi-square, $p > .10$). Respondents who only completed the first questionnaire ($n = 111$) did not significantly differ in age, cancer stage, dental care use, and needs from the respondents who completed both questionnaires ($n = 746$; chi-square, $p > .10$). We could not collect background data from patients who did not want to be approached about the study ($n = 74$).

Missing values

Percentages of missing values for dental care use and predictors ranged from 0.0% to 3.9%. The dental care needs question had more missing values: 18.0% at 6 and 15.3% at 15 months post-diagnosis. Patients who skipped this question did not differ significantly from other patients with regard to type of breast cancer or cancer stage. However, they were significantly younger (two-sample t -tests, $p < .05$).

Prevalence of dental care use and need

Six months post-diagnosis, 79% of the participants ($n = 572$) indicated that they did not have contact with a dentist in the past three months, 8% percent had one contact ($n = 56$), 10% had two contacts ($n = 70$) and 3% had more than two contacts ($n = 24$; range 3–6; missing values excluded). Ninety-one percent of the respondents ($n = 559$) believed that they had had sufficient contact with their dentist, 7% ($n = 39$) indicated that they had actually had more contact than they needed, and 2% ($n = 14$; missing values excluded) indicated a need for more contact in this three month period.

Fifteen months post-diagnosis, 77% of the participants ($n = 557$) indicated that they did not have contact with a dentist within in the past three months. One percent had one contact ($n = 9$) and 15% had two contacts ($n = 106$). The remaining 7% had more than two contacts ($n = 48$; range 3–5; missing values excluded). With regard to need, 91% ($n = 575$) believed that they had had sufficient contact with their dentist, 8% ($n = 50$) indicated that they had had more contact than required, and only 1% ($n = 7$; missing values excluded) indicated that they would have liked to have had more contact with their dentist in the previous three month period.

We estimated that 31.9% of patients had at least one contact with a dentist in a 12-month period. This was significantly lower than the 79.5% of women in the Dutch general population who had one or more contacts in the same time frame ($p < .05$). In the age groups of 65–75 years and 75 years and older, the number of people in the general population who had one or more contacts

with a dentist in 12 months was lower, namely 67.0% respectively 42.4% (gender specific data per age group were not online available). The dental care use of breast cancer patients in these age groups (19.6% for 65–75 years respectively 12% for 75 years and older) was still significantly lower in comparison ($p < .05$) [29].

Predictors of dental care use

Six months post-diagnosis, the odds of having had contact with a dentist in the past three months were 2.82 times higher for patients who received chemotherapy (95% CI, 1.76–4.50), and

Table 1
Sample characteristics ($n = 746$).

Characteristics	Total sample ^a
<i>Sociodemographic factors</i>	
Age at diagnosis (median, range)	59 (24–83)
Nationality (n, %)	
Dutch only	715 (96.1)
Dutch and other or other only	29 (3.9)
Educational level (n, %) ^b	
Low	345 (46.3)
Intermediate	185 (24.8)
High	215 (28.9)
Living situation (n, %)	
With partner	383 (51.5)
With partner and child(ren)	191 (25.7)
With child(ren)	33 (4.4)
Alone	127 (17.1)
Other	9 (1.2)
Employment status (n, %)	
Paid work	272 (39.7)
Homemaker	136 (19.8)
Retired	191 (27.8)
No work or unpaid	34 (5.0)
(Partly) work-disabled due to breast cancer	53 (7.7)
Dental insurance	
No	195 (26.7)
Yes	535 (73.3)
<i>Clinical factors</i>	
Type of breast cancer (n, %)	
Ductal carcinoma in situ (DCIS)	104 (13.9)
Invasive and DCIS	57 (7.6)
Invasive	585 (78.3)
Cancer stage at diagnosis (n, %)	
T1S: carcinoma in situ	103 (13.9)
Invasive early stage (T1/T2)	620 (83.6)
Invasive late stage (T3/T4)	19 (2.6)
Type of surgery (n, %)	
Lumpectomy	630 (84.5)
Mastectomy	105 (14.1)
Lumpectomy and mastectomy	9 (1.2)
No lumpectomy or mastectomy	2 (0.3)
Radio- and/or chemo- and/or hormonal therapy (n, %)	
Radiotherapy only	370 (49.6)
Radio- and chemotherapy	65 (8.7)
Radio- and hormonal therapy	100 (13.4)
Radio-, and chemo-, and hormonal therapy	133 (17.8)
Chemo- or hormonal therapy only	15 (2.0)
Chemo- and hormonal therapy	17 (2.3)
No radio-, chemo- or hormonal therapy	46 (6.2)
Other type of treatment (n, %; yes/no)	
Immunotherapy	32 (4.3)
<i>Psychosocial factor</i>	
Clinical distress (n, %)	
No clinical distress	422 (58.9)
Clinical distress	295 (41.1)

^a Presented percentages are valid percentages, missing values excluded.

^b Educational level was categorized as low (no education, elementary school, low level vocational education, or intermediate level high school), intermediate (intermediate level vocational education, or high level high school) and high (high level vocational education, or college or university).

Table 2
Factors associated with dental care use 6 and 15 months post-diagnosis.

Predictor	6 months post-diagnosis OR (95% CI) ^a	15 months post-diagnosis OR (95% CI) ^a
<i>Sociodemographic factors</i>		
Age at diagnosis	1.00 (0.98–1.02)	0.98 (0.96–1.01)
Educational level		
Low	1.00 (reference)	1.00 (reference)
Intermediate	0.93 (0.54–1.60)	0.77 (0.45–1.30)
High	1.50 (0.92–2.45)	0.86 (0.53–1.39)
Dental insurance		
No	1.00 (reference)	1.00 (reference)
Yes	1.52 (0.91–2.55)	1.80 (1.08–3.00)
<i>Clinical factors</i>		
Cancer stage at diagnosis		
TIS: carcinoma in situ	1.00 (reference)	1.00 (reference)
Invasive early stage (T1/T2)	1.72 (0.81–3.68)	1.83 (0.90–3.76)
Invasive late stage (T3/T4)	1.86 (0.45–7.61)	2.38 (0.61–9.32)
Type(s) of surgery ^b		
Lumpectomy	1.00 (reference)	1.00 (reference)
Mastectomy	1.40 (0.64–3.08)	1.38 (0.64–2.96)
Radiotherapy		
No	1.00 (reference)	1.00 (reference)
Yes	1.20 (0.50–2.89)	1.42 (0.61–3.33)
Chemotherapy		
No	1.00 (reference)	1.00 (reference)
Yes	2.82 (1.76–4.50)	1.93 (1.21–3.06)
<i>Distress</i>		
No clinical distress	1.00 (reference)	1.00 (reference)
Clinical distress	1.98 (1.32–2.98)	2.53 (1.70–3.79)

^a OR = odds ratio; CI = confidence interval. Printed in bold: multivariate analysis $p < .05$.

^b Category 'mastectomy' included patients who received a lumpectomy and a mastectomy ($n = 9$); patients who did not receive surgery were not included in the analyses ($n = 2$).

1.98 times higher for patients with clinical distress (95% CI, 1.32–2.98).

Fifteen months post-diagnosis, the odds of having had contact with a dentist in the past three months were 1.93 times higher for patients who had received chemotherapy (95% CI, 1.21–3.06), 2.53 times higher for patients with clinical distress at 6 months post-diagnosis (95% CI, 1.70–3.79), and 1.80 times higher for patients with dental insurance (95% CI, 1.08–3.00) (Table 2).

Discussion

Even though certain types of breast cancer treatment may lead to dental problems, we know little of breast cancer patients' actual dental care use and needs. Our results indicate that approximately one in five women with breast cancer visit their dentist at least once between 3 and 6 months post-diagnosis. The prevalence was the same between 12 and 15 months post-diagnosis. Only a few respondents (1–2%) indicated that they would have preferred to have more contact with their dentist. Six months post-diagnosis, having had chemotherapy and clinical distress were associated with having had dental care in the past three months. Along with having dental care insurance, these factors also predicted dental care use at 15 months post-diagnosis.

Our results indicate a substantially lower use of dental care services among breast cancer patients in the first 15 months after diagnosis as compared to women from the general population. Taichman and colleagues reported a higher prevalence of dental care use within 12 months among American breast cancer survivors after an average of ten years (66%). Dental care use of breast cancer survivors in their study did not significantly differ from that of women without cancer [3]. Thus, the problem of underuse of dental care may be restricted to the treatment and

early post-treatment phase. As these two studies are, to the best of our knowledge, the first to examine use of dental care practices among women with breast cancer, more research is needed.

The relatively few women in our study who made use of dental care services is concerning, given the elevated risk of dental problems among women with breast cancer. To our knowledge there are no generic oral care guidelines indicating when and under which conditions patients with breast cancer should visit their dentist. In the absence of such guidelines, we would recommend that clinicians, nurse practitioners, and cancer nurses, as some already do, routinely inform newly diagnosed patients with breast cancer about the range of possible treatment-related oral or dental problems [4,22]. Depending on the type of treatment, they can provide dental care instructions that can prevent or reduce the severity of oral mucositis and other complications [7,17,18]. They should also advise patients to visit their dentist before adjuvant treatment. For the majority of women, such a visit will be covered by their dental health insurance.

Those without dental care coverage, can be advised to attempt applying for reimbursement from their health insurance based on the patient's medical condition and received treatment [30]. There may be facilities nearby that provide low-cost services for those that need dental care but cannot afford it, which patients are not aware of. A more structural solution will require a change in the health care policy rules so that all those who have cancer, also have access to affordable dental care.

With regard to dental care needs, it would be informative to interview those patients (7–8% in our sample) who felt that they could have sufficed with fewer dental care visits than they actually had. It may be that, mistakenly, these women believe that a preventive dental health care visit is unnecessary.

One explanation for the unexpected positive association observed between clinical distress and dental care use is that clinically distressed patients experience more dental care problems than non-clinically distressed patients, just as they, in general, experience more physical and emotional problems [2]. Psychological distress could result in poor dental hygiene practices, which, in turn, may necessitate more problem-driven visits to the dentist in the period during and immediately after breast cancer treatment [31]. Alternatively, distressed patients are known to, in general, have higher medical care consumption [1,32,33], which may be reflected in their dental care use.

Strengths of the study include the large sample size and its multicenter, prospective design. The large sample size facilitated multivariable analyses to identify predictors of dental care use. To our knowledge this is the first study that has done so. A possible limitation of our study design is that many participants were recruited at radiotherapy departments. Therefore, patients who do not receive radiotherapy, a minority, were underrepresented. To give an impression, a previous study based on data from a Dutch population-based, regional cancer registry, indicated that 17% of the women with breast cancer received systemic therapy without radiotherapy in the period 2002–2006 [34]. Moreover, the results are mainly applicable to patients with early stage breast cancer. Respondents who answered the dental care need question were younger than those who skipped this question, thereby reducing the generalizability of these latter results. We did not assess patients' use of dental care before the diagnosis, and thus could not control for this factor. Finally, for the comparison with dental care use of women in the general population, actual assessment rather than an estimation of patients' dental care use over a consecutive period of 12 months would have been preferable.

To assure optimal care for patients with breast cancer, patient's dental care use, the purpose of their visit, be it preventive or problem-driven, and dental problems should be examined more in-depth over time, for example with the aid of the EORTC QLQ-OH17 module for assessment of oral health and related quality of life issues [7,35]. It would also be valuable to investigate the effectiveness of preventive dental care visits and distress-based interventions on the occurrence and severity of dental care problems before, during and after different anti-tumor treatments.

Conclusions

Breast cancer patients' dental care use is lower than that of the general female population, even though certain types of treatment can put them at higher risk of developing dental and oral problems. To increase dental care use among patients with breast cancer, further integration of medical and dental care services is needed. We would recommend that oncologists, nurse practitioners, and cancer nurses routinely inform patients about the increased risk of dental problems due to their cancer treatment, and encourage patients – particularly those without insurance – to visit their dentist before, during and after treatment. Dental problems during and after treatment should be monitored along with other problems, especially in chemotherapy and clinically distressed patients, who have a higher risk of dental care use and thus possibly experience more treatment-related dental side effects.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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Conflict of interest statement

The authors declare that they have no conflict of interest.

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