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Psychological distress among prostate cancer survivors in South Korea: A nationwide population-based, longitudinal study

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Abstract

Aim: This time-dependent study aimed to analyze the prevalence of psychological distress in prostate cancer survivors by using claims data in South Korea.

Methods: In a nationwide cohort, 32 005 patients were identified who were diagnosed with prostate cancer between January 2010 and December 2014. We referred the diagnostic codes of mental disorders as psychological distress. We categorized the prevalence of psychological distress based on age and specific times before and after the cancer diagnosis.

Results: The median age at diagnosis of prostate cancer was 70 years. Among 32 005 patients, 3074 (9.6%) were diagnosed at least once with a mental disorder between 1 year before the cancer diagnosis and the last follow-up. Among the first diagnoses of each patient, the common mental disorders were anxiety (39.1%) and depression (33.0%). In the total cohort, there were 54 666 claims for mental disorders and over 48.0% (26 256) were for depression. The frequency of psychological distress peaked just before cancer diagnosis. Anxiety was frequent before diagnosis of prostate cancer, whereas depression was frequent after diagnosis. Although stress reaction/adjustment disorders were relatively high in the younger group, depression was relatively high in the elderly group.

Conclusion: Psychological distress in prostate cancer survivors showed different patterns of prevalence between before and after cancer diagnosis, as well as between age groups. Timely diagnosis and intervention for mental health could promote quality of life for prostate cancer survivors.

KEYWORDS

anxiety, depression, prostate cancer, quality of life, South Korea

1 | BACKGROUND

Prostate cancer is the most common cancer among elderly patients.¹ It has a relatively good prognosis because of cancer screening, advanced treatment and increased accessibility to medical institutions.² Nearly 100% of men with local or regional prostate cancer survive more than 5 years after diagnosis; the relative 10-year survival rate is 98%.³ In South Korea, due to rapid aging, increased cancer screening, and westernized dietary habits, the incidence of prostate cancer has also increased, along with an increase in the number of prostate cancer survivors.^{4,5}

Psychosocial well-being may contribute to prognosis in a manner similar to that of physical health (e.g., cardiovascular disease and diabetes).⁶ Cancer survivors experience elevated levels of emotional distress, this occurs at diagnosis and during treatment, as well as after the completion of therapy.^{7,8} These psychological problems can affect treatment compliance and increase mortality.^{9,10} It has also been linked to suicide, increased use of health services and higher costs.^{11,12}

Prostate cancer survivors with psychological distress exhibited three-fold greater odds of emergency department use and hospitalization than men without psychological distress.¹³ Also, prostate cancer patients with depression tend not to undergo definitive treatment and

TABLE 1 The frequency of mental disorders in prostate cancer survivors (N = 32 005)

Age	No. of patients with prostate cancer	No. of patients with mental disorder					
		All mental disorders	Substance abuse	Depressive disorder	Anxiety disorder	Stress/adjustment disorder	Somatoform/conversion disorder
10–49	460	27	2	7	9	4	5
50–59	3,491	264	25	64	101	31	43
60–69	11,350	1,046	68	320	426	56	176
70–79	13,421	1,412	56	494	538	74	250
80–89	3,093	309	8	121	124	13	43
>90	190	16	0	9	4	1	2
Total	32 005	3075	159	1015	1202	179	519

experienced poor prognosis.¹⁴ Therefore, identifying the risks and patterns of psychological distress, as well as providing adequate clinical support, could improve prognosis and reduce medical expenses.

Unlike studies of other cancers,^{15–17} prostate cancer survivors are all men of relatively older age. Previous studies regarding mental disorders among prostate cancer survivors have used a cross-sectional design and small sample size.^{18,19} Therefore, we aimed to analyze nationwide claim data regarding psychological distress among prostate cancer survivors with a longitudinal study design.

2 | METHODS

The National Health Insurance (NHI) system is a public medical insurance system in South Korea. The HIRA database includes demographic data on sex, age and residential areas and clinical data on diagnosis, procedures and prescriptions; these data include patient demographics (gender, age and living area) and clinical variables (diagnosis, procedures and medications).²⁰ The nationwide cohort based on HIRA claims data included subjects who were diagnosed with prostate cancer from January 2010 to December 2014. This study was approved by the Institutional Review Board (IRB) of the Ajou University Hospital (IRB No. AJIRB-MED-EXP-16-494).

Patients were identified by diagnosis codes indicating prostate cancer (C56). Malignancies were diagnosed based on pathological findings and identified by principal diagnoses using codes based on the International Classification of Diseases, 10th Revision. Procedure codes, such as biopsy, were also used for cancer diagnosis. Because mental disorder in the claim data suggests a temporary need to medicate due to psychological distress, we defined psychological distress in case of having diagnostic code such as depression anxiety, stress and substance abuse.

This study focused on the effects of a cancer diagnosis on mental health, we limited our observation within 1 year before the diagnosis of prostate cancer. We confirmed the prevalence of psychological distress from 1 year before cancer diagnosis and evaluate mental health on the basis of a time sequence.²¹ We analyzed the frequency of psychological distress based on the diagnostic date during the first hospital visit. We also evaluate characteristics of mental health according

to disease and age. A comparison between or among the groups was performed using the χ^2 test. Logistic regression was used to adjust for sample differences and explore the demographics which may also influence mental health. Two-sided *P* values less than 0.05 were considered statistically significant. All statistical analyses were performed with R 3.0.2.

3 | RESULTS

A total of 32 005 prostate cancer survivors, who were diagnosed with cancer between 2010 and 2014, were identified in South Korea. The median age at diagnosis of prostate cancer was 70 years. Of these, 3074 (9.6%) were diagnosed at least once with psychological distress between 1 year before the cancer diagnosis and the time of the last follow-up. Table 1 shows the status of psychological distress among prostate cancer survivors. Of 3074 patients with psychological distress, depression, anxiety and somatoform/conversion disorder were 1015 (33.0%), 1202 (39.1%) and 519 (16.9%), respectively.

Figure 1 shows the disease incidence ratios by age group. Stress/adjustment disorders were relatively high in younger prostate cancer survivors. In contrast, the ratio of depression was higher in elderly groups. We compared the patterns of a psychological distress between before and after the diagnosis of cancer (Figure 2). A total of 1042 patients were diagnosed with a psychological distress before the diagnosis of cancer (prediagnosis group); 2032 were confirmed with a psychological distress after the diagnosis of cancer (postdiagnosis group). Anxiety was the most common disease reported during the prediagnosis period (39.5%), followed by depression (30.5%). Anxiety was also the most frequently confirmed in the postdiagnosis period (38.9%). Between both periods, there were 54 666 claims for psychological distress; 26 256 (48.0%) claims involved depression.

The overall frequency of psychological distress began to increase at 12 months before the diagnosis of prostate cancer and changed sharply both before and after diagnosis (Figure 3). The frequencies of depression and anxiety peaked immediately before the diagnosis of prostate cancer. Stress reaction/adjustment disorder showed the greatest increase after cancer diagnosis, compared with other mental disorders. Regarding the age groups, psychological distress peaked

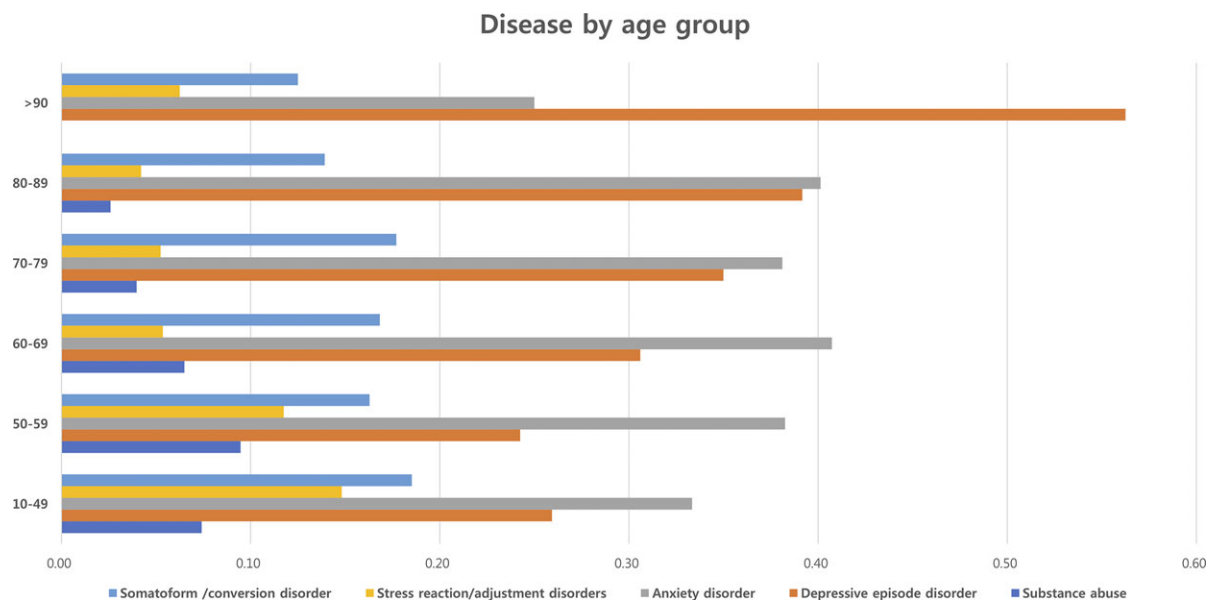
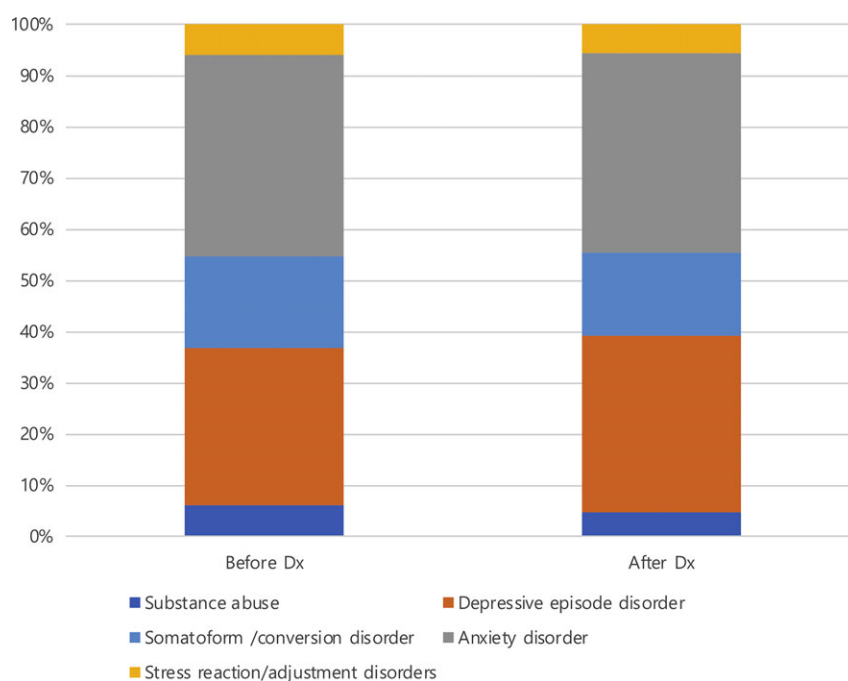


FIGURE 1 Distributions of mental disorders by age group among prostate cancer survivors [Colour figure can be viewed at wileyonlinelibrary.com]

FIGURE 2 Mental disorders before and after cancer diagnosis [Colour figure can be viewed at wileyonlinelibrary.com]



among elderly survivors (>70 years) before cancer diagnosis, whereas they peaked among younger survivors (<50 years) after cancer diagnosis (Figure 4).

The frequencies of mental health status according to age and initial treatment was summarized in Table 2. There were significant differences in mental health status between patients with an age of ≥ 70 and <70 years old ($P < 0.001$). Initial treatments such as surgery, radiotherapy and hormone therapy were not a significant factor affecting the frequency of mental health ($P = 0.086$). In a multivariate analysis, the factors that remain significantly associated with mental health was age >70 years (OR = 1.20; 95% CI, 1.11–1.29).

4 | DISCUSSION

Cancer survivors experienced elevated emotional distress at the time of cancer diagnosis and during treatment, as well as for a long period after the completion of treatment.^{7,15,16} We longitudinally analyzed changes in the frequency of mental disorders, beginning 1 year before prostate cancer diagnosis, by using nationwide claims data. From a group of 32 005 prostate cancer survivors, we identified 3074 (9.6%) patients with mental disorders (Table 1). Anxiety (39.1%) was the most common mental disorder; notably, its distribution was age dependent (Figure 1). Considering the total number of claims for mental

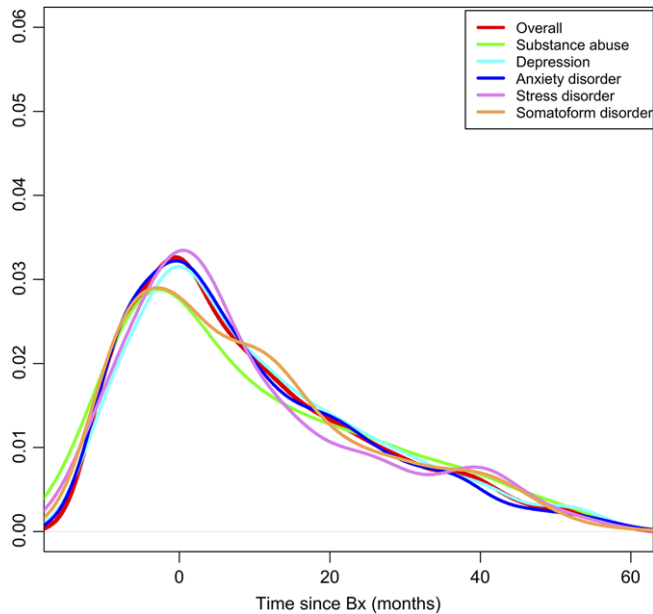


FIGURE 3 Frequency densities of mental disorders, stratified by mental disorder, among prostate cancer survivors [Colour figure can be viewed at wileyonlinelibrary.com]

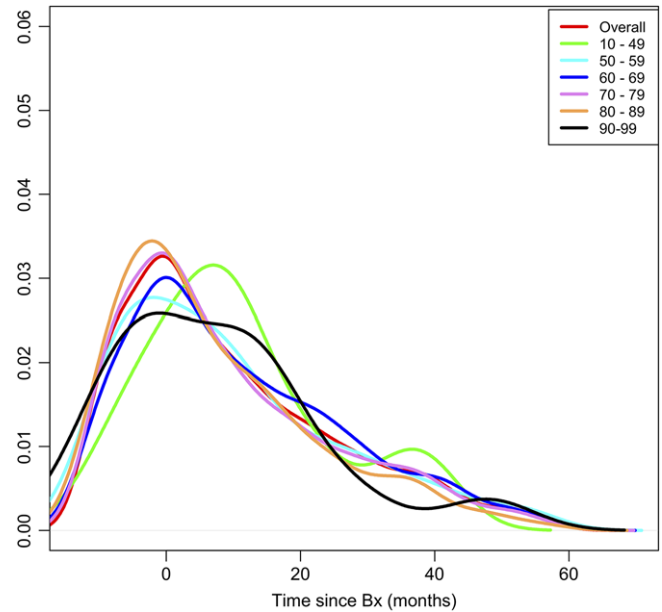


FIGURE 4 Frequency densities of mental disorders, stratified by age group, among prostate cancer survivors [Colour figure can be viewed at wileyonlinelibrary.com]

disorders, depression was the most common mental disease among prostate cancer survivors (48.0%; $n = 43\,788$). Upon comparison with newly-diagnosed mental disorders, this finding suggested that the frequency of depression in cancer survivors is relatively high and that its duration is long-lasting.

In this study, psychological distress in prostate cancer survivors were the highest around the time of cancer diagnosis, and then declined. Most survivors of prostate cancer experience urinary symptoms due to enlargement of the prostate before the diagnosis of cancer.²² The diagnostic workup for suspected malignancy may elevate patients' levels of distress.²¹ This study revealed that the frequency of stress/adjustment disorders increased more rapidly after cancer diagnosis than that of other mental disorders (Figure 2). Previous studies analyzing the frequency of mental disorders in patients with other cancers have also showed that stress reaction/adjustment disorder exhibited the greatest increase after cancer diagnosis.¹⁵

After cancer diagnosis, multimodality treatments, including surgery, radiotherapy, androgen deprivation therapy, active surveillance and chemotherapy, are associated with side effects (e.g., urinary incontinence, impotence and erectile dysfunction).^{23,24} These cancer-related symptoms can significantly affect the psychological well-being of survivors. In prostate cancer survivors, urinary incontinence may lead to the fear of urine leakage and urine smells.²⁵ These concerns may enhance social seclusion, thereby resulting in anxiety and depression.¹⁰ A previous study confirmed that cancer-related symptoms significantly predict psychological well-being among prostate cancer survivors.²⁶

With respect to age, elderly patients had a higher incidence of mental disorders before the diagnosis of cancer than after the diagnosis of cancer; the opposite pattern was present among younger patients. This may be associated with fear of additional diagnosis among older patients who already have many comorbid diseases. For

TABLE 2 The frequency of psychological distress according to age and initial treatment

Variable	No. of patients (%)		P value
	Psychological distress (–) ($N = 28\,931$)	Psychological distress (+) ($N = 3074$)	
Age, years			<0.001 ^a
<70	15 467 (53.5)	1522 (49.5)	
≥70	13 464 (46.5)	1552 (50.5)	
Initial treatment			0.086
Observation	2434 (8.4)	231 (7.5)	
Surgery	18 155 (62.8)	1997 (65.0)	
Radiotherapy	4999 (17.3)	503 (16.4)	
Hormone therapy	3343 (11.6)	343 (11.2)	

^aP values were calculated by the chi-square test.

younger patients, diverse social problems (e.g., returning to work after diagnosis) may contribute to the high frequency of mental disorders after the diagnosis of cancer.²⁷

We evaluated the impact of age and the type of adjuvant therapies on the risk of mental disorders (Table 2). Treatment-related factors were not significant risk factors in developing mental disorders in our cohort. It may be due to the limited information of public claim data with undetected cancer-related parameters such as cancer stage. In contrast, age was identified as a risk factor for psychological distress. Compared with the age over 70 years old, the odds ratio was 1.20 ($P < 0.001$). These results were also confirmed in studies of mental health in other cancer survivors.¹⁵

This study population comprised elderly men with a median age of 70 years, such advanced age may have influenced the patterns of mental disorders observed in this study, compared to the patterns of breast and ovarian cancer that occur in relatively younger female patients.^{15,16} The frequency of stress/adjustment disorder prominently increased immediately after cancer diagnosis compared with the frequencies of other mental disorders in patients with breast or ovarian cancer. However, prostate cancer survivors showed similar trends, regardless of other mental disorders. This may be due to the emotionally less sensitive nature of elderly men compared to that of younger women. Among women with cancer, the frequency of depression was higher than that of anxiety as the first diagnosis of mental disorder.¹⁵ In contrast, the frequency of anxiety was higher than that of depression among men with prostate cancer. However, based on the total number of prescriptions, depression was the most frequent mental disorder. These findings indicate that depression is also an important emotional disorder in men, as has been reported in previous studies with other malignancies.^{15,16}

Only 1.0% of the general population had depression, whereas 3.2% of prostate cancer survivors were diagnosed with depression. In the case of prostate cancer survivors, 3.8% were diagnosed with anxiety disorder, but only 0.9% were diagnosed in the general population.²⁸ These results show that prostate cancer survivors are more vulnerable to psychological distress than the general population.

This study should be interpreted considering its limitations. First, we identified psychological distress based on HIRA claims data, which only include diagnostic codes and demographic information. However, diagnoses of mental disorders were carefully coded by psychiatrists in most cases, because of the stigma effect in the process of the medical claim. Therefore, ICD-10 codes for mental disorders is relatively reliable in Korean claim data. Second, Korean claim data does not include the information to evaluate the severity of mental disorders, and it was impossible to present the seriousness of psychologic distress in this study. Third, the severity of prostate cancer was not available in the claims data such as clinical stage.

In conclusion, mental disorders in prostate cancer survivors showed different patterns of prevalence between before and after cancer diagnosis, as well as between age groups. Early diagnosis and intervention for psychological distress could promote an enhanced quality of life for prostate cancer survivors.

CONFLICTS OF INTEREST

All authors claim no conflicts of interest.

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