Health-related Quality of Life of Men on Hormonal Therapy for Prostate Cancer

Jacoba J. M. Jansen van Rensburg
https://orcid.org/ 0000-0002-8349-4178
University of the Witwatersrand
South Africa
kotievr@vodamail.co.za

Tikondwe K. Sichinga
https://orcid.org/0000-0002-4666-6452
University of the Witwatersrand
South Africa
tikondwe74sichinga@gmail.com

Johanna E. Maree
https://orcid.org/0000-0002-3153-3040
University of the Witwatersrand
South Africa
lize.maree@wits.ac.za

Abstract

Irrespective of the fact that prostate cancer is the most common cancer in South African men, little is known about the lives of men living with prostate cancer. This study aimed to describe the health-related quality of life (HRQoL) of men treated with hormonal therapy for prostate cancer. A cross sectional design, calculated sample size and convenience sampling method were used to recruit 113 men (n=113) treated at a tertiary hospital in the Gauteng Province. The EORTC QLQ-C30 and EORTC QLQ-PR25 questionnaires were used to collect the data. The data were analysed by means of descriptive statistics, and the Kruskall-Wallis H-test was used to compare the mean responses ($p \leq 0.05$). The ages of the sample (n=113) ranged from 52 to 96 years, with a mean of 68.8 years (SD±7.3). Overall health had the highest mean score (M=61; SD±19.1), compared to global health (M=60.5; SD±18.8), and HRQoL (M=60; SD±24.2). Social functioning was the domain that scored the lowest (M=72.6; SD±30.8), while hot flushes was the hormonal treatment-related symptom with the highest mean (M=46; SD±40.4). Hormonal therapy affected all the HRQoL domains of the men in our sample. However, the group 50 to 59 years of age and those in the first year of treatment had a better HRQoL compared to those 60 years and older and those in the second year of treatment. Nurses can enhance the HRQoL of these men through questioning, assessment and timely intervention.

Keywords: South Africa; prostate cancer; hormonal treatment; health-related quality

of life (HRQoL)

Introduction

According to the latest Globocan estimates (Sung et al. 2021), prostate cancer was the second most common cancer in men worldwide in 2020 and the fifth most common cause of cancer deaths amongst men. The incidence of prostate cancer varies across the world, with the greatest incidences occurring in northern America, northern and western Europe, the Caribbean, Australia and New Zealand and southern Africa. In sub-Saharan Africa, a rapidly increasing annual incidence, between 2% and 9%, has been reported over the time period between 1995 and 2018 in nine countries, including South Africa. According to the 2018 South African Population-based Cancer Registry (National Institute for Communicable Diseases 2020) 476 men were newly diagnosed with prostate cancer; the majority were white men (263), while 231 were Black, five Asian and four of mixed race.

Although South Africa supports prostate cancer screening (KwaZulu-Natal Province 2019), population-based prostate cancer screening is not available. This can contribute to the fact that Black South African men present on average five years later with prostate cancer compared to their American counterparts, while men living in the rural areas of South Africa present on average three years later than those living in the urban areas (Hayes and Bornman 2018). Le Roux et al. (2015) found the majority of men diagnosed with prostate cancer at a regional hospital in South Africa presented with incurable, advanced or metastatic disease, had a worse quality of life and experienced more complications compared to those who presented with less advanced disease.

Although not without complications, hormonal therapy, also referred to as androgen deprivation therapy (ADT), is the standard treatment for metastatic and locally advanced prostate cancer, as it delays disease progression and improves quality of life (QoL) (Haffejee 2016). QoL is an important factor in the management of any person with cancer, as cancer treatments can not only increase long-term survival, but can also be incapacitating (Pilkington and Mitchell 2004). QoL is multi-dimensional, subjective, can change over time, and most importantly, only the person living the life can judge his quality of life (Cella 1994; Goker et al. 2011; Maree and Jansen van Rensburg 2016). Health-related quality of life (HRQoL) focuses on health aspects and general QoL and includes culture, being independent and in control of the disease process, perceptions of and reactions to the person's health status, as well as non-health-related elements, such as employment, family and friends (Kagawa-Singer, Padilla, and Ashing-Giwa 2010; Lin, Lin, and Fan 2013).

The research problem for this study relates to men diagnosed with prostate cancer, specifically the HRQoL of men treated with hormonal therapy. Irrespective of the fact that prostate cancer is the most common cancer in men in South Africa (National Institute for Communicable Diseases 2020), little is known about the lives of men living with prostate cancer, complicating the provision of evidence-based holistic nursing care.

With this study, we wished to provide baseline data on the lives of these men by describing their HRQoL.

Method

Design, Setting and Population

A cross-sectional design was selected for the study. This design can be used to describe an event, such as the HRQoL of men treated with hormonal therapy for prostate cancer, at a specific point in time (Polit and Beck 2018). The research setting was an academic hospital in the Gauteng Province in South Africa. The hospital is a teaching hospital linked to a university and provides services to patients in Gauteng and neighbouring provinces. The hospital renders secondary, tertiary and highly specialised services (SANews 2017). Men presenting with urological cancers are treated at the Urology Department and the Radiation Oncology Department.

The accessible population, referring to the population that researchers can actually study (Polit and Beck 2018), was men receiving hormonal therapy for prostate cancer at the study setting during the period of data collection. To be included in the study, men had to be 18 years and older, diagnosed with prostate cancer, treated with hormonal therapy, able to understand basic English and willing to take part in the study.

Sampling Size, Sampling and Recruitment

The Raosoft Calculator® (Raosoft 2004) calculated the sample size at a confidence interval of 95%, margin error of 5%, response distribution of 50%, and population size of 158 (n=158), which resulted in a sample of 113 (n=113). Convenience sampling, which enabled us to select respondents who were available at the point of study (Polit and Beck 2018), was used to select the sample. Patients waiting for their scheduled medical appointments were approached and recruited; 115 were recruited, but two refused to take part. Recruitment continued until the sample size was realised.

Data Collection and Instruments

Data were collected after ethical clearance (#M170567) from the research ethics committee at the university, and permission from the CEO of the hospital and the Head of the Radiotherapy Department were obtained. The purpose of the study was first explained to those recruited, whereafter they were invited to take part in the study, and informed consent was obtained. Data were collected in a private room, taking between 15 and 20 minutes, within the period between October and December 2017.

Three researcher-administered questionnaires were used. A self-developed questionnaire was used to collect demographic data, while data on HRQoL were collected by means of two validated instruments, the EORTC QLQ-C30 and EORTC QLQ-PR25 questionnaires, with permission from the European Organisation for Research and Training in Cancer. The EORTC QLQ-C30 instrument investigates global

health status; five functional scales (physical, role, emotional, cognitive and social functions); three symptom scales (fatigue, pain, nausea and vomiting); as well as additional symptoms commonly reported by cancer patients (dyspnoea, loss of appetite, insomnia, constipation, diarrhoea and sleep disturbance) and financial difficulties. Each item is scored from 1 to 4 (1=not at all; 2=a little; 3=quite a bit; and 4=very much), except for items in the overall health and overall HRQoL scale, which range from 1 "very poor" to 7 "excellent" (Aaronson et al. 1993). The prostate-specific EORTC QLQ-PR25, developed to measure disease-specific HRQoL, is a 25-item questionnaire designed for the treatment of side effects among patients with localised and metastatic prostate cancer. It investigates urinary symptoms (9 items), bowel symptoms (4 items), treatment-related symptoms (6 items), and sexual functioning (6 items) (O'Leary et al. 2015).

The internal consistency of the EORTC QLQ-C30 and EORTC QLQ-PR25 was determined by Cronbach's alpha coefficients. Cronbach's alpha reliability coefficients of the EORTC QLQ-C30 varied from 0.62 for the nausea subscale to 0.87 for the general HRQoL. The reliability of the EORTC QLQ-PR 25 was acceptable, with Cronbach's alpha of >0.7 for urinary problems, sexual activity and sexual function (Marusteri and Bacarea 2010).

Validity and reliability were enhanced by using validated questionnaires meeting the criteria for validity and reliability (Heale and Twycross 2015) and using researcher administered questionnaires.

Data Analysis

The completed questionnaires were placed in a sealed box and numbered sequentially. Thereafter the data were entered onto an Excel® spread sheet, cleaned and analysed by means of the STATA version 14 statistical program; significance was set at p<0.05. The EORTC scoring procedure was used to calculate the HRQoL scores. The HRQoL raw scores were standardised to linear transformation ranging from 0–100 to ease the presentation and interpretation of data. All scales and single item measures had the lowest score of 0 and the highest score of 100. A higher score in the functional scales indicated better functioning status, while in the symptom scales, it indicated severe health problems. A higher score under global health status indicated a better HRQoL (Cassell et al. 2019). Descriptive statistics were used, and the Kruskal-Wallis H-test was applied to compare mean responses of different variables; $p \leq 0.05$ (Marusteri and Bacarea 2010).

Results

Demographic Profile

The respondents' ages ranged from 52 to 96 years, with a mean of 68.8 years (SD±7.3). The largest proportion was older than 70 years (46%; n=52); most were pensioners

(80.5%; n=91) who relied on social grants as their main source of income (74.3%; n=84); and 54% (n=61) were in their first year of treatment. Table 1 provides the details.

Table 1: Demographic profile (n=113)

Age (years)	n	%
50–59	10	8.8
60–69	51	45.1
≥70	52	46
Marital status		
Never married	4	3.5
Married	71	62.8
Living with partner	5	4.4
Separated/Divorced/Widower	33	29.2
Educational level		
Never attended school	6	5.3
Grade 1–7	25	22.1
Grade 8–10	42	37.2
Grade 11–12	28	24.8
Tertiary	12	10.6
Employment status		
Pensioner	91	80.5
Skilled (trained)	16	14.2
Unskilled	3	2.7
Unemployed	3	2.7
Social cultural group		
African (Black)	95	84.1
Coloured	7	6.2
White	5	4.4
Others (Indian, Chinese, Bini, Hindu, Lithuanian)	6	5.3
Main source of income		
No personal income	3	2.7
Self-employed	7	6.2
Employed	10	8.8
Social grant	84	74.3
Other	9	8.0
Time on treatment		
3–12 months	61	54
13–24 months	52	46

Overall Health, HRQoL and Global Health Status

When calculating the respondents' overall health, HRQoL and global health status, global health had the highest mean score. When combining these three variables and comparing them to age, the age group 50 to 59 years had the highest mean score (M=61.7; SD±21.1). When comparing time on treatment with the combined variables, the 13 to 24 months group scored slightly higher than the 3 to 12 months group (M=60.4; SD±20.4 versus M=60.6; SD±21.1).

When cross-tabulating the three variables with age, HRQoL obtained the highest mean score, while overall health scored the lowest. When comparing the individual variables with time on treatment, the 13 to 24 months group scored higher in global health status and overall health, while the 3 to 12 months group had a higher HRQoL mean score. These differences were not statistically significant. Please see table 2 for the details.

Table 2: Overall health, HRQoL and global health status compared to age and time on treatment (n=112)*

Variables	Total score		Age groups (years)							Time on treatment (months)				
			50–59 (n=10)		60–69 (n=51)		≥70 (n=52)			3–12 (n=60)		13–24 (n=52)		
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD	p	Mean	±SD	Mean	±SD	p
Global health status	60.5	18.8	61.7	18.9	59.5	19.8	61.2	18	0.928	60.4	18	60.6	19.7	0.760
HRQoL	60	24.2	66.7	28.3	58.7	25.5	59.9	22.4	0.748	60.8	23.7	59	25	0.632
Overall health	61	19.1	56.7	16.1	60.3	20.2	62.5	18.6	0.546	60	19.5	62.2	18.7	0.175

*One participant was not able to rate his overall health and quality of life

** Statistically significant, $p \leq 0.05$

Functioning

When calculating the mean scores for the different domains, physical functioning had the highest score (M=86.4; SD±20.5), while social functioning scored the lowest (M=72.6; SD±30.8). When cross-tabulating age with the different domains, physical, role and cognitive functioning had the lowest mean score in men aged 70 years and older. When comparing time on treatment with the different domains, all domains, except for role functioning, had a higher score in the group 3–12 months of treatment. The Kruskal-Wallis H-test showed no statistically significant difference between the variables, age and time on treatment. Table 3 provides the details.

Table 3: Functioning according to the various domains, age and time on treatment (n=113)

Domains	Total score		Age groups (years)						P	Time on treatment (months)				P
			50–59 (n=10)		60–69 (n=51)		≥70 (n=52)			3–12		13–24		
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		Mean	±SD	Mean	±SD	
Physical	86.4	20.5	89.3	16.1	87.5	19.3	84.9	22.4	0.625	86.6	19.3	86.3	21.9	0.907
Role	82.9	28.8	83.3	31.4	83.7	27.8	82.1	29.9	0.933	82.5	29.7	83.3	28	0.978
Emotional	85	19.2	83.3	14.2	84.6	18.2	85.6	21.1	0.589	87.8	15.2	81.6	22.6	0.210
Cognitive	82.3	24	86.7	18.9	85.3	24.4	78.5	24.3	0.168	85.2	21.1	78.8	26.8	0.262
Social	72.6	30.8	58.3	32.6	75.2	25	72.8	35.1	0.287	73.2	30.5	71.8	31.4	0.712

*Statistically significant, $p \leq 0.05$

General Symptoms

When calculating the mean scores for the general symptoms, insomnia scored the highest mean (M=24.5; SD±39.6), while nausea and vomiting scored the lowest

(M=1.7; SD±10.5). When cross-tabulating age with the various general symptoms, only the age group 60 years and older reported diarrhoea, while nausea and vomiting were found in the age group 70 years and older. Loss of appetite, dyspnoea, insomnia and constipation had the highest score in the age group 70 years and older. The Kruskal-Wallis H-test found a statistically significant relationship between age groups and nausea and vomiting (p=0.048).

When comparing time on treatment with the general symptoms, fatigue, pain, insomnia, and constipation had a higher mean score in the group 13–24 months of treatment. Nausea and vomiting were only present in the group 13–24 months of treatment. A statistically significant relationship was found between time on treatment and nausea and vomiting (p=0.014). Please see table 4 for the details.

Table 4: General symptoms (n=113)

| General symptoms | Total score | | Age groups (years) | | | | | | | | Time on treatment (months) | | | | |
| | | | 50–59 (n=10) | | 60–69 (n=51) | | ≥70 (n=52) | | p | 3–12 | | 13–24 | | p |
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		Mean	±SD	Mean	±SD	
Fatigue	23.4	28.5	27.8	34.4	20.9	26.4	25	29.5	0.791	20.4	25.7	26.9	31.3	0.239
Pain	21.7	28.9	26.7	26.3	21.9	28.6	20.5	30	0.513	18.9	26.1	25	31.7	0.362
Nausea and vomiting	1.7	10.5	0	0	0	0	3.8	15.3	0.048*	0	0	1.8	10.5	0.014*
Loss of appetite	8.0	22.8	6.7	21.1	6.5	23.1	9.6	23.2	0.408	8.2	24.1	7.7	21.5	0.813
Dyspnoea	9.7	22.1	3.3	10.5	9.8	20.3	10.9	25.3	0.684	10.9	21.7	8.3	22.7	0.329
Insomnia	24.5	39.6	26.7	37.8	16.3	34.9	32.1	43.3	0.08	20.2	35.6	29.5	43.6	0.291
Consti-pation	18.9	35	3.3	10.5	19	34.2	21.8	38.4	0.419	15.8	31.4	22.4	38.9	0.573
Diarrhoea	2.4	11.5	0	0	3.9	15.8	1.3	6.5	0.485	2.7	14	1.9	7.8	0.859
Financial problems	23	36.8	36.7	48.3	24.8	35.8	18.6	35.2	0.353	26.2	38.1	19.2	35.1	0.304

*Statistically significant, $p \leq 0.05$

Prostate-specific Problems

When calculating functioning scores for prostate-specific problems, sexual activity scored higher than sexual functioning (M=78.5; SD±26.2 versus M=51.7; SD±26.2). Hormonal treatment-related symptoms had the highest mean score of the symptom scores (M=14; SD±12.2). When cross-tabulating age and time on treatment with prostate-specific problems, sexual activity, sexual functioning and urinary problems had the highest score in men aged 70 years and older, while sexual functioning, urinary problems, bowel problems and hormonal treatment-related symptoms had the higher mean score between 13–24 months of treatment (see table 5).

Table 5: Prostate-specific problems (n=113)

Prostate specific problems	Total score		Age groups (years)							Time on treatment (months)				
			50–59 (n=10)		60–69 (n=51)		≥70 (n=52)		*p*	3–12		13–24		*p*
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		Mean	±SD	Mean	±SD	
Functioning scores														
Sexual activity	78.5	26.2	66.7	30.4	75.5	28.5	83.7	22	0.145	79.2	26.5	77.6	26.2	0.641
Sexual functioning#	51.7	26.2	60	23.1	43.3	26.6	72.9	14.2	0.11	47.2	25.3	59.3	27.5	0.311
Symptom scores														
Urinary problems	11.9	17.5	9.2	22	10.9	18.3	13.5	15.9	0.174	9.6	17.1	14.7	17.6	0.053
Bowel problems	5.2	11.6	5	9	4.9	11.2	5.4	12.7	0.925	3.8	9.2	6.7	13.9	0.278
Hormonal treatment-related symptoms	14	12.4	15.6	9.7	15.3	12.2	12.5	13	0.299	12.4	12.1	15.9	12.6	0.104

\# 24 respondents answered the question as it only pertained to those who were sexually active

Statistically significant, $p \leq 0.05$

Prostate-specific problems investigated various problems related to urinary and bowel problems and symptoms related to hormonal treatment. In terms of the urinary symptoms, wearing incontinence aids had the highest mean score (M=38.9; SD±44.3), with urination limiting daily activities the lowest score (M=3.8; SD±15.6). Frequent urination at night had the highest mean score in the age group 50 to 59, while wearing incontinence aids had the highest mean in both the age groups 60 to 69 years and 70 years and older. The Kruskal-Wallis H-test found a statistically significant difference between time on treatment and painful urination (p=0.037) (table 6).

Bloated abdomen had the highest mean of all the bowel symptoms (M=15.6; SD±31.5), which also applied to the age and time on treatment groups. However, a statistically significant difference was found between age group and bloody stool (p=0.015), where respondents in the age group 50–59 had experienced the most problems with bloody stools. Similarly, hot flushes had the highest mean score of the hormonal treatment-related symptoms (M=46; SD±40.4), as well as across the age and time on treatment groups. A statistically significant difference was observed between hot flushes and the time on treatment (p=0.045). Please see table 6.

Table 6: Urinary, bowel and hormonal treatment-related symptoms (n=113)

Symptoms	Total score		Age groups (years)							Time on treatment (months)				
			50–59 (n=10)		60–69 (n=51)		≥70 (n=52)		P	3–12		13–24		P
	Mean	±SD	Mean	±SD	Mean	±SD	Mean	±SD		Mean	±SD	Mean	±SD	
Urinary symptoms														
Frequent urination during day	13.3	28.7	10	31.6	12.4	29	14.7	28.3	0.671	8.7	24.3	18.6	32.6	0.064
Frequent urination at night	28.9	40.9	16.7	36	23.5	38.5	36.5	43.4	0.162	24	39	34.6	42.8	0.166
Urgency to pass urine	12.4	28.6	10	31.6	11.1	27.2	14.1	29.8	0.735	13.1	30	11.5	27.1	0.966
Disturbed sleep due to frequent urination	18.6	35.3	13.3	23.3	16.3	34.9	21.8	37.9	0.705	14.8	31.9	23.1	38.8	0.229
Staying close to toilet	4.4	17.5	6.7	21	5.2	18.1	3.2	16.5	0.636	4.4	16.6	4.5	18.7	0.885
Leakage of urine	7.4	21.2	6.7	21	7.2	20.3	7.7	22.5	0.948	5.5	17.4	9.6	25	0.36
Painful urination	6.5	19.3	3.3	10.5	7.2	19.2	6.4	20.9	0.901	2.7	11	10.9	25.3	0.037*
Urination limiting daily activities	3.8	16.5	6.7	21.1	3.9	15.8	3.2	16.5	0.725	3.3	14.5	4.5	18.7	0.824
Wearing Incontinence aids	38.9	44.3	0	0	33.3	38.5	50	70.7	0.617	33.3	47.1	41.7	50	0.803
Bowel symptoms														
Bowel problems limiting daily activities	1.8	9.8	0	0	3.9	14.3	0	0	0.082	1.6	9.5	1.9	10.3	0.872
Leakage of stool	1.5	11.3	0	0	1.3	9.3	1.9	13.9	0.907	1.1	8.5	1.9	13.9	0.9
Bloody stool	1.8	10.8	6.7	14.1	0.7	4.7	1.9	13.9	0.015*	1.6	7.3	1.9	13.9	0.408
Bloated abdomen	15.6	31.5	13.3	28.1	13.7	29.9	17.9	34	0.852	10.9	24.1	21.2	37.9	0.227
Hormonal treatment-related symptoms														
Hot flushes	46	40.4	53.3	45	49.7	39.6	41	40.5	0.436	38.8	39.1	54.5	40.7	0.045*
Enlarged breasts	6.2	23	13.3	28.1	7.8	27.2	3.2	16.5	0.214	7.1	24.4	5.1	21.3	0.622
Swollen legs	10.9	25.4	0	0	6.5	18.9	17.3	31.3	0.051	6.6	18.1	16	31.3	0.166
Weight loss	3.2	14.7	10	31.6	5.2	16.8	0	0	0.069	3.3	15.8	3.2	13.6	0.853
Weight gain	8	21.9	16.7	28.3	8.5	22.9	5.8	19.5	0.234	9.3	23.7	6.4	19.8	0.581
Feeling less masculine	9.7	24.7	0	0	13.7	28.4	7.7	22.5	0.181	9.3	24.4	10.3	25.2	0.738

* Statistically significant, $p \leq 0.05$

Sexual Activity

Sexual activity consisted of having interest in sex and the extent of being sexually active. Respondents could choose between "not at all"; "a little"; "quite a bit"; and "very much." Most respondents (57.5%; n=65) chose "not at all" for sexual interest, 8.9% (n=10) indicated "a little" 27.7% (n=20); "quite a bit"; and 15.9% (n=18) "very much." In terms of being sexually active, most (78.8%; n=89) indicated "not at all"; 8% (n=9) indicated "a little"; 10.6% (n=12) "quite a bit"; and 2.7% (n=3) "very much." Of those who were sexually active (n=24), more than a third indicated "very much" difficulty to get/maintain an erection and ejaculation problems (33.3%; n=8 and 37.5%; n=9 respectively). When cross-tabulating having interest in sex and the extent of being sexually active with the age groups and time on treatment, the Kruskal-Wallis H-test found a statistically significant difference between age groups and the extent of being sexually active (p=0.003).

Discussion

Our study population seemed to be typical of populations of men diagnosed with prostate cancer in terms of age, as we found an increased number of patients with older age, with the highest proportion aged 70 years and older. However, the mean age of 68.8 years was slightly lower than the mean age of 72 years reported in the South African study of Le Roux et al. (2015) but similar to four of the 16 studies included in a review of African studies to illustrate the challenges of treating men with advanced and metastatic prostate cancer (Cassell et al. 2019).

As seen in the current study, HRQoL scored the highest in the age group 50–59 years and in the 3–12 months treatment group. Mardani et al. (2020), when describing HRQoL in prostate cancer survivors living in Iran, found the same trend. However, the HRQoL in our study sample was higher compared to the men in the Iranian study. The reason for this difference is unclear. Odeo and Dego (2020) found that men receiving hormonal treatment, either as mono therapy or in combination with radiotherapy or radical prostatectomy, had the poorest HRQoL. The total sample of Iranian men received external beam radiation, and therefore it seems as if having had radiotherapy could have played a role in this discrepancy. As the current study did not collect data on radiotherapy, the effect thereof was not considered in this study.

The global health status of the study sample did not indicate a statistically significant change when compared to time on treatment. This is in contrast with the various studies that found statistically significant declines in global health status at three months, six months, 12 months, and two years after treatment (Odeo and Dego 2020; Siston, Knight, and Slimack 2003; Selli et al. 2014). The differences could possibly be linked to the current study design, compared to other studies, as the current study looked at 3–12 and 13–24 months of treatment. Our respondents showed a higher role functioning in the 13–24 months treatment group who, despite being treated for prostate cancer, were able to carry out their day-to-day activities.

Although the physical functioning of our study sample declined with age, no statistically significant differences in terms of age group or time on treatment were observed. This is in contrast to the findings of the Iranian study (Mardani et al. 2020), which found statistically significant declines in physical functioning in terms of both age and time on treatment. Once again, the physical functioning of the current sample scored higher than that of the respondents in the Iranian study. The fact that the current sample's physical functioning scored lower in the second year of treatment (13–24 months) was contrasted by various studies. For instance, Kim, Seong, and Yoon (2017) reported a decline in physical functioning in the first year of treatment, Alibhai et al. (2015) found a decline during the first six months of treatment, and Ueno et al. (2018) found a decline at three months, which improved at 12 months, but was still lower than the baseline. This difference could possibly be related to the fact that our sample's symptoms such as fatigue, pain, insomnia, hot flushes and urinary problems were worse during the second year of treatment.

In contrast with our respondents' emotional functioning, which showed an upward trend in terms of age group, cognitive functioning showed a downward trend. However, both domains showed a downward trend in the time of treatment groups. Cary et al. (2014), when investigating the influence of hormonal therapy on emotional well-being in men with prostate cancer, reported changes in emotional well-being, with a decline observed at 18 months but no meaningful decline at 24 months. Depression has also been associated with poor emotional well-being and functioning in men suffering from prostate cancer and those receiving hormonal therapy (Cary et al. 2014; Chung et al. 2017). However, as depression was not investigated in our study, its role cannot be considered. Whether hormonal therapy could be responsible for the decline in our sample's cognitive functioning is not clear, as studies reported contrasting results (Chung et al. 2017; Jansen van Rensburg, Maree, and Casteleijn 2017; Jim et al. 2012; Mohile et al. 2010; Patil and Bernard 2018). In addition, age-related cognitive decline could also have played a role.

Social functioning had the lowest overall mean score of the domains and also scored the lowest in terms of age group and time of treatment. It is possible that the most troublesome symptoms, namely insomnia, fatigue and pain, could have influenced social functioning, which was also the domain that scored the lowest in the Iranian study (Mardani et al. 2020), with the same three symptoms the most troublesome. In addition, Van Andel and Kurth (2003) in a study conducted in the Netherlands, found a similar trend and reported a decline in social functioning in a similar patient population after 18 months of treatment, which similar to the current study, was not statistically significant. Kim et al. (2017) also observed a similar decline in social functioning at 34.6 months of treatment. Odeo and Dego (2020) found that being married or living with a partner could have a positive influence on social functioning due to the potential effects of social support. The majority of our sample was married and could explain this finding.

Considering the symptoms investigated, we found hot flushes scored the highest mean, were most troublesome in the age group 50 to 59 years, and showed a statistically significant upward trend in terms of time on treatment. Hot flushes as an adverse effect of hormonal treatment are well known, especially in women during menopause, but not common in men (Cheung et al. 2017; Nishiyama, Hashimoto, and Takahashi 2004). Nishiyama et al. (2004) reported that hot flushes were more severe after 12 months of treatment, compared to the first 12 months. Eziefula, Grunfield, and Hunter (2013) found that men experienced changes in themselves, were embarrassed about the hot flushes and felt they were unable to meet their personal expectations in terms of physical activity, work and sexual activity, which had a negative influence on HRQoL.

Our study provided evidence that most of our sample was neither sexually active nor interested in sex. What was surprising was our finding that sexual function scored a higher mean in the 13 to 24 months treatment group compared to the 3 to 12 months group. This is not in accordance with other studies, as Donovan et al. (2018) reported that patients receiving hormonal therapy would report worsening sexual functioning over time. In addition, Huang et al. (2012), in a study where patients on hormonal therapy were followed up for four years, reported significant worsening of sexual functioning until two years, with no changes beyond that period. The reason for this discrepancy is not known; however, only a small percentage of our sample (approximately 20%) was sexually active, which could have influenced the results.

Limitations

The study has various limitations. A convenience sampling method was used to select respondents, and, therefore, the results cannot be generalised. The majority of the respondents were Black South Africans, and the results might not be applicable to other socio-cultural groups. Co-morbidities were not considered, and the reported health problems could have resulted from other underlying causes rather than prostate cancer and the treatment thereof. There is also a possibility of respondents giving socially acceptable answers when confronted with sensitive questions. However, we believe that the study provided base-line data that could guide nursing practice, especially with regards to support of patients treated with hormonal therapy for prostate cancer.

Recommendations

Nurses should maintain a high awareness of the effects men receiving hormonal treatment for prostate cancer could experience and how these effects influence their HRQoL. To lessen the effect that the social domain has on the HRQoL of these patients, social support could be assessed and nursing interventions implemented. For instance, life partners could be educated on how to support these patients, and patients and their families could be referred to organisations designated for cancer patients. In addition, patients' most pressing general, prostate-specific problems, hormonal therapy-related symptoms and sexual concerns should be identified, assessed and addressed. Further studies are also needed, including a longitudinal study with a large sample, to explore

the HRQoL changes in prostate cancer patients over time and allow for the development of tailored nursing interventions to support patients undergoing hormonal therapy, and lessen the effects of the treatment on their HRQoL.

Conclusion

Hormonal therapy affected all the HRQoL domains of the men in this sample. However, the group 50 to 59 years of age and those in the first year of treatment had a better HRQoL, compared to those 60 years and older and those in the second year of treatment. Social functioning was the domain that was mostly affected, while insomnia was the most troublesome general symptom and hot flushes the most troublesome hormonal treatment-related symptom. Taking cognisance of the effects that hormonal therapy has on the HRQoL of men diagnosed with prostate cancer, assessing the patients for these effects and intervening timely, could enable nurses to enhance their patients' HRQoL.

Acknowledgements

References

Aaronson, N. K., S. Ahmedzai, B. Bergman, M. Bullinger, A. Cull, N. J. Duez, A. Filiberti, H. Flechtner, S. B. Fleishman, and J. C. de Hoes. 1993. "The European Organisation for Research and Treatment of Cancer QLQ-C30: A Quality of Life Instrument for Use in International Clinical Trials in Oncology." *Journal of the National Cancer Institute* 85 (5): 365–376. https://doi.org/10.1093/jnci/85.5.365.

Alibhai, S. M., H. Breunis, N. Timilshina, G. Naglie, I. Tannock, M. Krahn, P Warde, N. E. Fleshner, S. D. Canning, and G. Tomlinson. 2015. "Long-term Impact of Androgen-deprivation Therapy on Physical Function and Quality of Life." *Cancer* 121 (14): 2350–2357. https://doi.org/10.1002/cncr.29355.

Cary, K. C., N. Singla, J. E. Cowan, P. R. Carroll, and M. R. Cooperberg. 2014. "Impact of Androgen Deprivation Therapy on Mental and Emotional Wellbeing in Men with Prostate Cancer: Analysis from the CaPSURE Registry." *Journal of Urology* 191 (4): 964–970. https://doi.org/10.1016/j.juro.2013.10.098.

Cassell, A., B. Yunusa, M. Jalloh, M. Ndoye, M. M. Mbodji, A. Diallo, S. Kouka, I. Labou, L. Niang, and S. M. Gueye. 2019. "Management of Advanced and Metastatic Prostate Cancer: A Need for a Sub-Saharan Guideline." *Journal of Oncology* 2019. https://doi.org/10.1155/2019/1785428.

Cella, D. F. 1994. "Quality of Life: Concepts and Definition." *Journal of Pain and Symptom Management* 9 (3): 186–192. https://doi.org/10.1016/0885-3924(94)90129-5.

Cheung, A. S., C. de Rooy, R. Hoermann, D. L. Joon, J. D. Zadac, and M. Grossmann. 2017. "Quality of Life Decrements in Men with Prostate Cancer Undergoing Androgen Deprivation Therapy." *Clinical Endocrinology* 86 (3): 388–394. https://doi.org/10.1111/cen.13249.

Chung, S. D., L. T. Kao, H. C. Lin, S. Xirosagar, C. C. Huang, and H. C. Lee. 2017. "Patients Receiving Androgen Deprivation Therapy for Prostate Cancer Have an Increased Risk of Depressive Disorder." *PLOS ONE* 12 (3). https://doi.org/10.1371/journal.pone.0173266.

Donovan, K. A., B. D. Gonzalez, A. M. Nelson, M. N. Fishman, B. Zachariah, and P. B. Jacobsen. 2018. "Effect of Androgen Deprivation Therapy on Sexual Function and bother in Men with Prostate Cancer: A Controlled Comparison." *Psycho-Oncology* 27 (1): 316–324. https://doi.org/10.1002/pon.4463.

Eziefula, C. U., E. A. Grunfeld, and M. S. Hunter. 2013. "'You Know I've Joined your Club … I'm the Hot Flush Boy': A Qualitative Exploration of Hot Flushes and Night Sweats in Men Undergoing Androgen Deprivation Therapy for Prostate Cancer." *Psycho-Oncology* 22 (12): 2823–2830. https://doi.org/10.1002/pon.3355.

Goker, A., T. Guvenal, E. Yanikkerem, A. Turhan and F. Koyuncu. 2011. "Quality of Life in Women with Gynaecologic Cancer in Turkey." *Asian Pacific Journal of Cancer Prevention* 12 (11): 3121–3128.

Heale, R., and A. Twycross. 2015. "Validity and Reliability in Quantitative Studies." *Evidence-based Nursing* 18 (3): 66–67. http://dx.doi.org/10.1136/eb-2015-102129.

Haffejee, M. 2016. "The Prostate Cancer Foundation of South Africa." Accessed April 4, 2022. http://www.prostatecancerfoundation.co.za.

Hayes, V. M., and M. S. R. Bornman. 2018. "Prostate Cancer in Southern Africa: Does Africa Hold Untapped Potential to Add Value to the Current Understanding of a Common Disease?" *Journal of Global Oncology* 4: 1–7. https://doi.org/10.1200/jgo.2016.008862.

Huang, I. S., A. T. L. Lin, H. H. H. Wu, H. J. Chung, J. Y. Kuo, and T. P. Lin. 2012. "Prostate Cancer Detection and Complication Rates with Transrectal Ultrasound-guided Prostate Biopsies among Different Operators." *Urological Science* 23 (3): 78–81. http://dx.doi.org/10.1016/j.urols.2012.07.006.

Jansen van Rensburg, J. J. M., J. E. Maree, and D. Casteleijn. 2017. "An Investigation into the Quality of Life of Cancer Patients in South Africa." *Asia Pacific Journal of Oncology Nursing* 4 (4): 336–341. https://dx.doi.org/10.4103%2Fapjon.apjon_41_17.

Jim, H. S. L., J. Y. Park, J. Permuth-Wey, M. A. Rincon, K. M. Phillips, B. J. Small, and P. B. Jacobson. 2012. "Genetic Predictors of Fatigue in Prostate Cancer Patients Treated with Androgen Deprivation Therapy: Preliminary Findings." *Brain, Behavior and Immunity* 26 (7): 1030–1036. https://doi.org/10.1016/j.bbi.2012.03.001.

Kagawa-Singer, M., G. V. Padilla, and K. Ashing-Giwa. 2010. "Health-related Quality of Life and Culture." *Seminars in Oncology Nursing* 26 (1): 59–67. https://doi.org/10.1016/j.soncn.2009.11.008.

Kim, S. H., D. H. Seong, and S. M. Yoon. 2017. "Predictors of Health-related Quality of Life in Korean Prostate Cancer Patients Receiving Androgen Deprivation Therapy." *European Journal of Oncology Nursing* 30: 84–90. https://doi.org/10.1016/j.ejon.2017.08.009.

KwaZulu-Natal Province. 2019. "Prostate Cancer." Accessed August 1, 2022. http://www.kznhealth.gov.za/prostate-cancer.htm.

Le Roux, H. A., R. J. Urry, B. Sartorius, and C. Aldous. 2015. "Prostate Cancer at a regional Hospital in South Africa: We Are only Seeing the Tip of the Iceberg." *South African Journal of Surgery* 53 (4): 57–62.

Lin, X. J., I. M. Lin, and S. Y. Fan. 2013. "Methodological Issues in Measuring Health-related Quality of Life." *Tzu Chi Medical Journal* 25 (1): 8–12. https://doi.org/10.1016/j.tcmj.2012.09.002.

Mardani, A., S. P. Razi, R. Mazaheri, M. Dianatinasab, and M. Vaismoradi. 2020. "Health-related Quality of Life in Prostate Cancer in Survivors: Implications for Nursing Care." *International Journal of Caring Sciences* 13 (2): 1322.

Maree, J. E., and J. J. M. Jansen van Rensburg. 2016. "Suitability of Quality-of-life Outcome Measures in Palliative Care in the South African Setting." *Palliative and Supportive Care*: 1–11. https://doi.org/10.1017/S14789515000036.

Marusteri, M., and V. Bacarea. 2010. "Comparing Groups for Statistical Differences: How to Choose the right Statistical Test?" *Biochemia Medica* 20 (1): 15–32. https://doi.org/10.11613/BM.2010.004.

Mohile, S. G., M. Lacy, M. Rodin, K. Bylow, W. Dale, M. R. Meager, and W. M. Stadler. 2010. "Cognitive Effects of Androgen Deprivation Therapy in an Older Cohort of Men with Prostate Cancer." *Critical Reviews in Oncology/Hematology* 75 (2): 152–159. https://dx.doi.org/10.1016%2Fj.critrevonc.2010.06.009.

National Institute for Communicable Diseases. 2020. "Ekurhuleni Population-based Cancer Registry 2018 Annual Report." Accessed April 4, 2022. https://www.nicd.ac.za/wp-content/uploads/2020/04/EPBCR-2018-report-Final-report.pdf.

Nishiyama, T., Y. Hashimoto, and K. Takahashi. 2004. "The Influence of Androgen Deprivation Therapy on Dihydrotestosterone Levels in the Prostatic Tissue of Patients with Prostate Cancer." *Clinical Cancer Research* 10 (21): 7121–7126. https://doi.org/10.1158/1078-0432.ccr-04-0913.

O'Leary, E., F. Drummond, A. Gavin, H. Kinnear, and L. Sharp. 2015. "Psychometric Evaluation of the EORTC QLQ-PR25 Questionnaire in Assessing Health-related Quality of Life in Prostate Cancer Survivors: A Curate's Egg." *Quality of life Research* 24 (9): 2219–2230. https://doi.org/10.1007/s11136-015-0958-y.

Odeo, S., and A. Dego. 2020. "Factors Affecting Health-related Quality of Life among Prostate Cancer Patients: A Systematic Review." *Journal of Oncology Pharmacy Practice* 26 (8):1997–2010. https://doi.org/10.1177/1078155220959414.

Patil, T., and B. Bernard. 2018. "Complications of Androgen Deprivation Therapy in Men with Prostate Cancer." *Oncology* 32 (9): 470–474.

Pilkington, F. B., and G. J. Mitchell. 2004. "Quality of Life for Women Living with a Gynaecological Cancer." *Nursing Science Quarterly* 17 (2): 147–155. https://doi.org/10.1177/0894318404263302.

Polit, D. F., and C. T. Beck. 2018. *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*, 9th edition. Philadelphia: Lippincott Williams.

Raosoft. 2004. "Sample Size Calculator." Accessed January 4, 2022. http://www.raosoft.com/samplesize.html.

SANews. 2017. "Charlotte Maxeke Hospital Leading in Cancer Treatment." Accessed March 20, 2017. https://www.sanews.gov.za/south-africa/charlotte-maxeke-hospital-leading-cancer-treatment.

Selli, C., A. Bjartell, J. Burgos, M. Somerville, M. Palacios, L. Benjamin, L. Black, and R. Castro. 2014. "Burden of Illness in Prostate Cancer Patients with a low-to-moderate Risk of Progression: A one-year, pan-European Observational Study." *Prostate Cancer* 2014:472949. https://doi.org/10.1155/2014/472949.

Siston, A. K., S. J. Knight, and N. P. Slimack. 2003. "Quality of Life after a Diagnosis of Prostate Cancer among Men of lower socioeconomic status: Results from the Veterans' Affairs Cancer of the Prostate Outcomes Study." *Urology* 61 (1): 172–178. https://doi.org/10.1016/s0090-4295(02)02141-6.

Sung, H., J. Ferlay, R. L. Siegel, M. Laversanne, I. Soerjomataram, A. Jemal, and F. Bray. 2021. "Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality worldwide for 36 Cancers in 185 Countries." *CA: A Cancer Journal for Clinicians* 71 (3): 209–249. https://doi.org/10.3322/caac.21660.

Ueno, S., Y. Kitagawa, M. Onozawa, M. Namiki, S. Hinotsu, H. Akaza, and A. Mizokami. 2018. "Background Factors and short-term health-related Quality of Life in Patients who initially Underwent Radical Prostatectomy or Androgen Deprivation Therapy for localized Prostate Cancer in a Japanese Prospective Observational Study." *Prostate International* 6 (1): 7–11. https://doi.org/10.1016/j.prnil.2017.05.004.

Van Andel, G., and K. H. Kurth. 2003. "The Impact of Androgen Deprivation Therapy on health-related Quality of Life in Asymptomatic Men with Lymph Node Positive Prostate Cancer." *European Urology* 44 (2): 209–214. https://doi.org/10.1016/s0302-2838(03)00208-2.