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Histopathological Prevalence of Genito-urinary Cancer in Rural Areas: Five Years Retrospective Study

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Abstract

Original Research Article

Background: Cancer is a public health problem in both developed and developing countries. It is among of the delayed diagnosis cancer due to asymptomatic characteristics and lack of screening behavior in low- and middle-income societies. The aim of this study was to determine the histopathologic epidemiological profile of urologic cancers in rural referral Hospital in Mororgoro Tanzania.

Methods: A retrospective study was conducted involving histopathological hospital data from January 2020 to December 2024.

Results: Total of urologic 88 histology samples were collected during the period. Out of these 62.5% were malignant. The majority of the patients were male 79. 5% and female were 20.5% resulting into M: F; 3.8:1. Patients over 60 years old comprised 62.5% of all cases. The most affected organs were prostate 44.32% and urinary bladder 36.36%. Adenocarcinoma and squamous cell carcinomas (SCC) were the most frequently diagnosed malignancies accounting for 28.4% % and 13.6% cases respectively. Among those with urinary bladder SCC, 4.5% had coexisting Schistosomiasis. Multivariate logistic regression analysis showed significant associations with malignancy for the following: Age above 60 years (AOR = 4.363; 95% CI: 2.544–6.181; p = 0.000), Male sex (AOR = 1.186; 95% CI: 1.761–2.610; p = 0.001), Female sex (AOR = 1.259; 95% CI: 0.682–1.836; p = 0.000), Bladder cancer (AOR = 5.966; 95% CI: 4.178–7.753; p = 0.012) Malignancies from other urologic structures (AOR = 3.063; 95% CI: 0.506–5.620; p = 0.020). Conversely, some variables were not statistically significant in multivariate analysis, including: Age below 60 years (AOR = 0.463; 95% CI: 0.872–1.797; p = 0.490) Prostate cancer (AOR = 4.503; 95% CI: 2.430–6.575; p = 0.461).

Conclusion: Since Urologic cancer is one of the non-communicable diseases in Tanzania and other low- and middle-income countries (LMICs); screening should be prioritized along with strengthening early detection and capacity building among clinicians, especially those working in primary health settings, to improve the rate of early diagnosis.

Key Words: Bladder cancer, Smoking, Carcinogens, Schistosomiasis, Chromosomal aberrations, Cancer

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INTRODUCTION

Urologic cancers (UCAs) referrers to any malignancy occurring in kidney, ureters, urinary bladder, prostate and urethra(1). It remains one of the global challenge as they are considered as the critical within broader concerns of global surgery(2). Early detection and treatment timely treatment are essential for achieving optimum outcomes and reducing mortality rates(1,3–5). The burden of Urologic malignancies is felt worldwide with patterns and prevalence varying even within the same country and regional zone(6). UCAs are notable cause of both morbidity and mortality with a significant effect on Disability Adjusted Life Years (DALYs)(3,5). Timely diagnosis and appropriate early appropriate interventions are key factors contributing to better prognosis, reduced morbidity lower mortality(1,7).

Medical advancement in diagnostic modalities and modern drugs have changed the face of diagnosis and treatment of urologic cancers(8). Early diagnosis and treatment, help to optimize the management outcomes with good prognosis(9–11). However, lack of urologic care in LMICs contributor to poorer management outcomes(1,2). Tanzania faces significant increases of urological cancer burden driven particularly by urinary bladder and prostate cancers (9,12). These malignancies are among the most reported to be the commonly urologic cancers in the region(6,8,13).

However, the availability of data on urologic cancers in LMICs are limited, hindering evidence- based resource mobilization especially in remote and rural areas. This result in inadequate resources distribution especially in rural and remote areas(1,14). Only 19% of global surgical specialists are found within LMICs. This increases the difficulty in getting appropriate surgical care in these limited resourced areas(1). This includes urologic cancer screening services which often result into seeking health care at advanced or untreatable stage(1,3,6,13,14). The study aimed to evaluate the histological characteristics of urological cancer in rural referral hospital the rural referral hospital in Tanzania.

METHODS

Study Design and Setting

The descriptive retrospective study was conducted based on histological results from urologic organ tissues specimens at Saint Francis Referral Hospital (SFRRH) over a

5- years period (January 2020 to December 2024). These included kidney, ureter, urinary bladder, prostate, urethra and penis. Data were retrieved from records in the urology Department. Patient histological record kept in the medical records were used for histological profile and demographic information such as sex, age, and address. Retrieved pathological information included histological type of cancer, presence of Schistosoma eggs, and the involvement of tissue histological patterns whether malignancy, benign, fibrosis inflammation. Patients with incomplete data confirmed cases were excluded from the study. Ethical approval for the study was issued by the institutional reviewer board (IRB) before the commencement of the study. Data were entered and analyzed using SPSS computer software version 26.0. Chi-square test was used to test for the association between categorical data while a P= value of ≤ 0.05 was considered to be statistically significant. Logistic regression was used to find the degree of association among variables in multivariate analysis with calculation of the adjusted OR with 95% confidence interval. They were all tests using the p-value. Those with P-value < 0.05was considered as the threshold of statistical significance.

RESULTS

A total of 88 urologic histology samples were tested during the study. Malignant diagnoses accounted for 62.5% (55) of all cases while 37.5% (33) benign. The male accounted for 79. 5% (70) and female were 20.5% (18) making M: F; 3.8:1. The age ranged from 21 to 100 whereby 61-80 age group was the most prevalent contributing to 62.5% (55) of all cases followed by 41-60 age group which counted for 23.86% (21). The least age groups were 21-40 and 81-100 which accounted for 6.8% (6) respectively as it is shown in table 1. Most of the patients come outside of Kilombero valley (Kirombero, Malinyi and Ulanga District) which involved only 21.6% (19) of all patients and 78.4% (69) of the patients came from other areas apart from Kilombero Valley. Most of the tissues were obtained from the prostate 44.32% (39), followed by urinary bladder 36.36% (32), bladder neck 6.8% (6), testis 8.0% (7), penis 1.1% (1), kidney 1.1% (1) and spermatid cord 2.3% (2). Out of the 88 histological samples 62.5% (55) had malignancy whereby adenocarcinoma and SCC were the most detected accounting 28.4% (25) % and 13.6% (12) respectively. Among the SCC 4.5% had Schistosomiasis. Out of 88 samples, 27.5% (33) had benign results of which benign prostatic hyperplasia (BPH) accounted 15.91% (14)

Figure 1: Patient demographic Characteristics and pathological features

Variable	Frequency (N)	Percent (%)
Age-group		
21-40	6	6.80
41-60	21	23.90
61-80	55	62.50
81-100	6	6.80
sex		

Male	70	79.50
Female	18	20.50
Adress		
Kilombero	19	21.60
Other areas	69	78.40
Organ tissue		
Urinary bladder	32	36.40
prostate	39	44.30
Bladder neck	6	6.80
Testis	7	8.0
Kidney	1	1.40
Penis	1	1.40
Testicular cord	2	2.30
Histologic patterns		
malignancy	55	62.5
benign	33	37.5

Figure 2: Histological Characteristics of Sampled Histology Histological patterns

Malignant tissues	Frequency (N)	Percent (%)
Squamous cell carcinoma	12	13.60
Adenocarcinoma	25	28.40
Transitional call carcinoma	6	6.80
SQC with schistosomiasis	4	4.54
Papillary Urethral carcinoma	3	3.40
TRC with schistosomiasis	1	1.14
Prostate adenocarcinoma	1	1.14
Cystic cell Ca	1	1.14
Neuroendocrine cell carcinoma	1	1.14
Squamous cell metaplasia	1	1.14
Benigne tissue		
BPH	14	15.9
fibrosis	8	9.10
schistosomiasis	1	1.14
polyp	3	3.41
orchitis	1	1.14
Testicular TB	1	1.14
Syphilitic inflammation	2	2.30
BPH with prostitis	3	3.41

			1	
	Histology results			
variables	Malignant (N&%)	Benign (N&%)	Chi-square	P-value
Age group	I			
≤60	14(15.91)	13 (14.77)	51.904	0.001
60 and above	41(46.60)	20 (22.73)		
Sex				
Male	39 (44.32)	31(35.23)	11.326	0.002
Female	16(18.18)	2(2.30)		
Organ tissue				
Urinary Badder/ bladder	30(34.09)	8(9.09)	12.718	0.01
neck				
Prostate	22(25.0)	19(21.59)		
Others	3(3.41)	8(9.09)		
Adress		1	1	1
Kilombero valley	18(20.45)	12(13.64)	1.543	0.918
Outside	40(45.45)	18(20.45)		

Figure 3 : The Association of Malignant Demographic Profiles

Above sixty years has highest malignant result 46.60%, male with cancer was 44.32%, bladder/ bladder neck 34.09%, and prostate malignant was 25.0% and most of the patient with

malignant 45.45%. The x^2 test and respective P=value is indicated in **table3** above

Figure 4: Multivariate logistic regression

Variables	Histology patterns	AOR	95% CI	P=value
Below 60yrs	Yes No	0.463	0.872-1.797	0.490
Above 60 yrs	Yes No	4.363	2.544-6.181	0.001
male	Yes No	1.186	1.761-2.610	0.001
Female	yes No	1.259	0.682-1.836	0.000
Bladder	yes no	5.966	4.178-7.753	0.012
Prostate	Yes No	4.503	2.430-6.575	0.461
Other sites	Yes No	3.063	0.506-5.620	0.020

On multivariate logistic regression analysis, the age above 60 years old AOR=,4.363; CI= 2.544-6.181; P=value: 0.00, male with cancer AOR=1.186, CI; 1.761-2.610; P=0.001, Female with cancer AOR=1.259; CI=0.682-1.836; P=value 0.000,

bladders cancer AOR 5.966; CI 4.178-7.753; P=value 0.012, and tissue from other structures AOR= 3.063; CI=0.506-5.620; P=0.020. On the other hand, some of variables who were tested in multivariate logistic regression revealed non statistically

significant. These included the age below 60 years AOR=0.463; CI=0.872-1.797, P=0.490 and prostate with cancer AOR=4.503; CI=2.430-6.575; 0.461.

DISCUSSION

This study aimed to evaluate the histopathological profile of genital-urinary samples done within five years. In this study, above 60 years patients were the most prevalent accounting for 69.32% over 30.68% of less than 60 years old. There were male predominance to female of which male to female ratio was 3.8:1. The corelating study has been reported in literatures including Ozah et al who reported the male predominance in urologic cancer in Nigeria(6,8,15). But also, the study becomes similar to what has been reported in the literatures such that M:F ratio range between 3-5:1 while in some areas it exceeds 6:1(8,12,15,16). Therefore, our study becomes among of those with higher M:F ratios in urologic cancer(15). The high exposure to smoking and inclusion of prostate samples in this study may explain the male dominance(17). The study showed higher M:F than what has been reported by Ngowi et al whose study M: F was 2.2:1(12). But also, the study is contrary to what was reported by Igbokwe et al who reported high female 59.7% than male 41.3% with M :F 1:1.5(6). This variation may be attributed by local community awareness on screening activities regularly at specific area. Generally, there is a need of regular genital urinary cancer screening particularly in the rural areas including Kilombero valley areas where people are less aware on importance of screening. This study shows the significant number of urological cancer cases which raise public concern on regular screening program at the regional and national level. Lack of screening awareness among the rural communities and financial are two major limiting factors where by people lack the resources to travel to healthcare facilities or afford diagnostic tests. Despite the fact that Tanzania has adapted for National health insurance fund (NHIF) for all, yet most of them are unable to contribute for it especially those who do not have formal employment. As a result, the patient comes to the hospital when they are already diseased whereby the cancer is at advanced stage.

Out of 88 cases of histologically samples 62.5% (55) were confirmed to have malignancies. Out of 55 malignant samples, urinary bladder composed of 54.54% (30/55), followed by prostate 40.0% (22/55) while other organs together composed of 5.45% (3/55) including penile cancer1.82 % (1/55) renal cancer 1.82 % (1/55) and testicular cancer 1.82 % (1/55). The se findings contrasts with that of Igbokwe et al of whose study, prostate cancer was high accounting for 75.0% over 14.76% of bladder cancers(6). Other studies also reported predominant prostate to other urologic cancers(8,15). Tobacco use, occupational schistosomiasis infection, exposure to carcinogenic chemicals like aniline dye and aromatic amine has been reported to be the contributing factors for Bladder carcinoma(6,8). These factors pronounce high prevalence of males than females. Smoking of any kind has been reported to contain multiple carcinogenic components of which nicotinederived nitrosamines induce carcinogenesis by DNA mutations and tumor growth receptor mediators including a4/B2nAChR

(18–20). The carcinogenic to humans include Nitrosamines such as 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and N'-nitrosonornicotine (NNN)(19,21).

Smoking cannot be ruled out as a key risk factor, especially in regions like Tanzania where tobacco regulation is limited. The widespread availability and use of tobacco coupled with weak enforcement of public health policies puts many individuals at risk of exposure to carcinogens. Taking into consideration that smoking carries a significant number of carcinogenic chemicals whereby 5,000 to 7,000 chemicals and 62 carcinogens have been detected in tobacco(4,19). Strengthening noncommunicable disease (NCD) prevention strategies is crucial, particularly for smoking-related malignancies. Despite that in Tanzania, we have a lot of annual health programs and campaigns, but it is unfortunately that we do not have antismoking campaign, instead we have multiple advertisements of Cigarettes producing companies. Since urogenital cancer is one of global disease affecting disability-adjusted life-years (DALYs) and the age-standardized incidence rate (ASIR) tripled from 1.16/100,000 to 3.21/100,000(2,3,5). As the national, we can still reduce the incidence through improving national health system including regular screening. Efforts to curb tobacco use should include banning cigarette advertising, launching mass media campaigns to highlight smoking risks, and enforcing public smoking bans to protect non-smokers. Addressing these factors will be essential in reducing the incidence of urologic cancers and improving outcomes in affected populations.

Among the 30 of sample bladder cancer 6 of them samples had schistosomiasis accounting 20.0% of all bladder cancers. This was comparable with other studies done in other countries including India, Tanzania and Nigeria in various degree (1,6,10,22). Schistosomiasis has been reported in various literature to be associated with bladder cancer through chronic inflammatory reaction to the eggs leading to parenchymal tissue destruction and fibrosis which with time leads to bladder mucosal cellular metaplasia(10,22). The continuous inflammatory reaction to the eggs leads to parenchymal tissue destruction, inflammation, fibrosis, and ultimately to fibrotic nodules, genetic alterations and chromosomal aberrations. A transition of H-ras and gene, the CpG sequences of the p53 tumor suppressor gene are among of genetic changes which have been reported in literatures(16).

Despite that female were few compared to male but most of them were likely to have malignant whereby out of 18 samples only 11.11% (2/18) had no malignant while 88.89% (16/18) had malignant. The similar urologic cancer patterns was documented by Ngowi *et al* in Moshi-Tanzania(12). This can be attributed by late presentations of urologic cancer presentations which usually occur late in female than in male or miss diagnosis of the disease in specific group. The urogenital disease in females is frequently treated as urinary tract infection (UTI) or pelvic inflammatory diseases (PID). In such condition they are treated with antibiotics for years while the disease is

advancing such that at the time of diagnosis is at the advanced stage.

CONCLUSION

Urologic cancer remains one of global significant non communicable disease but LMICs at large. Bladder cancer is common catting across both males and females. Screening awareness and clinician with experience in urologic cancer clinical presentations may lead to increase the rate of early diagnosis in Tanzania. However, there is a need of large prospective study to confirm the disease and demographic patterns in relation to the disease in regional particularly in Kilombero valley.

Limitations of the Study

A key limitation in our study we used only a single institute. However, this may reflect the general population that there is a need of national plan on regular screening to reduce late diagnosis which usually is associated by poor prognosis.

Conflict of Interest:

The authors declare that there was no conflict of interest related to this manuscript development

Source of fund. No fund was obtained for this study

Ethical Approval

Institutional and international research regulations were observed during interacting with the patient and the preparation of the manuscript. Also, ethical clearance was obtained from SFUCHAS internal reviewer board (IRB)

Author Contributions.

Conceptualization, AM and JS. Data curation, JS & ZA. Formal analysis, TK. Methodology, AM&TK. Software, JS. Writing original draft, TK, SM & RM. Writing review and editing, SB and SJ. All authors contributed to the article and approved the submitted version.

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