The Prevalence of Bacterial Isolates from Prostatitis Patients Using Indwelling Urinary Catheters in Healing Cross Hospital Umuahia, Abia State, Nigeria

Ogwuegbu, H.O[1*], Mbanaso, A.U[2], Opara-Nadi, N.[1], Nwokorie, C.C.[1] and Irogbeyi, L.A.[3]

[1]*Department of Microbiology, Abia State University Uturu, Nigeria*
[2]*Department of Medicine, Abia State University Uturu, Nigeria*
[3]*Department of Pharmacology, Abia State University Uturu, Nigeria*
**Corresponding author*

Abstract: **- Although indwelling urinary catheterization is a medical intervention with well-defined risks. Despite these known disadvantages, urethral urinary catheterizations are frequently used without an appropriate indication such as acute urinary retention. The prevalence of Bacterial Isolates From Prostatitis patients using indwelling Urinary Catheters was carried out in Umuahia, Abia State using culture technique. 800 patients were examined for prostate specific antigens (PSA) using quantitative and qualitative tests, culture and antibiotic susceptibility tests were also done. Out of 800 patients tested for PSA test in Umuahia was 416 (52.0%) and 433 (54.1%) for quantitative and qualitative tests respectively. in Umuahia as 800 urine samples were cultured with 280(50.9%) isolates from uncatheterized patients and 210(84.0%) isolates from catheterized patient. The bacterial isolates from catheterized and uncatheterized patients were *Escherichia* coli 149 (30.4%), *K. pneumoniae* 84 (17.1%), *S. aureus* 105 (21.40%), *S. faecalis* 61 (12.4%), *P. mirabilis* 51 (10.4%) and *P.aeruginosa* 40 (8.7%). Higher bacterial loads were observed in the catheterized patient's urine than in the uncatheterized patient's urine. Ceftriaxone, Streptomycin, and Augumentine were the drugs of choice in the sensitivity tests while high antimicrobial resistant rates were observed with Ampiclox, Septrin and Amoxil. Generally, high prevalence rate of PSA and bacterial pathogens were reported in patients of higher age (50 and above years). Increase in age, low socio-economic status and poor environment dwellers were found as demographic risk in aggravating the chance of getting prostatitis in the research areas. This calls for awareness, diagnosis and proper medical checks for men of 50 years and above. This medical check will prevent the chance of developing prostatitis and other complications that may lead to infertility and inability to urinate.**

Keywords: **Prostatitis, Urine culture, Catheter, Bacteria and diagnosis.**

I. INTRODUCTION

Urinary tract infection can be a consequence of poor diagnosis and is regarded as the common hospital acquired infection (Kolawole *et al*., 2009). Reducing the duration of catheter usage in the prostatitis patients has a positive impact on the reduction of urinary tract infection. Catheter should be removed once it's no longer needed to reduce the rate of biofilm growth on the catheters (Ogwuegbu, *et al*., 2018). Up to 25% of hospitalized patients have urinary catheters inserted, out of which 10-27% develop UTIs. Prostate patients that are using indwelling catheters are predisposed in infection due to the presence of an indwelling catheters device. The single most important risk factors for nosocomial bacteriuria and UTI mostly occur due to the presence of an indwelling urethral catheters. Once the urethral catheter is in place, the daily incidence of bacteriuria is 3-10%. Most patients who become bacteriuric do so by 30 days, because there is a convenient dividing line between short and long-term catheterization (Nicole, 2008).

Ethical Clearance

The clearance to obtain specimens and work with the people in the hospital was given by the Head Medical Directors in charge of the location after submitting the clearance letter obtained from the Abia State University, Uturu ethical clearance committee to the hospital.

A total sampling of 800 people were sampled in the research area. Their ages range from 21- 80 and above with 7 class intervals and they were placed in age bracket of 10 intervals (eg, 21-30, 31-40 etc).

II. MATERIALS AND METHODS

Specimen Collection for Prostate Specific Antigen (PSA) Test

- Approximately, about 3ml of Venous Blood of the target individual was withdrawn from the patients and places in a clean serum gel test tube (plan) and allowed to stand for 10-15minutes to clot.
- The blood specimen was capped and labelled.
- This serum was collected with pipette and stored at 20^0C. Until required for use according to the manufacturer's of the equipment instruction (ACON).

Specimen Collection for Urine Analysis and Urine Culture

- The Patients were instructed on how to collect the urine specimen.
- They were asked to wash their hands before they were given sterile, dried, wide-necked leak-proof containers to collect 10-20mls of midstream urine (MSU) specimens. (Cappucino and Sherman 2014).

Urine Collection from Catheterized Patients

- The old catheter was removed and the urethral areas was cleaned with alcoholic-impregnated swab.
- 2% lidocane gel was rubbed on the appropriate sizes of the catheters.
- The penis was straightly stretch and slightly upwards.
- The catheter was allowed to slip into the urethra until soft resistance is encountered to achieve the urine flow.
- About 10mls of the urine specimens were collected into a sterile urine container before connecting the urine bag.
- The balloon of the catheter was inflated with 10mls of water and care was taken to avoid the catheter resting against the bladder neck or on the prostate gland.
- The specimens were labeled appropriately.

Examination of Blood for PSA Qualitative Test Using Acon Cassette

- The PSA cassettes were removed from their sealed pouch.
- The PSA cassettes were placed on a cleaned and leveled surface.
- With pipette, 1ml of serum was transferred onto the specimen area of the cassette.
- One drop of buffer was transferred to the sample well on the PSA cassette to allow the serum to migrate membrane and generate colour line.
- The test was interpreted within 5 minutes.
- (A single line on the Acon cassette shows negative while double lines shows positive) (Cheng-Ching *et al*., 2015).

Urine Culture

- The urine specimen was inoculated on cystine lactose electrolyte-deficient (CLED) agar using the streaking technique of
- The inoculated plates were incubated at 37^0 C for 24-48hr and observed for bacterial growth (Cappucino and Sherman 2014).

III. RESULTS

The Prostate Specific Antigen quantitative results in Umuahia are presented in (Tables 1) In Umuahia, out of 800 patient tested for PSA using quantitative method, 416(52.0) patients are positive and 384(48.0) patients were negative. From 70-80 years of age had the highest level of PSA while the age brackets of 21-40 years had the lowest PSA positive patients of 1(0.23).

The occupational influence of PSA in Prostatitis patients in Umuahia using quantitative method was shown in (figure 1). In Umuahia, out of 800 patients tested in the research area, Farmers has the highest PSA positive patient results with 130 (59.6%) while civil servant and student had the lowest result with 10 (33.3%) (figure 2).

In Umuahia, out of 800 patient tested with PSA strip 433 (54.35) patient were positive. Again, Patients above 80 years and above had the highest PSA value of 40(80.0%) while 21-30 years of age had the lowest positive result of 3(15.0%). (Figure 3) Shows the residential-selttlemen–related distribution of PSA level in the target population in Umuahia. In Umuahia, the rural dwellers had the highest 283 (67.4%) while urban dwellers had 150 (39.5). The bacteria isolates of urine samples from catheterized and uncatheterized prostatitis patients from Umuahia was shown in (figure 4 & 5).

In Umuahia out of 800 patients 550 patients were uncatheterized, 280 (50.9%) patients had growth while 270 urine sample yielded no bacteria growth. *E. coli* had the highest bacterial isolates of 85(30.3%) while *Pseudomonas* had the lowest 14(5.0%). Out of 250 urine samples of catheterized patients was cultured, 210 had bacterial growth, while 40 patients had no pathogen isolated. *E. coli* had the highest pathogens isolates 64 (30.4%) while *P. mirabilis* had lowest bacterial isolates of 16 (7.6%). ANOVA Statistical analysis showed significant variation in the values obtained. (P. >0.05) as there were variation between the catheterized and uncatheterized results.

. **Table 1:** Age Distribution of PSA levels in the target population in Umuahia

Age	No. patient tested	Normal 0-4	4.1-10	10.1-20	20.1-30	30.1-40	40.1-50	50.1-60	70.1-100	100 & above	PSA positive patients
21-30	20(2.5)	19(4.9)	1(0.9)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(0.23)
31-40	50(6.2)	43(11.2)	5(4.8)	1(1.1)	1(1.4)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	7(1.7)
41-50	100(12.5)	60(15.6)	17(16.2)	10(11.5)	6(8.4)	5(11.9)	2(5.1)	0(0.0)	0(0.0)	0(0.0)	40(9.6)
51-60	150(18.5)	82(21.3)	10(9.5)	18(20.7)	20(28.2)	11(26.1)	9(23.1)	0(0.0)	0(0.0)	0(0.0)	68(16.3)
61-70	180(22.5)	80(20.8)	28(26.7)	22(25.3)	17(23.9)	5(11.9)	10(25.6)	10(32.2)	5(25.0)	3(14.3)	100(24.00)
71-80	250(31.2	92(23.9)	40(38.1)	32(36.8)	23(32.4)	15(35.7)	13(33.3)	17(54.8)	10(50.0)	8(38.1)	158(37.9)
Above 80	50(6.2)	8(2.1)	4(3.8)	4(5.6)	4(5.6)	6(14.3)	5(12.8)	4(12.9)	5(25.0)	10(47.6)	42(10.0)
Total	800(100.0)	384(48.0)	105(13.1)	87(10.9)	71(8.9)	42(5.2)	39(4.9)	31(3.9)	20(2.5)	21(2.6)	416(52.0)

Positive PSA level refers to those with PSA value of 4.0ng/l and above. Those in brackets are the percentage values.

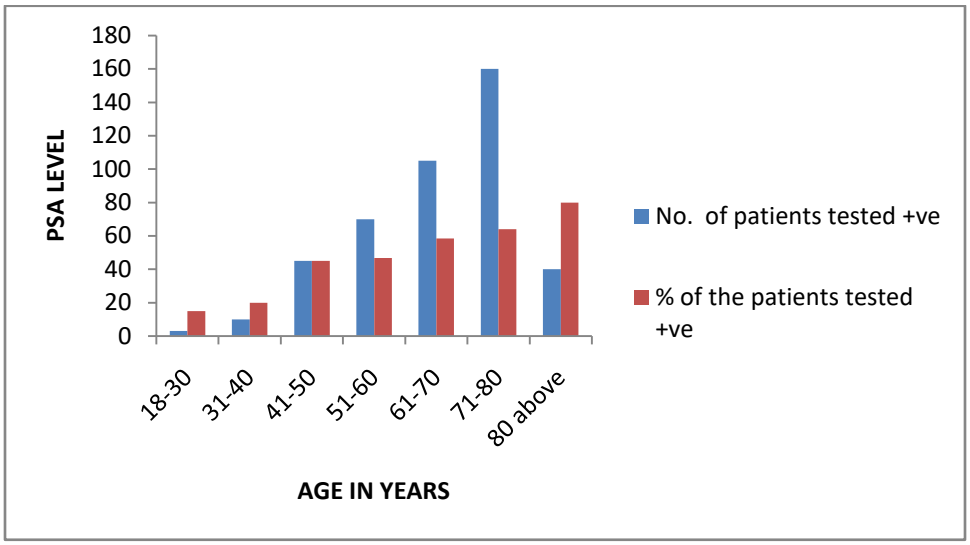

Fig.1 Age distribution of PSA using kit in the study population.

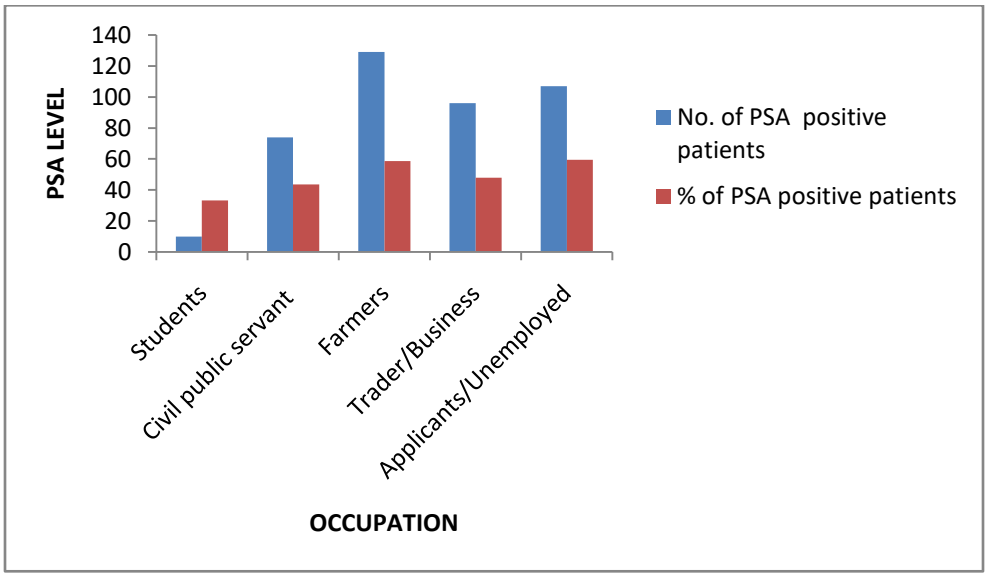

Fig. 2: Social Economic Status related to PSA level among the patients in Umuahia

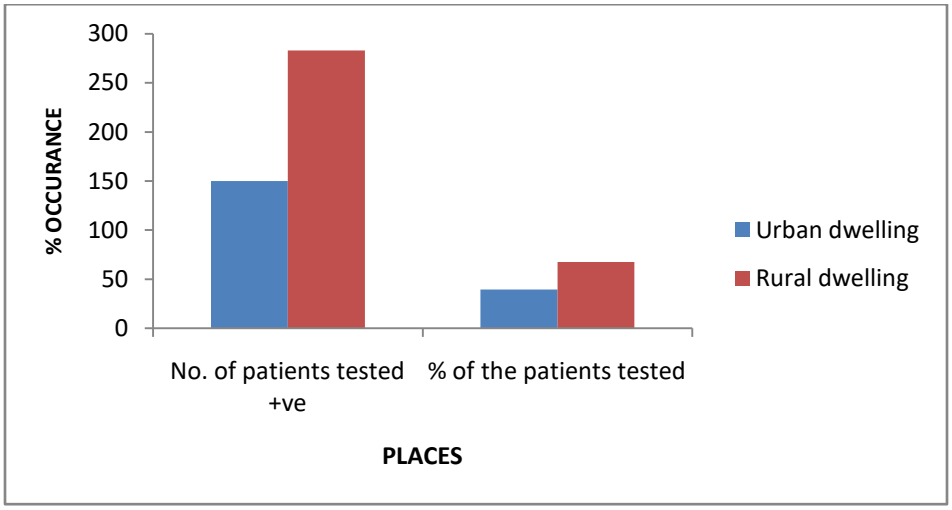

Fig. 3: Dwelling-related distribution of PSA among studied population in Umuahia.

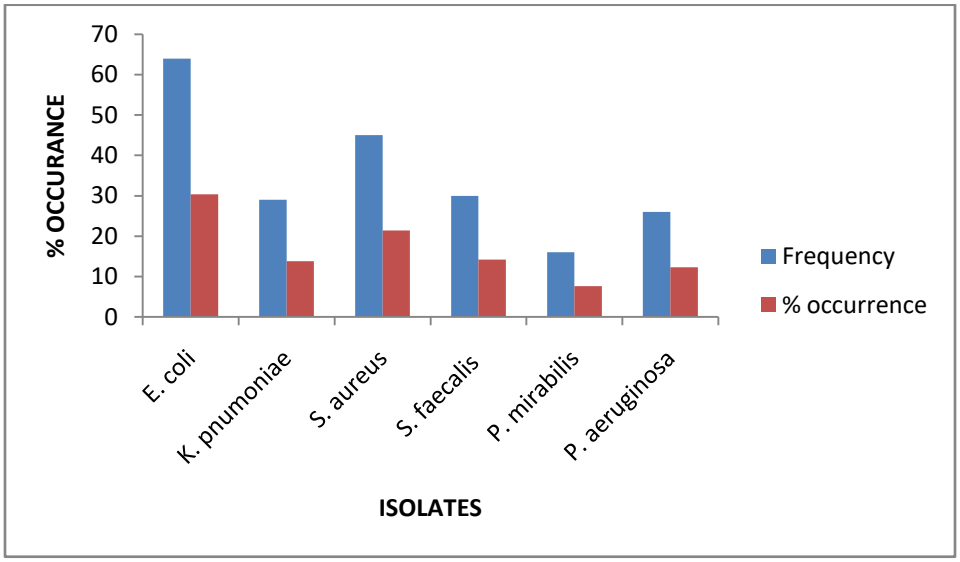

Fig. 4: Bacterial isolates from catheterized patients from Umuahia

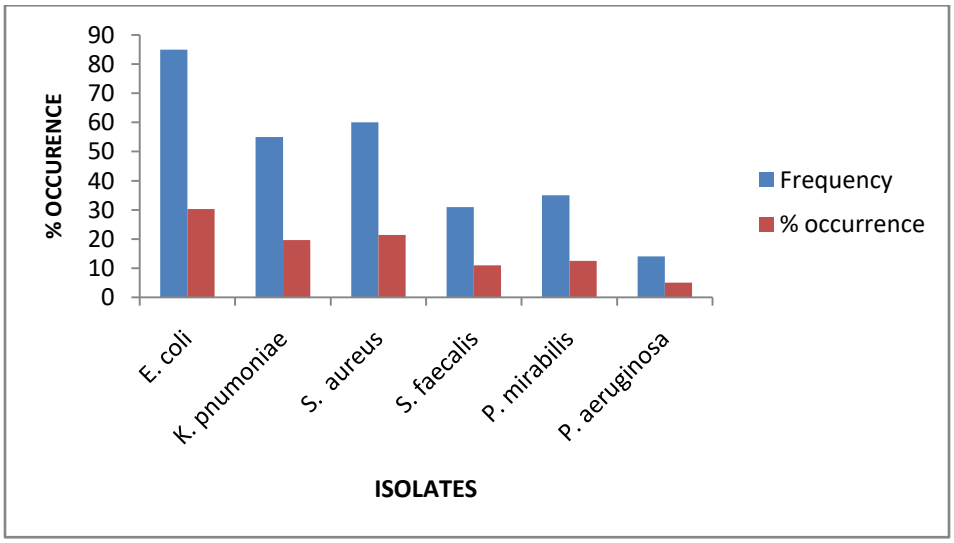

Fig. 5: Bacterial isolated from uncatheterized patients at HCH Umuahia

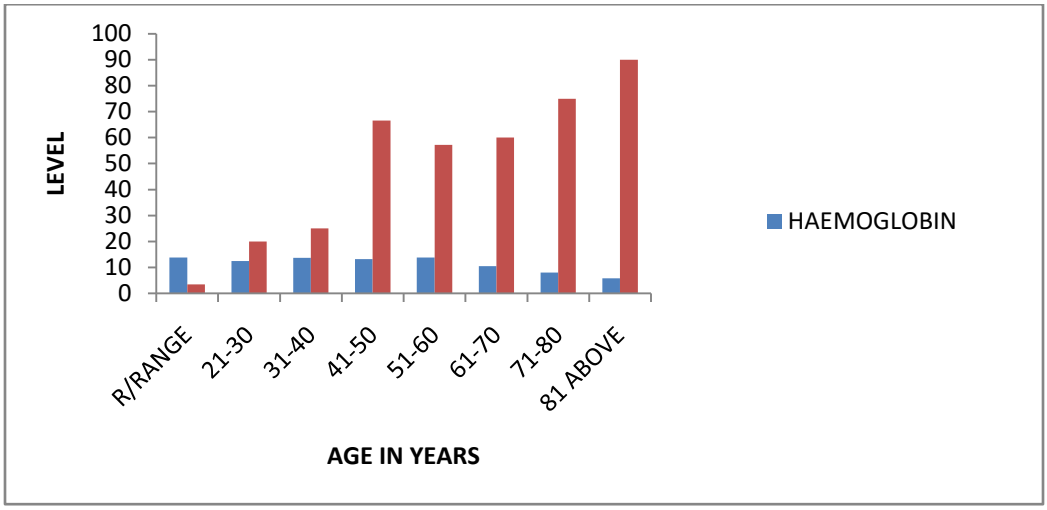

Fig. 6: Impact of PSA on Hemoglobin level in Umuahia.

IV. DISCUSSION

In this study, the prevalence of prostatitis was accessed in Umuahia Abia State using prostate specific Antigen (PSA) screening tests. The study lasted for 12 months period. A total of 800 (1000) specimens were screened using both qualitative and quantitative tests. A total prevalence of 562(56.2%) was recorded for qualitative and 535(53.5%) for a quantitative. In Umuahia, the prevalence was for 433(54.1%) for qualitative and 416(52.0%) for quantitative. This observation corresponds with those of Ogwuegbu, *et al.*, (2018a), Cheng-Ching *et al.*, (2015) and Nickel (2003a) who believed that PSA rapid test and clinical chemistry test are mutually exclusive methods and could defer. Results showed that some quantitatively positive individuals gave qualitatively negative results.

Age influenced the distribution of PSA among those screened in the research area. Generally, it was observed that individuals above 50 years were more predisposed to prostatitis heath challenges than those below 50 years of age. Results showed that the prevalence of PSA increased with age. The highest prevalence of PSA was observed in the patients between the age bracket of 70-80 was 250(31.2%) The results showed that age affected the PSA levels as the oldest group had prostatitis higher rate than the lower ages groups. This is in accordance with the results of Sharp *et al.*, (2010). Nickel *et al.*, (2001b) had found a slightly higher prevalence of prostatitis in the age group below 50 years than among men over 51 years of age in a few areas of their study, which was not statistically significant. The condition developed with time, so the older one becomes the likelihood for him to develop the Prostatitis condition. This therefore agrees with the assertion that increase in age results in increase in PSA level.

Occupational prevalence showed that generally, farmers had the highest prevalence followed by the unemployed people. This showed that awareness and access to healthcare facilities influenced the prevalence of the PSA levels. The observations were similar in both study locations. This further shows that socio-economic status contributed extensively to the prevalence of the prostatitis. This observation tallies with those of Ogwuegbu *et al.*, (2018), who also reported that increased in age, low socio-economic status and awareness are important in other not to increase the chances of developing PSA levels.

In the microbiological analysis of the urine specimens, from our findings it was showed that patients with high microbial growth were those with high PSA levels. This further showed positive correlation between microbial growth and PSA level. It also clearly indicated the association of microbial pathogens as aggravators of the prostatitis. This observation tends to tally with those of Ogwuegbu, *et al*., (2018) Ku, (2005) and Kalpana, (2016).

The microorganisms isolated from the study were *E. coli*, *Staphylococcus aureus*, *Steptococcus faecalis*, *Pseudomans auroginosa*, *Klebsiella* and *Proteus mirabils.* The results obtained showed that *E. coli* was the most prevalent followed by *Staphylococcus aureus* while *Proteus mirabils* had the least prevalent rates and that gram negative bacteria predominated the list of isolated bacteria. Further analysis of these organisms showed that all the isolated organisms had their highest prevalence in the catheterized patients than the uncatheterized ones and that similar organisms were reported in both study locations with age and high PSA levels playing significant roles.

This therefore goes to suggest that similar organisms cause the microbial complications observed in most prostatitis patients no matter the location and age. The observations also showed that the microbial involved lead to complications observed as the individuals with little or no complications in individuals with no microbial growth. Again, most of the bacterial isolates reported in this prostatitis study have been variously implicated in urinary tract infections.

This study agrees with Tain and Smith, (2000), Stamm, (2003) and Warren (2005) whose work showed that preventing unnecessary urinary catheter usage is certainly the most important aspect of preventing catheter-associated urinary tract infections. Various studied indicated that catheterization increases the probability of microbial complications in urinary tract related diseases (Stamm, 2000 and Vasudevan, 2014).

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