



Predictors for the utilization of social service counseling by prostate cancer patients

Clara Breidenbach¹ · Lena Ansmann² · Nora Tabea Sibert¹ · Simone Wesselmann¹ · Sebastian Dieng³ · Ernst-Günther Carl⁴ · Günter Feick⁴ · Cindy Stoklossa^{5,6} · Anne Taubert^{5,6} · Amanda Pomery⁷ · Burkhard Beyer⁸ · Andreas Blana⁹ · Marko Brock¹⁰ · Florian Distler¹¹ · Michael Enge¹² · Amr A. Gaber¹³ · Christian Gilfrich¹⁴ · Andreas Hinkel¹⁵ · Björn Kaftan¹⁶ · Thomas Knoll¹⁷ · Frank Kunath¹⁸ · Simba-Joshua Oostdam¹⁹ · Inga Peters²⁰ · Bülent Polat²¹ · Valentin Schrodi²² · Friedemann Zengerling²³ · Christoph Kowalski¹

Received: 10 May 2021 / Accepted: 8 October 2021 / Published online: 4 November 2021
© The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature 2021

Abstract

Purpose Social service counseling (SSC) is an important instrument to support cancer patients, for example, regarding legal support, or rehabilitation. Several countries have established on-site SSC in routine care. Previous analyses have shown that SSC utilization varies across cancer centers. This analysis investigates patient and center-level predictors that explain variations in SSC utilization between centers.

Methods Logistic multilevel analysis was performed with data from 19,865 prostate cancer patients from 102 prostate cancer centers in Germany and Switzerland. Data was collected within an observational study between July 2016 and June 2020 using survey (online and paper) and tumor documentation.

Results The intraclass correlation coefficient for the null model implies that 51% of variance in SSC utilization is attributable to the center a patient is treated in. Patients aged 80 years and older, with higher education, private insurance, without comorbidities, localized intermediate risk, and undergoing androgen deprivation therapy before study inclusion were less likely to utilize SSC. Undergoing primary radiotherapy, active surveillance, or watchful waiting as compared to prostatectomy was associated with a lower likelihood of SSC utilization. Significant negative predictors at the center level were university hospital, center's location in Switzerland, and a short period of certification.

Conclusion The results show that patient and center characteristics contribute to explaining the variance in SSC utilization in prostate cancer centers to a large extent. The findings may indicate different organizational processes in the countries included and barriers in the sectoral structure of the healthcare system. In-depth analyses of processes within cancer centers may provide further insights into the reasons for variance in SSC utilization.

Keywords Prostate cancer · Psychosocial needs · Social work · Oncology · Supportive care

Introduction

Prostate cancer is the most prevalent cancer disease among males in most European and North American countries [1, 2]. It has been pointed out in the literature that prostate cancer patients need supportive care [3–7] in relation to rehabilitation, financial matters, and guidance through the healthcare system, e.g., with follow-up care and rehabilitation, to name only a few areas of support. Social work has a

long tradition in healthcare in Germany and today focuses on providing advice, support, and relief services for dealing with illness-related changes in living conditions — for example, legal support, pension benefit issues, or medical and occupational rehabilitation [8]. Social work in hospitals is here referred to as social service counseling (SSC). More than 40% of all newly diagnosed prostate cancer patients in Germany are treated in prostate cancer centers certified by the German Cancer Society [Rueckher et al., submitted] which are thus essential for the implementation of SSC in routine care in Germany. Certified centers by the German Cancer Society are also common in German-speaking countries outside Germany such as Switzerland and have been

✉ Clara Breidenbach
breidenbach@krebsgesellschaft.de

Extended author information available on the last page of the article

introduced in further European and international countries such as Italy, China, and Russia. A certified center is a certified network in which all disciplines closely collaborate in the treatment of cancer patients. Centers with a certification are required, among other criteria, to treat a minimum number of primary cases or to implement structures for, i.e., pretherapeutic tumor boards. Additionally, every patient in a certified prostate cancer center must be given access to SSC on low threshold — these requirements are the same for Germany and Switzerland. SSC is usually provided face-to-face by a trained social worker or someone with equivalent qualification. Positive impacts of SSC have been suggested by a recent survey in which higher SSC utilization rates in cancer centers were correlated with lower information needs regarding financial issues and problems revolving around health insurance companies in oncological patients [9].

SSC utilization has been shown to differ among certified cancer centers, both between the various cancer types and within centers for one entity [10, 11]. However, much of the variation has not yet been sufficiently explained [10]. Knowledge on social counseling in oncology is still limited, and the research is often not differentiated from psycho-oncological research [12, 13]. So far, the scarce literature dealing with utilization of social counseling services by cancer patients has, for example, identified sociodemographic factors such as age, gender, income, insurance, and employment status; disease-specific characteristics such as receiving chemotherapy [14, 15]; as well as partnership and patients' psychological and physical functioning [16] as being associated with the consultation of a social worker by cancer patients. In addition, the location of social workers' offices within a hospital [17] and the country in which the certified cancer centers are located have been related to the utilization of social services [10]. The empirical literature mentioned indicates that factors at the patient level and at the organizational level are associated with the utilization of SSC.

A similar approach is taken by the Behavioral Model of Health Services Use (BM) by Andersen et al. [18], which posits that individual and contextual characteristics influence the utilization of health services. The model has been widely applied to different contexts [19]. This model assumes that at both levels, there are (1) conditions that predispose people to utilize or not utilize health services, such as sociodemographic factors; (2) enabling factors that inhibit or facilitate the utilization of health services, e.g., structures in health-care organizations; and (3) needs that require the utilization of a health service, such as physical health. In terms of the current research topic, Andersen's individual and contextual characteristics would refer to prostate cancer patients in certified prostate cancer centers.

Disparities in utilization raise the concern that there may be inequities in access to SSC stemming from the healthcare system. According to Andersen, inequitable access to health

services occurs when predisposing and enabling variables have an impact on who utilizes health services [18]. The objective of this study is therefore to better understand SSC utilization patterns in prostate cancer treatment in order to build a basis for reducing inequities and improving quality in cancer care. Using the BM as an analytical framework, this study aims to answer which factors, at both patient and center levels, explain the variance in SSC utilization between prostate cancer centers.

Materials and methods

Data collection

The data originates from a large-scale observational cohort study, the Prostate Cancer Outcome (PCO) study [20]. The PCO study is the German branch of the TrueNTH Global Registry, which aims at improving the health of locally treated prostate cancer patients by measuring and comparing clinical and patient-reported outcomes around the globe. In Germany and Switzerland, certified prostate cancer centers contribute to this by collecting patient-reported outcome data and sociodemographic information using surveys (online and paper) and linking it to clinical information routinely collected during the certification process. Eligibility criteria for study inclusion are newly diagnosed with prostate cancer (any T, any N, M0) and local treatment or active surveillance or watchful waiting in one of the study centers. Age was no eligibility criteria. Exclusion criteria were inadequate language skills to answer the survey (available in German, English, French, Dutch). The patient's doctor decides on eligibility. Patients were informed about the possibility of participation in the study by the study coordinator of the study center or a designated representative. After a detailed explanation of the study and receipt of a patient information document, the patient is asked to give his written consent. This analysis processes data collected between July 2016 and June 2020 in 96 prostate cancer centers in Germany and six prostate cancer centers in Switzerland.

The ethics board of the Berlin Medical Association approved the study protocol (Eth-12/16) and all participating patients gave informed written consent. The study has been registered in the German Clinical Trial Register (DRKS00010774).

Measures

Dependent variable — utilization of SSC

For certification purposes, certified prostate cancer centers document whether a patient utilized the center's SSC during

their treatment in the center, with a dichotomous variable indicating SSC utilization or no utilization of SSC.

Independent variables

At the patient level, clinical and sociodemographic characteristics such as age, educational level, nationality, and insurance status were taken into account to explain SSC utilization. Age was documented by the center. For the analysis, it was coded as under 50 years old, 50–59 years, 60–69 years, 70–79 years, and 80 years and older. Educational level, nationality, and insurance status were collected using a patient survey. Educational level was grouped into seven categories (no school-leaving qualification, lower secondary school education, intermediate secondary school education, vocational technical diploma, entrance certificate for university, other school-leaving qualification, and not applicable (patients from Swiss centers)). Nationality was categorized into German (including multiple nationalities), other nationalities, and not applicable (patients from Swiss centers), and insurance status was grouped into statutory,¹ private, none/other insurance, and not applicable (patients from Swiss centers). Clinical patient characteristics were documented by the center. Numbers of comorbidities were generated from the total of 12 predefined conditions listed in the protocol proposed by Martin and colleagues [21] and coded as 0, 1, and 2 or more comorbidities. The risk classification was calculated in accordance with the German clinical guideline for the diagnosis and treatment of prostate cancer [22] — including the prostate-specific antigen value, Gleason score, and clinical stage — and divided into six categories (localized low risk, localized intermediate risk, localized high risk, locally advanced (T3/4), advanced (N1), and not determined). Treatment after inclusion in the study was categorized into five groups (radical prostatectomy, primary radiotherapy, radical prostatectomy + adjuvant radiotherapy, active surveillance, watchful waiting).²

¹ In Germany, about 90% of the population is insured statutorily. The statutory health insurance system functions according to the principle of solidarity: all members with statutory health insurance pay contributions based on their financial capacity. These contributions are collected in the joint health fund of the health insurance funds. Health benefits are the same for everyone, meaning that regardless of the amount of the contributions paid, all insured persons receive the medically necessary services (www.bundesgesundheitsministerium.de/gkv).

² Active surveillance is a management strategy for patients with cancers that are slow-growing and not an immediate threat for the patient's life. It is suitable for patients with low-risk classification according to clinical guidelines [22]. With this treatment, the doctor actively monitors the cancer's progression (PSA level, biopsies) and initiates further therapies only when the cancer progresses. On the contrary, watchful waiting is a palliative treatment. Patient's symptoms are monitored and treated.

Additionally, androgen deprivation therapy (ADT) before study inclusion was coded as 'yes' or 'no.'

Center characteristics were collected during the certification process and included the country in which the center is located (Germany or Switzerland), the size of the municipality in which the center was located (population < 20,000, 20,000–100,000, > 100,000–1,000,000, > 1,000,000), hospital ownership as private or nonprofit/public, teaching status (nonacademic, academic, and university hospital),³ and years since first certification (during process for first certification, less than 1 year, 1–2 years, 2–3 years, 3–4 years, 4–5 years, more than 5 years).

Data analysis

Descriptive analyses were first performed and included median, interquartile range (IQR), and frequency distribution analysis. Chi-square tests were then performed in order to identify differences between patients who received SSC and patients who did not receive SSC.

In addition, a random intercept multilevel logistic model was used to identify predictors for SSC use and to respect the hierarchical structure of the data (patients nested in centers). Therefore, the assumption of no multicollinearity among the independent variables was checked by calculating variance inflation factors. An intraclass correlation coefficient (ICC) was then calculated using a null model without predictors. Subsequently, patient and center characteristics were added to the model blockwise (sociodemographic and clinical patient information was added first, followed by patients' therapy information and finally centers' characteristics). The model performance was analyzed using the Akaike (AIC) and Bayesian (BIC) information criteria. Missing cases in the independent categorical variables were included as separate categories in order to avoid case deletion. Fourteen centers did not document comorbidities, as discussed previously [20]. All patients from these centers were assigned a missing value for the number of comorbidities. An additional sensitivity analysis was therefore performed, excluding centers that had missing values for the number of comorbidities from the model. *P* values lower than 0.05 are considered to indicate statistical significance. All analyses were performed using the R statistical package, version 4.0.2, including the packages 'lme4' for multilevel analysis and 'performance' for analysis of model performance.

³ Academic teaching hospitals and university hospitals both train medical students. However, academic teaching hospitals do not belong to a university.

Results

Sample

The analytic sample consists of 19,865 prostate cancer patients. Seventy-five percent ($n = 15,002$) of the sample utilized SSC, and 24.5% ($n = 4,863$) did not. The respondents were a median of 67 years old (IQR 61–72). About one-third had a lower secondary school educational level (30.6%) and most of the respondents had statutory insurance (66.3%) and had German nationality (89.1%). The majority of the respondents had no comorbidities (63.3%), were classified as having localized intermediate risk (47.1%), did not receive ADT before study inclusion (93.7%), and underwent radical prostatectomy as a primary treatment (79.6%). Table 1 summarizes the descriptive results for the total sample. Table 2 shows the descriptive results for the subgroups of patients who utilized or did not utilize SSC and also presents the results of the chi-square tests. All the variables show statistically significant associations with SSC utilization.

Patients were nested in 102 prostate cancer centers, ranging from 13 to 3,428 included patients per center. Ninety-six centers in the sample were located in Germany and six centers were located in Switzerland. The SSC utilization rate ranged from 0 to 100% between the participating prostate cancer centers. The majority of the centers had a nonprofit/public ownership (88.2%), had an academic teaching status (76.5%), and were located in areas with a population of > 100,000–1,000,000 (52.0%). Most of the centers had been certified for more than 5 years (71.6%) at the time of this analysis. Table 1 and 2 (patient level) show the distribution of patients across center characteristics.

Logistic multilevel analysis

The null model shows that 51% of the variance in SSC utilization is attributable to the specific center a patient is treated in. The final model includes individual predisposing factors (sociodemographic factors), need factors (clinical information), and enabling contextual factors (center characteristics) in accordance with Andersen's BM [18], and was able to explain 18% of the variance in SSC utilization between prostate cancer centers ($ICC = 0.33$).

The final model shows that patients aged 80 and older are less likely to use SSC than patients aged between 60 and 69 years old (OR 0.60; CI 0.43 0.83). Patients with an entrance certificate for university (OR 0.87; CI 0.76 0.99) have a lower likelihood to use SSC than patients with lower secondary school education. In addition, privately insured patients (OR 0.59; CI 0.53 0.66) have lower odds

to use SSC that statutorily insured patients. In relation to clinical information, comorbid patients have a higher likelihood of using SSC than patients without any comorbidities (OR 1.22; CI 1.08 1.38). Moreover, patients with locally advanced (T3/4) disease (OR 1.55; CI 1.15 2.09) are more likely to utilize SSC compared to patients with localized, intermediate risk. Utilization of SSC is less likely in patients with ADT before study inclusion (OR 0.68; CI 0.55 0.84). Patients undergoing primary radiotherapy (OR 0.02; CI 0.02 0.02), active surveillance (OR 0.00; CI 0.00 0.01), and watchful waiting (OR 0.00; CI 0.00 0.01) had very small odds of utilizing SSC compared to patients undergoing radical prostatectomy.

Patients in Swiss centers had very small odds of utilizing SSC (OR 0.00; CI 0.00 0.01). University hospitals are negatively associated with SSC utilization in comparison with academic hospitals (OR 0.35; CI 0.16 0.81). In relation to time since first certification, the model shows that in centers that are currently undergoing the certification process for the first time, patients are less likely to utilize SSC than patients in centers that have been certified for more than 5 years (OR 0.13; CI 0.02 0.87). The size of the municipality and the hospital's ownership characteristics do not show any significant association with SSC utilization. Table 3 provides a detailed description of the model.

An additional sensitivity analysis calculating the model without centers that had missing values for the number of comorbidities ($n = 88$) showed the same tendencies as the final model presented in Table 3 (available upon request).

Discussion

The findings of this analysis confirm the high variance in utilization rates of SSC between centers demonstrated by previous research [10]. The results indicate that both patient characteristics and center characteristics are predictors for SSC utilization and explain a major proportion of the variance in SSC utilization in prostate cancer centers.

The model reveals that sociodemographic characteristics such as educational level, insurance status, and age are predictors for the probability of utilizing SSC. Firstly, age was shown to be a predictor, in that patients aged 80 and older were less likely to use SSC than patients in the reference group between 60 and 69 years of age. This is in line with previous research in breast cancer patients [23] and might be due to the fact that older patients face fewer unclear issues such as occupational concerns. Other explanations might be that patients in this age category may already be living in a nursing home and are thus less likely to have to deal with housing issues, or that older patients are transferred to geriatric units where SSC utilization may take place at a later time. Then, the analysis shows a lower probability of

Table 1 Sample characteristics
(*n* = 19,865)

Variables	Response options	Total <i>n</i> (%)
Patient characteristics		
Age	Under 50 years	261 (1.3)
	50–59 years	3,534 (17.8)
	60–69 years	9,137 (46.0)
	70–79 years	6,497 (32.7)
	80 years and older	428 (2.2)
	Missing	8 (0.0)
Educational level	No school-leaving qualification	86 (0.4)
	Lower secondary school	6,085 (30.6)
	Intermediate secondary school	4,588 (23.1)
	Vocational technical diploma	2,434 (12.3)
	Entrance certificate for university	4,758 (24.0)
	Other school-leaving qualification	289 (1.5)
	Not applicable (patients from Swiss centers)	711 (3.6)
Insurance	Missing	914 (4.6)
	Statutory	13,179 (66.3)
	Private	5,008 (25.2)
	None/other	105 (0.5)
Nationality	Not applicable (patients from Swiss centers)	711 (3.6)
	Missing	862 (4.3)
	German	17,706 (89.1)
	Other	568 (2.9)
Comorbidity	Not applicable (patients from Swiss centers)	711 (3.6)
	Missing	880 (4.4)
	0	12,583 (63.3)
	1	4,032 (20.3)
Risk classification	≥ 2	1,475 (7.4)
	Missing	1,775 (8.9)
	Localized, low risk	3,218 (16.2)
	Localized, intermediate risk	9,359 (47.1)
	Localized, high risk	6,036 (30.4)
Androgen deprivation therapy before inclusion	Locally advanced (T3/4)	748 (3.8)
	Advanced (N1)	243 (1.2)
	Not determined	39 (0.2)
	Missing	222 (1.1)
	No	18,606 (93.7)
	Yes	784 (4.0)
Treatment after study inclusion	Missing	475 (2.4)
	Radical prostatectomy	15,819 (79.6)
	Primary radiotherapy	1,989 (10.0)
	Radical prostatectomy + adjuvant radiotherapy	1,358 (6.8)
	Active surveillance	361 (1.8)
	Watchful waiting	116 (0.6)
Center characteristics	Missing	222 (1.1)
	Country	
	Germany	19,154 (96.4)
	Switzerland	711 (3.6)
	Municipality	
< 20,000 population	390 (2.0)	
20,000–100,000 population	7,376 (37.1)	
> 100,000–1,000,000 population	8,204 (41.3)	
> 1,000,000 population	3,895 (19.6)	

Table 1 (continued)

Variables	Response options	Total <i>n</i> (%)
Teaching status	Nonacademic	930 (4.7)
	Academic	12,518 (63.0)
Ownership	University	6,417 (32.3)
	Nonprofit/public	18,768 (94.5)
	Private	1,097 (5.5)
Years since first certification	During process for first certification	113 (0.6)
	Less than 1 year	168 (0.8)
	1–2 years	359 (1.8)
	2–3 years	1,081 (5.4)
	3–4 years	1,353 (6.8)
	4–5 years	505 (2.5)
	More than 5 years	16,286 (82.0)

SSC utilization with higher educational level. Secondly, the analysis demonstrates a negative association between private health insurance and SSC utilization in comparison with statutory insurance. A possible explanation for this might be that privately insured patients are often self-employed or high-income earners. This group of patients may have more experience in dealing with their insurance companies or may apply for rehabilitation less often due to financial losses when they are absent from their business.

Comorbidities and risk classification were also identified as predictors for SSC utilization. The presence of a comorbidity and risk classification of locally advanced (T3/4) were associated with a higher likelihood of SSC utilization. This is in line with previous findings [24]. An absence of comorbidities may be helpful in managing daily requirements, so that healthier patients may have a lower need for SSC in assisting with practical matters.

The type of therapy also appears to be a significant factor associated with SSC utilization. Receiving ADT before study inclusion was a predictor for a lower likelihood of SSC utilization, although an interest in psychosocial support services has previously been demonstrated in patients who receive ADT [25]. An explanation for the lower likelihood detected in the current analysis might be that patients were already utilizing outpatient services, since they were already confronted with the disease before entering the patient pathway in the prostate cancer center. A second finding regarding therapy was that patients who underwent radical prostatectomy were more likely to utilize SSC than patients who received primary radiotherapy or active surveillance and watchful waiting. The same associations have been shown in another analysis of earlier data from the same study concerning the utilization of psycho-oncological counseling [24]. These findings may either indicate differences in study inclusion between different wards or may indicate different levels of need for SSC depending on the treatment. It has been demonstrated that prostate cancer patients who

undergo radical prostatectomy experience reduced urinary continence and sexual functioning in comparison with patients who receive active surveillance or radiotherapy [26]. This might indicate a greater need for SSC — e.g., with assistance in applying for rehabilitation or in obtaining access to resources for dealing with incontinence. A third explanation might be that the differences in therapy type point to processual differences in the specific wards within the prostate cancer centers, since radical prostatectomy and radiotherapy are mostly carried out in different wards in a center. SSC may be integrated to a better extent in wards in which in-patients, such as radical prostatectomy patients, are treated and stay in the center for a longer period than in wards where outpatients receive radiotherapy or undergo active surveillance/watchful waiting and only stay for a short time at the center.

With regard to center characteristics, the model shows that country, teaching status, hospital ownership, and time since the center's first certification are predictors for SSC utilization. The likelihood for SSC utilization was found to be lower in Swiss centers than in German centers, even though the certification requirements regarding SSC are the same for both countries. This finding is in line with previous analyses [27] and may be traced back to differences in the healthcare systems. In Switzerland, the legal regulations regarding SSC differ from those in Germany and do not promote in-house services. Some typical tasks of the SSC in Germany may be covered by specialized nurses or case managers in Switzerland. It is also possible that differing social, cultural, and linguistic structures in Switzerland might affect the utilization of SSC. The model also revealed a negative association between university hospitals and SSC utilization in comparison with academic teaching hospitals. This association has also been found for the utilization of psycho-oncological services in prostate cancer centers [24] and may be related to difficulties in the processes needed for SSC provision. Ansmann et al. [28], for example, showed that

Table 2 Sample characteristics for patients with social service counseling (SSC) utilization ($n = 15,002$) and without SSC utilization ($n = 4,863$)

Variables	Response options	n with SSC (row percent)	n without SSC (row percent)	<i>P</i> value with vs. without SSC ¹
Patient characteristics				
Age	Under 50 years	196 (75.1)	65 (24.9)	< 0.001
	50–59 years	2,821 (79.8)	713 (20.2)	
	60–69 years	7,185 (78.6)	1,952 (21.4)	
	70–79 years	4,644 (71.5)	1,853 (28.5)	
	80 years and older	150 (35.0)	278 (65.0)	
	Missing	6 (75.0)	2 (25.0)	
Educational level	No school-leaving qualification	65 (76.6)	21 (24.4)	< 0.001
	Lower secondary school	4,912 (80.7)	1,173 (19.3)	
	Intermediate secondary school	3,731 (81.3)	857 (18.7)	
	Vocational technical diploma	1,949 (80.1)	485 (19.9)	
	Entrance certificate for university	3,551 (74.6)	1,207 (25.4)	
	Other school-leaving qualification	228 (78.9)	61 (21.1)	
	Not applicable (patients from Swiss centers)	13 (1.8)	698 (98.2)	
	Missing	553 (60.5)	361 (39.5)	
Insurance	Statutory	10,753 (81.6)	2,426 (18.4)	< 0.001
	Private	3,643 (72.7)	1,365 (27.3)	
	None/other	81 (77.1)	24 (22.9)	
	Not applicable (patients from Swiss centers)	13 (1.8)	698 (98.2)	
	Missing	512 (59.4)	350 (40.6)	
Nationality	German	13,998 (79.1)	3,708 (20.9)	< 0.001
	Other	467 (82.2)	101 (17.8)	
	Not applicable (patients from Swiss centers)	13 (1.8)	698 (98.2)	
	Missing	524 (59.5)	356 (40.5)	
Comorbidity	0	9,202 (73.1)	3,381 (26.9)	< 0.001
	1	3,290 (81.6)	742 (18.4)	
	≥ 2	1,169 (79.3)	306 (20.7)	
	Missing	1,341 (75.5)	434 (24.5)	
Risk classification	Localized, low risk	2,319 (72.1)	899 (27.9)	< 0.001
	Localized, intermediate risk	7,165 (76.6)	2,197 (23.4)	
	Localized, high risk	4,769 (79.0)	1,267 (21.0)	
	Locally advanced (T3/4)	518 (69.3)	230 (30.7)	
	Advanced (N1)	168 (69.1)	75 (30.9)	
	Not determined	26 (66.7)	13 (33.3)	
	Missing	37 (16.7)	185 (83.3)	
Androgen deprivation therapy before inclusion	No	14,509 (78.0)	4,097 (22.0)	< 0.001
	Yes	301 (38.4)	483 (61.6)	
	Missing	192 (40.4)	283 (59.6)	
Treatment after study inclusion	Radical prostatectomy	13,195 (83.4)	2,624 (16.6)	< 0.001
	Primary radiotherapy	539 (27.1)	1,450 (72.9)	
	Radical prostatectomy + adjuvant radiotherapy	1,199 (88.3)	159 (11.7)	
	Active surveillance	24 (6.6)	337 (93.4)	
	Watchful waiting	8 (6.9)	108 (93.1)	
	Missing	37 (16.7)	185 (83.3)	
Center characteristics				
Country	Germany	14,989 (78.3)	4,165 (21.7)	< 0.001
	Switzerland	13 (1.8)	698 (98.2)	

Table 2 (continued)

Variables	Response options	n with SSC (row percent)	n without SSC (row percent)	<i>P</i> value with vs. without SSC ¹
Municipality	< 20,000 population	308 (79.0)	82 (21.0)	< 0.001
	20,000–100,000 population	5,813 (78.8)	1,563 (21.2)	
	> 100,000–1,000,000 population	6,312 (76.9)	1,892 (23.1)	
	> 1,000,000 population	2,569 (66.0)	1,326 (34.0)	
Teaching status	Nonacademic	626 (67.3)	304 (32.7)	< 0.001
	Academic	10,016 (80.0)	2,502 (20.0)	
	University	4,360 (67.9)	2,057 (32.1)	
Ownership	Nonprofit/public	14,367 (76.6)	4,401 (23.4)	< 0.001
	Private	635 (57.9)	462 (42.1)	
Years since first certification	During process for first certification	64 (56.6)	49 (43.4)	< 0.001
	Less than 1 year	57 (33.9)	111 (66.1)	
	1–2 years	276 (76.9)	83 (23.1)	
	2–3 years	697 (64.5)	384 (35.5)	
	3–4 years	1,046 (77.3)	307 (22.7)	
	4–5 years	283 (56.0)	222 (44.0)	
	More than 5 years	12,579 (77.2)	3,707 (22.8)	

¹Chi-squared test

employees in breast cancer centers affiliated to university hospitals experience more process problems and difficulties in interaction and cooperation between wards than employees in non-teaching hospitals. To provide supportive care, however, interaction between wards is needed — in order to submit a counseling offer and information to the patient, for example. However, these findings may not be generalized to other patient groups in addition to those investigated here — an internal analysis of certification data by the German Cancer Society indicates that a negative association for centers with university teaching status may not be confirmed when patients with recurrent cancer are included in the sample. Finally, the analysis reveals that patients in centers that are undergoing the process of certification for the first time are less likely to utilize SSC than patients in centers that have been certified for more than 5 years. This finding implies that the certification requirements may promote the implementation of SSC structures in prostate cancer centers.

The major limitations of the study are that the response rate is unknown and that patients receiving primary radiotherapy or undergoing active surveillance or watchful waiting are represented less well in the sample than patients receiving radical prostatectomy. In addition, the number of comorbidities was recoded as described in the data analysis section, and this needs to be taken into consideration when interpreting the results. However, a sensitivity analysis was performed that excluded centers with missing values for comorbidities and it did not indicate any inconsistencies in comparison with the final model in Table 3. In this study, no

information was available on the patients' partnership status, which has been related to the use of social work services before [16], or the patients' language skills, which might play a role in SSC utilization. Also, we have not included metastatic patients in this study. Metastatic patients' needs may be different from non-metastatic patients [29] and this may also reflect in SSC utilization patterns. Finally, some of the data was collected during COVID-19 pandemic which might have influenced SSC utilization patterns. A positive aspect in relation to the generalizability of the findings is the fact that the majority of all currently certified prostate cancer centers in Germany and Switzerland were included in the analysis.

Some theoretical and practical conclusions may be drawn on the basis of this analysis. The findings imply that Andersen's healthcare utilization model [18] might be applicable for the context of SSC utilization in prostate cancer centers: individual predisposing and need factors as well as contextual enabling factors in accordance with Andersen's healthcare utilization model [18] were associated with SSC utilization. Future research should therefore take a closer look at the enabling center characteristics and predisposing patient characteristics that were identified in order to understand and reduce variance in SSC utilization. That is to say, future research should investigate the processes underlying the structural differences identified that may account for SSC utilization. The differences in relation to therapy type may indicate process differences between wards, as described above, and might represent an initial starting point

Table 3 Results of the logistic multilevel analysis with utilization of social service counseling (SSC) as binominal dependent variable

Variables	Response options	Odds ratio	<i>P</i> value	95% confidence interval
Intercept		27.37	<0.001	16.95 44.20
Patient characteristics				
Age	Under 50 years	0.83	0.30	0.59 1.18
	50–59 years	1.02	0.76	0.90 1.16
	60–69 years	Reference		
	70–79 years	0.92	0.12	0.82 1.02
	80 years and older	0.60	0.002	0.43 0.83
	Missing	0.79	0.84	0.08 7.60
Educational level	No school-leaving qualification	0.59	0.13	0.30 1.17
	Lower secondary school	Reference		
	Intermediate secondary school	1.05	0.48	0.92 1.20
	Vocational technical diploma	1.11	0.22	0.94 1.30
	Entrance certificate for university	0.87	0.04	0.76 0.99
	Other school-leaving qualification	1.11	0.61	0.74 1.65
	Missing	0.73	0.25	0.43 1.25
Insurance	Statutory	Reference		
	Private	0.59	< 0.001	0.53 0.66
	None/other	0.97	0.91	0.56 1.67
	Missing	0.83	0.59	0.42 1.64
Nationality	German	Reference		
	Other	0.79	0.12	0.59 1.06
	Missing	0.98	0.94	0.52 1.83
Comorbidity	0	Reference		
	1	1.22	0.002	1.08 1.38
	≥2	1.07	0.50	0.87 1.32
	Missing	1.03	0.95	0.45 2.34
Risk classification	Localized, low risk	1.10	0.14	0.97 1.26
	Localized, intermediate risk	Reference		
	Localized, high risk	1.10	0.09	0.99 1.23
	Locally advanced (T3/4)	1.55	0.004	1.15 2.09
	Advanced (N1)	1.06	0.81	0.66 1.69
	Not determined	0.37	0.10	0.12 1.20
	Missing	0.01	<0.001	0.00 0.01
	Androgen deprivation therapy before study inclusion	No	Reference	
Yes	0.68	<0.001	0.55 0.84	
Missing	2.20	0.009	1.22 3.95	
Treatment after study inclusion ¹	Radical prostatectomy	Reference		
	Primary radiotherapy	0.02	<0.001	0.02 0.02
	Radical prostatectomy + adjuvant radiotherapy	1.02	0.87	0.83 1.26
	Active surveillance	0.00	<0.001	0.00 0.01
	Watchful waiting	0.00	<0.001	0.00 0.01
Center characteristics				
Country	Germany	Reference		
	Switzerland	0.00	<0.001	0.00 0.01
Municipality	< 20,000 population	1.05	0.96	0.20 5.38
	20,000–100,000 population	0.73	0.31	0.41 1.33
	> 100,000–1,000,000 population	Reference		
	> 1,000,000 population	0.85	0.83	0.19 3.77

Table 3 (continued)

Variables	Response options	Odds ratio	<i>P</i> value	95% confidence interval
Teaching status	Nonacademic	0.69	0.52	0.22 2.14
	Academic	Reference		
	University	0.35	0.01	0.16 0.81
Ownership	Nonprofit/ public	Reference		
	Private	0.37	0.052	0.14 1.01
Years since first certification	During process for first certification	0.13	0.04	0.02 0.87
	Less than 1 year	0.41	0.34	0.06 2.58
	1–2 years	2.83	0.19	0.60 13.32
	2–3 years	1.42	0.54	0.46 4.37
	3–4 years	1.62	0.36	0.58 4.53
	4–5 years	1.00	0.998	0.19 5.30
	More than 5 years	Reference		
Patients (<i>n</i>)	19,865			
Centers (<i>n</i>)	102			
ICC (null model)	0.33 (0.51)			

¹The *missing* category for *therapy type* is dropped in the model because the variable contains the same observations as the missing category for risk classification; the categories *Not applicable* (patients from Swiss centers) for the sociodemographic variables are dropped in the model because they contain the same observations as the category *Switzerland* in the variable *country*

for further research. Another relevant research subject might be the extent to which communication processes contribute to SSC utilization variance in prostate cancer centers [30]. Finally, in order to understand whether provision is needs-oriented, screening tools for SSC need should be developed, evaluated, and implemented.

Acknowledgements We thank all the patients who participated in the study, as well as the prostate cancer centers that recruited patients and worked continuously on delivering and improving care. Funding was received from the Movember Foundation through Help for Prostate Cancer Patients, the collaborating partner of the Movember Foundation in Germany.

Author contributions CB: data analysis and manuscript writing/editing. LA: manuscript writing/editing. NTS: data analysis and manuscript writing/editing. SW: protocol/project development and manuscript writing/editing. SD: protocol/project development, data collection or management, manuscript writing/editing. EGC: protocol/project development and manuscript writing/editing. GF: protocol/project development and manuscript writing/editing. CS: manuscript writing/editing. AT: manuscript writing/editing. AP: protocol/project development, manuscript writing/editing. BB: data collection or management, and manuscript writing/editing. AB: data collection or management and manuscript writing/editing. MB: data collection or management, manuscript writing/editing. FD: data collection or management, manuscript writing/editing. MG: data collection or management and manuscript writing/editing. AAG: data collection or management, and manuscript writing/editing. CG: data collection or management, and manuscript writing/editing. AH: data collection or management, and manuscript writing/editing. BK: data collection or management, and manuscript writing/editing. TK: data collection or management, and manuscript writing/editing. FK: data collection or management, and manuscript writing/editing. BP: data collection or management, and manuscript writing/editing. VS: data collection or management, and manuscript

writing/editing. SJO: data collection or management, and manuscript writing/editing. IP: data collection or management, and manuscript writing/editing. FZ: data collection or management, and manuscript writing/editing. CK: protocol/project development, data analysis, and manuscript writing/editing.

Funding This study was funded by the Movember Foundation.

Data availability The datasets generated during and/or analyzed during the current study are not publicly available due to confidentiality of certification and patient data.

Code availability The R-code generated during the current study is available from the corresponding author on reasonable request.

Declarations

Ethics approval All procedures performed in studies involving human participants were conducted in accordance with the ethical standards of the Ethics Committee of the Medical Association of Berlin (Eth-12/16) and in accordance with the 1964 Helsinki Declaration and later amendments.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication N/A

Conflict of interest CB, NTS, SW, SD, and CK are employees of the two institutions in charge of the certification system. SJO reports personal fees from EUSA Pharma Inc. and medac GmbH outside the submitted work. FZ reports personal fees from Janssen Cilag GmbH, Bayer Vital GmbH, and Sanofi Aventis GmbH outside the submitted work. CK is treasurer of the German Society for Medical Sociology (unpaid) and member of the governing board of the European Public Health As-

sociation (unpaid). AT is board member of the Deutsche Vereinigung für Soziale Arbeit im Gesundheitswesen e. V. (unpaid). LA, EGC, GF, CS, AP, BB, AB, MB, FD, ME, AAG, CG, AH, BK, TK, FK, BP, VS, and IP declare no potential conflicts of interest.


References

1. Ferlay J, Colombet M, Soerjomataram I et al (2018) Cancer incidence and mortality patterns in Europe: estimates for 40 countries and 25 major cancers in 2018. *Eur J Cancer* 103:356–387. <https://doi.org/10.1016/j.ejca.2018.07.005>
2. Robert Koch-Institut (2019) Krebs in Deutschland für 2015/2016. <https://doi.org/10.25646/5977>
3. King AJ, Evans M, Moore TH et al (2015) Prostate cancer and supportive care: a systematic review and qualitative synthesis of men's experiences and unmet needs. *Eur J Cancer Care (Engl)* 24:618–634. <https://doi.org/10.1111/ecc.12286>
4. Paterson C, Robertson A, Smith A, Nabi G (2015) Identifying the unmet supportive care needs of men living with and beyond prostate cancer: a systematic review. *Eur J Oncol Nurs* 19:405–418. <https://doi.org/10.1016/j.ejon.2014.12.007>
5. Wright P, Wilding S, Watson E et al (2019) Key factors associated with social distress after prostate cancer: results from the United Kingdom Life after Prostate Cancer diagnosis study. *Cancer Epidemiol* 60:201–207. <https://doi.org/10.1016/j.canep.2019.04.006>
6. Watson E, Shinkins B, Frith E et al (2016) Symptoms, unmet needs, psychological well-being and health status in survivors of prostate cancer: implications for redesigning follow-up. *BJU Int* 117:E10–E19. <https://doi.org/10.1111/bju.13122>
7. Hyde MK, Newton RU, Galvão DA et al (2017) Men's help-seeking in the first year after diagnosis of localised prostate cancer. *Eur J Cancer Care (Engl)* 26:e12497. <https://doi.org/10.1111/ecc.12497>
8. Dettmers S, Uhrig A, Voigt M, et al (2018) Expertenstandard Psychosoziale Erstberatung onkologischer Patient*innen in der stationären Versorgung (PEOPSA). Arbeitsgemeinschaft für Soziale Arbeit in der Onkologie (ASO), Deutsche Vereinigung für Soziale Arbeit im Gesundheitswesen e.V. (DVSG), Deutsche Krebsgesellschaft e.V., Berlin
9. Kowalski C, Pfaff H, Halbach SM et al (2019) Sozialdienstliche Beratungsquoten und Informationsbedarfe bei BrustkrebspatientInnen – eine Mehrebenenanalyse mit PatientInnenbefragungs- und -auditdaten. In: Sagebiel J, Hammerschmidt P, Janßen C (eds) *Quantitative Forschung in der Sozialen Arbeit*. Beltz Juventa, Weinheim, pp 130–148
10. Kowalski C, Ferencz J, Singer S et al (2016) Frequency of psycho-oncologic and social service counseling in cancer centers relative to center site and hospital characteristics: Findings from 879 center sites in Germany, Austria, Switzerland, and Italy. *Cancer*. <https://doi.org/10.1002/cncr.30202>
11. Kowalski C, Ferencz J, Weis I et al (2015) Social service counseling in cancer centers certified by the german cancer society. *Soc Work Health Care* 54:307–319. <https://doi.org/10.1080/00981389.2014.999980>
12. Lilliehörn S, Isaksson J, Salander P (2019) What does an oncology social worker deal with in patient consultations? - An empirical study. *Soc Work Health Care* 58:494–508. <https://doi.org/10.1080/00981389.2019.1587661>
13. Pockett R, Dzidowska M, Hobbs K (2015) Social work intervention research with adult cancer patients: a literature review and reflection on knowledge-building for practice. *Soc Work Health Care* 54:582–614. <https://doi.org/10.1080/00981389.2015.1046577>
14. Holm LV, Hansen DG, Johansen C et al (2012) Participation in cancer rehabilitation and unmet needs: a population-based cohort study. *Support Care Cancer* 20:2913–2924. <https://doi.org/10.1007/s00520-012-1420-0>
15. Gray RE, Goel V, Fitch MI et al (2000) Utilization of professional supportive care services by women with breast cancer. *Breast Cancer Res Treat* 64:253–258. <https://doi.org/10.1023/A:1026548320063>
16. Gadalla TM (2007) Cancer patients' use of social work services in Canada: prevalence, profile, and predictors of use. *Health Soc Work* 32:189–196. <https://doi.org/10.1093/hsw/32.3.189>
17. Abbott YK (2016) Breast cancer patient access to social work. *J Soc Work* 17:531–543. <https://doi.org/10.1177/1468017316649331>
18. Andersen RM, Davidson PL, Baumeister SE (2014) Improving access to care. In: Kominski G (ed) *Changing the US health care system: key issues in health services policy and management*. Wiley & Sons, San Francisco, CA, pp 33–69
19. von Lengerke T, Gohl D, Babitsch B (2014) Re-visiting the behavioral model of health care utilization by Andersen: a review on theoretical advances and perspectives. In: Janssen C, Swart E, von Lengerke T (eds) *Health Care Utilization in Germany*. Springer, New York, pp 11–28
20. Kowalski C, Roth R, Carl G et al (2020) A multicenter paper-based and web-based system for collecting patient-reported outcome measures in patients undergoing local treatment for prostate cancer: first experiences. *J Patient-Rep Outcomes* 4:56. <https://doi.org/10.1186/s41687-020-00224-7>
21. Martin NE, Massey L, Stowell C et al (2014) Defining a standard set of patient-centered outcomes for men with localized prostate cancer. *Eur Urol*. <https://doi.org/10.1016/j.eururo.2014.08.075>
22. Leitlinienprogramm Onkologie (2019) Interdisziplinäre Leitlinie der Qualität S3 zur Früherkennung, Diagnose und Therapie der verschiedenen Stadien des Prostatakarzinoms. (Version 5.1). Leitlinienprogramm Onkologie, Berlin
23. Breidenbach C, Wesselmann S, Sibert NT et al (2021) Use of social service counseling by cancer patients: an analysis of quality assurance data of 6339 breast cancer patients from 13 certified centers in Germany treated between 2015 and 2017. *BMC Cancer* 21:1–9. <https://doi.org/10.1186/s12885-021-08396-1>
24. Breidenbach C, Roth R, Ansmann L et al (2020) Use of psycho-oncological services by prostate cancer patients: a multilevel analysis. *Cancer Med* 9:3680–3690. <https://doi.org/10.1002/cam4.2999>
25. Shapiro PJ, Coyne JC, Kruus LK et al (2004) Interest in services among prostate cancer patients receiving androgen deprivation therapy. *Psychooncology* 13:512–525. <https://doi.org/10.1002/pon.769>
26. Donovan JL, Hamdy FC, Lane JA et al (2016) Patient-reported outcomes after monitoring, surgery, or radiotherapy for prostate cancer. *N Engl J Med* 375:1425–1437. <https://doi.org/10.1056/NEJMoa1606221>
27. Griesshammer E, Adam H, Sibert NT, Wesselmann S (2020) Implementing quality metrics in European Cancer Centers (ECCs). *World J Urol* 39:49–56. <https://doi.org/10.1007/s00345-020-03165-4>
28. Ansmann L, Kowalski C, Pfaff H (2018) Work organization in breast cancer centres – do hospitals structures account for differences? In: M Körner, Ansmann L, Schwarz B, Kowalski C (eds) *Organizational Behaviour in Healthcare – Theoretical Approaches, Methods and Empirical Results*. LIT Verlag, Wien, branch office Zürich, pp 107–134

29. Colloca G, Colloca P (2016) The effects of social support on health-related quality of life of patients with metastatic prostate cancer. *J Cancer Educ* 31:244–252
30. Bayer O, Billaudelle F, Alt J et al (2020) Was Männer davon abhält, ambulante Krebsberatungsstellen aufzusuchen. Eine qualitative Studie *Onkologie* 26:1047–1055. <https://doi.org/10.1007/s00761-020-00840-4>

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Authors and Affiliations

Clara Breidenbach¹  · Lena Ansmann² · Nora Tabea Sibert¹ · Simone Wesselmann¹ · Sebastian Dieng³ · Ernst-Günther Carl⁴ · Günter Feick⁴ · Cindy Stoklossa^{5,6} · Anne Taubert^{5,6} · Amanda Pomery⁷ · Burkhard Beyer⁸ · Andreas Blana⁹ · Marko Brock¹⁰ · Florian Distler¹¹ · Michael Enge¹² · Amr A. Gaber¹³ · Christian Gilfrich¹⁴ · Andreas Hinkel¹⁵ · Björn Kaftan¹⁶ · Thomas Knoll¹⁷ · Frank Kunath¹⁸ · Simba-Joshua Oostdam¹⁹ · Inga Peters²⁰ · Bülent Polat²¹ · Valentin Schrodi²² · Friedemann Zengerling²³ · Christoph Kowalski¹

Lena Ansmann
lena.ansmann@uni-oldenburg.de

Nora Tabea Sibert
sibert@krebsgesellschaft.de

Simone Wesselmann
wesselmann@krebsgesellschaft.de

Sebastian Dieng
s.dieng@onkozert.de

Ernst-Günther Carl
guenther@carl-soft.de

Günter Feick
g-feick@gmx.de

Cindy Stoklossa
cindy.stoklossa@charite.de

Anne Taubert
Anne.Taubert@med.uni-heidelberg.de

Amanda Pomery
amanda.pomery@movember.com

Burkhard Beyer
b.beyer@uke.de

Andreas Blana
Andreas.Blana@klinikum-fuerth.de

Marko Brock
marko.brock@proselis.de

Florian Distler
Florian.Distler@klinikum-nuernberg.de

Michael Enge
Michael.Eng@sanktgeorg.de

Amr A. Gaber
a.gaber@ctk.de

Christian Gilfrich
christian.gilfrich@klinikum-straubing.de

Andreas Hinkel
Andreas.Hinkel@franziskus.de

Björn Kaftan
Bjoern.Kaftan@klinikum-lueneburg.de

Thomas Knoll
t.knoll@klinikverbund-suedwest.de

Frank Kunath
frank.kunath@uk-erlangen.de

Simba-Joshua Oostdam
Simba-Joshua.Oostdam@krh.eu

Inga Peters
peters.inga@mh-hannover.de

Bülent Polat
polat_b@ukw.de

Valentin Schrodi
v.schrodi@klinikum-braunschweig.de

Friedemann Zengerling
friedemann.zengerling@uniklinik-ulm.de

Christoph Kowalski
kowalski@krebsgesellschaft.de

¹ German Cancer Society, Berlin, Germany

² Carl von Ossietzky Universität Oldenburg, Oldenburg, Germany

³ OnkoZert GmbH, Neu-Ulm, Germany

⁴ Bundesverband Prostatakrebs Selbsthilfe e. V., Bonn, Germany

⁵ Deutsche Vereinigung für Soziale Arbeit im Gesundheitswesen e. V., Berlin, Germany

⁶ Arbeitsgemeinschaft Soziale Arbeit in der Onkologie, Berlin, Germany

⁷ Movember Foundation, Melbourne, Australia

⁸ Martini-Klinik, Prostate Cancer Center Hamburg, Hamburg, Germany

⁹ Klinik für Urologie und Kinderurologie, Klinikum Fürth, Fürth, Germany

¹⁰ Department of Urology, Stiftungsklinikum Proselis, Recklinghausen, Germany

¹¹ Urologische Klinik der Universitätsklinik der Paracelsus Medizinischen Privatuniversität am Klinikum Nürnberg, Nürnberg, Germany

¹² Klinik für Urologie und Andrologie, Klinikum St. Georg, Leipzig, Germany

¹³ Carl-Thiem-Klinikum Cottbus, Cottbus, Germany

- ¹⁴ Klinikum St. Elisabeth Straubing, Straubing, Germany
- ¹⁵ Klinik für Urologie, Franziskus Hospital Bielefeld, Bielefeld, Germany
- ¹⁶ Urologische Klinik, Städtisches Klinikum Lüneburg, Lüneburg, Germany
- ¹⁷ Department of Urology, Klinikum Sindelfingen-Boeblingen, Sindelfingen, Germany
- ¹⁸ Department of Urology, University Hospital Erlangen, Erlangen, Germany
- ¹⁹ Klinikum Siloah Hannover, Hannover, Germany
- ²⁰ Clinic for Urology and Urologic Oncology, Hannover Medical School, Hannover, Germany
- ²¹ Department of Radiation Oncology, University of Würzburg, Würzburg, Germany
- ²² Department of Urology, Academic Hospital Braunschweig, Braunschweig, Germany
- ²³ Department of Urology, Ulm University Hospital, Ulm, Germany