# Prostate Specific Antigen Protein Level as Biomarker in Breast Carcinoma Patients at Oncology Centre in Sebha City/ Libya

**Abubaker Hamed Ali** ***Seada Faraj Alsonossi** ***Fatima Abdullah Abdrahim**

Sebha University/ Collage of Science- Biotechnology Department

*Sebha University/ Collage of Science - Zoology Department

Sebha - Libya

**E_mail**: Abu.Ali@Sebhau.edu.ly

## Abstract

Breast carcinoma is one of the most common types of carcinomas worldwide in female women of all ages according to world health organization. The current study was aimed to evaluate whether the Prostate Specific Antigen (PSA) protein level could serve as a biomarker for breast carcinoma. In this study, Immunoeznymometric assay was performed to evaluate PSA protein level of 60 women's; 40 women's with breast carcinoma and 20 healthy women's (without carcinoma) was used as control group. The mean age was 46.3 years; age range (28 to 64 years). The Mean PSA protein level was 0.324 ng/ml, SD was 0.387, P-value was 0.330 > 0.05. This study is the first study to report no high expression of PSA protein was observed in Libyan women's who has breast carcinoma, and there was no association between PSA proteins with breast carcinoma. This indicates that the PSA protein has no important role as an indicator for breast cancers patients from women's and cannot be biomarker for breast carcinoma.

**Keywords**: Breast Carcinoma, Prostate Specific Antigen, Protein Expression, and Oncology.

# دراسة مستوى مستضد البروتين الخاص للبروستات كدلالة حيوية لمرضى سرطان الثدي في مركز الأورام في مدينة سبها / ليبيا

**أبوبكر حامد علي** **سعدة فرج السنوسي*** **فاطمة عبد الله عبد الرحيم***

جامعة سبها/ كلية العلوم - قسم التقنية الحيوية

*جامعة سبها/ كلية العلوم - قسم علم الحيوان

سبها - ليبيا

## الخلاصـــة

يعد سرطان الثدي أحد أكثر أنواع السرطان شيوعاً في جميع أنحاء العالم لدى النساء الاناث من جميع الأعمار وفقًا لمنظمة الصحة العالمية. هدفت هذه الدراسة الحالية لتقييم ما إذا كان مستوى مستضد البروتين الخاص للبروستات PSA يمكن أن يكون كدلالة حيوية لسرطان الثدي. في هذه الدراسة اجري الفحص المناعي لتقييم مستوى PSA لـ 60 امرأة، 40 امرأة مصابة بسرطان الثدي و20 امرأة من الاصحاء (غير مصابين بسرطان الثدي) استخدمت كمجموعة ضابطة بمتوسط عمر 46.3 سنة ومعدل عمر من 28 إلى 64 سنة. كانت نتائج المتوسط الحسابي لمستوى PSA هو 0.324 نانوغرام / مل والانحراف المعياري هو 0.387 بقيمة احتمالية (0.330)>0.05. ولوحظ كذلك عدم وجود اي ارتباط بين PSA وسرطان الثدي. يعد العمل الحالي أول دراسة كتبت عن عدم وجود تعبير عالي لمستوى PSA للنساء الليبيات المصابات بسرطان الثدي وهذا دليل على أن PSA ليس له دور مهم كمؤشر لمرضى سرطان الثدي من النساء ولا يمكن أن يكون دلالة حيوية لسرطان الثدي.

**الكلمات المفتاحية**: سرطان الثدي ومستضد البروستات الخاص وتعبير البروتين وعلم الأورام.

## Introduction

Breast carcinoma is one of the most common malignancy tumor and responsible for the highest cause of death in female women (Parkin, 2001). Incidence of breast carcinoma is increasing with majority of rise seen in all developing countries of the world (Ferlay, *et al*., 2010). It is second most common carcinoma overall (10.9% of all Malignancy Tumour) but ranks as fifth cause of death in the world (Ferlay, *et al*., 2010). In 2004 were registered 1.15 million new breast carcinoma cases and over 500,000 deaths reported around all the world and more than half of all cases occurred in developed countries (Parkin and Fernandez, 2006). Prostate specific Antigen (PSA) was identified in 1977 by Wang, *et al*. (1977). PSA is as single chain glycoprotein of approximately 34,000 Daltons containing 7% carbohydrate (Wang, *et al*., 1979). It is a member of the human glandular kallikrein family, a locus of which is comprised to three genes and spans a 60-70kb region on chromosome 19 q13.3-q13.4 (Riegman, *et al*., 1992; Clements, 1994). It has emerged of prostate carcinoma with proven diagnostic and prognostic implications as an eminent biomarker (Giai, *et al*., 1995). The demonstration of PSA from extra prostate sites such as periurethral gland, pancreas, breast, endometrial tissue, and body fluids like amniotic fluid, ascitic fluid, pleural effusions, cerebrospinal has caught the attention of scientists for prospective role of PSA in a myriad of other diseases (Narita, *et al*., 2005). Also, the hormonal influence of prostate and breast carcinogenesis has prompted studies to determine the role of PSAconcentrationin breast carcinoma as a vital biomarker (Poh, *et al*., 2008). PSA is a well-established tumour marker for prostate carcinoma, is now believed to be not prostate specific, but present in other tissues (Yu, *et al*., 1998). As well it is present in female tissues, specially the breast and its secretions and can be used as a predictive indicator for prognosis, diagnostic and treatment (Yu, *et al*., 1998). After realising that not all breast tumors make PSA, studies developed quickly by the usage of PSA as low cellularity, diploid tumors, low s- phase fraction, less advanced disease stage, lower risk of relapse and longer overall survival (Yu, *et al*., 1995).

The present study was, therefore, undertaken to assess if peripheral serum PSA levels can be correlated with diagnosis and prognosis of breast carcinoma because the studies for PSA protein as biological marker is very few in breast carcinoma. To the best of our knowledge, there is no report at oncology centre in Libya of PSA protein level for breast carcinoma. Therefore, the main aim of the present study is to evaluate whether the PSA protein level could serve as a biomarker for breast carcinoma to be better for diagnosis.

## Materials and Methods

### Blood Samples Collection

Two groups were used in this study, group A; this group included 40 breast carcinoma who were admitted in the Oncology Centre in Sebha City with breast carcinoma and were of the age group between 28 to 64 years with a mean value ± S.D., (46.30±7.18). Group B: the control group included 20 healthy subjects Woman's without carcinoma breast served as control group B, the average group age was the same as in group A. Blood specimen were taken from both groups A and B after overnight fasting, the blood was kept into plain tube for separation by centrifugation at 4500 rpm for 5 minutes to get serum specimen from whole blood and stored at –20℃ until analysis.

The PSA concentrations were analyzed by ImmunoEnymometric Assay.

**Technique of ImmunoEnymometric Assay for PSA Protein Level**

ST AIA–pack PSA Cat. No. 0025212 was designed for in vitro diagnostic use only for the quantitative assay of PSA in human serum specimen on TOSOH AIA system analysers. This instrument is suggested for serum PSA measurement in combination with digital rectal examination as assistance in the identification of prostate carcinoma in males 50 years or older using the manual's operator. (100A071001-032F, Rev.03/12). The steps of ImmunoEnymometric Assay were performed entirely in the ST AIA – PACK PSA Test cups. The sample presented in bound with monoclonal counter acting agent immobilized on an attractive strong stage and enzyme labelled monoclonal counter acting agent within the test tubes. The attractive globules are washed to evacuate unbound chemical labelled monoclonal counteracting agent (Antibody) at that point hatched with a fluorogenic substrate 4 methyl phosphate. The sum of protein labelled monoclonal counter acting agent that ties to the beads in straight forwardly corresponding to the PSA concentration within the test. All samples and control cases are performed automatically to PSA level in ng/ml. Reference of PSA concentrations in this study were in (0-4.0 ng/ml).

**Data Statistical Analysis**

All results were expressed as mean value ± SD. These results were applied to analyze the differences between the mean value ± SD using unpaired student - t test. Critical P-value was considered statistically significant at $p < 0.05$ (Hill, 1971).

**Results and Discussions**

Breast carcinoma is one of the most common tumours that affect healthy women in the worldwide specially developing countries (Shiryazdi, *et al*., 2015). The detection of tumour markers for example Carcinoembryonic Antigen (CEA), Alfa fito protein (AFP), Cancer antigen 15.3 (CAl5.3) and Carbohydrate Antigen 19.9 (CAl9.9) are critical for the early diagnosis of breast carcinoma. However, all these markers were shown lack of specificity for diagnosis (Shiryazdi *et al*., 2015). Modern studies with ultra-sensitive immunoassays demonstrated that approximately 70% of breast tumours cystolic extracts contained PSA (Yu, *et al*., 1998). From knowledge, the fact that not all breast tumours produce PSA prompted studies of the utilization of PSA as a prognostic indicator in breast carcinoma (Yu, *et al*., 1995; Yu, *et al*., 1998). Table (1) showed the results of the current study which revealed that the date on serum PSA in breast carcinoma patients was present very low in both control group and breast carcinoma patients group with the mean PSA protein level 0.324 ng/ml and S.D was 0.387 of breast carcinoma patients group A (Table 1) and (Figure 1). It is not as acceptable biochemical parameter for diagnosis and monitoring of breast carcinoma. These results were in accordance very well with the results of previous study like (Giai, *et al*., 1995), which was observed that high concentrations of tumour PSA were not correlate with high PSA concentrations in the presurgical sera. Serum PSA concentration in this study was not higher in patients with PSA positive breast cancers than in PSA negative cancers and with (Giai, *et al*., 1995) who reported that peripheral PSA did not an acceptable biochemical parameter for diagnosis, response to treatment, and detection of early recurrence during follow patients with breast cancer.

**Table (1) Serum PSA ng/ml levels in Breast Carcinoma Group and Control Group**

| Parameters | group A Breast Carcinoma Mean ±S.D N=40 | Group B Control Mean ±S.D N=20 | T- test P - value |
|---|---|---|---|
| Age (yeas) | 46.30±7.18 | 32.65±10.04 | P=0.000 |
| Serum PSA ng/ml | 0.324±0.387 | 0.235±0.170 | P=0.330 |

Significant at P< 0.05values are given as Mean ± S.D.

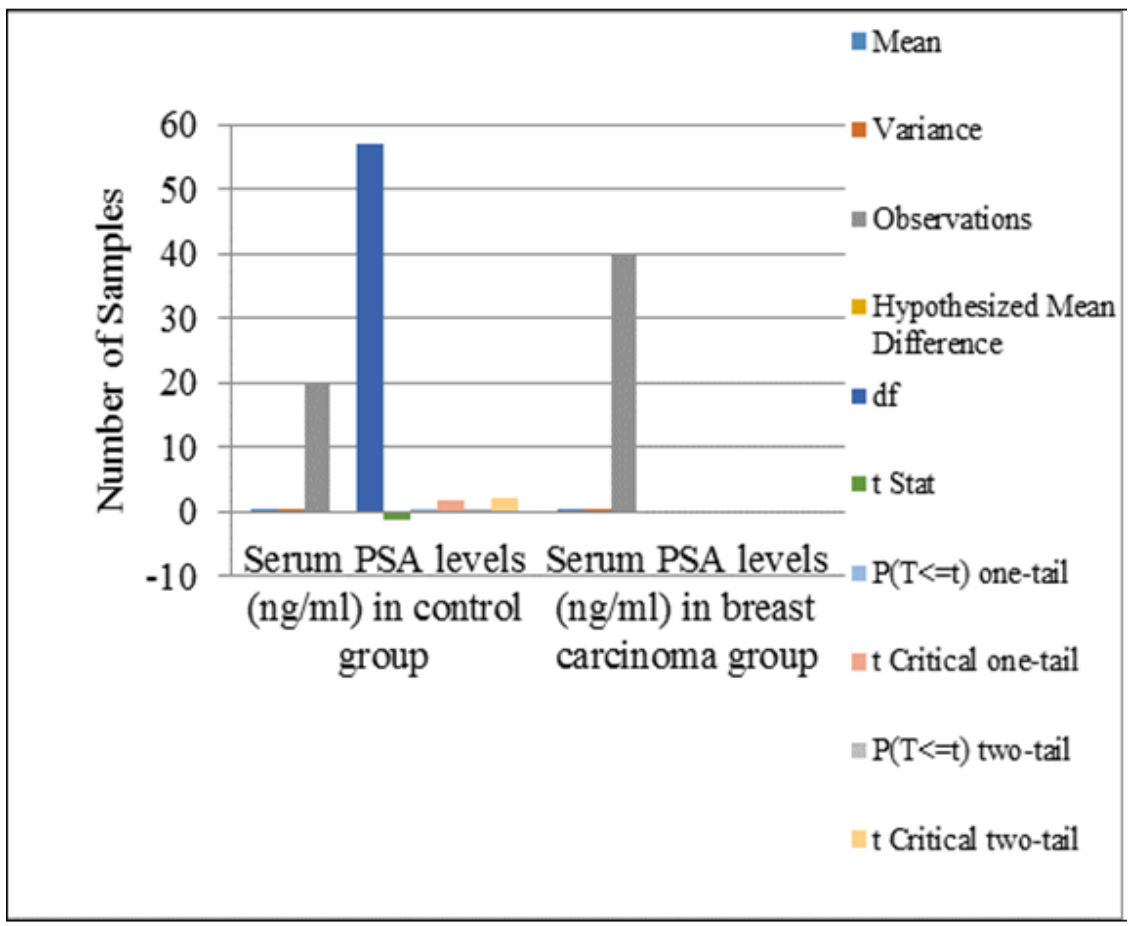


**Figure (1) T- Test of Serum PSA ng/ml levels in Breast Carcinoma Group and Control Group**

Finally, these results supported the conclusion of previous studies of several authors like (Nikhil, *et al*., 2014) and (Giai, *et al*., 1995) that was concluded that serum PSA concentrations did not useful for breast carcinoma patient diagnosis or prognosis with other studies. On the other hand, some authors like (LI, *et al*., 2018), have suggested that serum PSA is a potential prognostic indicator in breast carcinoma patients and the value of Serum PSA concentrations may be a useful as biomarker for the diagnosis and prognostic of breast carcinoma.

## Conclusions

From our observations in this current study, there is no important role of PSA protein level as biomarker for breast carcinoma in general and for Libyan patients as well.

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