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Provision of prostate cancer services in Tanzania: perspectives from five tertiary hospitals

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Abstract

Background Access to quality prostate cancer services remains a global challenge, particularly in Low- and Middle-Income countries. This is often due to weak health systems that struggle to meet the population's needs. The provision of quality health services to patients with prostate cancer requires a comprehensive approach involving multiple stakeholders and structural inputs. However, few studies have comprehensively assessed the relationship between these structural inputs and prostate cancer treatment outcomes. This study, therefore, aimed to determine the availability of selected structural inputs and descriptions of how they influence the provision of quality services to patients with prostate cancer in Tanzania.

Methods We conducted a cross-sectional study using an explanatory sequential mixed-method approach to collect data from five tertiary hospitals providing cancer services in Tanzania. A validated checklist was used to collect information on available structural inputs for prostate services at tertiary hospitals. A semi-structured interview guide was used to conduct 42 in-depth interviews with 20 healthcare providers, five hospital managers, and 17 patients undergoing treatment for prostate cancer. Descriptive analysis was performed for the quantitative data, and thematic analysis was conducted with the aid of NVivo 14 qualitative software for the interview transcripts.

Results All five assessed tertiary hospitals had inadequate human resources for health to provide prostate cancer services. Only one had 70% of the required HRH, while none had above 40% of the required HRH. Within the hospitals, the skill mix imbalance was severe across cadres. Five themes emerged: inadequate infrastructure, delays in diagnosis, delays in treatment, shortage of human resources for health (HRH), and inefficient organization of prostate cancer services.

Conclusion The findings of this study, underscore the major health system deficiencies for the provision of prostate cancer services in tertiary hospitals. With the increased aging population, strong health systems are vital in addressing conditions of old aging, including prostate cancers. Studies on optimization of the available HRH and infrastructure are needed to improve the provision of prostate cancer in tertiary hospitals as an interim solution while long-term measures are needed for improving the HRH availability and conducive infrastructure.

Keywords Structural inputs, Quality of service, Prostate cancer

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Introduction

Globally, Prostate Cancer (PC) remains among the major contributors to morbidity and mortality among men [1, 2]. It is the second most common cancer among cancers affecting men after lung cancer [1, 2]. In the last decade, the burden of PC has risen sharply globally, with the biggest brunt felt in Low- and middle-income countries, LMICs [1, 3]. While the provision of PC services is relatively better in Higher-income Countries (HIC), the provision of PC services in LMICs is a major challenge [3, 4]. Weak health systems coupled with a shortage of human resources for health, underequipped health facilities, and chronic underfunding of the health systems are among the major factors contributing to the hiccups in providing PC services in LMICs [3].

In Tanzania, prostate cancer is the most common cancer among men, followed by Esophageal cancer, and the majority of patients present with advanced prostate cancer due to various reasons [1, 3, 5, 6]. With a shortage of 66% HRH with the worse situation for the surgical workforce, underequipped health facilities, weak referral systems, and chronic underfunding of prostate cancer services are among the significant attributes of the challenged provision of PC services in Tanzania [6, 7]. Supportive infrastructure, including equipment; insufficient numbers of skilled personnel to support diagnosis, safe anesthesia, and dedicated surgical and perioperative nursing, remains among other challenges for the provision of quality service to patients with prostate cancer [3, 8].

Human Resources for Health (HRH), equipment, and facilities are essential structural inputs for the provision of quality service for a better treatment outcome [9, 10]. Increased workload due to a staff shortage may lead to delayed diagnosis, death before diagnosis, and patient dissatisfaction [10, 11]. Healthcare providers with suitable qualifications certified by professional bodies have been documented to offer quality services that prevent

premature death, disease, discomfort, disability, and dissatisfaction [12]. A package of structural input for early detection of prostate cancer and individualized treatment are essential components for patient-reported outcomes (PROs [3, 10, 12]. Documentation on available inputs for better outcomes of patients with prostate cancer in Tanzania cannot be underestimated. We, therefore, aimed to determine the availability of selected structural inputs and descriptions on how they influence the provision of quality services to patients with prostate cancer in Tanzania.

Methods

Study design

We used a mixed method sequential design to answer the study objectives as demonstrated in Fig. 1. We started with a quantitative cross-sectional design using a standard checklist to collect data on available structural inputs for provision of prostate cancer services and then conducted in-depth interviews with health care providers including managers and prostate cancer patients [13]. The sequential mixed method design was deemed relevant for this study as the situation on providing PC services in Tanzania remains less known. While the cross-sectional design provided the situation on the availability of services and their structural elements, the qualitative interviews provided a contextual understanding of the situation [13].

Study settings

The study was conducted in five tertiary hospitals with the capacity to manage and care for prostate cancer in Tanzania. These are Ocean Road Cancer Institute (ORCI) and Muhimbili National Hospital (MNH) in the Eastern zone, Mbeya Zonal Referral Hospital (MZRH) in the Southern Highlands, Kilimanjaro Christian Medical Center (KCMC) in the Northeastern zone, and Bugando Medical Center (BMC) in the Lake zone. Three tertiary

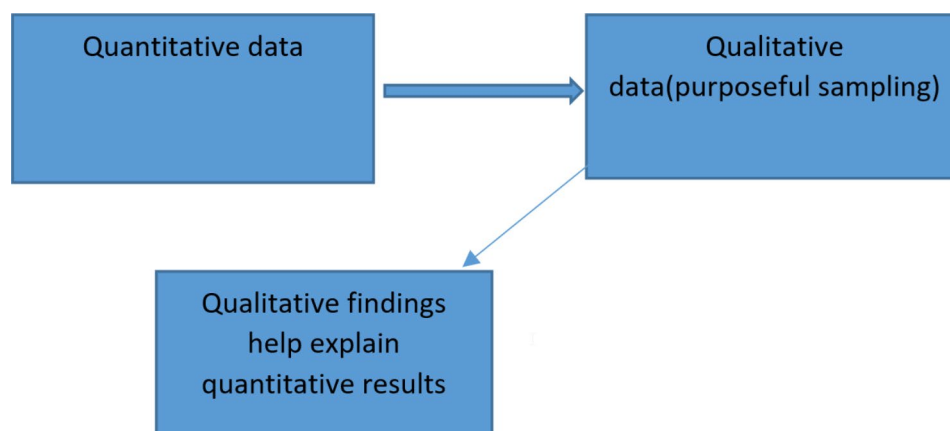


Fig. 1 Explanatory sequential study design [13]

hospitals (MNH, ORCI, and MZRH) are public hospitals, while KCMC and BMC are owned by faith-based organizations. These hospitals receive referral patients from lower-level facilities who have different payment mechanisms including health insurance, out-of-pocket payment, or patients' exemption by policy.

Population

Our study population included health care providers (urologists, oncologists and nurses) who are working at urology or oncology clinics but also health managers including directors of respective hospitals. Patients with prostate cancer who have been on treatment for not less than six months were included to give their experiences related to their treatment pathway.

Data collection tools and procedures

Quantitative data collection

We collected data from five tertiary hospitals providing cancer services in Tanzania regarding the status of staff, equipment, guidelines, and health information management system. We collected data for from July to December 2023 using an adapted validated structured checklist in Research Electronic Data Capture (RedCap) during observation and clarification from the head of the respective unit at the hospital. Before its use, the checklist was pretested and received inputs from healthcare providers for internal consistency and validity.

Qualitative data collection

A total of 42 in-depth interviews (IDIs) were conducted to purposively selected 25 healthcare providers (Urologists, oncologists, nurses, and managers) who are providing care to patients with prostate cancer as experts and 17 Patients with prostate cancer who have been on treatment for more than six months. The saturation point of information about individual experiences and perspectives on the structural inputs for prostate cancer services was reached when interviewing 23rd to 25th HCP and 15th to 17th Patient. We used a semi-structured interview guide to interview healthcare providers, facility managers, and patients undergoing treatment for PC. The tools were pre-tested after translation to Swahili and retranslation to English. A digital audio recorder captured the conversation during the interviews with moderation and field notes were taken simultaneously by one member of the data collection team. The interviews were conducted in English or Swahili in a dedicated room at urology or oncology clinic, depending on the preference of the participant/interviewee. In-depth interviews (IDIs) lasted approximately 15–30 min after informed consent.

Data management and quality control

Quantitative data were cleaned and checked for completeness by the first author before analysis. The interviews were conducted in a dedicated room at urology or oncology clinics to ensure privacy and confidentiality of the information generated. Furthermore, tertiary hospitals were coded with letters for anonymity and participants were assigned numbers. The digital audio recorder and other documents were stored in the locked cabinet by the first author.

Data analysis

Descriptive analysis was conducted for the quantitative data to summarize statistics using tables. Categorical variables were summarized using frequencies and percentages. Numeric variables were summarized using mean, standard deviation, maximum and minimum of staff. For qualitative analyses, we adopted the six stages of thematic analysis employing both deductive and inductive approaches pragmatically to accommodate positivist (concentrating on independent given facts on structural input) and constructivist (creation of meaning thematically regarding required and available structural inputs for prostate cancer services [14]. We involved verbatim transcription of the In-Depth Interviews (IDIs) of which before coding, the transcripts of interviews were translated from Swahili to English. This interpretive and representational process involved questioning the infrastructure, consumables, diagnostic and treatment equipment, staff numbers, and Health Information Management Systems (HIMS) to assess whether they are conducive to providing quality service to patients with prostate cancer. After transcription of the audio, line-by-line coding of the interviews- was done to assist the ownership of the data including making of sense patterns, connections, and the bigger picture from the data. The codes were grouped into broader subthemes and themes which reflected issues identified by the study participants as vital to them. We used different methods (Observation and interviews) for triangulation to ensure the trustworthiness of our findings [15]. Furthermore, interviews were sometimes prolonged though with precaution of personal bias to build trust and rapport with participants for researchers to gain details to increase the credibility [15]. The purposeful sampling of our participants, hospitals with specific criteria and content description gives the potential of transferability of our findings [15]. Our sequential mixed approach with interaction with our participants including health care providers increases dependability, and confirmability of our findings [15, 16].

Ethical consideration

We obtained ethical clearance from the Research and Ethics Committee of the Muhimbili University of Health and

Table 1 Number of prostate cancer patients who attended 2022 tertiary hospitals and ratio of urologists available in Tanzania

Hospitals	N (%)	Urologist patient ratio
A	431(28.7%)	0:431
B	378(25.1%)	1:32
C	323(21.5%)	1:81
D	265(17.6%)	1:66
E	106(7.1%)	1:21
Total	1503(100%)	

Allied Sciences number MUHAS-REC-05-2023-1671. Permission to conduct the study was granted by the respective hospital authority before the commencement of data collection on the available structural inputs for prostate cancer services. Written informed consent was obtained from each participant before the interview. Participants' information was kept confidential even during analysis and presentation of findings, efforts were made to ensure the anonymity of the source of information.

Results

A total of 1503 patients with prostate cancer were attended at different frequencies in five tertiary hospitals in Tanzania from January to December 2022. The mean age of patients in 2022 was 71.88 years with a standard deviation of 10.64. The majority 1281(82.5%) of our patients were in clinical stage cT3-cT4 of prostate cancer. Most 1004(66.8%) of our patients had high-risk/poorly differentiated prostate cancer with a Gleason score of >8. Table 1 below gives a summary distribution of the number of patients who were attended for Prostate cancer in 2022 per hospital. The analysis of qualitative data generated five themes, namely; shortage of human resources for health (HRH), inadequate infrastructure, delays in diagnosis, delays in treatment, and inefficient organization of prostate cancer services. It was explained that the hospitals were receiving – a large number of patients with prostate cancer contrary to existing infrastructure and the number of staff. Radiotherapy services were scarcely available impairing patient-centered services.

Available qualified Human resources to manage prostate cancer in tertiary hospitals

Table 2 presents a summary of staff of different cadres, some hospitals did not have any urologists and

psychiatrists. Most cadres, except nurses and oncologists, the median number available in the visited hospitals was less than 5. Hospital A had a unique number of nurses because it is a special hospital for cancer services therefore all nurses at the hospital were involved in cancer care. It was reported that staff for prostate cancer services were not adequate due to the large number of patients. As a result, study participants reported a concern that some services were not offered to patients due lack of staff with the required skills. It was also reported that there were efforts to improve staffing to deliver quality prostate cancer services. Patients reported delays in receiving services due to a shortage of staff. Staff were working for long hours which could reduce their efficiency.

In Fig. 2, the number of needed specialists for attending patients with prostate cancer was skewed when compared to the number of available specialists per cadre except in hospital B of which the number of needed (299) specialists was not distributed per cadre. Hospital B has a list of available specialists per cadre as follows urologists [12], Pathologist [7], Oncologists [7], Radiologists [11], and Psychiatrists/psychologists [12]. No radiotherapist was available at hospital B, D, and E while hospital A was missing urologists and psychologists despite of their need.

Shortage of urologists impairs provision of prostate cancer services “The number of urologists is still very low at hospital C, we are only three, it is worse especially if you want to do major surgery such as radical prostatectomy, it is even difficult to manage routine duties including outreach services due to the shortage of urologists” (HCP at hospital C-01).

Some tertiary hospitals had critical shortage of oncologists “We facing a critical shortage of oncologists, we are only three, We need more specialists” (HCP at hospital D-03).

Specialists with administrative responsibilities work for long hours “Although the number of urologists has increased significantly from one in the past to almost six and some more are in training, we have only one oncologist at hospital E who attends patients from the whole zone, she is overworked but also she has

Table 2 Staff availability and numbers

Profession	Minimum	1st Quartile	Median	Mean (±SD)	3rd Quartile	Maximum
Number of Urologists	0	4	4	5 ± 4.4	5	12
Number of Pathologists	2	2	3	3.4 ± 2.1	3	7
Number of Oncologists	1	2	7	7.8 ± 7.98	8	21
Number of Radiologists	2	4	4	5.4 ± 3.4	6	11
Number of Psychiatrists	0	4	4	4.2 ± 3.2	4	9
Number of Nurses	17	18	19	34.2 ± 35.1	20	97

Available specialists per cadre who are needed in the care of patients with prostate cancer and deficit by 2023

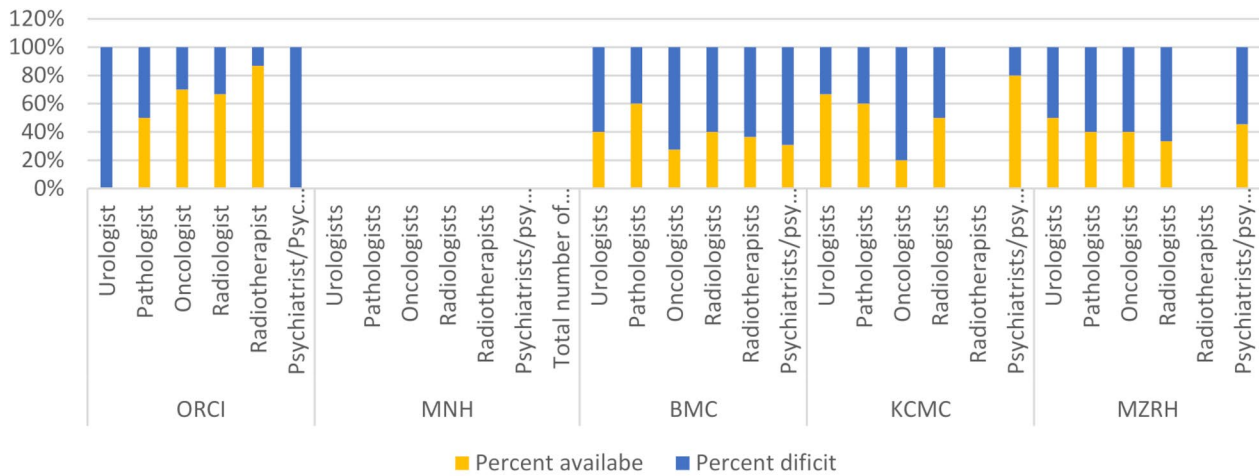


Fig. 2 Available specialists per cadre who are involved in the care of patients with prostate cancer and deficit by December 2023

Table 3 Available equipment and consumables for prostate cancer treatment services at the visited facilities

Item	Frequency (%)	
	Available	Not Available
Available equipment for diagnosis and treatment including consumables for the provision of quality services to patients with Prostate Cancer	5 (100)	0 (0)
PSA machine	5 (100)	0 (0)
Transrectal ultrasound (TRUS)	1 (20)	4 (80)
Trucut needle	4 (80)	1 (20)
Ultrasound machine (KUB)	5 (100)	0 (0)
CT scan machine	5 (100)	0 (0)
Magnetic Resonance Imaging machine (MRI)	5 (100)	0 (0)
Pathologists set	5 (100)	0 (0)
Consent forms	5 (100)	0 (0)
Larger tray/basic tray for Radical prostatectomy	4 (80)	1 (20)
Operating theatre	4 (80)	1 (20)
Robotic surgery services	0 (0)	5 (100)
Radiotherapy services	2 (40)	3 (60)
Chemotherapy	5 (100)	0 (0)
Surgical sutures	5 (100)	0 (0)
Antibiotics	5 (100)	0 (0)
Analgesics	5 (100)	0 (0)
Complete blood count machine	5 (100)	0 (0)
Chemistry machine	5 (100)	0 (0)

administrative responsibility” (HCP at hospital E-04).

Inadequate infrastructure for timely management of prostate cancer in Tanzania

In Table 3 equipment items and consumables for diagnosis and treatment of prostate cancer at tertiary hospitals such as Prostate Specific Antigen (PSA) machines, Ultrasound machines (KUB), CT scan machines, Magnetic Resonance Imaging machines (MRI), Pathologists sets, consent forms, Chemotherapy, Surgical sutures, Antibiotics, Analgesics, Complete blood count machine, and Chemistry machine were available at tertiary hospitals. Hospital A and C were offering Radiotherapy services. Only hospital D had a Trans rectal ultrasound (TRUS). Robotic surgery services were not available at all tertiary hospitals. The study findings revealed that patients visit tertiary hospitals for health checkups, especially during different health campaigns but they end up missing proper testing or get delays to be tested due to a shortage of screening kits. Patients explained that the delay in receiving services was sometimes due to a shortage of staff and limited number of machines. Furthermore, participants reported that surgical services to patients with local prostate cancer were centralized in a few hospitals which caused delays in starting treatment. For instance, at hospital B it could take six weeks to get biopsy results due to the long process and a large number of samples. Furthermore, the diagnosis of a patient with prostate cancer at hospital C was reported to be delayed because the laboratory was receiving many samples from nine regions

of the lake zone. Study participants said that the demand for surgical services in hospital A was high but there was no urologist to handle patients with prostate cancer. Radiotherapy services for cancer treatment including prostate cancer were not available at hospital D despite it being an old and big hospital. Patients with prostate cancer and other malignant conditions were referred to hospital A for radiotherapy. At hospital E treatment for prostate cancer and other malignant conditions was not comprehensive because radiotherapy was not available warranting clinicians to refer patients to hospital A for radiotherapy. Participants reported getting services partially at tertiary hospitals with a lot of cost implications.

Limited scope of prostate cancer services “We are receiving patients with prostate cancer from all over the country especially for radiotherapy because facility A is the only national referral hospital for cancer services so you can imagine the burden shouldered to this hospital although we don’t offer surgical services for prostate cancer, we do normally refer our pc patients to hospital B for surgical intervention but we in final stages of building theatre here that is why we have staff who are on training (surgeons and urologist)”(HCP at hospital A – 01).

Need of radiotherapy services for prostate cancer “Hospital D is a big and old hospital but we don’t have radiotherapy services we refer our Patients with prostate cancer and other cancer to hospital A for radiotherapy”(HCP at hospital D- 05).

Lack of comprehensive prostate cancer services at tertiary hospitals “ To treat cancer you need radiotherapy, but up to now we don’t have this service at our hospital we are not yet compressive for the treatment of prostate cancer and other cancers so you can see the challenge is still there as per now we refer cancer patients to hospital A” (HCP at hospital E– 01).

Need of patient centered prostate cancer services“I was told by doctor that I had prostate cancer three years ago, then I started the treatment here at hospital D and I was operated on after one year I was referred to hospital A for radiotherapy treatment, I was confused and I could not believe that this big hospital is lacking this important service for cancer” (Patient at hospital D– 01).

Limited capacity of laboratory for timely diagnosis of prostate cancer “We receive many biopsy samples from hospitals, it takes time to process them because of limited equipment at our laboratory” (HCP at hospital B – 02).

Shortage of machines for radiotherapy “I have been waiting to start radiotherapy for three months because they said one machine is not working and we are many” (patient at hospital A – 03).

Large number of biopsy specimen causes delays “Hospital C is receiving patients with prostate cancer from all regions of Lake Zone as you know this is an endemic zone for cancer not only prostate cancer so sometimes we are overwhelmed to the extent that processing samples and diagnosis takes time” (HCP at hospital C – 01).

Inefficient organization of prostate cancer services

Tertiary hospitals had functional health information systems as seen in Table 4. Guidelines/protocols and referral protocols were available. Only hospital A had a copy of the national cancer strategy and WHO cancer treatment guideline. Participants reported that prostate cancer services were available even though not comprehensive at tertiary hospitals but not at regional hospitals or district hospitals. It was further reported that patients were not diagnosed at an early stage of prostate cancer at a low facility level due to a lack of integration of prostate cancer services at primary facilities. The study participants did not appreciate the organization of the health system for the provision of prostate cancer. Participants reported that prostate cancer services were fragmented because tertiary hospitals did not provide comprehensive care for prostate cancer. Lack of comprehensive care was reported to cause delays in care and increased cost of treatment. Furthermore, patients reported a delay in getting services due to an uncoordinated referral system as the health information management system (HIMS) was not integrated. Participants reported that prostate cancer services were centralized at zonal hospitals but were still not patient-centered in service provision. Social and financial hardship were experienced by the patients in the referral process due to fragmented services.

Table 4 Presence of a working health information system along with guidelines used

Item	Frequency (%)	
	Available	Not Available
Presence of a functional Health information system	5 (100)	0 (0)
Treatment guidelines/protocols	5 (100)	0 (0)
National cancer treatment guideline	4 (80)	1 (20)
National cancer strategy	1 (20)	4 (80)
European Cancer Treatment guideline	3 (60)	2 (40)
American Cancer Treatment guideline	3 (60)	2 (40)
WHO cancer treatment guideline	1 (20)	4 (80)
Referral protocol (Interdepartmental)	5 (100)	0 (0)
Payment policy for PC services	4 (80)	1 (20)

Lack of integrated HIMS among tertiary hospitals
 “Our doctor explained to us that we might repeat some investigation at hospital A because the system in Mbeya is not connected to that of hospital A” (patient at hospital E-14).

Lack of decentralized prostate cancer services
 “I went to the nearby hospital and they referred me here at hospital C because it is the only big hospital which would solve my problem” (Patient at hospital C-04).

Lack comprehensive prostate cancer services had cost implication and was causing treatment delays
 “I was referred from Kyela to Mbeya and then to hospital A for radiotherapy surprisingly I started a new registration because of no information which was forwarded from Mbeya about my illness. It increases cost and causes treatment delays” (Patient at hospital A- 03).

Discussion

This study provides information on the available structural inputs for the provision of prostate cancer services in Tanzania. It is a unique study as it is calling for more investments for provision of quality services to patients with prostate cancer. This study reflects the health system in terms of services provision and distribution to patients with prostate cancer at tertiary hospitals in Tanzania. This study is in line with the Donabedian model of service provision which recommends a balanced input for better outcomes in the context of quality health care [9]. We, therefore, aimed to determine the available structural inputs and the description of how they influence the provision of quality services to patients with prostate cancer in Tanzania.

Tertiary hospitals in Tanzania were overwhelmed by a large number of patients with prostate cancer contrary to existing infrastructure and the number of staff in this study. The ratio of urologists to patients was too high which gives an implication that patients with prostate cancer may miss proper care from a qualified staff. This is similar to many studies that report limited infrastructure to support cancer services in low and middle-income countries in the era of increased burden of cancer [3, 17]. Radiotherapy services were scarcely available impairing the provision of patient-centered services. Notably, quality of service requires infrastructure that is patient-centered for a holistic approach [12]. Transrectal ultrasound (TRUS) was available in hospital D which means in other hospitals urologists depend on finger guided tru cut to take biopsy from prostate gland which gives a high chance of false negative biopsy results while in developed countries Magnetic Resonance Imaging (MRI) guides the needle to biopsy a lesion even in the anterior zone

of the prostate gland which increases the chance of getting accurate diagnosis at early stage of prostate cancer to enhance proper planning and good treatment outcome [10, 18]. Laparoscopic robotic radical prostatectomy for local prostate cancer has less morbidity compared to open radical prostatectomy [19]. Therefore it is imperatively important for tertiary hospitals to have essential equipment for the diagnosis and treatment of patients with prostate cancer to avoid unnecessary delays and better treatment outcome [3, 20].

In this study, participants reported that at hospital B it could take up to six weeks to get biopsy results due to the long process and large number of samples contrary to practices in other hospitals whereby prefixation/transport time from wards/clinics is 15 min and 1 h, and 25 min for routine paraffin embedding, cutting, and staining in the pathology laboratory, the slides can be ready for evaluation by the pathologist within 4 h after the biopsy specimen has been taken this fast track the process of treatment for better outcomes [21]. The delays of biopsy results could in disease progression to metastatic stage even in those patients who presented at the hospital with local disease [22]. The treatment of patients with metastatic prostate cancer becomes more expensive notwithstanding poor primary and secondary outcomes [22, 23]. Furthermore, the reported lack of comprehensive treatment at tertiary hospitals due to fragmented services caused unnecessary delays which resulted to treatment for palliative intention to patient who could benefit from aggressive treatment of local prostate cancer for curative intention [6, 24, 25].

The shortage of staff for prostate cancer services was alarming in this study. Some services such as radical prostatectomy were not offered to patients with local prostate cancer due lack of staff with the required skills. The number of available staff was low if compared to patients who are treated across all the hospitals. We also observed planning for staffing is not properly done, we call for better planning for staffing to improve cancer service as per standard practices. Doctor patient ratio in our study reflected that some patients are denied some services including psychosocial support due to a shortage of staff [3, 26]. This is similar to what has been recommended that improving access requires increasing the number and quality of the cancer care workforce, This will reduce burnout and psychological distress in the workforce to maintain quality and safety globally [3]. It is imperative that for good quality of service as part of Universal health coverage, cancer control including prostate cancer having competent and adequate HRH is an important step towards improving access to quality and safe care, this was reflected in our study of health care providers and patients’ perspectives. Prostate cancer specialists are important for a pragmatic approach, and

sustainable and effective interventions for all patients at all times to patients [3, 10], in this study participants reported that few available urologists were lacking skills for open and laparoscopic radical prostatectomy. Staff referred in this study were not purely dedicated to care patients with prostate cancer regrettably they were used handling patients with other diseases. It is important to allocate staff based on workload, We therefore encourage hospitals to effectively use Workload Indicator for Staffing Needs (WISN) analysis for proper planning, allocation, and reallocation of staff /resources [27, 28].

Organization of prostate cancer services was found to be a barrier to the provision of timely and affordable care. All tertiary hospitals were located in urban areas whereby patients with prostate cancer were travelling for long distance to get proper service. Prostate cancer services sounded to be accessible, available, and affordable to minorities, especially from the perspective of quality service, especially to those who were not insured. This is similar to the findings of other studies which have reported that cancer treatment is expensive and the high prices of cancer medicines have a huge impact on access in LMICs [3, 5]. Decentralization of prostate cancer services could be the solution but still needs policy directives as studies have documented that about 1 in 5 people develop cancer in their lifetime and approximately 1 in 9 men and 1 in 12 women die from the cancer which calls for integration of cancer screening of the population at risk from the level of primary health facilities to enhance early cancer detection for better treatment outcome [2, 29, 30]. Participants in this study reported lack of proper organization of prostate cancer services caused unnecessary delays to diagnosis and treatment but also the poor organization increased the cost of cancer treatment. Our findings were similar to the global WHO survey report towards Universal health coverage (UHC) which shows that only 39% of the surveyed countries covered the basics of cancer management as part of their financed core health services for all citizens, ‘health benefit packages’ (HBP) with only 28% of surveyed countries additionally covering care for people who require palliative care, including pain relief in general which important LMICs as most of cancer patients present with advanced stage [2, 3, 31]. A World Health Organization (WHO) technical report showed that countries with a lower national income had lower availability of anti-cancer medicines, or availability only with higher out-of-pocket patient payments, especially for higher-cost medicines, including targeted therapies [32].

Strengths, limitations, and future direction

Our sequential mixed approach with interaction with our participants including health care providers increases dependability, and confirmability of our findings [15, 16].

Moreover, our findings are transferable to the other hospitals in Tanzania with similar challenges related to structural input in the provision of quality services to patients with prostate cancer. Healthcare providers (HCP) were selected based on their experience in providing services to patients with prostate cancer and involving patients who have been on treatment for prostate cancer reflects dependability of our findings. A cosmopolitan composition of a research team with experience in quantitative and qualitative research and being well trained in ethics to avoid bias increased credibility and confirmability [15]. Patients who were interviewed may be responded positively to please the researcher because they were still on treatment. Health care providers including managers may be felt obliged to give positive information to protect the image of their hospitals. Community based study would be useful in future regarding the perceived resources needed for provision of quality services to patients with prostate cancer.

Conclusion

Structural inputs for prostate cancer services are scarce and fragmented. Hospitals should be encouraged to perform Workload Indicators for Staff Needs Analysis (WISN) for proper planning, allocation, and reallocation of HRH resources. Studies on optimization of the available HRH and infrastructure are needed to improve the provision of prostate cancer in tertiary hospitals as an interim solution while long-term measures are needed for improving the HRH availability and conducive infrastructure.

Abbreviations

PC	Prostate cancer
DR	Document review
HS	Health System
HRH	Human Resource for Health
IDIs	In-depth Interviews
KCMC	Kilimanjaro Christian Medical Center
SSA	Sub Saharan Africa
LMICs	Low-and-middle-income countries
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
MZRH	Mbeya Zonal Referral Hospital
ORCI	Ocean Road Cancer Institute
SSI	Semi-Structured Interviews

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-024-11580-1>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

ON; developed research proposal, collected and analyzed data, developed manuscript. NS, GF, DS, DU, and BS; reviewed the proposal and manuscript.

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Data availability

It is declared that data and materials are available. They can be sought from the corresponding author (first author). Note that most of data has been provided in this manuscript.

Declarations**Competing interests**

The authors declare no competing interests.

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