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Assessment of neuropathic pain management knowledge, attitudes, and practices among urology trainees and consultants in prostate cancer care: a survey-based study

O. Sinkila^{1*} , N. Matjomane¹, T. Cronje² and K. Mathabe¹

Abstract

Background Effective neuropathic pain management is crucial in improving the quality of life for patients with prostate cancer. There is an abundance of research about cancer pain and guidelines that have been developed by World Health Organization including the analgesia step ladder, yet patients with cancer pain are still sub optimally analgesed. This is due to a variety of both patient and physician factors which include: lack of knowledge on the use of adjuvant medication, fear of addiction and poor characterization of the type of pain. This study intended to assess the knowledge, attitudes, and practices of urology trainees and consultants in the the context of neuropathic pain in prostate-cancer care.

Methods The study involved 91 urologists, comprising of junior registrars, medical officers and experienced specialists who are members of the South African Urological Association (SAUA). Data was collected through a 25-question web-based survey. The survey covered: demographic information, knowledge, attitudes, and practices related to cancer pain management.

Results The study revealed that a significant proportion of urologists assessed neuropathic pain reactively, with only 8% of respondents being familiar with screening scales. Approximately, one-third preferred referrals, and 74% expressed confidence in self-treatment. Concerns regarding opioid prescription were observed in 40.4% of respondents. Furthermore, the usage of adjuvant medications was limited, with only 35% proficiently combining analgesia and adjuvants. Notably, 65% continued to escalate analgesic monotherapy.

Conclusion Effective neuropathic pain management in prostate cancer care necessitates a multidisciplinary approach, comprehensive assessment and expertise in adjuvant medication usage. The discrepancies observed among urologists are likely due to variations in experience levels. The study identifies knowledge gaps and suboptimal practices in neuropathic pain management among urologists. Addressing these issues through education, awareness, and interdisciplinary collaboration is imperative to enhance patient outcomes and improve the quality of life for individuals with prostate cancer. This study underscores the need for improved education and interdisciplinary

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collaboration among urologists in managing neuropathic pain among prostate cancer patients. Enhancing these aspects is essential to achieve better patient outcomes and overall quality of life.

Keywords Neuropathic pain, Prostate cancer, Pain assessment, WHO analgesic ladder, DN4 questionnaire, Pain DETECT questionnaire, Pain management

1 Background

Prostate cancer is the most common non-cutaneous malignancy in men, with presentations that can range from mild disease to advanced metastasis [1, 2]. Advanced prostate cancer patients frequently grapple with the burden of pain as a complication of the disease, with 60–90% experiencing moderate to severe pain [3–5]. This, significantly, impacts their quality of life (QOL), hinders their economic productivity, and may lead to depression and hopelessness [6, 7].

It is, therefore, natural that the targeted management of pain in prostate cancer becomes a cornerstone in the daily care of patients and their families [8, 9]. Cancer-related pain can be broadly classified into nociceptive and neuropathic types of pain [10, 11]. Nociceptive pain, typically, arises from direct tumor invasion of surrounding tissues, while neuropathic pain, which accounts for approximately 21% of all cancer pain, is postulated to result from the invasion of central nervous system (CNS) or peripheral nervous system (PNS) structures by the tumor mass [10–13]. Clinically, individuals often characterize this discomfort as a burning sensation, shooting pain, a prickling sensation, an electric-like feeling, or numbness. Moreover, it tends to extend along dermatomal patterns. Neuropathic pain alone is often observed in 35–56% of patients with metastatic disease, in contrast to the 6–17% prevalence in non-metastatic cases [10, 11].

A subset of prostate cancer pain patients may present with a mixed type of pain syndrome. Recognizing this is crucial, as neuropathic pain is generally more challenging to control due to its limited responsiveness to typical opioid monotherapy [14]. This underscores the necessity for a multifaceted approach to pain management in this patient group [15].

The WHO analgesic guidelines provide a systematic stepwise ladder approach for treating cancer-related pain, which includes that of prostate cancer have been found to be very effective in treatment of pain [16]. These advocate for the consideration of adjuvant medications at any step of the treatment ladder to achieve complete control of cancer pain [17].

Despite the availability of the WHO analgesic guidelines for cancer pain management, mounting evidence highlights that cancer pain remains inadequately treated in approximately half of all cases [18–21]. Various reasons contribute to this discrepancy, which can be

categorized as healthcare provider, regulatory, patient, and family barriers to effective pain control [22, 23].

Healthcare-provider related barriers to effective pain management in cancer include lack of knowledge about the assessment and diagnosis of neuropathic pain, as well as fear and anxiety about prescribing opioids, their potential side effects, and the need for monitoring and titration [15, 24]. Healthcare providers also tend to have limited understanding of available options regarding adjuvant treatments [25–29].

The use of validated questionnaires, such as the DN4 and the pain DETECT questionnaires, can play an essential role in the rapid assessment and diagnosis of patients with neuropathic cancer pain [25, 29].

This precise evaluation of neuropathic pain can be achieved through thorough methodical and targeted questioning methods. These represent a gold standard in the diagnosis of neuropathic pain [13, 29, 30]. However, the knowledge of how to use these questionnaires lies solely with the treating team.

The general approach to pain management in cancer-related pain entails the primary use of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) and opioids for somatic pain, while adjuvants such as antidepressants and antiepileptic drugs are employed to address neuropathic pain [31–33]. For instance, combining gabapentin and an opioid as a first-line treatment strategy for neuropathic pain may be more effective than opioid monotherapy [10, 34].

Although opioids are considered safe for managing cancer pain, reluctance to use them may stem from concerns among patients, families and healthcare workers. These concerns revolve around how to aggressively employ opioid monotherapy in cases of treatment failure [10, 24, 35, 36].

This hesitation may be due to a lack of confidence among healthcare providers regarding dosage, frequency and escalation strategies when using opioids, as well as concerns about the risk of adverse effects such as respiratory depression or addiction [10, 24, 37, 38]. Effective control of neuropathic pain in cancer patients leads to statistically significant improvements in the quality of life, reduced depression, enhanced sleep quality, overall well-being and reduced anxiety as well as depression [8, 39, 40].

Managing cancer pain in developing countries poses unique challenges. These include long distance trips by

patients to obtain medication, language barriers hindering effective communication and the challenge of patient illiteracy. Combined, all these factors render pain assessment, management and optimization difficult [10].

It is, therefore, evident that in order to effectively manage cancer patients' pain and avoid the common mistake of undertreatment, healthcare professionals overseeing their care must possess a comprehensive understanding of the modern tools employed in evaluating neuropathic pain in cancer cases and their treatment [38, 40–42].

The primary aim of this study was to, comprehensively, assess urologists' understanding of neuropathic pain within the context of prostate cancer, while also scrutinizing their approach to the assessment and treatment of this condition. To attain this overarching goal, the study was structured around the following research objectives:

1. Ascertaining the extent of urologists' comprehension and awareness regarding the neuropathic component in prostate cancer pain,
2. Scrutinizing urologists' familiarity with drug classes recognized for their efficacy in the treatment of neuropathic pain,
3. Evaluating urologists' confidence levels in prescribing opioids for patients with prostate cancer, and
4. Exploring the presence of a multidisciplinary approach in the management of prostate cancer and to identify the various disciplines engaged in this process.

2 Methodology

2.1 Study design

This study employed a cross-sectional, prospective, descriptive survey design.

2.1.1 Participant selection

This study was conducted among urology professionals consisting of consultants and trainees who are registered members of the South African Urological Association (SAUA). SAUA plays a pivotal role in the networking and knowledge sharing of urologists across Southern Africa, covering South Africa, Namibia, Botswana and Zimbabwe. This association has a robust and engaging membership base, and it serves as a comprehensive hub and educational resource for urologists in the region. There are 374 active members comprising of 303 consultants and 71 trainees. For the purpose of this study, we specifically targeted consultants and trainees who are actively practicing and registered with SAUA.

2.1.2 Survey instrument

A standardized internet-based survey questionnaire was developed to comply with the requirements of this study

and it proved reliable and feasible. This questionnaire was administered to obtain data and information from each participant. The questionnaire comprehensively covered topics relating to the management of prostate cancer, with emphasis on the neuropathic pain.

2.1.3 Survey delivery

The distribution of the survey questionnaire was facilitated through a secure website accessible to all members of SAUA. Access to the questionnaire can be obtained through this link: [Survey Questionnaire] (https://pretoria.eu.qualtrics.com/jfe/preview/SV_dbwlVhsJFqezOg5?Q_CHL=preview).

2.1.4 Ethical considerations

Ethical approval for this study from the University of Pretoria ethics committee with ethical clearance [334/2021] was obtained before commencing with the investigation.

2.1.5 Questionnaire structure

The standardized questionnaire comprised of a balanced blend of two questions. The first comprised of the validated, which were adapted from knowledge and attitudes regarding cancer pain management among oncology nurses in China by Dan Li et al. (2001), and the second was the non-validated type. The questionnaire was categorized into demographic data and an in-depth information of participants' knowledge, attitudes and practices concerning cancer pain management. Also, the questionnaire used Likert scale items and open-ended questions, encouraging comprehensive responses. In total, the questionnaire had 25 concise questions.

2.1.6 Questionnaire refinement

A pilot study was conducted within the department of Urology at the University of Pretoria. The sample size for the pilot study included randomly selected 13 trainees and 4 consultants. This served as an essential phase in assessing the survey feasibility and refining the questionnaire based on feedback from the participants. In order to eliminate the possibility of duplicate responses and avoid bias, these participants were excluded from the main study.

2.2 Data collection

2.2.1 Data collection period

Data collection extended over a period of 11 months.

2.2.2 Response rate enhancement

Strategies employed to enhance response rates included automated reminders dispatched via the Qualtrics system to non-respondents within five days of the initial distribution.

Additionally, the survey link was directly disseminated to Urology Heads of Department (HoDs) for further circulation within their departments, facilitating engagement with urology trainees not registered with SAUA.

2.3 Study population

2.3.1 Inclusion criteria

The study's inclusion criteria encompassed urology consultants and trainees, actively involved in the management of prostate cancer.

2.3.2 Exclusion criteria

Excluded from the study were: retired urologists, urologists not engaged in prostate cancer management and urologists who had participated in the pilot study.

2.4 Sample size

2.4.1 Participant selection

The sample is composed of a convenience sample of 91 urology trainees and consultants actively practicing and registered with the SAUA.

2.4.2 Database size

The SAUA database comprises approximately of 370 participants, with at least 50% meeting our inclusion criteria.

2.4.3 Initial sample size aim

Initially, our target sample size was 111, with an anticipated response rate of 60%. However, the survey successfully gathered responses from 91 participants.

3 Results

Out of the 111 participants targeted for the survey, 91 responses from urologists, which indicated an 82% response rate. These respondents encompassed both experienced and inexperienced urologists involved in the treatment of cancer pain.

3.1 Knowledge

Among the participants, 92% lacked formal pain management training while a minority (8%) have received such training, indicating a significant knowledge gap in this area (Fig. 1). Self-assessed knowledge varied widely, with ratings ranging from excellent (2.20%) to poor (4.40%), highlighting diverse perceptions of competence in pain management Fig. 2. The majority (92%) did not employ questionnaires in the assessment of neuropathic pain in cancer patients, indicating limited utilization of standardized tools for evaluating pain (Fig. 3).

3.2 Attitude

A substantial majority (74%) of the respondents displayed a high level of confidence in their abilities and preferred a

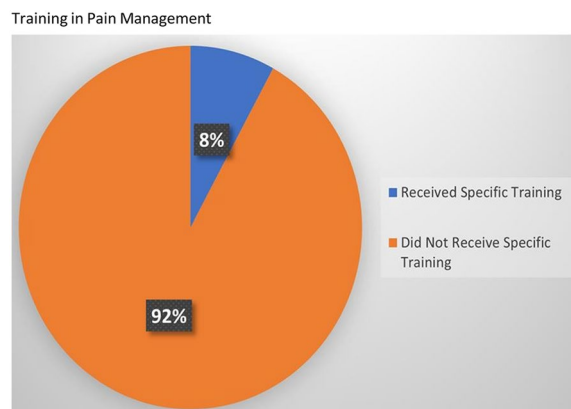


Fig. 1 Training in Pain Management: This pie chart reveals participants' training status in pain management. A significant majority (92%) have not undergone specific pain management training, while a minority (8%) have received such training. This representation highlights the prevalence of training gaps in pain management among participants

self-treatment approach for managing cancer pain. This attitude suggests a certain level of self-reliance. A smaller proportion (26%) opted for referrals, possibly reflecting a more collaborative or cautious attitude, seeking additional expertise or support in managing pain (Fig. 4). Concerns about opioid prescription practices revealed that 24.20% expressed worries about the safety of prescribing opioids, and 19.80% cited concerns about potential side effects, indicating a cautious attitude toward these medications. A smaller fraction (4.40%) expressed concerns about the risk of addiction associated with opioid prescriptions, reflecting a more reserved attitude regarding the potential for addiction (Fig. 5).

3.3 Practice

In the management of cancer pain, 65% of the participants preferred an analgesic monotherapy approach which uses analgesic medications, exclusively. The remaining 35% adopted a combined approach, incorporating adjuvants alongside analgesics, reflecting a more comprehensive and multidisciplinary practice in pain management (Fig. 6). Referral practices among participants highlighted diverse approaches. Among those who referred patients, 60% referred to oncologists, 36% referred to pain specialists, and 4% referred to psychologists or psychiatrists, reflecting different referral practices to address various aspects of pain management (Fig. 7).

4 Discussion

The primary findings of this study indicate that: firstly, only 8% of the study respondents received formal training on pain management, while on the other hand, 92%

Training and management assessment

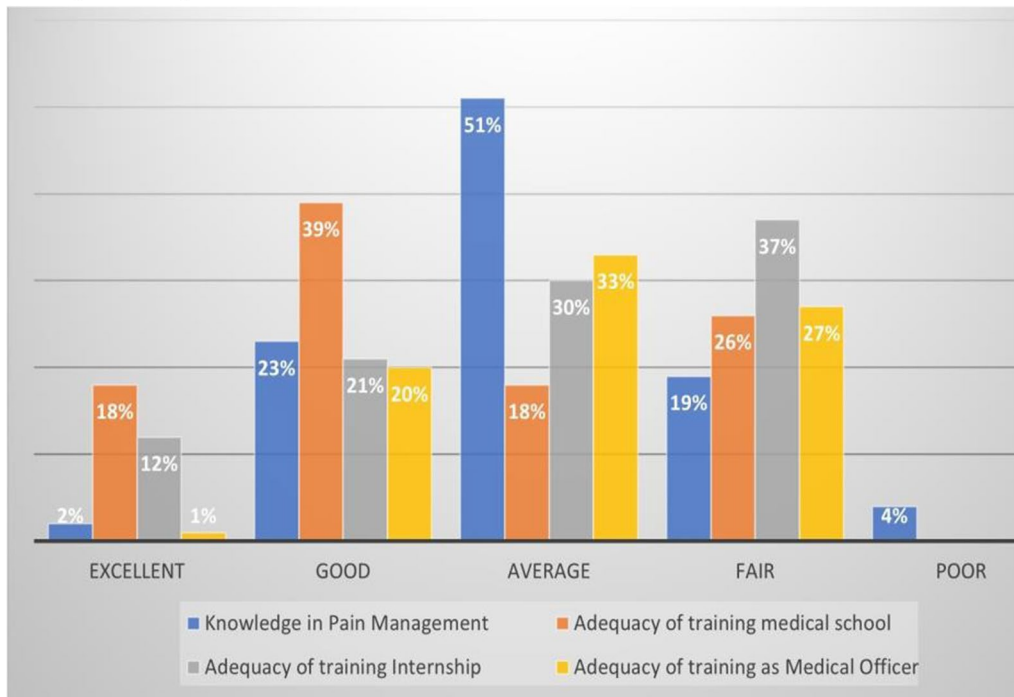


Fig. 2 This bar graph, succinctly, portrays participants’ pain management training status and self-evaluated knowledge and competency. Significantly, 92% of participants in this study were found to lack formal pain management training, with only 8% having received such training. Additionally, participants’ self-assessed knowledge spans from excellent (2.20%) to poor (4.40%), while their self-perceived competency ratings during medical school, internship, and as medical officers demonstrate varied percentages in respective categories. This graphical representation provides valuable insights into participants’ training backgrounds and self-assessed competence, offering a glimpse into their capabilities in pain management

Assessment Methods for Neuropathic Pain and treatment

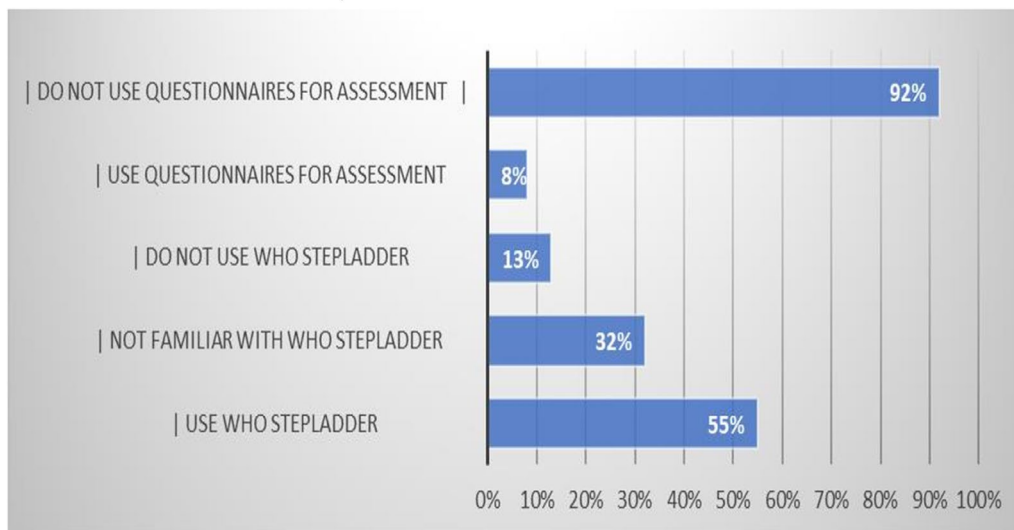


Fig. 3 This bar graph illustrates the distribution of assessment methods used by participants when evaluating neuropathic pain in cancer patients. It reveals that a significant majority, comprising 92%, do not employ questionnaires in their assessments, while 8% utilize them as part of their evaluation process. It also assesses the use of WHO guidelines in cancer patients. A significant number (45%) does not use the WHO stepladder which is an evidenced approach method

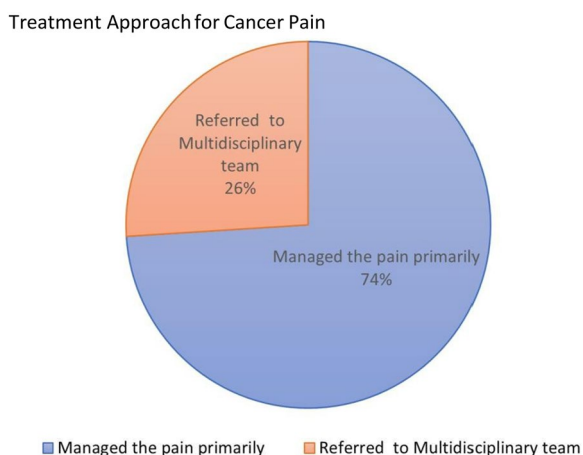


Fig. 4 This pie chart depicts the treatment approach adopted by participants in managing cancer pain. The data illustrates that 26% of participants opt for referrals, while the majority, (74%) undertake the treatment themselves

of the respondents did not receive formal training. This, potentially, indicates that the minority of urologists used the validated questionnaires in the assessment of neuropathic pain in cancer patients. Studies by Gudala et al. [26] and Attal et al. [29] confirm that the use of validated questionnaires such as the Douleur Neuropathique 4 (DN4) and pain DETECT as screening tools in determining neuropathic pain is effective. Bennet et al. [13] indicated that in the case where screening tools were

not employed to identify neuropathic pain, this often resulted in delayed diagnosis and suboptimal pain management. Effective pain management for these prostate cancer patients necessitates a comprehensive approach, involving the thorough characterization and quantification of neuropathic pain. This indicates that ascertaining the extent of urologists’ comprehension and awareness regarding neuropathic component in prostate cancer patients is crucial. This; however, was not the case in this study as the majority of urologists did not receive training regarding using the validated questionnaire as a screening tool for neuropathic pain management.

Secondly, in managing cancer pain, the majority (65%) of the study participants preferred an analgesic monotherapy approach, and the remaining 35% used a combined approach involving analgesic and adjuvants. The exclusive use of analgesic monotherapy by many participants underscores a knowledge gap that serves as a barrier to optimized pain control against prostate cancer neuropathic pain [14]. Further to this, the WHO step-ladder analgesic guidelines provide an evidence-based approach to cancer pain management and it is in support of the combined approach [16–18, 43]. In this study, only 55% of participants treating prostate cancer patients utilized the WHO analgesic ladder, while 45% (32 and 13%) were either not familiar with it or did not use it at all. When appropriately employed, it has been established that the WHO analgesic ladder can effectively control pain in 70–90% of patients [16]. Adherence to these

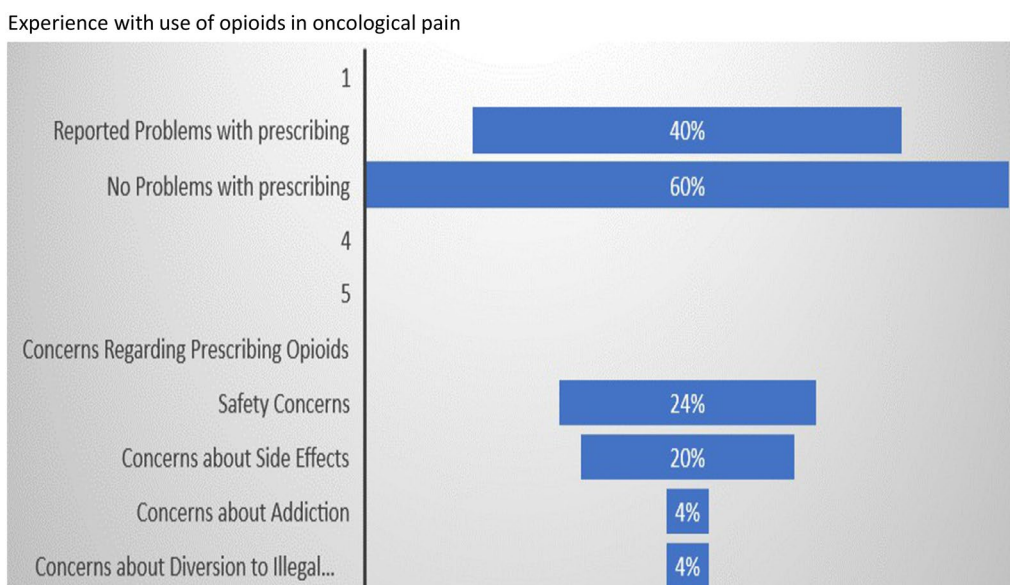


Fig. 5 Participants’ concerns about prescribing opioids varied. The majority (24.20%) voiced concerns about safety, followed by 19.80% citing worries about side effects. Additionally, 4.4% of participants expressed concerns about addiction, and a similar percentage (4.4%) apprehended the diversion of drugs to the illegal market. These findings underscore the multifaceted considerations surrounding opioid prescription within the study cohort

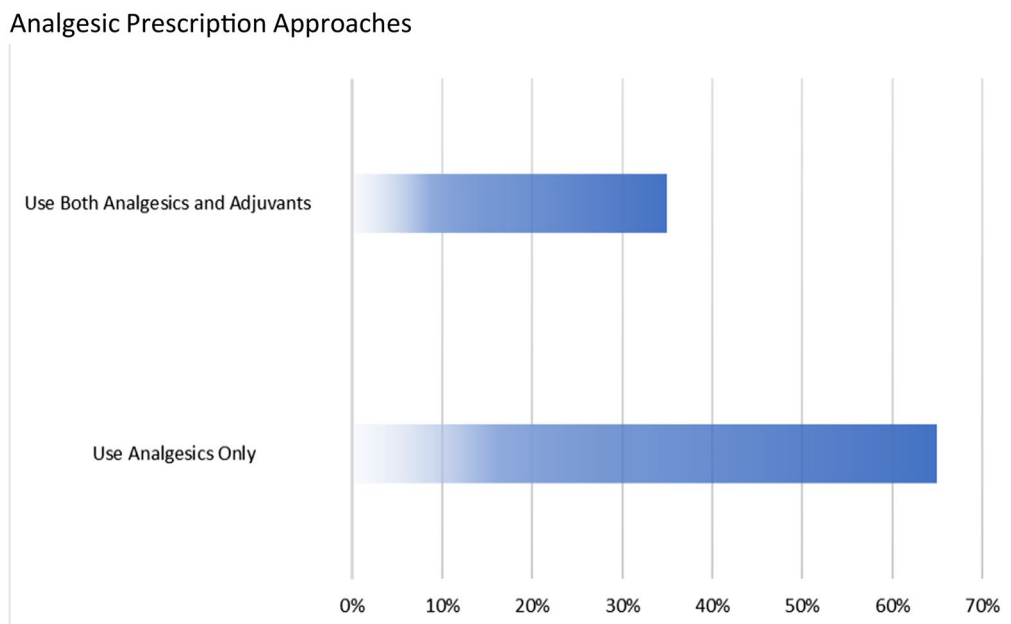


Fig. 6 This bar graph represents participants' approaches to prescribing analgesics in the management of cancer pain. A majority, accounting for 65%, opt for the use of analgesics exclusively, while 35% employ a combined approach involving both analgesics and adjuvants

Referral Practices for Cancer Pain Management

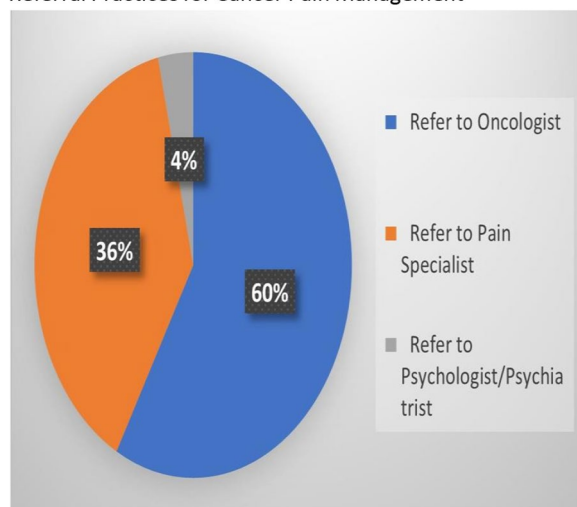


Fig. 7 This pie chart presents the distribution of referral practices among participants who opt to refer patients for cancer pain management. The data reveals that among these participants, 60% refer patients to oncologists, 36% to pain specialists, and 4.40% to psychologists or psychiatrists

guidelines, which includes, prescribing the appropriate analgesics or adjuvants at correct doses, schedules, and monitoring adverse effects is crucial for optimal pain control [16–18, 43]. Thus the majority (65%) of urologists in this study used a monotherapy approach. This is

despite the fact that they have familiarity (55%) with the WHO analgesic stepladder guideline of drug classes that are recognized for their efficacy in the treatment of neuropathic pain. In addition, the study participants demonstrated limited knowledge about using adjuvants when treating neuropathic pain. This was evident in the fact that 65% of them opted for a monotherapy approach.

In evaluating urologists' confidence levels in prescribing opioids for patients with prostate cancer, 24.2% of study participants expresses worries about their safety while 19.8% cited concerns about potential side effects, and indicated a cautious attitude toward these medications. Only 4.4% expressed concerns about the risk of addiction. The traditional ladder approach, which typically starts with non-opioids administration, may not be effective for neuropathic pain [5] and controlling this neuropathic pain in cancer patients can enhance their quality of life [39]. Furthermore, 40% expressed discomfort with prescribing opioids as shown by Fig. 5, which is worrisome because among these study participants, concerns about adverse effects of medication, addiction and illegal diversion were cited as reasons for apprehension over opioid prescriptions. However, limited evidence supports the prevalence of opioid addiction among cancer patients receiving adequate analgesic treatment, which then runs against the fact that the fear of opioid use has led to under treatment of pain [15, 44] (Fig. 8).

Effective pain management often necessitates a multidisciplinary approach which involves specialists such

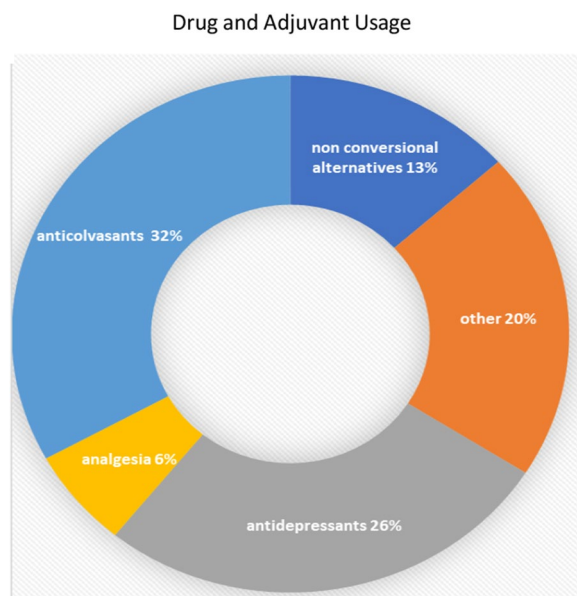


Fig. 8 This pie chart outlines the utilization of various drugs and adjuvants in cancer pain management. Key categories include anticonvulsants (32.30%), antidepressants (25.80%), analgesia (6.50%), non-conventional alternatives (12.90%), and other adjuvants (19.60%)

as: oncologists, pain specialists, psychologists and psychiatrists [40, 45]. In our study, 74% of respondents were confident in managing the pain component on their own, while 26% opted to refer patients to a multi-disciplinary team for optimized pain care, underscoring the need for improved collaboration in managing cancer pain. An early referral pattern to the multi-disciplinary team might represent a better approach in cases of uncertainty in cancer management paradigms. Despite more than 50% of participants rating their knowledge as average, the actual responses concerning attitudes and practices unveiled that only around 30% of them were effectively managing neuropathic pain linked to prostate cancer. This discrepancy may stem from a subset of respondents who had privileged access to streamlined multi-disciplinary teams such as senior urologists and those in private practice. The limited number of respondents who received formal pain education within the context of cancer is indicative to the pressing need for a more structured approach to teaching and learning in this field. This is crucial not only for enhancing the knowledge of trainees but also for improving the quality of life for their patients who grapple with neuropathic pain on a daily basis.

4.1 Study limitations

Response rate: While our intended sample size was 111, we obtained responses from 91 individuals, yielding an

82% response rate. The 91 respondents provided valuable insights into the issues surrounding the management of cancer pain in prostate cancer.

The initial plan was to conduct a physical survey at the SAUA congress. However, due to global COVID-19 pandemic, we successfully transitioned to an electronic survey format, thereby broadening our reach beyond geographical boundaries.

Different levels of experience between respondents: This survey collected responses from a diverse group of urologists, including both trainee urologists and experienced practitioners.

This diversity provides valuable insights, but it is important to acknowledge that differences in experience and exposure could influence attitudes, knowledge and practices related to pain management.

5 Conclusion

In conclusion, the findings from this study suggest that urologists are not providing optimal treatment for neuropathic pain, particularly, in the context of prostate cancer.

Factors contributing to suboptimal care include a lack of knowledge about cancer pain, underutilization of pain assessment tools and inadequate familiarity with adjuvant medications.

This situation leaves patients with limited treatment options, and negatively impacts their quality of life. Further research into the management of neuropathic pain in prostate cancer is warranted to bridge the existing knowledge and practice gaps and improve patient outcomes.

Abbreviations

SAUA	South African Urological Association
CNS	Central nervous system
PNS	Peripheral nervous system
WHO	World Health Organization
NSAIDs	Nonsteroidal anti-inflammatory drugs
QOL	Quality of life
COVID-19	Coronavirus disease 2019

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Author contributions

OS Contributed to the conceptualization, data collection, data analysis, writing of the original draft, writing—review and editing, methodology, and the conceptual framework of the study. Also involved in formal analysis, validation, experiment design, and participant recruitment. TM Contributed to the conceptualization and methodology of the study. Also provided project administration, writing—review and editing, data analysis, and formal analysis. KM Contributed to the conceptualization and methodology of the study. Also provided project administration, writing—review and editing, data analysis, and formal analysis. TC Contributed to the development of data visualization,

data analysis, methodology, and also played a role in formal analysis and validation.

Funding

There was no funding used in the study.

Availability of data and materials

The raw data for this study is available in an offline registry, and access is password-protected. Researchers and interested parties may request access to the raw data by making a reasonable request to the first author for inspection. The password-protected access ensures that data are available while also maintaining security and privacy standards.

Declarations

Ethics approval and consent to participate

Ethics approval was granted by the human ethics committee of the University of Pretoria. The committee reference number for this approval is [334/2021]. This approval confirms that the study, which involved human participants, specifically urologists who answered a survey, adhered to ethical guidelines and standards.

Consent for publication

Consent for publication is not applicable in this study as the manuscript does not contain any individual person's data in any form, including individual details, images, or videos.

Informed consent

Informed consent was obtained from all participating urologists to ensure compliance with ethical practices.

Competing interests

The authors declare that they have no competing interests.

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References

- Mason RJ et al (2022) UPDATE—2022 Canadian Urological Association recommendations on prostate cancer screening and early diagnosis: endorsement of the 2021 Cancer Care Ontario guidelines on prostate multiparametric magnetic resonance imaging. *Can Urol Assoc J* 16(4):184–196
- Canadian Cancer Society's Advisory Committee on Cancer Statistics (2015) Canadian cancer statistics 2015-special topic: predictions of the future burden of cancer in Canada. Canadian Cancer Society, Toronto
- Jost L, ESMO Guidelines Working Group (2007) Management of cancer pain: ESMO clinical recommendations. *Ann Oncol* 18:92–94
- Keefe FJ, Abernethy AP, Campbell LC (2005) Psychological approaches to understanding and treating disease-related pain. *Ann Rev Psychol* 56:601–630
- Christo PJ, Mazloomdoost D (2008) Cancer pain and analgesia. *Ann NY Acad Sci* 1138(1):278–298
- Money S, Garber B (2018) Management of cancer pain. *Curr Emerg Hosp Med Rep* 6(4):141–146
- Alleaume C et al (2018) Chronic neuropathic pain negatively associated with employment retention of cancer survivors: evidence from a national French survey. *J Cancer Surviv Res Pract* 12(1):115–126
- Meyer-Rosberg K et al (2001) Peripheral neuropathic pain—a multidimensional burden for patients. *Eur J Pain* 5(4):379–389
- Bouhassira D et al (2008) Prevalence of chronic pain with neuropathic characteristics in the general population. *Pain* 136(3):380–387
- Davis MP, Walsh D (2004) Epidemiology of cancer pain and factors influencing poor pain control. *Am J Hosp Palliat Care* 21(2):137–142
- Wordliczek J, Zajackowska R (2013) Mechanisms in cancer pain. Springer-Verlag London Ltd., London
- Bennett MI et al (2012) Prevalence and aetiology of neuropathic pain in cancer patients: a systematic review. *Pain* 153(2):359–365
- Bennett MI et al (2007) Using screening tools to identify neuropathic pain. *Pain* 127(3):199–203
- Keskinbora KMD, Pekel AFMD, Aydinli IMD (2007) Gabapentin and an opioid combination versus opioid alone for the management of neuropathic cancer pain: a randomized open trial. *J Pain Symptom Manag* 34(2):183–189
- National Institute for Clinical Excellence (2004) Improving supportive and palliative care for adults with cancer: executive summary. National Institute for Clinical Excellence, London
- Jadad AR, Browman GP (1995) The WHO analgesic ladder for cancer pain management. Stepping up the quality of its evaluation. *JAMA* 274(23):1870–1873
- Zech DFJ et al (1995) Validation of World Health Organization Guidelines for cancer pain relief: a 10-year prospective study. *Pain* 63(1):65–76
- Mercadante S (1999) Pain treatment and outcomes for patients with advanced cancer who receive follow-up care at home. *Cancer* 85(8):1849–1858
- Pérez C et al (2015) Prevalence of pain and relative diagnostic performance of screening tools for neuropathic pain in cancer patients: a cross-sectional study. *Eur J Pain* 19(6):752–761
- George, B., et al. *Opioids in cancer-related pain: current situation and outlook*. Supportive care in cancer, 2019.
- Azevedo São Leão Ferreira K, Kimura M, Jacobsen Teixeira M (2006) The WHO analgesic ladder for cancer pain control, twenty years of use. How much pain relief does one get from using it? *Support Care Cancer* 14:1086–1093
- Vranken MJM et al (2017) Barriers to access to opioid medicines for patients with opioid dependence: a review of legislation and regulations in eleven central and eastern European countries. *Addiction* 112(6):1069–1076
- Minello C et al (2019) Assessing cancer pain—the first step toward improving patients' quality of life. *Support Care Cancer* 27(8):3095–3104
- Højsted J, Sjøgren P (2007) Addiction to opioids in chronic pain patients: a literature review. *Eur J Pain* 11(5):490–518
- Aho T et al (2020) Douleur Neuropathique 4 (DN4) stratifies possible and definite neuropathic pain after surgical peripheral nerve lesion. *Eur J Pain* 24(2):413–422
- Gudala K, Ghai B, Bansal D (2017) Neuropathic pain assessment with the PainDETECT questionnaire: cross-cultural adaptation and psychometric evaluation to Hindi. *Pain Pract* 17(8):1042–1049
- Mathieson S et al (2015) Neuropathic pain screening questionnaires have limited measurement properties. A systematic review. *J Clin Epidemiol* 68(8):957–966
- VanDenKerkhof EG et al (2018) Sensitivity of the DN4 in screening for neuropathic pain syndromes. *Clin J Pain* 34(1):30–36
- Attal N, Bouhassira D, Baron R (2018) Diagnosis and assessment of neuropathic pain through questionnaires. *Lancet Neurol* 17(5):456–466
- Bouhassira D et al (2005) Comparison of pain syndromes associated with nervous or somatic lesions and development of a new neuropathic pain diagnostic questionnaire (DN4). *Pain* 114(12):29–36
- Caraceni A et al (2004) Gabapentin for neuropathic cancer pain: a randomized controlled trial from the Gabapentin Cancer Pain Study Group. *J Clin Oncol* 22(14):2909–2917
- Rayment C et al (2013) Neuropathic cancer pain: prevalence, severity, analgesics and impact from the European Palliative Care Research Collaborative-Computerised Symptom Assessment study. *Palliat Med* 27(8):714–721
- Bennett MI (2011) Effectiveness of antiepileptic or antidepressant drugs when added to opioids for cancer pain: systematic review. *Palliat Med* 25(5):553–559
- Mishra S et al (2012) A comparative efficacy of amitriptyline, gabapentin, and pregabalin in neuropathic cancer pain: a prospective randomized

- double-blind placebo-controlled study. *Am J Hosp Palliat Care* 29(3):177–182
35. Gunnarsdottir S et al (2002) Patient-related barriers to pain management: the Barriers Questionnaire II (BQ-II). *Pain* 99(3):385–396
 36. Chou R, Clark E, Helfand M (2003) Comparative efficacy and safety of long-acting oral opioids for chronic non-cancer pain: a systematic review. *J Pain Symptom Manage* 26(5):1026–1048
 37. Ward SE et al (1993) Patient-related barriers to management of cancer pain. *Pain* 52(3):319–324
 38. Gunnarsdottir S et al (2017) A multicenter study of attitudinal barriers to cancer pain management. *Support Care Cancer* 25(11):3595–3602
 39. Yennurajalingam S et al (2012) The impact of an outpatient palliative care consultation on symptom burden in advanced prostate cancer patients. *J Palliat Med* 15(1):20–24
 40. Carlson CL (2016) Effectiveness of the World Health Organization Cancer Pain Relief Guidelines: an integrative review. *J Pain Res* 2016:515–534
 41. Breivik H et al (2009) Cancer-related pain: a pan-European survey of prevalence, treatment, and patient attitudes. *Ann Oncol* 20(8):1420–1433
 42. Grond S et al (1999) Assessment and treatment of neuropathic cancer pain following WHO guidelines. *Pain* 79(1):15–20
 43. Virgen CG et al (2022) Pharmacological management of cancer pain: novel therapeutics. *Biomed Pharmacother* 156:113871
 44. Brozović G et al (2022) Cancer pain and therapy. *Acta Clin Croat* 61(Suppl 2):103–108
 45. Hussain Z (2022) The holistic approach to cancer pain management. *Ulster Med J* 91(1):45–49