

EVALUATION OF C-REACTIVE PROTEINS IN BENIGN PROSTATIC HYPERPLASIA (BPH) SUBJECTS

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ABSTRACT

This study was carried out to evaluate the levels of C-reactive protein (CRP) in benign prostatic hyperplasia (BPH) subjects in General Hospital Bwari, FCT Abuja, Nigeria. A total of fifty (50) subjects were recruited in this study. Twenty five (25) BPH subjects served as test and twenty five (25) apparently healthy subjects served as control. Fluorescence immunoassay (FIA) method for quantitative evaluation of CRP was used in this assay. The data generated from this study was statistically analysed using statistical package for social science (SPSS) version 21.0 for windows. The result showed that there was no significant difference ($p > 0.05$) in the mean concentration of C-reactive protein (CRP) (mg/L) in Benign Prostatic Hyperplasia (BPH) subjects (6.92 ± 3.62) when compared with apparently healthy subjects (5.24 ± 3.63). Hence, C-reactive protein cannot be used as a marker for the diagnosis of benign prostatic hyperplasia (BPH).

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Keywords: c-reactive proteins, benign prostatic hyperplasia, inflammation

INTRODUCTION

The prostate is a small muscular gland that produces an important fluid that transports sperm and keeps them safe. Although not vital for life, the prostate is vital for reproduction. All men have a prostate. It sits just in front of the rectum and below the bladder (Daniel and Tim, 2018). Weighing around 1 ounce (30 grams), the prostate surrounds the urethra, the tube that carries urine from the bladder to the penis. It is vital for the proper functioning of the male reproductive system (Ogbonna *et al.*, 2021; Nnatuanya *et al.*, 2018; Nwosu *et al.*, 2015). The prostate only appears in males. It secretes a fluid that keeps sperm alive while protecting them and the genetic code they carry. The prostate contracts during ejaculation and squirts its fluid into the urethra. During ejaculation, sperm travels along two tubes called vas deferens. They carry millions of sperm from the testes (where they are made) to the seminal vesicles. The seminal vesicles are attached to the prostate and add extra fluid to the semen before it is sent down the urethra. The site where the vas deferens meets the seminal vesicles is known as the ejaculatory duct. During ejaculation, the prostate contracts, closing off the opening between the bladder and urethra, as well as pushing semen through at speed. This is why it is impossible to urinate and ejaculate at the same time (Mike, 2019).

Benign prostatic hyperplasia (BPH) is a condition in which the prostate, a walnut-sized body part made of glandular and muscular tissue, grows in size. BPH is an enlarged prostate. The prostate surrounds part of the [urethra](#), which is the tube that carries urine and sperm out of the body. The benign (noncancerous) prostatic hyperplasia condition is also called benign prostatic enlargement (BPE), adenofibromyomatous hyperplasia, or benign prostatic obstruction. This is a common condition as men get older (Bent *et al.*, 2006). An enlarged prostate gland can cause uncomfortable urinary symptoms, such as blocking the flow of

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urine out of the bladder. It can also cause bladder, urinary tract or kidney problems. Needing to urinate often is a common symptom of BPH.

C-reactive protein (CRP) is a ring-shaped (annular), pentameric protein found in [blood plasma](#), whose circulating concentrations rise in response to [inflammation](#). It is a substance produced by the liver in response to inflammation. Other names for CRP are high-sensitivity C-reactive protein (hs-CRP) and ultra-sensitive C-reactive protein (us-CRP). CRP was so named because it was first identified as a substance in the serum of patients with acute inflammation that reacted with the antibody against the somatic [capsular](#) polysaccharide (C-polysaccharide) of [pneumococcus](#) (Levine, 2011). The CRP gene is located on [chromosome](#) 1 (1q23.2). The level of CRP which can be measured in the blood increases when there's inflammation in the body. CRP level might be checked for infections or for other medical conditions. A high-sensitivity C-reactive protein (hs-CRP) test, which is more sensitive than a standard test, also can be used to evaluate the risk of developing coronary artery disease (which can lead to a heart attack). CRP test might be ordered to check for inflammation, which can indicate infection or a chronic inflammatory disease, such as rheumatoid arthritis or lupus, as well as risk of heart disease. A high level of CRP in the blood can be associated with an increased risk of heart attacks. A CRP test doesn't indicate the cause of inflammation, though, so it's possible that a high hs-CRP level could mean there's inflammation caused by something besides the heart. A high level of CRP in the blood is a marker of inflammation. It can be caused by a wide variety of conditions, from infection to cancer (Daniel and Tim, 2018).

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This study was done in order to study the effects of benign prostatic hyperplasia (BPH) on C-reactive protein, as well as comparing the changes in the apparently healthy subjects in FCT Abuja, Nigeria.

AIM

The aim of this study is to evaluate C-reactive protein in Benign Prostatic Hyperplasia (BPH) subjects attending General Hospital Bwari, FCT Abuja, Nigeria.

MATERIALS AND METHODS

STUDY AREA

This study was conducted in Abuja. It is the capital city of Nigeria located in the centre of the country within the Federal Capital Territory (FCT). It is a planned city designed as a new national capital city to replace Lagos, and was built mainly in the 1980s, replacing the country's most populous city of Lagos as the capital on 12 December 1991 (Roman, 2013). Abuja's geography is defined by Aso Rock, a 400-metre (1,300 ft) monolith left by water erosion. The Presidential Complex, National Assembly, Supreme Court and much of the city extend to the south of the rock. Zuma-Rock, a 792-metre (2,598 ft) monolith, lies just north of the city on the expressway to Kaduna.

STUDY POPULATION

A total of fifty (50) samples were used for the research. Twenty five (25) benign prostatic hyperplasia (BPH) subjects from General Hospital Bwari, FCT Abuja, Nigeria were recruited for this study. Also, twenty five (25) apparently healthy Nnatuanya, I.N., Obeagu, E.I., Nwakulite, A. and Chikaeme, A.H. (2022). Evaluation of C-Reactive Proteins in Benign Prostatic Hyperplasia (BPH) Subjects. Madonna University Journal of Medicine and Health Sciences. 2(1):239-248

health subjects from FCT Abuja, Nigeria, served as controls. These subjects were within the ages of 40-70.

Inclusion Criteria: Subjects for this research were male within the ages of 40-70 years with no underlining illness.

Exclusion Criteria: Male who are not within the 40-70 years of age and individuals with known cases of hepatitis, tuberculosis and other inflammatory diseases were excluded.

ETHICAL APPROACH

The participants were briefed on the aim and objectives of the study and were reassured of confidentiality. An informed consent was obtained from each of the participants in the study. The investigations were carried out at no cost to the participants.

SAMPLE COLLECTION

Two milliliters (2 mls) of venous blood sample was taken from the antecubital vein of every participant, and was dispensed into a plain sterile container (no anticoagulant). The blood was allowed to clot for 45 minutes. Using an applicator stick, the clotted blood was dislodged and then centrifuged at 2,500 rpm (revolution per minute) for 5 minutes. The serum obtained was carefully

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picked using an automatic micropipette and transferred into a cryovial tube, after which it was carefully stored at -20°C until ready for analysis.

METHOD

All tests were performed on both test and control samples. The following methods were carried out for the purpose of this study.

C-REACTIVE PROTEIN (CRP)

Quantitative evaluation of CRP was done using fluorescence immunoassay (FIA).

Procedure

A puncture was made on the top of the detection buffer tube by inserting an empty sample collector. Then 10 μL of sample was drawn with a sample collector which was assembled into one and the sample in the sample collector was mixed by inversion. The mixture of buffer and the sample has to be used within 30 seconds, After which the cap of the assembled tube was removed and two drops of reagent was first discarded onto the paper towel before applying only two drops of the mixture was onto the sample well of the cartridge. The cartridge was left at room temperature for 3 minutes before inserting the device into the holder where it was then scanned by insert it into the cartridge holder of the instrument for ichroma tests. Ensure proper orientation of the cartridge before pushing it all the way inside the cartridge holder. An arrow has been marked on the cartridge especially for this purpose. Then the 'select' button on the instrument for ichroma tests was pressed to start the scanning process. After

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which the test results on the display screen of the instrument for ichroma test was read and recorded.

STATISTICAL ANALYSIS

Statistical package for Social Science (SPSS) was used for all statistical analysis. Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 18.0 for windows. The results were expressed as mean \pm S.D. Data obtained from this study were analysed using independent sample t-test which was used to compare means, and values were considered significant at $p < 0.05$ and non-significant at $p > 0.05$.

RESULTS

The results were expressed as mean \pm standard deviation and comparisons of different mean were done using students t-test. The result of the study showed that C-reactive protein (mg/L) was 6.92 ± 3.63 in Benign Prostatic Hyperplasia (BPH) subjects (tests) while 5.24 ± 3.63 in control ($P > 0.05$) as seen in table 1 below.

Table 1: C-reactive protein (CRP) in Benign Prostatic Hyperplasia (BPH) subjects (tests) and healthy health subjects (controls).

Table 2; shows age group data of concentration of C-reactive protein (CRP) in Benign Prostatic Hyperplasia (BPH) subjects (tests) and healthy health subjects (controls)

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Table 1: Shows C-reactive protein concentrate

Tests (BPH)	Controls	F	P-value
6.92 ± 3.625.	24 ± 3.63	1.926	0.172

P > 0.05: Statistically Not Significant

Table 2: shows age group data of concentration of C-reactive protein (CRP)

GROUP	Age group (years)	C-reactive protein (CRP) (mg/L)
Control	40-48	5.09±
	49-57	3.98±
	58-67	9.07±
Tests (BPH)	40-48	6.19±
	49-57	5.96±
	58-67	8.20±
	F	1.889
	P	0.116

Post Hoc

ANALYSIS OF RESULTS

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The C-reactive protein (CRP) (mg/L) concentration in Benign Prostatic Hyperplasia (BPH) subjects (6.92 ± 3.62) and that of the apparently healthy subjects (5.24 ± 3.63) as shown in table 1.

The age grouping of both the control and Benign Prostatic Hyperplasia (BPH) subjects were analysed statistically and it showed that there was no significant difference between them as shown in table 2.

DISCUSSION

The result of study showed that there was no significant difference ($P > 0.05$) in the C-reactive protein (CRP) (mg/L) of Benign Prostatic Hyperplasia (BPH) subjects attending General Hospital Bwari, Abuja and their control. This is in contrast to study by Jennifer *et al.* (2009) that reported that higher C-reactive protein (CRP) are associated with rapid increases in prostate volume and prostate-specific antigen levels.

C-reactive protein (CRP) is a non-specific marker of systemic inflammation, and it may reflect the presence of inflammation in urologic pathways that could lead to the development of BPH.

CONCLUSION

Benign (non-cancerous) prostatic hyperplasia is a condition in which the prostate grows in size (i.e., an enlarged prostate). C-reactive protein (CRP) is a ring-shaped (annular), pentameric protein found in blood plasma, whose circulating concentrations rise in response to inflammation. Evaluations on the Nnatuanya, I.N., Obeagu, E.I., Nwakulite, A. and Chikaeme, A.H. (2022). Evaluation of C-Reactive Proteins in Benign Prostatic Hyperplasia (BPH) Subjects. Madonna University Journal of Medicine and Health Sciences. 2(1):239-248

effect of benign prostatic hyperplasia (BPH) on the serum levels of C-reactive protein (CRP) were done. The study revealed that there was no significant difference in the level of C-reactive protein for both the test and control. Hence, C-reactive protein cannot serve as a maker in the diagnosis of benign prostatic hyperplasia (BPH).

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Nnatuanya, I.N., Obeagu, E.I., Nwakulite, A. and Chikaeme, A.H. (2022). Evaluation of C-Reactive Proteins in Benign Prostatic Hyperplasia (BPH) Subjects. *Madonna University Journal of Medicine and Health Sciences.* 2(1):239-248