



Prevalence and risk factors associated with prostate cancer among patients in Enugu State, Nigeria

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Abstract

Prostate Cancer are the leading cause of death, disability and suffering to increasingly large number of men and therefore calls for concerted efforts from all and sundry. Based on this study was designed to determine the prevalence and risk factors associated with prostate cancer among patients in Enugu State Nigeria from 2014 to 2018. Four research questions and four null hypotheses guided the study. Descriptive, retrospective epidemiological survey design was used for the study. The uniform data format was designed based on information contained in the medical folders of prostate patients of the study. Data collected were analyzed using descriptive statistics of frequency counts and percentages to answer the research question while Chi-square statistic was used to test the null hypotheses at 0.05 level of significance. The result of study among others showed that the prevalence of Prostate Cancer among patients in Enugu State as found in this study was high in the year 2018 and 2014 for Prostate Cancer patients respectively. The prevalence of prostate cancer differed significantly from 2014 to 2018 ($p > 0.05$). based on the findings and conclusions, it was recommended among others that both federal and state governments should build additional hospitals and health centers that offer specialized services for prostate cancer to males from the age of 35 partner with their respective communities.

Keywords: prevalence, risk factor, prostate, cancer

Introduction

The prostate is an exocrine gland of the male reproductive system and exists directly under the bladder in front of the rectum. An exocrine gland's secretion ends up outside the body, for example, prostate gland and sweat glands (Parkin, Bray, Ferlay & Pisani, 2001) [12]. According to Okoye (2016) [10, 11], the prostate gland is approximately the size of small kola-nut that lies below the urinary bladder, deep in the male pelvis and carries within it the first part of the male urethra. The urethra – a tube that goes from the bladder to the end of the penis and carries urine and semen out of the body goes through the prostate (Parkin, *et al.* 2001) [12]. However, there are thousands of tiny glands in the prostate. They all produce a fluid that forms part of the semen. This fluid also protects and nourishes the sperm. When a male has an orgasm, the seminal vesicles secrete a milky liquid with which the semen travels. The liquid is produced in the prostate gland, which the sperm is kept and produced in the testicles. When a male climaxes (has an orgasm) contractions force the prostate to secrete this fluid into the urethra and it leaves the body through the penis (Ekwere & Egbe, 2002) [5]. As the urethra goes through the prostate, the gland is also involved in urine control (continence) with the use of prostate muscle fibers. These muscle fibers in the prostate contract and relax, controlling the flow of urine flowing through the urethra (Odedina, Ogunbiyi & Ukoli, 2006) [8].

Also, according to Yawe, Tahir and Nggada (2006) [15], the epithelial cells in the prostate gland produce a protein called PSA (Prostate Specific Antigen). The PSA helps keep the semen in its liquid state. Some of the PSA escapes into the bloodstream. We can measure a man's PSA levels by checking his blood. If a man's level of PSA is high, it might

be an indication of either prostate cancer or some kind of prostate condition. According to Yawe, *et al.* (2006) [15], in some older men, the prostate may continue to grow, especially the part that is around the urethra. This can make it more difficult for the man to pass urine as the growing prostate gland maybe causing the urethra to collapse.

Prostate cancer is the most common cancer among Nigerian men and the second most common cause of death from cancer in men worldwide (Ogundele & Ikuerowo, 2015) [9]. It is a leading cause of death, disability and suffering to increasingly large number of Nigerian men. Its annual incidence in Nigeria is quoted to be 127/100,000 men and according to Okoye (2016) [10, 11] is one of the highest in the world. Increasingly, many Nigerian men are being diagnosed with prostate cancer and often at very advanced (late) stages when unfortunately little can be done except to palliate (keep the patient as comfortable as possible, whilst waiting for the inevitable death). In fact, many men die of old age, without even knowing they had prostate cancer. Shittu and Ogunbiyi (2003) [14] found that about 80 percent of all men in their eighties had prostate cancer which was unknown to them until when a medical checkup is done. Medical experts say that prostate cancer starts with tiny alterations in the shape and size of the prostate gland cells – prostatic intraepithelialneoplasia (PIN). They say that nearly 50 percent of men over 50 years old have PIN. The cells are still in place, they do not seem to have moved elsewhere but the dangers can be seen under a microscope. Experts describe these prostate gland cell changes as low-grade or high grade. High grade is abnormal while low grade is more or less normal. Moreover, prostate cancer according to Shittu and Ogunbiyi usually present no symptoms during the early stage, thus the importance of

screening when the individual seem completely well and not yet feeling any of the symptoms.

According to Okoye (2016) ^[10, 11], the signs of prostate cancer include frequent urination at night and day, difficulty in postponing urination, poor urine stream, straining and incomplete emptying. There are also the locally advanced signs which include unilateral leg swelling, penile and scrotal swelling; metastatic symptoms – anemia, weight loss, low back pain, new lumps on the skull, fractures after trivial injury, sudden onset of paralysis of the lower limbs.

Prostate cancer prevalence among patients in Enugu State and the magnitude of the risk in the population may have been grossly underestimated. The Nigerian government through its ministry of health both at the federal and state levels has procured drugs, machines and equipment that will facilitate the testing and treatment of the prostate cancer. There has also been sensitization programmes on the media channels, printing of handbills and posters to bring the knowledge of the ailment to the men and the need for regular checkup and testing. In spite of all these efforts, there is still high prevalence of men having the prostate cancer. It is based on this premise that the researcher deems it necessary to carry out this study which seeks to determine the prevalence and risk factors associated with prostate cancer among patients in Enugu State Nigeria from 2014 to 2018.

Purpose of the study

The main purpose of the study was to determine the prevalence and risk factors associated with prostate cancer among patients in Enugu State Nigeria from 2014 to 2018. Specifically, the study determined the:

1. prevalence of prostate cancer among patients in Enugu State from 2014 to 2018,
2. prevalence of prostate cancer among patients in Enugu state based on their ages,
3. prevalence of prostate cancer among patients in urban and rural areas of Enugu State,
4. prevalence of prostate cancer among patients in Enugu state based on their educational level.

Research question

The following research questions guided the study;

1. What is the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018?
2. What is the prevalence of prostate cancer among patients in Enugu state based on their ages?
3. What is the prevalence of prostate cancer among patients in urban and rural areas of Enugu state?
4. What is the prevalence of prostate cancer among patients in Enugu state based on their educational level?

Hypotheses

The following null hypotheses were formulated to guide this work and were tested at .05 level of significance.

1. There is no significant difference in the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018.
2. There is no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their ages.
3. There is no significant difference in the prevalence of prostate cancer among patients in urban and rural area of Enugu State.

4. There is no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their educational level

Method

A descriptive, retrospective epidemiological survey design was adopted for this study. The study area of this research was Enugu State, in the South-East geopolitical zone of Nigeria. Population of this study comprised the case files or folders of all the male patients aged 45 years and above who attended prostate cancer screening and checkup in all the purposively drawn health facilities in Enugu State between 2014 and 2018. Patients' case files will represent the actual patients of the study since the study was mainly concerned with the patients' past records. Purposive sampling technique was used to draw four health facilities that were used for the study.

Research questions 1

What is the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018?

Hypothesis 1

There is no significant difference in the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018.

The data used in answering research question five and testing hypothesis five are shown in Table 1

Table 1: Prevalence of prostate cancer among patients in Enugu State from 2014 to 2018 (N = 2883)

S/N	Years	F	%
1	2014	687	23.8
2	2015	466	16.2
3	2016	535	18.6
4	2017	634	22.0
5	2018	561	19.5
	Total	2883	100

$\chi^2 = 83.31$, critical value = 9.49, df = 4, $p < 0.05$; significant

Table 1 presents the frequencies and percentages of the subjects that suffered from prostate cancer representing the prevalence of the disease in Enugu State from 2014 to 2018. The table shows that the greatest percentage (23.8%) of all the subjects put together in 2014 suffered from prostate cancer, followed by 2017 (22.0%), 2018 (19.5%), 2016 (18.6%) and 2015 (16.2%) in this descending order of magnitude.

When the data in table one were subjected to χ^2 analysis to test the hypothesis, the χ^2 statistics results showed that the χ^2 calculated of 83.31 was greater than the table value of 9.49 at 4 degree of freedom (df) and 0.05 level of significance. Therefore the null hypothesis was rejected and the conclusion drawn was that the prevalence of prostate cancer among patients differed significantly based on the years of the men in Enugu state from 2014 to 2018.

Research questions 2

What is the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018 based on age?

Hypothesis 2

There is no significant difference in the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018 based on age

The data used in answering research question six and testing hypothesis six are shown in Table 2.

Table 2: Prevalence of prostate cancer among patients in Enugu State from 2014 to 2018 based on age

Age (years)

S/N	Years	40-49 yrs f	%	50-59 yrs f	%	60-69 yrs f	%	70-79 yrs f	%	80-89 yrs f	%	90 yrs & above f	%	Total f	%
1	2014	53	1.8	56	1.9	79	2.8	119	4.1	120	4.2	139	4.8	566	19.6
2	2015	53	1.8	89	3.1	83	2.9	114	4.0	129	4.5	124	4.3	592	20.5
3	2016	39	1.4	34	1.2	82	2.8	109	3.8	126	4.4	119	4.1	509	17.7
4	2017	38	1.3	72	2.5	102	3.5	131	4.5	221	7.7	138	4.8	702	24.3
5	2018	69	2.4	54	1.9	59	2.0	98	3.4	120	4.2	114	4.0	514	17.8
	Total	252	8.7	305	10.5	405	14.0	571	19.8	716	24.8	634	21.1	2883	100

$\chi^2_{cal} = 104.44$, critical value = 31.41, df = 20, $p < 0.05$

Table 2 presents the frequencies and percentages of the subjects that suffered prostate cancer from 2014 to 2018. The table shows that in 2014, 4.8 percent of the subjects aged 90years and above suffered from prostate cancer, followed by subjects 80-89years (4.2%) and subjects 70-79years (4.1%). In 2015, subjects 80-89years (4.5%), 90 years and above (4.3%), 70-79years (4.0%) and 50-59 years (3.1%) suffered from prostate cancer. In 2016, 4.4 percent of the subjects aged 80-89years, followed by subjects 90years and above (4.1%), and subjects 70-79years (3.8%) suffered from prostate cancer. In 2017, 7.7 percent, 4.8 percent, 4.5 percent, and 3.5 percent of the subjects suffered from prostate cancer among the age ranges of 80-89years, 90 years and above, 70-79years and 60-69 years respectively. In 2018, subjects 80-89years (4.2%), 90years and above (4.0%) and 70-79years (3.4%) suffered from prostate cancer.

The table also shows that greatest percentage (24.3%) of all the subjects put together in 2017 suffered from prostate cancer, followed by 2015 (20.5%), 2014 (19.6%), 2018 (17.8%) and 2016 (17.7%). The table also shows that within the period of the study, the highest percent (24.8%) of the subjects 80-89years suffered from prostate cancer, followed

by 90years and above (21.1%), 70-79years (19.8%), 60-69years (14.1%), 50-59years (10.5%) and 40-49years (8.7%) in this descending order of magnitude.

The chi-square (χ^2) analysis shows that the calculated χ^2 value of 104.44 was greater than the critical χ^2 table value of 31.41 at 20 degrees of freedom (df) and 0.05 level of significance. Therefore the null hypothesis that there will be no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their ages was rejected. This implies that there was a significant difference in the prevalence of prostate cancer among patients in Enugu state based on their ages from 2014 to 2018.

Research questions 3

What is the prevalence of prostate cancer among patients in urban and rural areas of Enugu state?

Hypothesis 3

There is no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their locations.

The data used in answering research question seven and testing hypothesis seven are shown in Table 3.

Table 3: Prevalence of prostate cancer among male patients in Enugu State from 2014 to 2018 based on location (urban and rural areas)

Location

S/N	Years	Urban area f	%	Rural areas f	%	Total f	%
	2014	270	9.4	294	10.2	557	19.3
	2015	250	8.7	366	12.7	504	17.5
	2016	284	9.9	332	11.5	564	19.6
	2017	210	7.3	290	10.1	656	22.8
	2018	307	10.6	280	9.7	602	20.9
	Total	1321	45.9	1562	54.2	2883	100

$\chi^2_{cal} = 38.06$, critical value = 9.49, df = 4, $p < 0.05$; significant

Table 3 presents the frequencies and percentages of the subjects that suffered from prostate cancer from 2014 to 2018. The table shows in 2014, 10.2 percent of the subjects in the rural area suffered from prostate cancer, while the subjects in the urban area that suffered it was 9.4 percent. In 2015, the subjects in the rural that suffered from prostate cancer was 11.7 percent and subjects in the urban area (8.7%). In 2016, subjects in the rural area (11.5%) and urban area (9.9%). In 2017, 10.1 percent and 7.3 percent suffered from prostate cancer with the location of rural area and urban area respectively. In 2018, subjects in urban area (10.6%) and rural area (9.7%) suffered from prostate cancer. The table also shows that greatest percentage (22.8%) of all the subjects put together in 2017 suffered from prostate cancer, followed by 2018 (20.9%), 2016 (19.6%), 2014 (19.3%) and 2015 (17.5%). The table also shows that within

the period of the study, highest percentage (54.2%) of subjects in the rural area suffered from prostate cancer while the subjects in the urban had 45.9%.

The chi-square (χ^2) analysis shows that the calculated χ^2 value of 38.06 was less than the critical χ^2 table value of 9.49 at 4 degrees of freedom (df) and 0.05 level of significance. Therefore the null hypothesis that there will be no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their location was rejected. This implies that there was significant difference in the prevalence of prostate cancer among patients in Enugu state based on their location from 2014 to 2018.

Research questions 4

What is the prevalence of prostate cancer among patients in Enugu state based on their educational level?

Hypothesis 4

There is no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their educational level.

The data used in answering research question eight and testing hypothesis eight are shown in Table 4.

Table 4: Prevalence of prostate cancer among patients in Enugu state based on their educational level

Educational level

S/N	Years	FSLC f	%	WAEC/NECO f	%	OND/NCE f	%	BSC/HND f	%	MSc/Ph.D f	%	Total f	%
	2014	103	3.6	173	6.0	104	3.6	113	3.9	146	5.1	639	22.2
	2015	122	4.2	112	3.9	42	1.5	181	6.3	69	2.4	526	18.2
	2016	137	4.8	151	5.2	45	1.6	231	8.0	161	5.6	725	25.1
	2017	154	5.3	93	3.2	20	0.6	121	4.2	101	3.5	489	17.0
	2018	100	3.5	130	4.5	23	0.8	155	5.4	96	3.3	504	17.5
	Total	616	21.4	659	22.8	234	8.1	801	27.8	573	19.9	2883	100

$\chi^2_{cal} = 79.41$, critical value = 26.30, df = 16, $p < 0.05$, significant

Table 4 presents the frequencies and percentages of the subjects that suffered from prostate cancer from 2014 to 2018. The table shows in 2014, 6.0 percent of the subjects with WAEC/NECO suffered from prostate cancer, followed by subjects with M.Sc./Ph.D (5.1%), B.Sc./HND (3.9%), FSLC and OND/NCE having the same 3.6 percent each. In 2015, subjects with B.Sc./HND (6.3%), FSLC (4.2%) and WAEC/NECO (3.9%). In 2017, 5.3 percent, 4.2 percent, 3.5 percent and 3.2 percent of the subjects suffered from prostate cancer with the educational qualification of FSLC, B.Sc./HND, M.Sc./Ph.D and WAEC/NECO respectively. In 2018, subjects with B.Sc./HND (5.4%), WAEC/NECO (4.5%), FSLC (3.5%) and M.Sc./Ph.D (3.3%) suffered from prostate cancer.

The table shows that greatest percentage (25.1%) of all the subjects put together in 2016 suffered from prostate cancer, followed by 2014 (22.2%), 2015 (18.2%), 2018 (17.5%) and 2017 (17.0%). The table also shows that within the period of the study, highest percent (27.8%) of the subjects with B.Sc./HND suffered from prostate cancer, followed by WAEC/NECO (22.8%), FSLC (21.4%), M.Sc./Ph.D (19.9%) and OND/NCE (8.1%) in the descending order of magnitude.

The chi-square (χ^2) analysis shows that the calculated χ^2 value of 79.41 was greater than the critical χ^2 table value of 26.30 at 16 degrees of freedom (df) and 0.05 level of significance. Therefore the null hypothesis that there will be no significant difference in the prevalence of prostate cancer among patients in Enugu state based on their educational level was rejected. This implies that there was a significant difference in the prevalence of prostate cancer among patients in Enugu state based on their educational level from 2014 to 2018.

Prevalence of prostate cancer among patients

The result on the prevalence of prostate cancer among patients in Enugu State from 2014 to 2018 showed that the highest prevalence was in 2014 (23.8%), while 2015 had the lowest prevalence of 16.2 percent (table 1). The prevalence of prostate cancer among patients differs significantly from 2014 to 2018 ($P < 0.05$). The results were actually in line with the expected outcome as mainly, men are usually prone to prostate cancer as they are ageing. This finding is in line with the finding of Bray, *et al.* (2018)^[12] who stated that the incidence rate of prostate cancer varies across the regions and populations. They stated that in 2018, 1,276,106 new cases of prostate cancer were registered worldwide, representing 7.1 percent of all cancers in men. Prostate

cancer incidence rates are highly variable worldwide. The age-standardized rate (ASR) was highest in Oceania (79.1 per 100,000 people) and North America (73.7), followed by Europe (62.1). Conversely, Ferlay, *et al.* (2019)^[16] in their own study, showed that Africa and Asia have incidence rates that are lower than those from developed countries (26.6 and 11.5, respectively). Differences in incidence rates were 190-fold between the populations at the highest rate. Furthermore, a study by Quinn and Babb (2002)^[13] stated that the reason for these differences among the countries was not entirely clear. The worldwide variations in prostate cancer incidence might be attributed to PSA testing. For example, in Europe, prostate cancer is the most frequently diagnosed cancer among men, accounting for 24 percent of all new cancers in 2015, with around 450,000 new prostate cancer cases estimated in 2015 (Epidemiology of prostate cancer in Europe European Commission, 2015). In support of the above, Cancer Stat Facts: Prostate Cancer SEER (2018) posited that while in the USA, prostate cancer is the second most common cancer accounting for 9.5 percent of all new cancer cases (164,690 new cases of prostate cancer) registered in 2018.

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