

## ORIGINAL RESEARCH

---

### Sexual Concerns after (Pelvic) Radiotherapy: Is There Any Role for the Radiation Oncologist?

Esmée M. Krouwel, MD,\* Melianthe P. Nicolai, MD, PhD,\* Gerard J. van der Wielen, MD, PhD,<sup>†</sup> Hein Putter, PhD, Prof,<sup>‡</sup> Augustinus D.G. Krol, MD, PhD,<sup>§</sup> Rob C.M. Pelger, MD, PhD, Prof,\* Luca Incrocci, MD, PhD,<sup>¶</sup> and Henk Willem Elzevier, MD, PhD\*

\*Department of Urology, Leiden University Medical Centre, Leiden, The Netherlands; <sup>†</sup>Department of Urology, Bronovo Hospital, The Hague, The Netherlands; <sup>‡</sup>Department of Medical Statistics, Leiden University Medical Centre, Leiden, The Netherlands; <sup>§</sup>Department of Radiation Oncology, Leiden University Medical Centre, Leiden, The Netherlands; <sup>¶</sup>Department of Radiation Oncology, Erasmus MC Cancer Institute, Rotterdam, The Netherlands

DOI: 10.1111/jsm.12969

#### ABSTRACT

---

**Introduction.** Sexual function is an important aspect of quality of life, and may be impaired after (pelvic) radiation.

**Aim.** The aim of this study was to identify practice, responsibility attitudes, knowledge, and barriers of Dutch radiation oncologists regarding sexual counseling.

**Methods.** A cross-sectional survey was performed using a 28-item questionnaire sent to all members of the Dutch Society for Radiotherapy and Oncology.

**Main Outcome Measures.** Self-reported practice, knowledge, barriers, need for training and responsibility attitudes in regard to demographic characteristics.

**Results.** Of the surveyed sample, 54.6% of the radiation oncologists completed the instrument ( $n = 119$ ). Frequency of discussing sexual function was fluctuating, depending on the type of tumor. The majority of the responding radiation oncologists (75%) agreed that discussing sexual function is their responsibility, about one-third (33.6%) pointed at the involved specialist (surgeon, urologist, gynecologist, or oncologist), a fifth also considered the general practitioner responsible (21%). Additional training about discussing sexuality was required according to 44.4%, the majority agreed that sexual counseling should be a regular component of radiation oncology residency ( $n = 110$ , 94%). Barriers most mentioned included patient is too ill (36.2%), no angle or reason for asking (32.4%), advanced age of the patient (27%) and culture/religion (26.1%). For prostate cancer patients, *phosphodiesterase 5* inhibitor information was supplied regularly (49.2%) and often (40.7%).

**Conclusions.** Radiation oncologists generally perform sexual counseling in case of pelvic radiation therapy, but not consistently in case of gastrointestinal, breast, and other cancers. The majority of radiation oncologists considered counseling on sexual functioning as a part of their job, some also pointed at the referring specialist or general practitioner. The findings suggest that awareness about sexual dysfunction is present among radiation oncologists, but responsibility for active counseling is uncertain. Results emphasize the need for providing educational and practical training, as well as a list for specialized referral. **Krouwel EM, Nicolai MP, van der Wielen GJ, Putter H, Krol ADG, Pelger RCM, Incrocci L, and Elzevier HW. Sexual concerns after (pelvic) radiotherapy: is there any role for the radiation oncologist? J Sex Med 2015;12:1927–1939.**

**Key Words.** Radiotherapy; Cancer; Oncology; Sexual Dysfunction; Quality of Life; Physician Practice Patterns; Cross-Sectional Survey

---

This study was initiated by the Pelvic Floor and Sexuality Research Group Leiden. The study was supported by the Target Fund Urology (“Doelfonds Urologie”) of the Leiden University Medical Center Bontius Foundation and an unrestricted grant from AstraZeneca.

## Introduction

Cancer is a life-threatening disease, but because of expanding treatment options, it is turning into a condition with decreasing mortality. As patients live longer after diagnosis, attention for late effects of treatment and quality of life are of increasing importance, both during treatment and throughout survivorship [1]. A typical problem is that physicians and patients tend to concentrate on intensive medical treatment options and underestimate the late treatment-related adverse effects [2,3].

Radiotherapy (RT) is commonly used to treat cancer, whether as external-beam RT or brachytherapy. Specifically, pelvic RT for the treatment of uterine, cervical, bladder, prostatic, rectal, or anal cancer is known for its influence on sexual function, affecting both men and women [4,5]. Sexual dysfunction (SD) caused by pelvic RT originates from injury to organs, vessels, persistent inflammatory responses, hormonal deprivation, and psychologic responses, although the molecular etiology is not completely understood [6–13]. Tissue toxicity is depending on the accumulated radiation dose to the pelvic area [14–16]. Possible late effects of pelvic RT include pelvic fibrosis, resulting in endothelial damage, inflammation, ischemia, and eventually necrosis [17]. Vaginal discharge, skin erythema, and fatigue result in low scores of satisfaction with sexual function in women after pelvic RT [18–20]. Three years after RT for prostate cancer, 38% of pre-treatment potent men reported erectile dysfunction (ED), resulting in decreased satisfaction with sexual function [21]. Preoperative RT in primary rectal cancer has negative effects on sexual function in men and women [5]. RT on other areas of the body also has the ability to affect sexual function by inducing fatigue, psychosocial and emotional problems, sensory loss and reduced fertility [22], also breast radiation can have an impact on long-term cosmetic outcomes [23].

Despite the significant effect on sexual function, clinical assessment of treatment-induced SD following RT is an underexposed item during regular radiation oncologist consultations [24–26]. For this reason, patients should be actively informed on problems associated with radiation-induced SD and must be guided toward appropriate therapeutic options. To our knowledge, information concerning the attitude of radiation oncologists is barely available yet. So far, research focusing on radiation oncologists' attitudes regarding the provision of sexual counseling only involved a Chinese study [25]. However, the

Global Survey of Sexual Attitudes and Behaviors revealed that women in East Asia were the least likely to talk to a doctor about their sexual issues (9% vs. 18–40% in non-Asian countries) [27]. For this reason, the Chinese survey might differ significantly from a non-Asian perspective.

As medical doctors are the major information source of treatment-induced morbidity and have a legal obligation to inform their patients on treatment-induced morbidity, investigating their current sexual counseling practices is of significant importance. By collecting data and demonstrating possible omissions, the development of a consistent and effective sexual health care counseling policy for patients receiving RT can be established.

## Aims

The aim of this study was to investigate the attitude, knowledge, and barriers of Dutch radiation oncologists toward informing their patients on the possibility of treatment-induced SD. We also investigated the need for training and perceptions concerning responsibility for addressing sexual issues, in order to clarify whether or not this is felt to be the radiation oncologist's responsibility. The data obtained could be used to adapt and develop educational training, guidelines and standard operating procedures regarding the counseling of cancer patients on treatment-induced sexual problems.

## Methods

### Study Design

A cross-sectional postal survey was held among radiation oncologists and RT residents holding active practice in The Netherlands.

### Cohort Identification and Survey Process

Questionnaires were sent to all radiation oncologists and RT residents ( $n = 234$ ) who were member of the Dutch Association for Radiotherapy and Oncology (NVRO) at the time of Spring 2012. An information letter concerning the study and a postpaid return envelope were added, as well as an opt-out possibility. To facilitate the response rate, the initial mailing was followed by two reminders in August and November 2012. All data were collected anonymously in order to prevent a self-reporting bias.

### Instrument Design and Development

Identified participants were sent a 28-item questionnaire developed by the authors, content based

on questionnaires successfully used for similar studies among cardiologists, urologists, surgical oncologists and oncology nurses in the Netherlands (Appendix 1) [28–31]. A pilot study with 24 radiation oncologists was performed to evaluate the questions and adjust the questionnaire for the final survey according to the comments. As a result of the pilot study, questions on practice attitudes were separated for tumor-specific areas of specialization, and participants were given the opportunity to answer for two different areas of specialization.

### Data Analysis

Quantitative data were analyzed using SPSS 20 (SPSS Inc., Chicago, IL, USA). The results were described using frequency distribution and descriptive statistics. Missing data (i.e., not completed questions) were not added with percentage calculations; *n* is always mentioned to clarify. Bivariate associations between demographic information and specific answers were made with Pearson's chi-squared test and Cochran-Armitage trend test.

### Ethical Considerations

In The Netherlands, research that does not involve patients or interventions is not subject to approval from ethical boards. In previous research where nurses were the participants, the Medical Ethics Committee was consulted in order to verify whether ethical approval was necessary. As the study did not concern any information recorded by the investigator in such a manner that subjects could be identified, directly or through identifiers linked to the subjects, and as it did not compromise the study participants' integrity, the Committee declared that no formal ethical approval was needed [32]. Participation was fully voluntarily and anonymous, an opt-out possibility was implemented.

### Main Outcome Measures

- Demographic questions relating function, experience, gender, age, and focus areas.
- Self-reported practice patterns regarding sexual counseling and providing information on sexuality.
- Opinion about responsibility for sexual counseling and referral behavior.
- Barriers toward assessing sexual health issues.
- Knowledge on sexual problems in reference to RT.
- Need for additional training.

## Results

### Participants

Questionnaires were sent to 234 members of the NVRO. The final response rate was 54.6%, for further details on participation see Figure 1.

### Demographics of Respondents

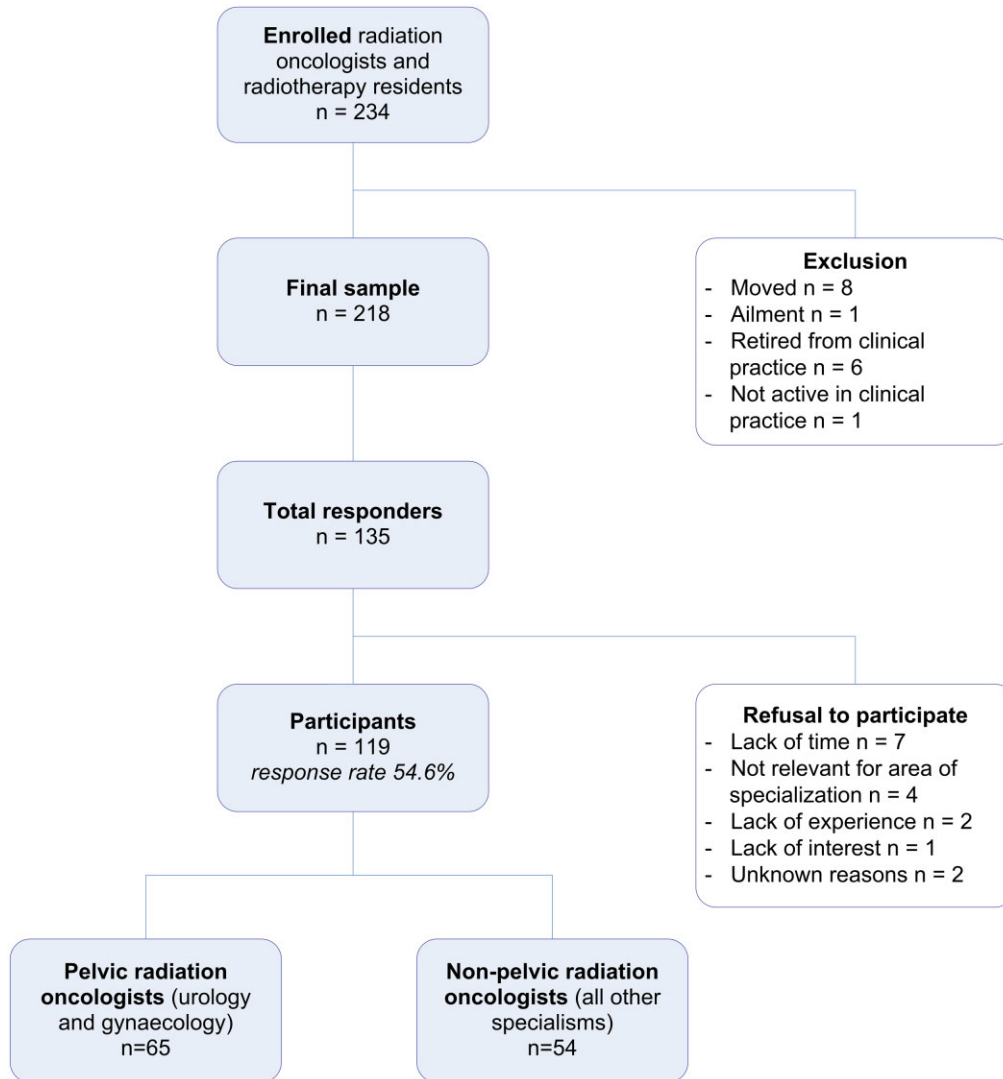
Overall, there was an almost equivalent amount of men and women with a median age of 47 years. There was variation in experience, 52.9% of all respondents had over 15 years of experience in RT. All demographic information is displayed in Table 1.

### Practice Patterns

Data about practice attitudes regarding sexual function were separated according to area of specialization. Each radiation oncologist was able to provide answers for two areas of specialization and answer the questions for each type of patient. The results to the question "How often do you discuss sexual functioning of the patient?" are featured in Figure 2.

According to the radiation oncologists involved with care for urology patients (*n* = 59), information about the risk for ED after prostatic RT is given regularly (16.9%) and often (81.3%). The majority declared to inform patients about the use of *phosphodiesterase* 5-inhibitors regularly (49.2%) and often (40.7%). A few radiation oncologists stated to rarely or never inform patients about erection medication (10.2%). Participants involved with gynecology patients (*n* = 27) gave information about sexual function after RT for cervical cancer rarely (*n* = 4, 14.8%) and regularly plus often (*n* = 23, 85.2%). Physicians involved with breast cancer patients (*n* = 48) provided information about sexuality in respect to breast radiation never (12.5%), rarely (50%), regularly (18.8%), and often (18.8%).

During conversations about sexual function, the partner was present in half of the cases (*n* = 32, 28.8%), more than half of the cases (*n* = 37, 33.3%) or almost always (*n* = 38, 34.2%). As for the question "How long does it take before treatment adverse effects to sexual function start to decrease?" 62.7% of the respondents (*n* = 69) stated from experience that adverse effects from RT on sexual function remain forever. Forty-one responders estimated that sexual adverse effects remain for about 3–24 months (37.3%). The majority believed that women who underwent RT for cervical cancer often (82.5%, *n* = 94), regularly



**Figure 1** Flow chart of the final participants.

(14%,  $n = 16$ ) and sometimes (3.5%,  $n = 4$ ) experience sexual problems, after RT for breast cancer it was believed that women experience problems often (7%,  $n = 8$ ), regularly (38.3%,  $n = 44$ ), sometimes (36.5%,  $n = 42$ ) and never/rarely (18.3%,  $n = 21$ ).

#### **Responsibility and Referring**

Evaluation of treatment-induced SD is the responsibility of the radiation oncologist according to the majority of the respondents ( $n = 87$ , 75%). Remaining respondents considered neutral ( $n = 22$ , 19%) or disagreed having responsibility ( $n = 7$ , 6%). In the following question regarding

responsibility of other health care providers (with a multiple answer possibility), a third of the respondents pointed at the referring specialist (e.g., the surgeon, urologist, gynecologist or oncologist) regarding responsibility for discussing SD ( $n = 40$ , 33.6%). A fifth considered the general practitioner responsible ( $n = 25$ , 21%). The primary responsibility of sexual counseling was separately analyzed among all pelvic radiation oncologists ( $n = 65$ , 54.6%), consisting of all radiation oncologists with urology and gynecology as their primary specialism. In this pelvic radiation group, the referring specialist ( $n = 19$ , 29.2%) and general practitioner ( $n = 9$ , 13.8%) were also felt to be responsible for

**Table 1** Demographic characteristics of the respondents (n = 119)

|  | n (%)      |
|--|------------|
| Age (years)                              | 119 (100)  |
| Median 47 (range 26–66)                  |            |
| Mean 46.5 (SD 8.9)                       |            |
| Gender                                   |            |
| Male                                     | 58 (48.7)  |
| Female                                   | 61 (51.3)  |
| Function                                 |            |
| Radiation oncologist                     | 116 (97.5) |
| Resident                                 | 3 (2.5)    |
| Radiotherapy experience (years)          |            |
| <1                                       | 2 (1.7)    |
| 1–2                                      | 2 (1.7)    |
| 3–5                                      | 4 (3.4)    |
| 6–10                                     | 23 (19.3)  |
| 11–15                                    | 25 (21)    |
| >15                                      | 63 (52.9)  |
| Hospital type                            |            |
| University hospital                      | 60 (50.4)  |
| District general teaching hospital       | 27 (22.7)  |
| District general hospital                | 22 (18.5)  |
| Categorical cancer hospital              | 4 (3.4)    |
| University and district general hospital | 3 (2.6)    |
| Independent consultant                   | 1 (0.8)    |
| Not available                            | 2 (1.7)    |

SD = standard deviation.

addressing sexual functioning. Sixteen percent of respondents stated that the patient has its own responsibility to initiate discussion on SD.

To the question regarding patient referral in case of SD, 75.9% (n = 88) confirmed to have the possibility of referring their patients to an expert on this topic, 24.1% of the radiation oncologists (n = 28) was not familiar where to refer patients. The majority of the respondents indicated to be in need of a list with qualified sexual health care providers for referral (n = 84, 72.4%).

### Barriers

The respondents were given a list of possible barriers for discussing SF, in order for them to indicate to which extent they agreed (Table 2). Radiation oncologists mentioned “patient is too ill” to discuss sexual issues as a major barrier (36.2%). The second barrier, to which 32.4% agreed, was “no angle or reason for asking.” Other barriers were “advanced age of the patient” (27%), “culture/religion” (26.1%), “language/ethnicity” (24.5%), “sexuality is not a patient’s concern” (23.9%), “patient doesn’t bring up the subject” (20%), “lack of training” (19.3%), and “patient is not ready to discuss sexual functioning” (13.1%). The barriers that did not keep radiation oncologists from sexual counseling were all barriers regarding gender, “it’s someone else’s task” (2.6%), “age difference between you

and the patient” (3.5%), “afraid to offend the patient” (3.5%), and embarrassment (5.3%). The results to the question concerning the provision of information about treatment-related SD in regard to the age of a patient are displayed in Figure 3.

### Knowledge and Training

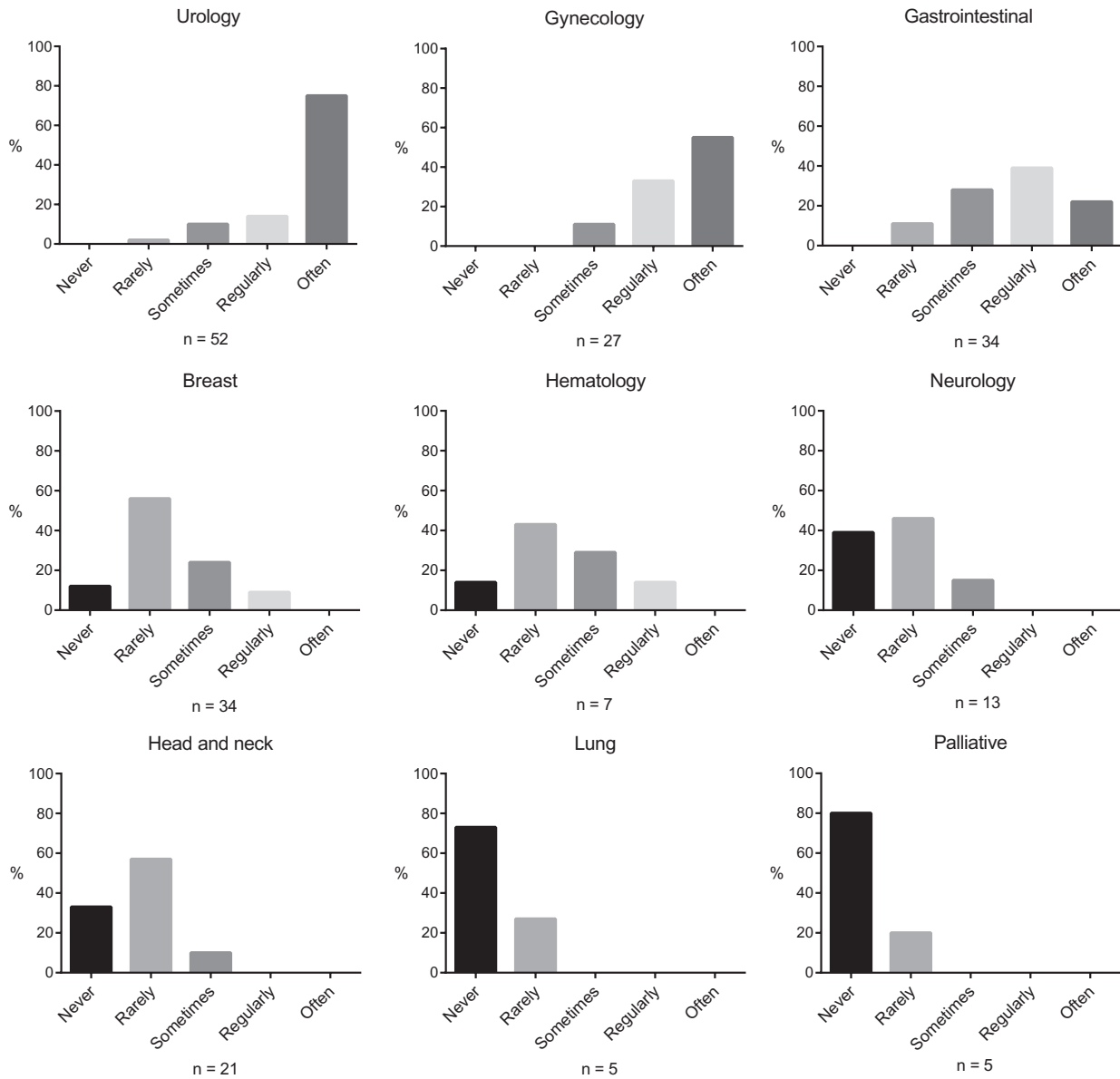
To the question regarding knowledge, the majority of radiation oncologists stated to possess some knowledge concerning SD (n = 87, 67.2%), a quarter of all respondents stated to have sufficient knowledge on SD (n = 29, 25%) and the remaining respondents stated to have not much knowledge on SD (n = 9, 7.8%). Radiation oncologists under the age of 47, possessed less knowledge of SD in comparison to respondents of 47 years and older (P = 0.046). Gender did not influence the knowledge of SD (P = 0.513).

Of all responding radiation oncologists, 44.4% indicated to be in need of additional training regarding discussing sexuality with their patients (n = 50). Female respondents more often wished additional training than their male colleagues

**Table 2** Barriers to sexual counseling; sorted from most agreed to least agreed

|  | Agree     | Partly agree/<br>partly disagree | Disagree   |
|--|-----------|----------------------------------|------------|
|  | n (%)     | n (%)                            | n (%)      |
| Patient is too ill                                 | 41 (36.2) | 36 (31.9)                        | 36 (31.9)  |
| No angle or reason for asking                      | 37 (32.4) | 21 (18.4)                        | 56 (49.2)  |
| Advanced age of the patient                        | 31 (27.0) | 38 (33.0)                        | 46 (40.0)  |
| Culture/religion                                   | 30 (26.1) | 32 (27.8)                        | 53 (46.1)  |
| Language/ethnicity                                 | 28 (24.5) | 33 (29.0)                        | 53 (46.5)  |
| Sexuality is not a patient’s concern               | 27 (23.9) | 32 (28.3)                        | 54 (47.8)  |
| Patient does not bring up the subject              | 23 (20.0) | 19 (16.5)                        | 73 (63.5)  |
| Lack of training                                   | 22 (19.3) | 35 (30.7)                        | 57 (50.0)  |
| Patient is not ready to discuss sexual functioning | 15 (13.1) | 39 (33.9)                        | 61 (53.0)  |
| Presence of a third party                          | 13 (11.3) | 36 (31.3)                        | 66 (57.4)  |
| Lack of time                                       | 13 (11.3) | 21 (18.3)                        | 81 (70.4)  |
| Sexuality is a private matter                      | 12 (10.5) | 15 (13.2)                        | 87 (76.3)  |
| Lack of knowledge                                  | 10 (8.8)  | 31 (27.2)                        | 73 (64.0)  |
| I feel uncomfortable                               | 9 (7.9)   | 15 (13.2)                        | 90 (78.9)  |
| Embarrassment                                      | 6 (5.3)   | 14 (12.3)                        | 94 (82.4)  |
| Afraid to offend the patient                       | 4 (3.5)   | 15 (13)                          | 96 (83.3)  |
| Age difference between you and patient             | 4 (3.5)   | 6 (5.2)                          | 105 (91.3) |
| It’s someone else’s task                           | 3 (2.6)   | 24 (20.9)                        | 88 (76.5)  |
| Patient is the opposite gender                     | 2 (1.7)   | 5 (4.3)                          | 108 (93.9) |
| Patient is the same gender                         | –         | 3 (2.6)                          | 112 (97.4) |

For ease of presentation, results in response categories “Strongly agree” and “agree” have been merged, as have “strongly disagree” and “disagree.”



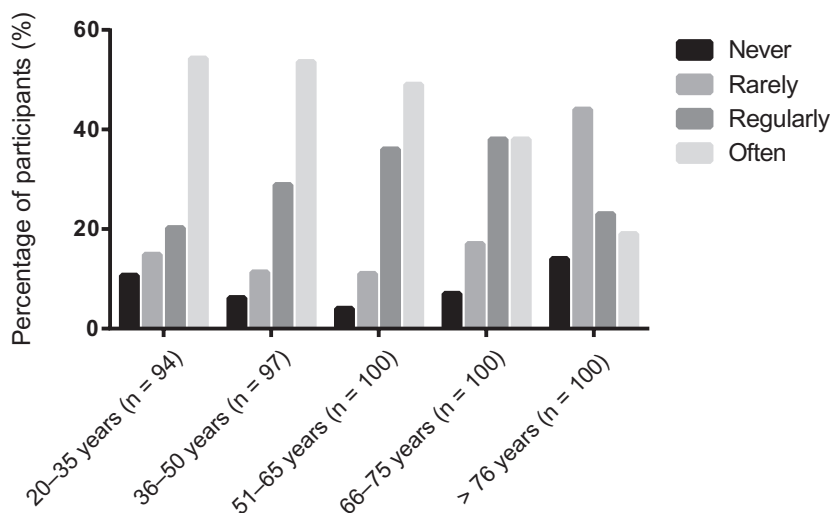
**Figure 2** Results to the question “How often do you discuss sexual functioning of the patient?,” allocated for type of cancer.

(55% vs. 33.9%,  $P = 0.023$ ). Age (<47 vs.  $\geq 47$  years) did not influence the wish for training (48.3% vs. 41.1%,  $P = 0.432$ ). Almost all respondents agreed that sexual counseling should be a regular component of the radiation oncology residency (n = 110, 94%).

**Discussion**

Key findings of this study are that radiation oncologists routinely discuss sexuality with their urology and gynecology patients, but not so consistently with their gastrointestinal-, breast-, and

other cancer patients. The majority of radiation oncologists considered counseling on sexual functioning as part of their job, a third also pointed at the referring specialist as well as a fifth indicated that to be a responsibility of the general practitioner. More than half of the radiation oncologists indicated that radiation effects on sexual function usually persist forever. The majority of radiation oncologists stated to have some knowledge on treatment-related SD. Young radiation oncologists had less knowledge of the topic; illustrating experience might play a role in counseling. An important finding was that 44% of the respondents



**Figure 3** How often do you discuss sexual concerns with patients in the following age categories?

indicated that they would benefit from additional training regarding sexual counseling in radiation practice; female physicians indicated this wish more often than male physicians. Almost all respondents agreed that training in sexual counseling should be a regular part of RT residency. Barriers for sexual counseling included patient is too ill, no angle or reason for asking, advanced age, and culture or religion.

#### Comparison with Literature

To our knowledge, this survey was the first evaluation in Europe of radiation oncologists' attitudes and practice patterns regarding sexual health. In China, a similar evaluation was performed among radiation oncologists, also evaluating attitudes and behavior toward sexual issues of patients who received RT [25]. In line with our results, the radiation oncologists felt responsible for addressing the issue, nonetheless, dissimilar to our results they hardly addressed the issue spontaneously but only when the patient explicitly consulted them on this issue. The majority of Chinese radiation oncologists expressed the need for training to enable them to provide guidance to patients, in the present study this was less than fifty percent. Wang et al. [25] found 41.7% of their surveyed radiation oncologists to be uncomfortable discussing sexual functioning with a patient, compared with 20% of the Dutch radiation oncologists, illustrating that the East Asian attitude regarding sexuality might differ from the non-Asian perspective.

In the United Kingdom, a survey among specialist gynecologic oncology nurses and an evaluation of the content of patient brochures showed a prominent lack of psychosexual content for

example regarding vaginal dilatation in both clinical counseling and written materials [33]. Vaginal dilatation after pelvic radiation is recommended in order to maintain patency of the vagina. Although there is no reliable evidence on preventing stenosis, several reports suggest that women who dilate their vagina after RT reported and measured less stenosis [34]. Furthermore, a psycho-educational intervention is demonstrated to increase compliance of the use of vaginal dilators compared with supplying information only [35]. As for Faithfull et al. their "information after pelvic radiation" survey, physicians rarely provided patient education in relation to sexual health advice and vaginal dilatation [33]. Patient education was considered a nursing or radiographer role; however, the physician was thought to be the one to evaluate on a patient's compliance regarding any intervention. Noteworthy, it appeared information was solely provided for gynecology patients, even though pelvic radiation therapy is also frequently used for the treatment of women with bladder, rectal and anal tumors.

The discrepancy between doctors' assumptions and the actual experienced complaints after receiving pelvic RT have also been emphasized in other reports, showing underreport of vaginal discomfort and underestimation of ED by physicians. In the United Kingdom, RT follow-up consultations were observed in order to determine the clinical assessment of treatment-induced female sexual difficulties [26]. Results showed acknowledgment by both patient and physician in the challenge of discussing sexual concerns. Barriers included the different priorities during consultations; like attention for possible recurrence of disease, lack of time, lack of expertise and lack of adequate referral pathways.

Vistad et al. compared physician-assessed morbidity (including vaginal discomfort) with reported symptoms from patients treated with RT for cervical cancer. Patient morbidity scores correlated poorly with data reported by physicians, confirming underreporting and underestimation of intestinal and bladder morbidity [24]. Vaginal discomfort was not compared with physician data; at follow-up only two-thirds of the patients were examined for vaginal symptoms, indicating the physician did not actively counsel at all.

Showalter et al. surveyed the estimation of 926 radiation oncologists on how often RT affected recovery of ED after radical prostatectomy. Significantly less radiation oncologists (47%) predicted a “major/total detrimental effect” to erectile function following RT in comparison with urologists (69%) [36]. With respect to patient-reported outcomes regarding RT for prostate cancer, the number of patients reporting inability to achieve an erection sufficient for intercourse after 2 (60.8%), 5 (71.9%), and 15 years (93.9%) illustrates the underestimation of the radiation oncologists [37].

Clearly, the main barriers toward sexual counseling detected in the current survey can be opposed. The primary reason for not discussing sexual health “the patient is too ill” should be questioned, considering the body of evidence reporting on the importance of sexual function to the quality of life of patients with all sorts of cancer patients being in early as well as advanced stages. The second barrier, “no angle or reason for asking,” can easily be tackled by the provision of practical training on how to address the subject. By providing informed consent and mentioning possible treatment-related SD, as well as additionally notifying that the patient should address any concerns, the key component of sexual health care has already been performed. The third barrier, advanced age of the patient, was also found in a recent survey among a group of surgical oncologists [31]. Apparently, physicians seem to consider that elderly patients are not sexually active anymore and the subject is consequently not relevant to discuss. This assumption might be rather incorrect; according to a study on the prevalence of sexual activity among 3005 adults of 57–85 years, a serious percentage of older adults is still sexually active [38], making this barrier defeasible.

#### Limitations

This study has a few limitations. We used a nonvalidated questionnaire, as there are no vali-

dated questionnaires available that assess the provision of sexual counseling by radiation oncologists. In order to explore the aim of the study, specific questions were required regarding sexual function in the face of radiation therapy. For this reason, we developed a particular questionnaire investigating the aims and influencing factors instead of using a validated, more general instrument. Nevertheless, the questionnaire was based on other surveys of the research group, which successfully assessed the provision of sexual counseling by several (oncology) health care providers [28–32]. As for an approximation toward validation, an extensive pilot study was performed and the instrument was adjusted because of the comments. Test–retest reproducibility of the questionnaire was not tested due to the anonymous design; therefore, nothing can be said about the reproducibility of the questionnaire. Another important limitation, which may have resulted in over- or underestimation, is that physician responses were self-reported. Attempts were made to reduce this bias by collecting the survey results anonymized.

The subdivisions by area of specialization resulted in small numbers of radiation oncologists in each group. For this reason, it was not possible to reflect on the relationship between frequency of counseling sexual function and demographic characteristics of the respondents. At the same time, because of the subdivisions we were able to produce a detailed insight in patient groups who might lack attention for SD following RT. Only three residents responded to the survey, which made it impossible to calculate differences in results between residents and radiation oncologists. Different treatment settings, knowing curative therapy, salvage therapy and palliative radiation, where not in particular assessed in this survey. As a result, nothing can be concluded about the approach of radiation oncologists toward patients receiving a different type of treatment.

The response rate was comparable with that of other postal questionnaires among physicians [39]. Nevertheless, nonrespondents may have different beliefs, attitudes and practice patterns than respondents, this may have caused a nonresponse bias and hence radiation oncologists may perform less or more active counseling for sexual problems after RT in daily practice.

#### Conclusions

Findings suggest that awareness of treatment-induced SD is present among radiation



oncologists, but responsibility for active counseling was not fully agreed on. Counseling on sexual function is routinely done in case of pelvic radiation therapy, but not consistent in case of gastrointestinal, breast and other cancers. According to the majority of the radiation oncologists, treatment-induced effects on sexual function are lasting forever. Radiation oncologists stated the preference for more detailed education about discussing SD in daily practice, and indicated that education about sexual issues should be a routine component of the residency in radiation oncology. A list for specialized referral regarding patients experiencing treatment-induced SD is requested.

#### *Implications for Clinical Practice*

In order to provide this component of care, radiation oncologists need to have good communication skills, an open and nonjudgmental approach, and knowledge of the potential consequences of radiation therapy on sexuality. Especially for gastrointestinal patients who possibly receive radiation on or close to the pelvic area, awareness should be improved among radiation oncologists. Both standard education within radiation oncology residency as additional education for practicing radiation oncologists are strongly recommended. Radiation oncologists who have the intention to integrate sexual health in their practice and would like to make use of a structured framework, could for example counsel with the widely used Permission (P), limited information (LI), specific suggestions (SS), and intensive therapy (IT) (PLISSIT) model [40]. Guidelines and standard operating procedures for radiation treatment should implement possible sexual side effects and the importance of addressing them as a part of informed consent and follow-up. Within the oncology team, clear appointments should be made regarding responsibility for addressing sexual issues with every patient before and during treatment. A list with specialized sexual health care providers should become available for referral of patients in need of specialized advice.

#### **Acknowledgments**

The authors thank all the radiation oncologists for their participation and Anne Dekkers, medical student, for assisting us in collecting the data.

**Corresponding Author:** E.M. Krouwel, MD, Department of Urology, Leiden University Medical Centre, J3P PO-box 9600, 2300 WB Leiden, The Netherlands. Tel: 0031 71 526 5255; Fax: 0031 71 5248135; E-mail: e.m.krouwel@lumc.nl

*Conflict of Interest:* The authors report no conflicts of interest.

#### **Statement of Authorship**

##### *Category 1*

##### **(a) Conception and Design**

Henk Willem Elzevier; Luca Incrocci; Augustinus D.G. Krol; Rob C.M. Pelger

##### **(b) Acquisition of Data**

Esmée M. Krouwel; Melianthe P. Nicolai

##### **(c) Analysis and Interpretation of Data**

Esmée M. Krouwel; Melianthe P. Nicolai; Gerard J. van der Wielen; Hein Putter

##### *Category 2*

##### **(a) Drafting the Article**

Esmée M. Krouwel; Melianthe P. Nicolai; Gerard J. van der Wielen

##### **(b) Revising It for Intellectual Content**

Luca Incrocci; Augustinus D.G. Krol; Rob C.M. Pelger; Henk Willem Elzevier

##### *Category 3*

##### **(a) Final Approval of the Completed Article**

Esmée M. Krouwel; Melianthe P. Nicolai; Gerard J. van der Wielen; Hein Putter; Augustinus D.G. Krol; Rob C.M. Pelger; Henk Willem Elzevier

#### **References**

- 1 Baker F, Denniston M, Smith T, West MM. Adult cancer survivors: How are they faring? *Cancer* 2005;104(11 suppl):2565–76.
- 2 Haboubi NH, Lincoln N. Views of health professionals on discussing sexual issues with patients. *Disabil Rehabil* 2003;25:291–6.
- 3 Flynn KE, Reese JB, Jeffery DD, Abernethy AP, Lin L, Shelby RA, Porter LS, Dombeck CB, Weinfurt KP. Patient experiences with communication about sex during and after treatment for cancer. *Psychooncology* 2012;21:594–601.
- 4 Incrocci L, Jensen PT. Pelvic radiotherapy and sexual function in men and women. *J Sex Med* 2013;10(Suppl 1):53–64.
- 5 Marijnen CA, van de Velde CJ, Putter H, van den Brink M, Maas CP, Martijn H, Rutten HJ, Wiggers T, Kranenbarg EK, Leer JW, Stiggelbout AM. Impact of short-term preoperative radiotherapy on health-related quality of life and sexual functioning in primary rectal cancer: report of a multicenter randomized trial. *J Clin Oncol* 2005;23:1847–58.
- 6 Kimura M, Rabbani ZN, Zodda AR, Yan H, Jackson IL, Polascik TJ, Donatucci CF, Moul JW, Vujaskovic Z, Koontz BF. Role of oxidative stress in a rat model of radiation-induced erectile dysfunction. *J Sex Med* 2012;9:1535–49.
- 7 Bentzen SM. Preventing or reducing late side effects of radiation therapy: Radiobiology meets molecular pathology. *Nat Rev Cancer* 2006;6:702–13.
- 8 Meirou D, Nugent D. The effects of radiotherapy and chemotherapy on female reproduction. *Hum Reprod Update* 2001;7:535–43.
- 9 Brauner R, Czernichow P, Cramer P, Schaison G, Rappaport R. Leydig-cell function in children after direct testicular

- irradiation for acute lymphoblastic leukemia. *N Engl J Med* 1983;309:25–8.
- 10 Nord C, Bjoro T, Ellingsen D, Mykletun A, Dahl O, Klepp O, Bremnes RM, Wist E, Fossa SD. Gonadal hormones in long-term survivors 10 years after treatment for unilateral testicular cancer. *Eur Urol* 2003;44:322–8.
  - 11 Milbury K, Cohen L, Jenkins R, Skibber JM, Schover LR. The association between psychosocial and medical factors with long-term sexual dysfunction after treatment for colorectal cancer. *Support Care Cancer* 2013;21:793–802.
  - 12 Jensen PT, Groenvold M, Klee MC, Thranov I, Petersen MA, Machin D. Longitudinal study of sexual function and vaginal changes after radiotherapy for cervical cancer. *Int J Radiat Oncol Biol Phys* 2003;56:937–49.
  - 13 Incrocci L, Slob AK, Levendag PC. Sexual (dys)function after radiotherapy for prostate cancer: A review. *Int J Radiat Oncol Biol Phys* 2002;52:681–93.
  - 14 Fiorino C, Valdagni R, Rancati T, Sanguineti G. Dose-volume effects for normal tissues in external radiotherapy: Pelvis. *Radiother Oncol* 2009;93:153–67.
  - 15 Majewski W, Tarnawski R. Acute and late toxicity in radical radiotherapy for bladder cancer. *Clin Oncol (R Coll Radiol)* 2009;21:598–609.
  - 16 Roach M, Winter K, Michalski JM, Cox JD, Purdy JA, Bosch W, Lin X, Shipley WS. Penile bulb dose and impotence after three-dimensional conformal radiotherapy for prostate cancer on RTOG 9406: Findings from a prospective, multi-institutional, phase I/II dose-escalation study. *Int J Radiat Oncol Biol Phys* 2004;60:1351–6.
  - 17 Andreyev J. Gastrointestinal symptoms after pelvic radiotherapy: A new understanding to improve management of symptomatic patients. *Lancet Oncol* 2007;8:1007–17.
  - 18 Rodrigues AC, Teixeira R, Teixeira T, Conde S, Soares P, Torgal I. Impact of pelvic radiotherapy on female sexuality. *Arch Gynecol Obstet* 2012;285:505–14.
  - 19 Bergmark K, Avall-Lundqvist E, Dickman PW, Henningsohn L, Steineck G. Vaginal changes and sexuality in women with a history of cervical cancer. *N Engl J Med* 1999;340:1383–9.
  - 20 Davidson SE, Burns MP, Routledge JA, Swindell R. The impact of radiotherapy for carcinoma of the cervix on sexual function assessed using the LENT SOMA scales. *Radiother Oncol* 2003;68:241–7.
  - 21 van der Wielen GJ, van Putten WL, Incrocci L. Sexual function after three-dimensional conformal radiotherapy for prostate cancer: Results from a dose-escalation trial. *Int J Radiat Oncol Biol Phys* 2007;68:479–84.
  - 22 Geenen MM, Cardous-Ubbink MC, Kremer LC, van den Bos C, van der Pal HJ, Heinen RC, Jaspers MW, Koning CC, Oldenburger F, Langeveld NE, Hart AA, Bakker PJ, Caron HN, van Leeuwen FE. Medical assessment of adverse health outcomes in long-term survivors of childhood cancer. *JAMA* 2007;297:2705–15.
  - 23 Vrieling C, Collette L, Fourquet A, Hoogenraad WJ, Horiot JC, Jager JJ, Pierart M, Poortmans PM, Struikmans H, Van der Hulst M, Van der Schueren E, Bartelink H. The influence of the boost in breast-conserving therapy on cosmetic outcome in the EORTC “boost versus no boost” trial. *Int J Radiat Oncol Biol Phys* 1999;45:677–85.
  - 24 Vistad I, Cvanarova M, Fossa SD, Kristensen GB. Postradiotherapy morbidity in long-term survivors after locally advanced cervical cancer: How well do physicians’ assessments agree with those of their patients? *Int J Radiat Oncol Biol Phys* 2008;71:1335–42.
  - 25 Wang J, Sun X, Cai R, Jiao S, Yu H, Zhang Y, Feng G, Ren S, Zhao Y, Du X. Attitudes and behavior of radiation oncologists toward sexual issues of cervical cancer patients who receive radiation therapy: A survey in China. *Int J Gynecol Cancer* 2013;23:393–8.
  - 26 White ID, Faithfull S, Allan H. The re-construction of women’s sexual lives after pelvic radiotherapy: A critique of social constructionist and biomedical perspectives on the study of female sexuality after cancer treatment. *Soc Sci Med* 2013;76:188–96.
  - 27 Moreira ED Jr, Brock G, Glasser DB, Nicolosi A, Laumann EO, Paik A, Wang T, Gingell C. Help-seeking behaviour for sexual problems: The global study of sexual attitudes and behaviors. *Int J Clin Pract* 2005;59:6–16.
  - 28 Nicolai MP, Both S, Liem SS, Pelger RC, Putter H, Schalijs MJ, Elzevier HW. Discussing sexual function in the cardiology practice. *Clin Res Cardiol* 2013;102:329–36.
  - 29 Bekker M, Beck J, Putter H, van Driel M, Pelger R, Lycklama AN, Elzevier H. The place of female sexual dysfunction in the urological practice: Results of a Dutch survey. *J Sex Med* 2009;6:2979–87.
  - 30 Krouwel EM, Nicolai MP, van Steijn-van Tol AQ, Putter H, Osanto S, Pelger RC, Elzevier HW. Addressing changed sexual functioning in cancer patients: A cross-sectional survey among Dutch oncology nurses. *Eur J Oncol Nurs* 2015; DOI: 10.1016/j.ejon.2015.05.005.
  - 31 Krouwel EM, Hagen JH, Nicolai MPJ, Vahrmeijer AL, Putter H, Pelger RCM, Elzevier HW. Management of sexual side effects in the surgical oncology practice: A nationwide survey of Dutch surgical oncologists. *Eur J Surg Onc* 2015;41(9): 1179–1187. DOI: 10.1016/j.ejso.2015.06.009.
  - 32 Bekker MD, Van Driel MF, Pelger RC, Nijeholt GA, Elzevier HW. How do continence nurses address sexual function and a history of sexual abuse in daily practice? Results of a pilot study. *J Sex Med* 2011;8:367–75.
  - 33 Faithfull S, White I. Delivering sensitive health care information: Challenging the taboo of women’s sexual health after pelvic radiotherapy. *Patient Educ Couns* 2008;71:228–33.
  - 34 Miles T, Johnson N. Vaginal dilator therapy for women receiving pelvic radiotherapy. *Cochrane Database Syst Rev* 2014;(9):CD007291.
  - 35 Jeffries SA, Robinson JW, Craighead PS, Keats MR. An effective group psychoeducational intervention for improving compliance with vaginal dilation: A randomized controlled trial. *Int J Radiat Oncol Biol Phys* 2006;65:404–11.
  - 36 Showalter TN, Ohri N, Teti KG, Foley KA, Keith SW, Trabulsi EJ, Lallas CD, Dicker AP, Hoffman-Censits J, Pizzi LT, Gomella LG. Physician beliefs and practices for adjuvant and salvage radiation therapy after prostatectomy. *Int J Radiat Oncol Biol Phys* 2012;82:e233–8.
  - 37 Resnick MJ, Koyama T, Fan KH, Albertsen PC, Goodman M, Hamilton AS, Hoffman RM, Potosky AL, Stanford JL, Stroup AM, Van Horn RL, Penson DF. Long-term functional outcomes after treatment for localized prostate cancer. *N Engl J Med* 2013;368:436–45.
  - 38 Lindau ST, Schumm LP, Laumann EO, Levinson W, O’Muircheartaigh CA, Waite LJ. A study of sexuality and health among older adults in the United States. *N Engl J Med* 2007;357:762–74.
  - 39 Barclay S, Todd C, Finlay I, Grande G, Wyatt P. Not another questionnaire! Maximizing the response rate, predicting non-response and assessing non-response bias in postal questionnaire studies of GPs. *Fam Pract* 2002;19:105–11.
  - 40 Annon JS. The PLISSIT model: A proposed conceptual scheme for the behavioral treatment of sexual problems. *J Sex Educ Ther* 1976;2:1–15.

**Appendix 1. Questionnaire radiation oncologists (translated from Dutch).**

This questionnaire concerns patients with any kind of cancer in any stage of 16 years and above.

**Demographics**

1. What is your age? . . . . . years
2. What is your gender? M/F
3. What is your function?
  - Radiation oncologist
  - Resident
4. Where do you work?
  - Academic hospital
  - District general teaching hospital
  - District general hospital
5. What is/are your area(s) of specialization?  
.....
6. How long do you practice as a radiation oncologist?
 

|                                      |  |
|--------------------------------------|--|
| <input type="checkbox"/> 0–11 months | <input type="checkbox"/> 6–10 year       |
| <input type="checkbox"/> 1–2 year    | <input type="checkbox"/> 11–15 year      |
| <input type="checkbox"/> 3–5 year    | <input type="checkbox"/> 15 year or more |

**Sexual function**

1. How often do you discuss the sexual function of the patient?
 

|                                    |                                    |
|------------------------------------|------------------------------------|
| Specialty: . . . . .               | Specialty: . . . . .               |
| <input type="checkbox"/> Never     | <input type="checkbox"/> Never     |
| <input type="checkbox"/> Rarely    | <input type="checkbox"/> Rarely    |
| <input type="checkbox"/> Sometimes | <input type="checkbox"/> Sometimes |
| <input type="checkbox"/> Regularly | <input type="checkbox"/> Regularly |
| <input type="checkbox"/> Often     | <input type="checkbox"/> Often     |
2. In your current workplace, which percentage of the patients do you estimate to experience changed sexual function due to radiotherapy?  
Specialty: . . . . .— . . . . .%      Specialty: . . . . .— . . . . .%
3. In the past year, with which percentage of your patients did you discuss their sexual function?  
Specialty: . . . . .— . . . . .%      Specialty: . . . . .— . . . . .%
4. In the past year, which percentage of your patients did you refer to another physician or health care provider for guidance of sexual concerns or for answering questions regarding sexuality?  
Specialty: . . . . .— . . . . .%      Specialty: . . . . .— . . . . .%
5. The radiation oncologists carry responsibility for discussing sexual function with patients.
 

|  |   |
|--|---|
| <input type="checkbox"/> Totally agree | <input type="checkbox"/> Disagree         |
| <input type="checkbox"/> Agree         | <input type="checkbox"/> Totally disagree |
| <input type="checkbox"/> I don't know  |   |
6. Otherwise, who has the responsibility for discussing sexual function? (multiple answers possible)
  - Treating medical specialist (urologist, gynecologist, surgeon, oncologist)
  - General practitioner
  - Sexologist
  - Social work
  - Nurse
  - Physical therapist
  - Psychologist
  - The patient has to raise the subject by itself.
  - Other: . . . . .
7. During the informing of patients about the possible consequences of the radiotherapy (informed consent), do you also inform about the possible consequences on sexual functioning?
 

|                                    |                                    |
|------------------------------------|------------------------------------|
| Specialty: . . . . .               | Specialty: . . . . .               |
| <input type="checkbox"/> Never     | <input type="checkbox"/> Never     |
| <input type="checkbox"/> Rarely    | <input type="checkbox"/> Rarely    |
| <input type="checkbox"/> Sometimes | <input type="checkbox"/> Sometimes |
| <input type="checkbox"/> Regularly | <input type="checkbox"/> Regularly |
| <input type="checkbox"/> Often     | <input type="checkbox"/> Often     |

8. During the follow-up appointments after treatment, do you get back to the subject sexual functioning?

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Specialty: . . . . .               | Specialty: . . . . .               |
| <input type="checkbox"/> Never     | <input type="checkbox"/> Never     |
| <input type="checkbox"/> Rarely    | <input type="checkbox"/> Rarely    |
| <input type="checkbox"/> Sometimes | <input type="checkbox"/> Sometimes |
| <input type="checkbox"/> Regularly | <input type="checkbox"/> Regularly |
| <input type="checkbox"/> Often     | <input type="checkbox"/> Often     |

9. How often present patients sexual functioning complaints spontaneously?

- |                                    |                                    |
|------------------------------------|------------------------------------|
| Specialty: . . . . .               | Specialty: . . . . .               |
| <input type="checkbox"/> Never     | <input type="checkbox"/> Never     |
| <input type="checkbox"/> Rarely    | <input type="checkbox"/> Rarely    |
| <input type="checkbox"/> Sometimes | <input type="checkbox"/> Sometimes |
| <input type="checkbox"/> Regularly | <input type="checkbox"/> Regularly |
| <input type="checkbox"/> Often     | <input type="checkbox"/> Often     |

10. To which extent, do you possess sufficient knowledge to be able to discuss the subject sexual function with your patients?

- |  |   |
|--|---|
| <input type="checkbox"/> No knowledge at all   | <input type="checkbox"/> Sufficient knowledge |
| <input type="checkbox"/> Not so much knowledge | <input type="checkbox"/> A lot of knowledge   |
| <input type="checkbox"/> Some knowledge        |   |

11. In your current workplace, how often did you inform men with prostate cancer about sexuality:

- |  | <b>Never</b>             | <b>Rarely</b>            | <b>Regularly</b>         | <b>Often</b>             |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| A. The risk of erectile dysfunction          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. The use of phosphodiesterase 5-inhibitors | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

12. In your current workplace, how often did you inform about sexuality to:

- |   | <b>Never</b>             | <b>Rarely</b>            | <b>Regularly</b>         | <b>Often</b>             |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| A. Male patients after radiotherapy on the prostate or rectum | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Female patients after radiotherapy on the breast or cervix | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. How often do you believe women who underwent radiation for breast cancer experience sexual problems due to radiotherapy?

- Never
- Rarely
- Sometimes
- Regularly
- Often

14. How often do you believe women who underwent radiation for cervical cancer experience sexual problems due to radiotherapy?

- Never
- Rarely
- Sometimes
- Regularly
- Often

15. According to you, how long does it take before side-effects of radiotherapy to sexual function start to decrease?

- 3–6 months
- 6–12 months
- 1–2 year
- More than 2 years
- The side-effects will remain forever

16. In your current workplace, how often did you supply information to patient after they received pelvic radiation, from the following age categories?

- |                     | <b>Never</b>             | <b>Rarely</b>            | <b>Regularly</b>         | <b>Often</b>             |
|---------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| — 20–35 year        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| — 36–50 year        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| — 51–65 year        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| — 66–75 year        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| — 76 year and older | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

17. If you discuss sexual function, how often is the partner present during these conversations?

- Never / almost never
- In less than half of the cases
- In half of the cases
- In more than half of the cases
- Almost always / always

18. In the subsequent table are reasons that possibly keep you from discussing sexual function with your patients. To which extent do you agree with the statements? Please circle one square per statement.

|  | Totally disagree         | Disagree                 | Partly agree/partly disagree | Agree                    | Totally agree            |
|--|--------------------------|--------------------------|------------------------------|--------------------------|--------------------------|
| Lack of time                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Lack of knowledge                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Lack of training                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| It's someone else's task                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Patient is not ready to discuss SF           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Sexuality is not a patient's concern         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Patient is too ill                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Concerned about making patient uncomfortable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Reasons related to culture/religion          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Reasons related to language/ethnicity        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Age difference between you and patient       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
|  | Totally disagree         | Disagree                 | Partly agree/partly disagree | Agree                    | Totally agree            |
| Patient is the opposite gender               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Patient is the same gender                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Presence of a third party                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Embarrassment                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Advanced age of the patient                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Sexuality is a private matter                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| No angle or reason for asking                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| I feel uncomfortable                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Patient doesn't bring up the subject         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |
| Afraid to offend the patient                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>     | <input type="checkbox"/> | <input type="checkbox"/> |

19. In your clinic, do you have the possibility to refer patients with sexual problems?

- Yes
- No
- Unknown

If yes, to .....

20. Do you feel the need to extent your knowledge on discussing sexual function with your patients?

- Yes
- No

21. Do you believe counseling of sexual functioning should be a regular component of the radiation oncology residency?

- Yes
- No

22. Are you in need of a topical list with qualified sexual health care providers for referral of your patients?

- Yes
- No

Are there items you miss or you would like to see otherwise?

---



---

Thank you very much for participating!