Treatment decision-making in men with localized prostate cancer living in remote area: A cross-sectional observational study

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Abstract

Introduction: For the management of localized prostate cancer, patient treatment choice is poorly documented among people living in remote areas where access to certain treatments offered in large centres involves travelling several hundred kilometres. This study aimed to describe and identify the determinants of treatment decision-making in men with localized prostate cancer living in remote areas.

Methods: In this cross-sectional study, patients with prostate cancer were recruited from Rouyn-Noranda's urology clinic (Quebec, Canada) between 2017 and 2019.

Results: A total of 127 men (mean age 68.34±7.23 years) constituted the study sample. Radiotherapy, a treatment not available locally, was chosen most frequently (67.7%), followed by options available locally, such as surgery (22.8%) and active surveillance (9.4%). Most patients preferred to play an active role in this choice (53.5%) and agreed with the statement, "I chose that treatment because it gives the best chance for a cure" (86.6%). Multiple logistic regression analysis revealed that cancer stage (odds ratio [OR] 10.15; 95% confidence interval [CI] 3.18–32.40) was the only factor associated with radiotherapy choice (patients with lower stage cancer were more likely to choose radiotherapy). The socioeconomic status was not associated with treatment choice.
Conclusions: While radiotherapy was not available locally, it was the most frequently chosen treatment, even though the available literature suggests that no one treatment option is superior in terms of cancer control. The choice of radiotherapy is not associated with patient income, but rather the cancer stage. This result could be explained by the patients' desire to avoid surgery and its adverse effects.

Introduction

Prostate cancer is the most commonly diagnosed non-skin cancer in Canadian men[1, 2] with 21,300 new cases diagnosed in 2017.[1] It is also the third leading cause of death from cancer in men.[1, 2] Prostate cancer and its treatment affect multiple spheres of the patients' quality of life[3] and represent a significant economic burden to our society.[4] Among newly diagnosed men, about 90% have a localized cancer.[5, 6] Patients with localized cancer can choose between different treatment options including radical prostatectomy, radiotherapy and active surveillance.[7-10] None of these options has been proven superior in terms of cancer control.[11, 12] However, each is associated with adverse effects such as anxiety, and urinary, bowel and erectile dysfunction.[11-13]

Several studies have assessed localized prostate cancer decision-making among men in the US and Europe.[10, 14-27] These studies showed that decision-making is influenced by different factors such as the patients' sociodemographic and clinical profile, preferences, beliefs and affective factors (e.g., distress during decision-making). In Canada, some studies have been conducted in large urban centres.[28-39] To our knowledge, decision-making is, however, poorly documented in remote areas (only one epidemiological study[37]). Yet, in these regions, access to certain treatments offered only in large centres is challenging[40] as it is conditional upon travelling several hundred kilometres and may incur out-of-pocket expenses. Understanding prostate cancer decision-making in the specific context of remote areas is important to provide healthcare professionals with evidence allowing them to give patients the best support.[23] This study objectives were to : 1) describe localized prostate cancer decision-making among patients living in a remote region of Quebec in terms of the type of treatment chosen, the

preferred role in treatment decision-making, decisional conflict, treatment-related regrets, information sources consulted before deciding and reasons associated with this decision; and 2) identify sociodemographic and clinical factors associated with the choice of radiotherapy, not available locally.

Methods

Study setting and sample

The remote regions of Quebec are those removed from major urban centres, on the eastern, northern and western borders of Quebec.[41] Abitibi-Témiscamingue is one such region.[41] Its population resides in urban poles (58%) or rural areas (42%).[42] In this remote region, only active surveillance and radical prostatectomy were available at the time of the study and are offered by the two urologists of the region. To receive radiotherapy, patients had to travel 417 to 867 kilometres.

Between November 2017 and February 2019, a cross-sectional observational study was conducted among adults with prostate cancer from the Urology Clinic at the Rouyn-Noranda hospital, CISSS de l'Abitibi-Témiscamingue (the regional urology centre). Patients were eligible if they: 1) did not have cognitive/physical problems preventing them from responding to the study questionnaire or giving free and informed consent, and 2) were able to answer the questionnaire in French. Patients were considered every day during the recruitment period except on days prior to holidays when the high workload did not allow urologists to inform patients about the study. At the end of medical visits, the clinic's urologists (n = 2) informed eligible patients about the study (regardless of time since diagnosis and treatment) and handed those interested a package containing an information letter, the questionnaire and a consent form to share information contained in their medical records. Those interested completed the questionnaire at home and returned it in a postage-paid envelope. A 1-week reminder phone call was made to non-respondents. This study was part of a larger research project. Only patients with clinically staged localized prostate cancer (clinical T-stage ≤ T2c) [43] and who had to choose a treatment were included in the present study. The Ethics Committees of Université du Québec en Abitibi-Témiscamingue and CISSS des Laurentides approved the study.

Questionnaire and variables

A pretest performed with 10 prostate cancer patients was used to maximize the questionnaire's clarity; no changes were required. The questionnaire included the treatments received (i.e., active surveillance, radical prostatectomy, radiotherapy [internal and external]). The calendar date of treatment was also requested, allowing the calculation of the time since the treatment. For patients who had two consecutive treatments (e.g., radical prostatectomy, then external radiotherapy), only the first treatment was considered (the second treatment was received later in the trajectory due to

a positive margin after the surgery or a recurrence of cancer). Patients were asked if they received hormonotherapy in addition to their treatment.

The patients preferred role in treatment decision-making was assessed using the questionnaire version of the Control Preference Scale (CPS).[44] The decision-making conflict regarding the treatment choice was assessed using the SURE test (Canadian French clinical version of the Decision Conflict Scale).[45] The detailed description of these two scales is provided in Appendix 1. We also asked patients if they regretted their treatment choice and the information sources they consulted before making their choice. The reasons for their choice, including preferences, beliefs and affective factors, were also assessed with 5-point agreement Likert scales used in an earlier study.[22] Participants were questioned about their sociodemographic and clinical profile. The latter included: 1) comorbidities measured using the Self-Administered Comorbidity Questionnaire[51] and 2) tumor characteristics at diagnosis regarding the prostate-specific antigen (PSA) level, Gleason score and clinical stage abstracted from medical records.

Statistical analyses

Descriptive statistics were used to assess patient characteristics and reasons for the decision. Logistic regression models were used to identify sociodemographic and clinical factors associated with the choice of radiotherapy. Potentially associated factors with a $p < 0.15$ in univariable logistic regressions (relationship status and stage) were included in the final multivariable model (entry method). Age and income were forced into the model since they were identified as determinants of decision-making. We also adjusted for time since treatment. In total, we included five variables in the model. Variance inflation factors were used to rule out any multicollinearity problems. Sensitivity analyses were carried out to assess the impact of models and modelling techniques on conclusions (model including all sociodemographically and clinically relevant variables disregarding the findings of the univariable analysis (Appendix 2), model containing variables with a $p < 0.25$ in univariable logistic regressions, model without the forced variables of age and income, stepwise selection). Data were analyzed with IBM SPSS version 22.0 software.

Results

Of the 169 patients who returned the questionnaire, those who had localized cancer and had to make a treatment choice formed the convenience sample of this study (n = 127). The recruitment flowchart and refusal reasons are shown in Figure 1.Study population characteristics are presented in Table 1. Participants' mean age was 68.34 ± 7.23 years. More than half of patients had not completed post-secondary education (52.7%) and almost half had an annual family income between $20,000 and $39,999 (48.8%). At diagnosis, most patients had a clinical tumor stage ≤ T2a (82.5%). Most patients (84.25 %) had a Gleason score of 6 or 7. Only 15.75 % of patients had a score of 8 or 9 and no patient had a score of 10.

As shown in Figure 2, the treatment chosen most frequently was radiotherapy (67.7%), not available locally. Among those who chose external radiotherapy (38.6%), 4.7% received hormonotherapy as a combined treatment. When comparing the proportion of patients who chose radiotherapy based on the time since treatment, it was substantially higher in patients who had chosen their treatment in the past five years vs. more than 6 years ago (Figure 4).

According to the CPS, 53.5% of patients preferred to be active decision makers (Figure 5). The SURE test results showed that 31.5% were not confident in their decision, while 7.9% regretted their decision. Before choosing their treatment, patients reported having used multiple sources of information. As shown in Figure 6, the most common source was physicians (77.2%), followed by spouses (36.2%), and people having experienced prostate cancer (34.6%). Only 18.9% had consulted a nurse. Treatment choice reasons are displayed in Table 2. The statement with which patients most frequently agreed was "I chose that treatment because it gives the best chance for a cure" (86.6%).

The results of univariable analyses and the final multivariable model conducted to identify factors associated with the choice of radiotherapy (unavailable locally) are shown in Table 3. Controlling for time since treatment, the final model revealed that patients with a lower cancer stage (OR ≤ T2a vs. T2b-T2c stages: 10.15; 95% CI: 3.18-32.40; $p = 0.0001$) were more likely to choose an out-of-region treatment. The sociodemographic factors such as age and income were not associated with treatment choice ($p > 0.05$). Sensitivity analyses did not change our conclusions (the model including all sociodemographically and clinically relevant variables is presented in Appendix 2).

Discussion

Radiotherapy was the most frequently chosen treatment, although unavailable locally. Most patients preferred an active involvement in treatment decision-making. Furthermore, our analyses suggest that over one third of patients were unsure of the choice to make and that 7.9% regretted their choice. Also, physicians, spouses and other patients were the most frequently consulted sources of information. Regarding the reasons, most patients believed that they chose the treatment that offered them the best chance of a cure. Finally, none of the sociodemographic factors were found to be associated with patient decision-making. Controlling for time since treatment, cancer stage was the sole determinant for choosing radiotherapy.

Choosing radiotherapy entails travelling at least 417 kilometres. Potential out-of-pocket expenses and absenteeism can be substantial. Moreover, our study population had a relatively low economic status. It is therefore both surprising and interesting that radiotherapy was the most frequently chosen treatment. This is not consistent with results published by Timilshina et al. (2017), which showed that active surveillance was the treatment most frequently chosen by patients living in another remote region in Quebec.[37]

Most patients from our study (86.6%) believed that they chose the treatment that offered them the best chance of getting rid of the disease. This could explain why patients choose active treatment (radiotherapy and radical prostatectomy) rather than active surveillance, which is a mean of cancer observation. In addition, their willingness to avoid surgery (80.6%) could explain why, among active treatment options, radiotherapy was more frequently chosen than surgery, which is perceived as a threat to the male identity[24]. Radiotherapy was more frequently chosen during the last five years. This increase in popularity may be due to recent radiotherapy advances.[52]

Our findings regarding patient preference in terms of implication in treatment decision-making align with those of previous works; 63% of patients want to play an active role, 29% prefer a collaborative shared decision-making with the physician, and 8% desire to defer the decision to their physician.[21] Also, our results align with a previous study on decisional conflict and treatment regret.[14, 21] Shared decision-making is important to avoid regret[53] and decrease decision-making conflict.[54] It was suggested that patients who surrendered the decision to their physician did so from a lack of knowledge or understanding of their illness and treatments[55], and a desire to defer responsibility to an informed expert.[56] Healthcare professionals (e.g., oncology nurse navigators [ONNs]) could help provide patients with information enabling them to take part in decision-making.[57, 58]

Regarding information sources, our results corroborate those of other studies[21, 22, 59] that conclude that men consult various information sources. The fact that spouses were the second most important source suggests the importance of their viewpoint for patient decision-making. Spouses should thus receive medical information (e.g., individual meetings with the nurse) if they are to be consulted. Also, patient support groups are important since they ranked third in terms of preferred information sources. Finally, while ONNs are already integrated in many healthcare centres, only 18.9% of patients reported having consulted them. We therefore recommend that they be systematically involved in treatment decision-making.

Regarding the reasons underlying the choice, patients believed that they chose the best treatment for recovery. Although this result corroborates that of an earlier study[21], it is intriguing since available evidence suggests that treatment options are equally efficacious. [11] While the origin of this belief is uncertain, it may be due to illness representations and treatment perceptions among patients.[56] Such perceptions should be investigated in subsequent studies, including qualitative studies, in order to better understand them. Healthcare professionals other than physicians should also be involved in treatment decision-making in order to verify the proper understanding of the information given by the physician. ONNs are very well placed to intervene in treatment decision-making given their knowledge of the subject and their greater availability compared to that of physicians.

In our study, lower tumor stage was the determinant of the choice of radiotherapy. As the tumor was at an early stage, perhaps the patients had selected a conservative treatment (i.e., radiotherapy) that could cure the cancer[24] while allowing them to avoid a radical prostatectomy and its incontinence and erectile dysfunction consequences.[30, 60]

Socioeconomic factors were not associated with patient decision-making. Patients may want to avoid surgery and its adverse effects, regardless of their age. Out-of-region treatment choice was not influenced by the patients' income. This result was unexpected since, as mentioned, out-of-region treatments involve out-of-pocket expenses, and the family income of many of our participants was below $39,999. This could be explained by the importance that patients give to their health. Spending would therefore not constitute a barrier to getting the care they want.

This study's strengths include a high participation rate, comparable to other studies (66% vs. 69%)[18], and the use of a pilot-tested questionnaire that included validated scales. Our findings should, however, be interpreted considering some limitations. First, we cannot rule out selection bias. In fact, 99 new cases of prostate cancer were diagnosed at the clinic during the study period. Additionally, between 2013 and 2017, 336 cases were diagnosed which could contribute to our pool of recruitment (prevalent cases). Among theses patients, some may have moved or died. Others were not considered by urologists. Indeed, all prostate cancer patients were approached every day during the recruitment period except on days when the workload was high (these days corresponded to workdays prior to the holidays such Christmas, New Year's and Easter). On these days, the two urologists see more patients than usual in anticipation of the interruption or slowing down of service provision. As a result, during these days, all patients were not considered, not because of their characteristics (ex. mood, physical appearance, socioeconomic status), but because of the high workload that did not allow it. On the other days, urologists approached all prostate cancer patients who came to the clinic and were eligible for the study. Globally, on each day that recruitment was possible, all eligible patients were approached, and patients' characteristics did not affect the likelihood of being informed about the study. It should also be noted that patients who returned the questionnaire (n = 169) were comparable to non-participants (n = 81) regarding socioeconomic characteristics and treatment received (Figure 1). The sample was, moreover, comparable to the clinic prostate cancer patients (source population) in terms of age (68.73 ± 7.28 vs 67 ± 6.30). For all these reasons, we believe that if any selection bias is present, it should be minimal. Second, time since diagnosis may have influenced patient willingness to participate in the study. Patients with a long-standing diagnosis were probably not interested in the study. On the other hand, those who had just been diagnosed were probably so concerned about the diagnosis that they were not willing to participate. Third, a potential recall bias is possible given that the average amount of time since treatment was approximately 4 years (patients may have misremembered the reasons that initially motivated their choice). Nevertheless, in

multivariate models aimed at identifying variables associated with the choice of radiotherapy, we have adjusted for the time elapsed since the treatment. Fourth, the cross-sectional nature of our observational study limits the assessment of causality regarding factors associated with decision-making. Fifth, a potential type 2 error due to the modest sample size cannot be excluded. However, we are confident of the results since they remained unchanged in the sensitivity analyses, which underline our model robustness. One of the models (the one with 3 variables whose $p < 0.15$ in univariate logistic regressions [i.e., stage and relationship status] and where we adjusted for time since treatment) produced the same results: the stage was the only determinant of choosing radiotherapy. Sixth, as for external validity, the study's unicentric nature can affect result generalization. Finally, the present study did not record data about some variables potentially associated with the choice of radiotherapy (e.g. prostate cancer family history).

Conclusions

Radiotherapy is the most frequently chosen treatment, although not available locally in the Abitibi-Témiscamingue remote region. Cancer stage was the only factor that influenced this choice. The patients' sociodemographic profile does not influence out-of-region treatment choice. Further studies should investigate the patients' economic burden related to out-of-region treatments.

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Figures and Tables

Fig. 1. Recruitment flowchart.

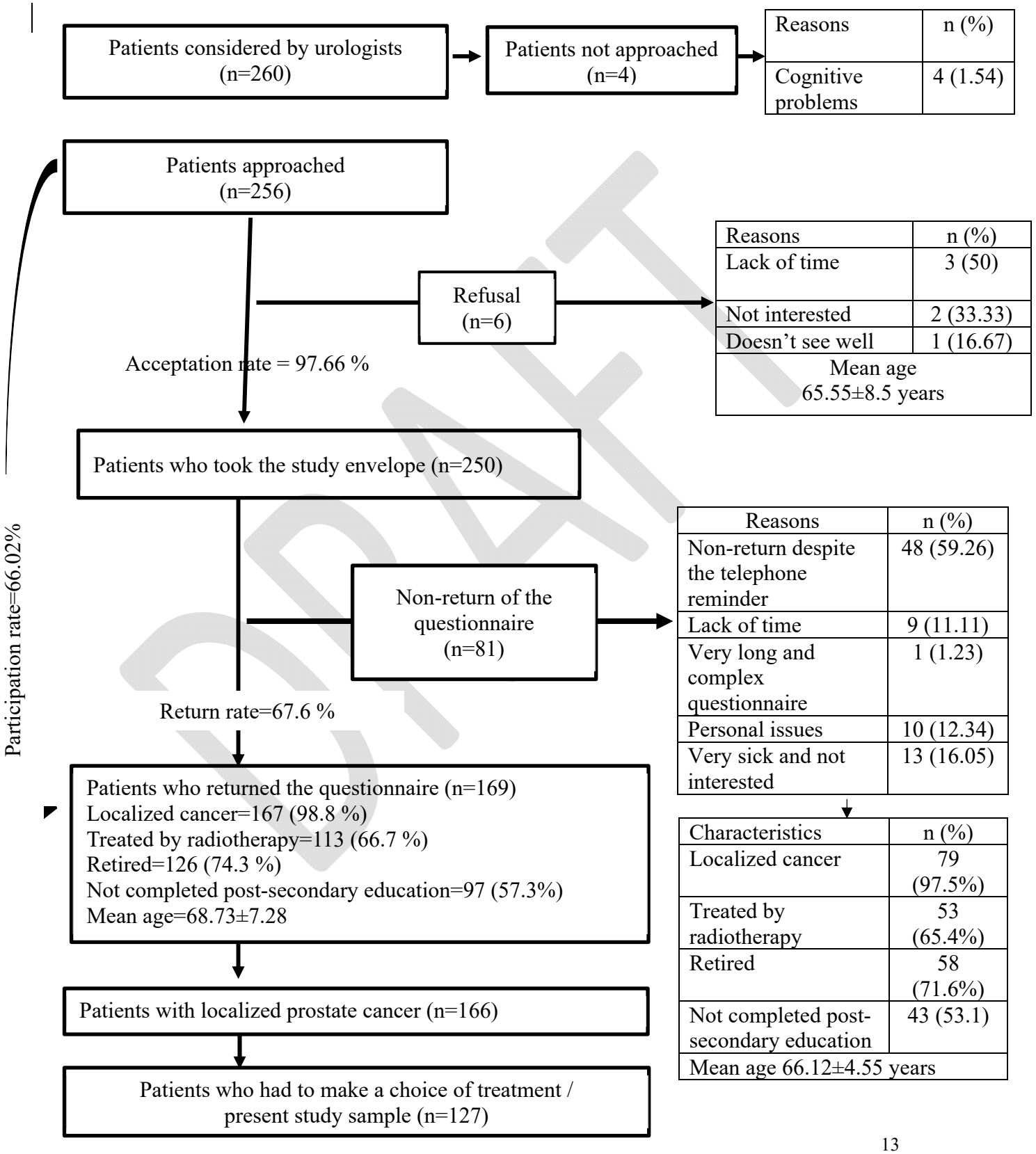

Fig. 2. Treatment chosen by all patients.

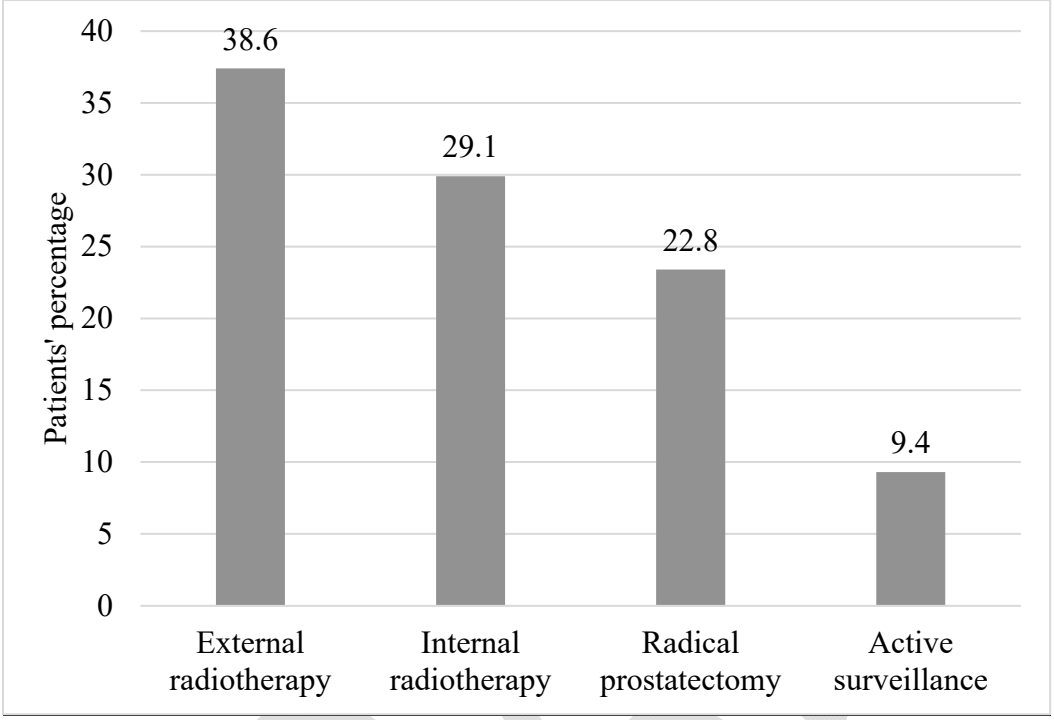

Fig. 3. Treatment chosen by patients according to Gleason score.

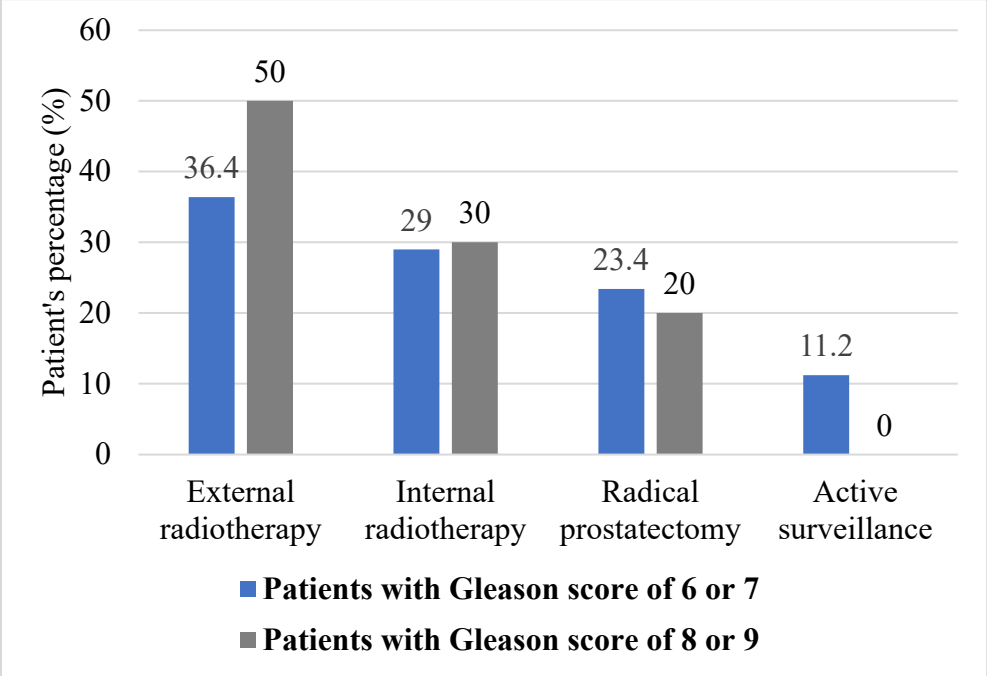

Fig. 4. Patients choosing radiotherapy according to time between data collection and treatment.

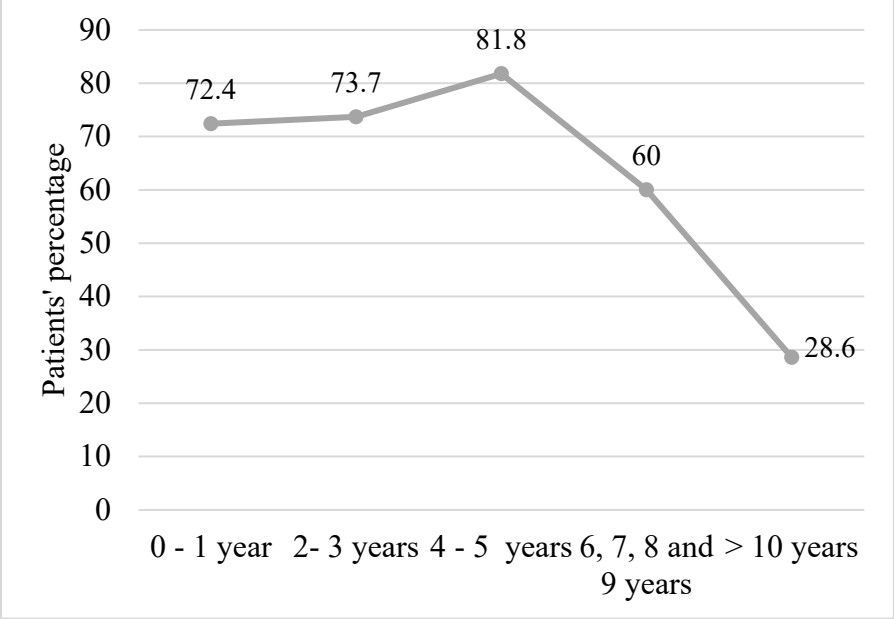

Fig. 5. Patients' preferred role in prostate cancer treatment decision-making.

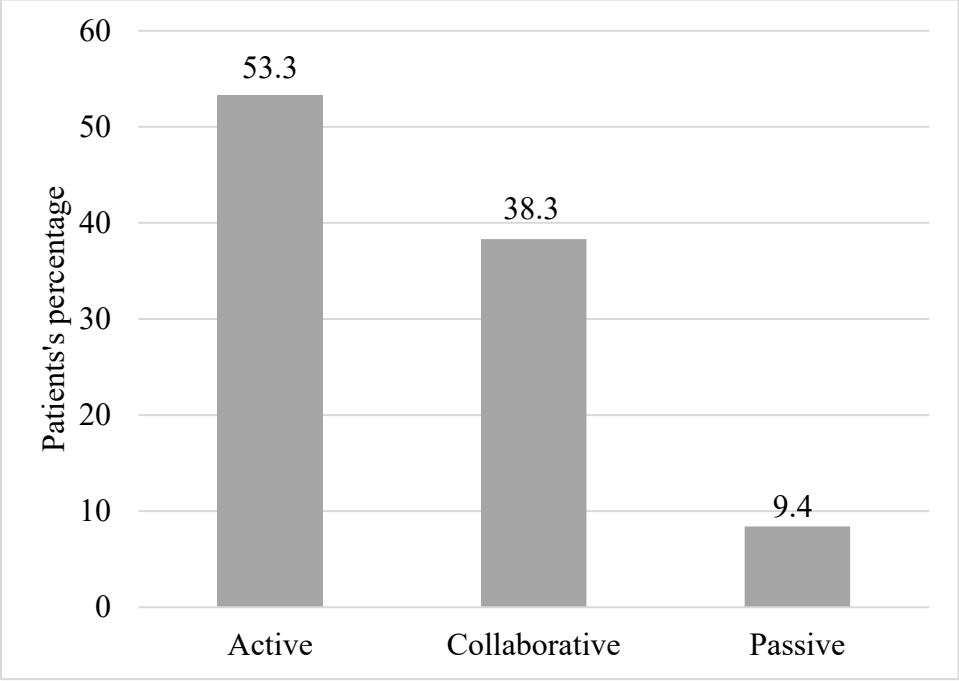

Fig. 6. Sources of information consulted by patients before making their choice of treatment.

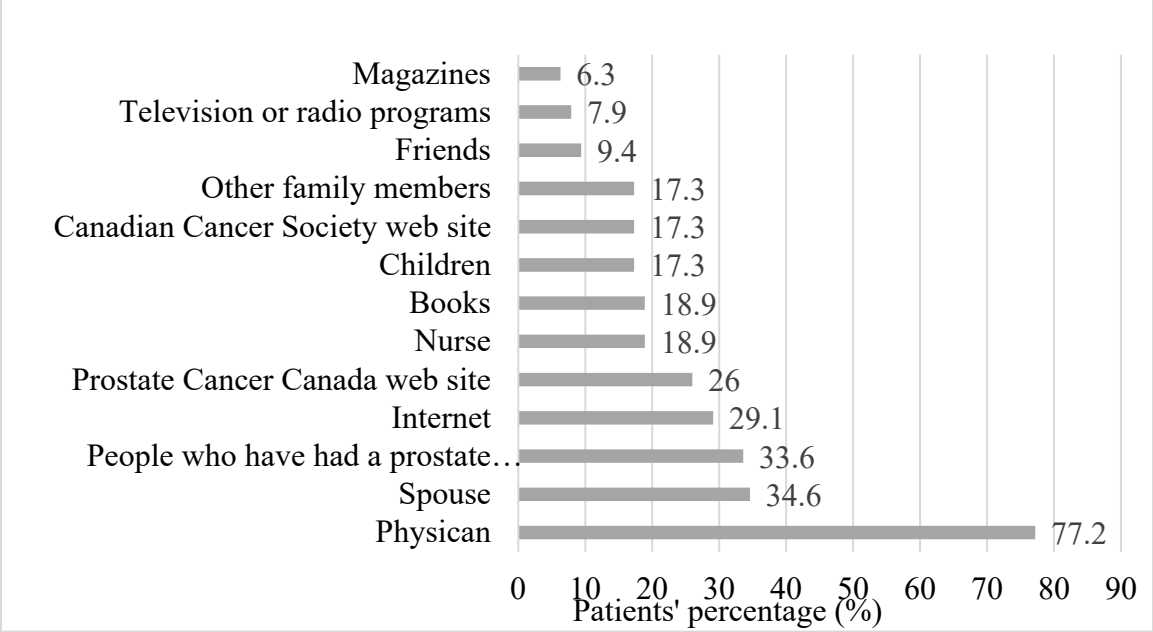

Table 1. Study population's sociodemographic and clinical characteristics	
Characteristics (n=127)	**No. (%) of participants**[a]
Age (years), mean ± SD	68.34±7.23
Min	47
Max	87
Race/ethnicity	
White	127 (100)
Country of birth	
Canada	125 (98.4)
Other	2 (1.6)
Professional status	
Full-time job	22 (17.3)
Part-time job	13 (10.2)
Retired	89 (70.1)
Not working	2 (1.6)
Welfare	1 (0.8)
Relationship status	
In couple	104 (81.9)
Not in couple	23 (18.1)
Annual family income (CAD)	

Less than $20 000	17 (13.4)
Between $20 000 and $39 999	45 (35.4)
Between $40 000 and $59 999	28 (22)
Between $60 000 and $79 999	16 (12.6)
Between $80 000 and $99 999	12 (9.4)
$100 000 and over	9 (7.1)
Completed education level	
Elementary school	21 (16.5)
High school	46 (36.2)
Professional studies	18 (14.2)
College	22 (17.3)
University	20 (15.7)
Region of residence[b]	
Urban	74 (58.3)
Rural	53 (41.7)
PSA (ng/ml), mean ± SD	12.59±41.73
Min	1
Max	448
Gleason score	
≤6	39 (30.7)
7	68 (53.5)
>7	20 (15.7)
Tumor stage	
≤ T2a	104 (82.5)
T2b	20 (15.9)
T2c	2 (1.6)
Comorbidity, mean ± SD	4.73±3.77
Min	1
Max	23
Time since treatment (years), mean ± SD	4.13±3.78
Min	0
Max	20
Risk groups	
Low-risk	31 (24.4)
Intermediate-risk	90 (70.9)
High-risk	5 (3.9)

[a]Missing data across presented variables is 0.8%. [b]Urban region (10 000 inhabitants and more) and rural region (fewer than 10 000 inhabitants).[61] SD: standard deviation.

Table 2. Reasons for choosing treatment		
Statements (n=127)	**Proportion of patients who agreed with the statement (4=mostly or 5=completely) n (%)[a]**	**5-point Likert agreement scale score[*] mean ± SD[a]**
You chose treatment …		
Because it is the best chance for a cure	110 (86.6)	4.40±0.94
Because it is least painful	57 (44.9)	3.28±1.42
Because it is less invasive	79 (62.2)	3.80±1.17
Because it is doctor's recommendation	93 (73.2)	4.06±1.27
Because it has fewest side effects	85 (66.9)	3.90±1.20
To avoid surgery	79 (80.6)	4.24±1.13
Because you know people satisfied with it	62 (48.8)	3.12±1.54
Given your understanding of your prostate cancer, how serious do you believe your prostate cancer is?	29 (22.8)	2.85±0.96[**]
Having cancers worries you	89 (70.1)	3.84±1.21
The risk that your cancer will spread in your body worries you	81 (63.8)	3.56±1.29
The treatment decision-making is difficult	74 (58.3)	3.35±1.4
The treatment decision-making causes you stress	86 (67.7)	3.56±1.24
You've been worried about the right decision to make	75 (59.1)	3.39±1.37

[a]No missing data across presented variables. [*]Higher scores indicate higher level of agreement. Likert scales were analyzed as ordinal variables (proportion of patients who agreed mostly or completely with the statement), but were also analyzed as continuous variables to ensure comparability with the analysis of other studies that used the same questions.[20-22] [**]Higher scores indicate higher level of severity. SD: standard deviation.

Table 3. Sociodemographic and clinical variables associated with the choice of radiotherapy (treatment unavailable locally)						
Predictors	**Treatment offered outside the region (radiotherapy) (n=86)**	**Treatment offered in the region (radical prostatectomy or active surveillance) (n=41)**	**Univariate logistic regression p**	**Unadjusted OR (95% CI)**	**Multivariable logistic regression p**	**Adjusted OR (95% CI)*****
Age (years), mean ± SD	67.90±7.10	69.27±7.49	0.32	0.97 (0.92–1.03)	0.30	0.97 (0.90–1.03)
Annual family income, n (%)[a]						
Less than $39 999 (reference)	42 (48.8)	20 (48.8)				
Between $40 000 and $79 999	32 (37.2)	12 (29.3)	0.58	1.27 (0.54–2.98)	0.62	1.3 (0.46–3.70)
$80 000 and over	12 (14)	9 (22)	0.38	0.64 (0.23–1.75)	0.69	0.78 (0.22–2.70)
Completed education level, n (%)[b]						
Elementary and high school (reference)	44 (51.2)	23 (56.1)				
Professional studies and college	31 (36)	9 (22)	0.20	1.8 (0.73–4.41)		
University	11 (12.8)	9 (22)	0.39	0.64 (0.23–1.76)		
Employment status, n (%)[b]						
Retired or not working (reference)	61 (70.9)	31 (75.6)				
Full-time and part-time job	25 (29.1)	10 (24.4)	0.58	1.27 (0.54–2.98)		
Relationship status n (%)						
In couple (reference)	65 (75.6)	39 (95.1)				
Not in couple	21 (24.4)	2 (4.9)	0.02*	6.30 (1.40–28.34)	0.10	3.84 (0.77–19.26)
Region of residence n (%)						

Urban (reference) Rural	49 (57) 37 (43)	25 (61) 16 (39)	0.67	1.18 (0.55–2.52)		
Comorbidity, mean ± SD	5.01±3.63	4.13±4.04	0.23	1.07 (0.96–1.21)		
PSA, mean ± SD	12.35±47.65	13.07±25.7	0.93	1 (0.99–1.01)		
Gleason score, mean ± SD[c]	6.92±0.71	6.76±0.70	0.23	1.40 (0.81–2.43)		
Tumor stage, n (%)[d] ≤T2a T2b-T2c (reference)	 80 (94.1) 5 (5.9)	 24 (58.5) 17 (41.5)	 0.00*	 11.33 (3.79–33.93)	 0.00**	 10.15 (3.18–32.40)
Time since treatment, mean ± SD	3.42±2.86	5.63±4.93	0.01*	0.69 (0.52–0.92)	0.04**	0.88 (0.78–0.99)

Missing data across presented variables is 0.8%. *p<0.15. **p≤0.05. ***Estimation of adjusted OR for all predictors with a p<0.15 in the univariate logistic regression models, age, income, and for time since treatment. [a]Variable originally measured using 6 answer categories but was regrouped in 3 in logistics analyses. The recategorization was distribution-based. [b]Variable originally measured using 5 answer categories but was regrouped in 3 in logistics analyses. The recategorization was distribution-based. [c]Categorical variable originally, converted into a continuous variable in logistics analyses given the modest sample size. [d]Variable originally measured using 3 answer categories but was regrouped in 2 in logistics analyses. The recategorization was distribution-based. CI: confidence interval; OR: odds ratio; PSA: prostate-specific antigen; SD: standard deviation.