

## Original Article

# Analyses of psychopathological symptoms in patients performing prostate biopsy

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**Abstract:** Patients performing prostate biopsy have been reported to suffer from high levels of psychopathological symptoms, while there are few significantly influencing factors have been found until now. This study constructed a psychosocial database of prostate biopsy subjects to investigate morbidity and risk factors of psychopathological symptoms. We distributed psychological questionnaires which were scheduled for a prostate cancer biopsy before biopsy and 3 days after biopsy. Psychological questionnaires including data of socioeconomic status, International Prostate Symptom Score (IPSS), serum level of Prostate Specific Antigen (PSA), and biopsy-related symptoms were also collected. 138 men returned all questionnaires. The scores of anxiety and depression post biopsy were significantly high compared with those before biopsy ( $P < 0.05$ ). The positive rate of anxiety post biopsy was also higher than those before biopsy (24.6% vs. 14.5%,  $P < 0.05$ ). Likewise, significant difference was detected between anxiety and no anxiety patients in age, serum level of PSA, family economic status, educational level, and having biopsy-related symptoms ( $P < 0.05$ ). In the multivariate analysis, only young age ( $< 60$  y), poor family economic status, high level of PSA ( $> 10$  ng/ml), and problematic biopsy-related symptoms were risk factors of anxiety. Prostate biopsy can lead to increased psychopathological symptoms. But other factors, like cancer-related worry, might contribute more to anxiety.

**Keywords:** Psychopathological symptoms, prostate biopsy, risk factor

## Introduction

Prostate cancer (PCa) is the most commonly diagnosed cancer in developed country [1]. In China, the incidence of PCa is rising gradually, especially in urban area. It is the fifth most frequently diagnosed cancer in Chinese men, with a highest prevalence rate of 28.1 per 100,000 in Hongkong area in the year 2010. The mortality is high in Chinese rural area which 5% patients died of PCa worldwide lived in China [2, 3]. Early diagnosis of PCa is the most effective means to increase survival rate. Detectable rate of PCa has risen rapidly after introduction of Prostate-Specific Antigen (PSA) blood tests. For men who have a high PSA testing, histologic diagnosis of PCa requires a prostate needle biopsy, and numbers of men undergoing biopsy have increased correspondingly [4].

The benefits of screening for PCa include early detection and reduced mortality. In a recent trial, the death from prostate cancer in the screening group can reduce 20% compared with the control group not receiving such screening [5]. Some opinions remain the potential harms of screening for PCa. The recent two reviews concluded that such screening resulted in a small or no reduction in PCa-specific mortality, but was closely associated with harms related to subsequent investigation or treatment [6, 7]. Prostate biopsy may cause bleeding, pain, and urinary and sexual symptoms [8]. Evidence of the psychological impact of biopsy showed that problematic post biopsy symptoms can lead to increased anxiety and depression [9, 10]. But those psychopathological symptoms might also come from cancer-related worry or diagnosis of prostate cancer [9, 11].

## Psychopathological symptoms of prostate biopsy

Data about the factors influencing psychopathological symptoms in patients performing prostate biopsy is lacking.

This research investigated the psychopathological symptoms in patients performing prostate biopsy on two occasions: before biopsy and 3 days post biopsy. We explored the difference of psychopathological symptoms between two occasions. Some other psychological data are also collected. Specifically, we analyzed risk factors of psychopathological symptoms among those patients.

### Materials and methods

#### *Study population*

We investigated all patients who were hospitalized for prostate biopsy to rule out cancer at the Urology Department of First Affiliated Hospital of Anhui Medical University from January 1, 2014 to June 30, 2015. All patients had an elevated PSA result, ( $>3.0$  ng/ml). Patients were excluded if they met following criteria: already diagnosed as having any kind of cancer, had cognitive impairment and/or severe psychiatric disorders that made the subject incapable of participating in the project. There were a total of 138 patients included in the project. The mean age was  $67.36 \pm 7.45$  years old, ranged from 47 to 82 yrs. 14 patients were below 60 yrs, 84 between 61 yrs and 70 yr, and 40 above 70 yrs. The study protocol was approved by the Ethics Review Board of Anhui Medical University, and written consent was obtained from all subjects.

#### *Socioeconomic and clinical characteristics*

Before biopsy, every patient was evaluated low urinary tract symptoms (LUTS). They completed questionnaires about International Prostate Symptoms Score (IPSS). All participants reported their registered residence (rural =1, suburban =2, urban =3), educational level (primary school or below =1, high school =2, college degree or above =3), and family economic status (below average =1, medium =2, above average =3).

#### *Biopsy-related symptoms*

Each subject underwent a 13-core transrectal ultrasound guided prostate biopsy (TRUS-Bx).

Men self-reported biopsy-related symptoms three days after TRUS-Bx. Specific related complications included fever, shivers, pain in area of biopsy, haematuria, and hematochezia. For each reported symptom, participants were asked to grade the degree of "problem" associated with its presence as none, minor, moderate, or major. We used this information to derive a binary outcome for each symptom, as present with moderate/severe problem versus not present/minor problem. We defined patient with any moderate/severe problematic symptom three days after TRUS-Bx as having problematic biopsy-related symptoms.

#### *Psychopathological symptoms*

We investigated psychopathological symptoms, anxiety and depression, before TRUS-Bx and three days after TRUS-Bx. The Zung Self-Rating Depression Scale (SDS) and Zung Self-Rating Anxiety Scale (SAS) are commonly used self-evaluation instruments for measuring depression and anxiety symptoms, respectively [12, 13]. Both the SAS and the SDS have 20 questions related to the frequency of various symptoms. The standard total score is the sum of the scores of 20 items multiplied by 1.25. An SDS standard score  $\geq 53$  indicates the presence of depression, and an SAS standard score  $\geq 50$  indicates the presence of anxiety.

#### *Statistical analysis*

SPSS17.0 software was used in data analyses (SPSS, Chicago, IL). Continuous data were described as means and S.D. S (mean  $\pm$  S.D.); categorical variables were expressed as cases or percentages. The Pearson chi-square test and paired samples t test were used for analysis of psychopathological symptoms difference between before biopsy and 3 days post biopsy. Differences in age, IPSS, PSA level, registered residence, educational level, and family economic status, biopsy-related symptoms between patients with and without psychopathological symptoms were analyzed using the Pearson chi-square or the independent samples t-test. To evaluate the risk factors of psychopathological symptoms, a multivariate logistic regression model using the forward step wise method was used. The level of significance was set at  $P < 0.05$ .

## Psychopathological symptoms of prostate biopsy

**Table 1.** Comparison of anxiety and depression symptoms before and post biopsy

Variable	Scores of anxiety	Anxiety symptoms n (%)	Scores of depression	Depression symptoms n (%)
Before biopsy	43.77±9.02	20 (14.5)	42.89±10.01	16 (11.6)
Post biopsy	45.92±9.83	34 (24.6)	43.68±10.83	20 (14.5)
χ/t value	-3.446	4.513	-2.523	0.511
P value	0.001	0.034	0.013	0.475

**Table 2.** Comparison of socioeconomic and clinical characteristics between patients with and without anxiety

Characteristic	Anxiety	No anxiety	χ/t value	P value
Number of subjects	34	104		
Age	63.94±9.02	68.48±6.53	3.187	0.002
IPSS	23.50±6.83	21.41±5.38	-1.832	0.069
PSA	12.27±2.30	9.13±2.13	-7.301	0.000
Registered residence			2.591	0.274
Rural	7 (29.4%)	13 (9.6%)		
Suburban	19 (58.8%)	53 (50.0%)		
Urban	8 (11.8%)	38 (40.4%)		
Educational level			11.532	0.003
Primary school or below	11 (32.4%)	12 (11.5%)		
High school	12 (35.3%)	68 (65.4%)		
College degree or above	11 (32.4%)	24 (23.1%)		
Family economic status			31.505	0.000
Below average	14 (41.2%)	4 (3.8%)		
Medium	14 (41.2%)	68 (65.4%)		
Above average	6 (17.6%)	32 (30.8%)		
Biopsy-related symptoms			7.159	0.007
Yes	16 (47.1%)	24 (23.1%)		
No	18 (52.9%)	80 (76.9%)		

IPSS, international prostate symptoms score; PSA, prostate specific antigen.

### Results

#### Population characteristics

The minimum and maximum PSA level of the participants was 3.8 and 16.2 ng/mL, respectively. The mean level was 9.90±2.55 ng/mL. The median and IQR (P25, P75) were 10.20, 8.15, and 11.80 ng/mL, respectively. Many patients had LUTS before biopsy. The mean IPSS was 21.93±5.82. The median and IQR (P25, P75) were 21, 19, and 25.25, respectively. Many patients experienced adverse physical effects of biopsy, but majority were mild and relieved quickly among them. Three days after biopsy, 40 men reported experiencing problematic symptom of the procedure: 21 pain, 16

hematuria, 14 hematochezia, 3 fevers, 2 shivers. 14 men experienced two or three problematic symptom.

#### Psychopathological symptoms

Patients had significantly high scores of anxiety and depression post biopsy compared with that before biopsy (P<0.05). 20 patients before biopsy and 34 patients post biopsy had anxiety symptoms. The positive rate of anxiety post biopsy was significantly higher than that before biopsy (P<0.05) (**Table 1**).

According to anxiety symptoms post biopsy, we divided patients into two groups, having anxiety symptom (34 patients) and no anxiety symptom (104 patients). We compared age, IPSS, serum level of PSA, registered residence, family economic status, educational level, and problematic biopsy-related symptoms between two groups (**Table 2**). There was significant difference between anxiety and no anxiety patients in age, serum level of PSA, educational level, family economic status, and having biopsy-related symptoms (P<0.05).

In the binary logistic regression model, anxiety symptom post biopsy was set as a dependent variable, and all the above 5 variables that were significantly different between patients with and without anxiety were added to the model as independent variables. The age was changed to categorical variable (below 60 yr =1, between 61 yr and 70 yr =2, above 70 yr =3). Serum level of PSA was set as below 10 ng/ml =1, above 10 ng/ml =2. The indicator of every independent variable was set as follows: age (between 61 yr and 70 yr), PSA (below 10 ng/ml), education level (high school), family economic status (medium), biopsy-related symptoms (no). In the

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**Table 3.** Results of regression analyses of anxiety symptom post biopsy

Variable	$\beta$	S.E.M	Wald	P	OR (95% CI)
Age (below 60 yr)	5.685	1.413	16.193	0.000	294.283 (18.463~4690.557)
PSA (above 10 ng/ml)	3.826	1.170	10.689	0.001	45.857 (4.628~454.332)
Family economic status (poor)	2.536	0.922	7.565	0.006	12.626 (2.072~76.919)
Biopsy-related symptoms	1.620	0.714	5.148	0.023	5.055 (1.247~20.495)

PSA, prostate specific antigen; CI, confidence interval; OR, odds ratio.

results of multivariate analysis, only below 60 yr, the level of PSA above 10 ng/ml, poor family economic status, and having biopsy-related symptoms entered the model. As **Table 3** shows, the four variables were risk factors of anxiety in patients performing prostate biopsy.

### Discussion

Prostate biopsy can cause psychological and physical impact. In the present study, 24.6% of patients post biopsy experienced anxiety. It's significantly higher than before biopsy. But many other factors had significant difference between patients with and without anxiety. In the multivariate regression analysis, besides biopsy-related symptoms, other factors: below 60yr, poor family economic status, and the level of PSA above 10 ng/ml, were also risk factors of anxiety in patients post biopsy.

Many studies reported psychological impact of biopsy. In a recent big cohort, compared with those experiencing non-problematic symptoms at 7 days after biopsy, anxiety was greater in those experiencing problematic biopsy-related symptoms: pain, shivers, hematuria, hematochezia, and hemoejaculate [9]. Macefield et al. [14] found the psychological impact was highest at the time of the biopsy, with around 20% reporting high distress and tense/anxious moods. Even after a negative biopsy result, 10% of men still experienced high distress up to 3 months following prostate biopsies [15]. The result of present study was similar with those studies. Prostate biopsy not only had physical impact but also had psychological impact on patients, especially for anxiety mood. Opinion remains divided over decreased prostate cancer-specific mortality of screening for PCa. In a large meta-analysis, majority of data didn't demonstrate that screening for PCa could significantly reduce prostate cancer-specific and overall mortality; and any reduction in prostate cancer-specific mortality may take up

to 10 years to accrue. So considering for adverse effects of screening and subsequent diagnostic biopsy, the authors concluded that screening for prostate cancer was unlikely to be beneficial if men had a life expectancy less than 10 to 15 years [16].

Besides problematic biopsy-related symptoms, many other factors might involve in psychopathological symptoms in those patients performing biopsy to rule out cancer. In Wade et al. study [9], at the 35-day after biopsy when diagnosis was known, the proportion of men with a negative biopsy result reporting problematic biopsy-related symptoms were similar with those at 7 days after biopsy, but levels of anxiety were considerably reduced. Compared with 7 days after biopsy, men who had received a cancer diagnosis had high levels of anxiety at the 35-day after biopsy. In a recent study investigating psychological distress of couples in relation to the conduct of prostate biopsy, there were no significant differences in the levels of psychological distress among all participants before the biopsy. The prostate cancer patients and their partners had significantly higher levels of psychological distress as compared with the non-prostate cancer patients at 1 month after being informed whether the diagnosis was cancer or not [11]. One another study showed that anxiety peaked before biopsy result disclosure [17]. Those evidences suggest that diagnosis of cancer and worrying about cancer before result of biopsy given out might contribute to psychopathological symptoms. In the present study, young age (below 60 yr), poor family economic status, and high level of PSA (above 10 ng/ml), were all risk factors of anxiety. In China, medicare is not perfect. Patients will have to pay certain amounts of medical charges. Young men will face missing of working ability due to having cancer. So people with young age and poor family economic status may worry more about having cancer. Patients with PSA>10 ng/ml were defined as

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higher risk patients [18]. So those patients might worry more about positive biopsy result. These three risk factors can all be attributed to worrying about cancer. The odds ratios of the three factors are higher than that of problematic biopsy-related symptoms. This suggests they might contribute more to anxiety.

The strength of this study was its investigation and comparison of psychopathological symptoms before and post biopsy. The most significant feature of this study is the risk factor analysis of anxiety post biopsy. The limitation of this study is small sample size, which is associated with the relatively low incidence of PCa in China. Another limitation is that we didn't analyze the relationship between psychopathological symptoms and result of biopsy, this is due to the patients with negative result might be lost to follow up, and patients with positive result might go to another hospital for operation.

In conclusion, prostate biopsy can lead to increased psychopathological symptoms, especially for anxiety. But other factors: young age (below 60 yr), poor family economic status, and high level of PSA (above 10 ng/ml), are also risk factors of anxiety. These factors can be attributed to worrying about cancer. They might contribute more to anxiety than problematic biopsy-related symptoms.

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### Disclosure of conflict of interest

None.

### Abbreviations

PCa, prostate cancer; PSA, prostate specific antigen; LUTS, low urinary tract symptoms; TRUS-Bx, transrectal ultrasound guided prostate biopsy; IPSS, international prostate symptoms score; SDS, The Zung Self-Rating Depression Scale; SAS, The Zung Self-Rating Anxiety Scale; CI, confidence interval; OR, odds ratio.

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