Social Support, Anxiety and Depression in Patients with Prostate Cancer: Complete Mediation of Self-Efficacy

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Research Article

Keywords: Social support, anxiety, depression, self-efficacy, mediating role

Posted Date: February 1st, 2022

DOI: <https://doi.org/10.21203/rs.3.rs-1192268/v1>

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Abstract

Background: Social support and self-efficacy are important factors to improve negative emotions such as depression and anxiety in patients with prostate cancer after surgery, however, little is known about the relationship between them. The objective of the study was to comprehensively explore the relationship between social support, self-efficacy, and anxiety and depression.

Method: A cross-sectional design and a convenience sampling method were used to recruit patients with prostate cancer from a comprehensive hospital in Zhejiang Province. Structured scales were used for data collection, including the Social Support Rating Scale, Strategies Used by People to Promote Health, the hospital anxiety and depression scale.

Results: The result showed that anxiety and depression were negatively correlated with self-efficacy ($r = -0.434$, $P < 0.01$) and social support ($r = -0.212$, $P < 0.01$), while self-efficacy and social support were positively correlated ($r = 0.356$, $P < 0.01$). A structural equation model showed that the effect value of social support on self-efficacy was ($\beta = 0.386$, $p < 0.01$) and the effect value of self-efficacy on negative emotions was ($\beta = -0.497$, $p < 0.01$). Self-efficacy fully mediated the effect between social support and negative emotions with a 100% mediation rate.

Conclusion: Social support and self-efficacy did contribute to the improvement of depression and anxiety in patients with radical prostatectomy, and they were associated with a full mediating effect of self-efficacy. Providing social support that matches the coping needs of the stressor can maximize the role of social support. Therefore, it is necessary to identify the patient's stressor and coping needs in advance, which will help us to provide matching social support, so as to alleviate patients' bad emotions more effectively and improve their prognosis.

Introduction

Prostate cancer is more common in older men. Such patients are more likely to have complex complications, decreased functional reserve of multiple organ systems[1]. Many long-term survivors of prostate cancer experience adverse effects of treatment, including decreased physical function, cancer fatigue, urinary incontinence, and sexual dysfunction, which not only negatively affect patients' quality of life, but also cause great stress to mental health[2]. There are 27.04% of prostate cancer patients experience anxiety as well as 17.24% of patients experience depression[3] due to factors such as fear of disease prognosis and low androgen maintenance levels due to depot treatment[4]. In China, the incidence of depression in prostate cancer ranges from 13–53%. A systematic review study of cohorts showed that depression and anxiety were associated with an increased risk of cancer death in prostate cancer, with symptoms of depression and anxiety as defined by the scale being associated with poorer cancer survival and higher cancer-specific mortality, but not with increased cancer incidence[5]. African American men reported high levels of clinically significant distress (>31%) and anxiety (>23%) in a non-matching comparative study, which also showed that depressive symptoms became more severe with age in prostate cancer patients[6]. As many men with clinically localized prostate cancer (PC) are surviving longer due to continued scientific advances in treatment technology, more emphasis should be placed on health-related quality of life areas during survival time in the treatment of prostate cancer patients[7]. As an important component of quality of life, patients' psychological conditions should be given adequate attention, and psychological stress caused by adverse reactions to illness or treatment should be addressed as appropriately as possible. By identifying the sources and causes of psychological stress in patients, proposing appropriate and effective measures to alleviate psychological stress may be able to help improve cancer survival and atopic mortality rates. It is happy to find that more and more health care professionals are focusing on exploring the mechanisms of patient' negative emotions.

It has been shown that social and family emotional support plays an important role in improving cancer depression, anxiety and negative emotions, and the higher the level of support, the less negative emotions[8, 9]. The occurrence of negative emotions is closely related to the subjective and objective support in social support and the degree of its utilization. At the psychological level, the lack of social support decreases the patient's sense of self-worth and self-confidence, which leads to

changes in the patient's mental world or social behavior and negative illness perceptions and coping styles, which gradually aggravate depressive symptoms. According to the buffer model theory of social support, good social support can buffer the negative impact of stressful events on body and mind, and is of great significance for maintaining mental health[10]. Results of a study of 947 colorectal cancer patients showed that patients often received support from others to cope with multiple stresses, including multiple negative emotions such as psychological distress, and that those with higher social support had more improvement in anxiety and depression 12 months after surgery[11]. This result is the same as that of Talia et al[12]. Therefore, social support, as an external resource available to the individual, can reduce psychological stress, relieve tension, and improve social adjustment, thereby improving survival rate and reducing mortality.

In addition to the influence of external factors, the patient's own personality traits are another important factor in determining emotional regulation. As a variable widely based on patients' personality and life experience, self-efficacy refers to the perception of controllability of self-management tasks and the effectiveness of using skills in difficult circumstances[13]. A meta-analysis showed that perceived self-efficacy, strategic ability and belief in coping with cancer, was strongly negatively correlated with bad emotions and significantly positively correlated with quality of life[14]. High levels of self-efficacy can improve quality of life and disease adaptation, psychological status and health behaviors in patients with prostate cancer[15, 16]. Weber investigated the effect of self-efficacy on mood in men with prostate cancer. Results indicate that men with high self-efficacy was less likely to have depressive symptoms[17]. These studies demonstrate the value of assessing self-efficacy at an early stage because it can identify men at risk for emotional maladjustment at diagnosis, and maximizing self-efficacy and building confidence in coping effectively with cancer may improve patients' psychological adjustment to stressful events to reduce the negative impact of cancer diagnosis and treatment on emotional adjustment. Interestingly, high self-efficacy significantly predicted vitality (activity and vigor), which was the only positive mood index in the study. If vitality levels can be maintained, it may provide resilience for men who are about to enter the treatment phase[18]. Based on this, it will be necessary to understand the patient's sense of self-efficacy with regard to emotions at the time of diagnosis before the impact of treatment effects comes into play.

In the disease adaptation process of cancer patients, good social support can effectively enhance patients' ability to cope with the disease and adapt to the society, help improve individual self-efficacy, reduce adverse physical and psychological symptoms and thus improve patients' negative emotions. A study on positive thinking and related factors in prostate cancer patients receiving hormone therapy conducted in Taiwan showed that self-efficacy was a mediating factor affecting the relationship between treatment satisfaction, evaluation support, and positive thinking [19]. Another study showed that social support and self-efficacy could indirectly predict the psychological stress in children with malignant tumor, with self-efficacy having the greatest total effect on psychological stress in children. It also confirmed the mediating role of self-efficacy and coping styles on psychological stress, proposing that appropriate social support can increase self-efficacy and encourage positive coping with the disease during the treatment period in children with malignant tumor, thus effectively preventing or reducing the occurrence of psychological stress[20]. Receiving external support has a direct impact on reducing stress and improving anxiety and depression, and the acceptance of support is moderated by improving self-efficacy, which helps to reduce psychological stress and promote better emotional results[21].

Up to now, barely study have explored the relationship between anxiety self-efficacy and social support. The goal of this study is to examine potential benefits of self-efficacy, with particular focus on anxiety and depression output in prostate cancer survivors. Bandura's self-efficacy theory[22] is that self-efficacy is an important factor to determine whether individuals produce behavior motivation. The higher the self-efficacy is, the more likely it is to complete the established behavior, the stronger the sense of accomplishment is, and the less likely it is to produce negative emotions. That is to say, the individual's mental health depends on their belief in the face of external stress. Depression and other emotions can also be explained and transformed by the level of efficacy. However, the social stress buffer model[23] believes that social support itself has no direct impact on individual physical and mental health, but can protect individuals by improving their ability to cope with life and confidence. Therefore, social support can improve patients' ability to cope with cancer stress, provide problem-solving strategies, and indirectly reduce the side effects of stress through self-efficacy. We speculated that prostate

cancer survivors who reported higher levels of social support would show a more positive effect of self-efficacy than those reporting lower levels of social support (Hypothesis 1). Second, we tested a model that self-efficacy as a mediator of social support relationship with anxiety and depression (Hypothesis 2).

Methods

Participants and procedures

The participants were 263 patients who were hospitalized in the Department of Urology for radical prostatectomy from October 2020 to April 2021 and were preparing to be discharged after surgery. After providing written informed consent, participants completed paper questionnaires. We explained the aims of the study to all participants and ensured the confidentiality of their responses and the anonymity of the data. All participants, except those with other serious complications or other cancers, filled out the scale when their condition was stable after surgery. Men received a gift compensation for their participation in the study. Informed consent was obtained from all individual participants included in the study. All procedures have been approved by the Ethics Committee of The First Affiliated Hospital, Zhejiang University School of Medicine. (Approved No.2018-707).

A cross-sectional design and a convenience sampling method were used to recruit patients with prostate cancer from a hospital in Zhejiang Province. Structured scales were used for data collection, including the Social Support Rating Scale, Strategies Used by People to Promote Health, the hospital anxiety and depression scale. Demographic and social data from the study participants included age, education level ,BMI, PSA and marital status, employment status, income, cancer stage and types of treatment being received.

Measures

Social support

The Social Support Rating Scale (SSRS) was designed by Xiao Shuiyuan from 1986 to 1994[24]. The scale is used to measure three dimensions of an individual's social relationships with a total of 10 items: objective support (the actual support the patient receives), subjective support (the support the patient can experience or emotional support), and support utilization (support utilization is a reflection of the individual's active use of various social supports, including ways of talking, seeking help, and participating in activities). Higher scores on the total score and each subscale indicate better social support. The scale has been proven to be generally well designed and valid over time. The entries of the scale are easy to understand and free from ambiguity. It has good reliability and validity[25]. The reliability of the scale in the present study was 0.780.

Self-efficacy

SUPPH (Strategies Used by People to Promote Health) is a cancer self-management efficacy scale developed by Professor Lev in the United States in 1996 [26]. The scale is a self-assessment scale with 29 items and a 5-point scale, with scores of 1 to 5 indicating no confidence, a little confidence, confident, quite confident, and very confident, respectively. Higher scores indicate greater individual self-efficacy. The scale was localized into a Chinese version of the Self-Management Efficacy Questionnaire for Cancer Patients by Professor Yuan Chang-Rong et al. in 2011[27], and the Cronbach's a coefficient of the Chinese version of the scale was tested to be 0.849-0.970, with good reliability and validity. The scale consists of three dimensions, namely, positive attitudes, self-determination, and self-stress reduction. The reliability of this scale in this study was 0.927.

Anxiety and depression (The hospital anxiety and depression scale, HADS)

This scale is a self-assessment scale used to screen for anxiety and depression of patients in comprehensive hospital. The scale consists of 14 items, divided into 2 subscales, namely the anxiety subscale (7 items) and the depression subscale (7 items). Each item is scored 0 - 3. The total score of each subscale is 0-7 for asymptomatic manifestation, and 8-10 for suspicious symptoms, and 11-21 for anxiety or depressive symptoms. The scale has good reliability and validity. The reliability of this scale in this study was 0.864.

Data Analysis

Data analysis was performed using IBM SPSS version 24.0. The inference methods for the statistical analysis corresponding to the research hypotheses were as follows: using Pearson product moments (stepwise method) for correlation and regression, using SPSS Process for intermediary verification, and using bi-variate correlation to test the relationship between the study variables. The percentage of missing data was 0.9%-1.2% across all study variables, and average substitution was used for missing data. In this paper, a simple mediation model was used to perform the mediation test. An α of 0.05 ($p < 0.05$) was used as the significance level. The study shows that if statistical significance tests are required, a ratio of 10:1 or even 20:1 is recommended between the sample size and the number of parameters estimated by the model. In general, SEM is less stable in small samples (60-120) and the minimum sample size depends mainly on the complexity, effect size and degrees of freedom of the model[28]. A total of 22 parameters were estimated in this model (9 fixed, 5 parameters to be evaluated and 8 variance to be evaluated).

Result

Demographic profile of the study participants

The mean age reported by participants was 68.17 years ($SD=6.25$) and the mean BMI was 23.83 ($SD=2.41$). All patients had completed laparoscopic or robotic radical surgery, and 14 (5.3%) of them had received radiotherapy. The mean PSA of patients was 16.40 ($SD=22.23$) due to overall late detection or severe disease. See Table 1.

Correlation Analysis

Correlation analysis showed that anxiety and depression were negatively correlated with self-efficacy ($r = -0.434$, $P < 0.01$) and social support ($r = -0.212$, $P < 0.01$), while self-efficacy and social support were positively correlated ($r = 0.356$, $P < 0.01$). See Table 2.

Mediating Effect Analysis

The results of the correlation analysis showed a significant correlation between anxiety and depression status, social support and self-efficacy in prostate cancer patients. See Table 3. To further explore the effects of social support and self-efficacy on mood (anxiety and depression), a structural equation model was developed to examine the mediating role of self-efficacy between social support and mood (anxiety and depression). A structural equation model was established with social support as the independent variable, self-efficacy as the mediating variable, and mood (anxiety and depression) as the dependent variable. The specific model setup is as follows (see Figure 1). From the model path, the effect value of social support on self-efficacy was ($\beta = 0.386$, $p < 0.01$) and the effect value of self-efficacy on negative emotions was ($\beta = -0.497$, $p < 0.01$). Social support does not directly and positively predict negative emotions (anxiety-depression), but indirectly predicts anxiety through self-efficacy. Overall, self-efficacy fully mediated the effect between social support and negative emotions with a 100% mediation rate, or the effect of social support on negative emotions in prostate cancer patients was mainly achieved through an indirect effect mediated by self-efficacy. It is generally accepted that a value of X^2 (df) less than 5, indices such as NFI, TLI, and CFI above 0.90, and RMSEA less than 0.08 indicate a good model fit[29, 30]. The fit indices of the model in

this study were χ^2 (df) of 2.333, $p = 0.017$, NFI of 0.974, TLI = 0.972, CFI = 0.985, and RMSEA = 0.071. This indicates that the model can fit the data well.

Discussion

Although previous studies have shown the positive contribution of social support interventions to improve negative emotions and increase self-efficacy in prostate cancer patients[31, 32], there are few studies that comprehensively explore the relationship between social support, self-efficacy, and anxiety and depression, which is one of the main features of this study. Eila's study found that 17% of prostate cancer patients reported potential moderate to severe anxiety and 10.2% reported moderate to severe depression, while the side effects they had were associated with higher psychological morbidity, poorer self-efficacy, and poor overall health status[33]. Therefore, it is crucial to improve the self-efficacy of prostate cancer patients to improve their mood. When the self-efficacy is enhanced, the individual's confidence in dealing with stress events is enhanced, which promotes the improvement of individual psychological state, which is also consistent with Weber's study. Social support plays an important role in the process of cancer adaptation and facilitates the reconstruction of individual self-efficacy, which helps cancer patients to achieve a positive trajectory in the course of the disease[34].

There was a negative correlation between anxiety and depression and self-efficacy in prostate cancer patients in this study, which is consistent with the study of Omran et al[35]. Omran's findings showed that self-efficacy was significantly associated with depression, meaning that the higher the effect of self-efficacy on depression (reducing depression), the higher the perception of QOL. In other words, when self-efficacy is lacking, the formulated goal results exceed the range that self-efficacy can achieve, and bad cognition and behavior increase. In this study, social support played a fully mediating role on anxiety and depression in prostate cancer patients by affecting self-efficacy. Unlike the present study, Mehnert's study[36] showed that positive social support interacted with anxiety and depression in prostate cancer patients. This may be because, for social support to have an effect on patients negative emotions, it has to be actually internalized as self-efficacy. Transforming external stimuli into internal motivation and finally feeding back into their own emotional regulation, Self-efficacy is the result of measuring and evaluating one's own abilities. To a certain extent, it represents the degree of effort the patient has to make for self-management of the disease, which in turn moderates patients' choices of behavior, the amount of effort they put in, and determines their ability to perform in the task of fighting cancer.

The current study provides a unique perspective on the relationship between social support and negative emotions in prostate cancer survivors, for social support to be effective, there should be a reasonable match between the type of support provided and the coping needs of the stressor. This study reveals that identifying psychological distress in cancer survivors prior to cancer surgery and using appropriate screening measures will facilitate better psycho-social health care programs and early allocation and referral of patients with specific needs for support services. This unexpected finding suggests that for this sample of college students, personal variables such as health values and health self-efficacy have a greater impact on participation in health-promoting lifestyles than external factors. Health values and health self-efficacy significantly contributed to participants' participation in health promotion activities lifestyle[37].

Based on the above discussion of the full mediating role of self-efficacy and the conditions under which social support plays the maximum role, this study believes that effective improvement of depression and anxiety in patients with radical prostatectomy requires the improvement of self-efficacy and the accuracy of social support in pressure matching.

The limitations of this study lie in the following two aspects. First, the data analyzed in this study are cross-sectional and self-reported, so the study cannot infer causal associations. Second, the data collected in this study were from a Grade III Level A hospital in a city in Zhejiang Province, located in an economically developed region of China, and may not represent the average economic and medical level of prostate cancer patients in China. In addition, the sources and causes of psychological stress were not discussed in depth in this study. Further studies can be conducted on the effect of different stressors and matched social support on improving bad emotions to further support the results of this study.

Declarations

Funding: The project is supported by the Zhejiang Provincial Basic Public Welfare Research Program under Grant No. LGF19H050007 and Zhejiang Provincial Medical and Health Technology Project (grant. 2020KY111).

Conflicts of interest/Competing interests: The authors declare that they have no conflict of interest.

Availability of data and material: data and material are available to public.

Code availability: Not applicable

Authors' contributions: LJW performed data analysis work and wrote the manuscript. JL helped collecting data and YQL edited the manuscript. YZ help modify text content and help data entry, WW designed all the study and helped correct the writing problems. All authors read and approved the final manuscript.

Ethics approval: All procedures have been approved by the Ethics Committee of The First Affiliated Hospital, Zhejiang University School of Medicine. (Approved No.2018-707).

Consent to participate: Informed consent was obtained from all individual participants included in the study.

Consent for publication: The authors affirm that all the contents of this article agree to be published.

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Tables

Table 1
Demographic and clinical characteristics of the sample(n=263)

Characteristic	Frequency(%)
Age	68.17(6.25)
Educational level	
Middle school or lower	136(51.7%)
High school	83(31.6%)
College	44(16.8%)
Marital status	
Married	237(90.1%)
Single/Separated/Divorced/Widowed	26(9.9%)
Stage	
I	28(10.6%)
II	123(46.8%)
III	89(33.8%)
IV	23(8.7%)
Smoking	144(54.8%)
Alcohol	90(34.2%)
Surgery approach	
Open radical prostatectomy	12(4.6%)
Laparoscopic radical prostatectomy	96(36.5)
Robot-assisted radical prostatectomy	155(58.9)

Table 2
Samples Correlations and descriptive statistics for main study variables

	1	2	3	4	5	6	7	8	mean	SD
1 anxiety	-								14.057	4.11
2 depression	0.729**	-							14.255	4.04
3 positive attitude	-0.379**	-0.403**	-						45.806	11.87
4 self decision-making	-0.267**	-0.346**	0.724**	-					8.84	3.02
5 Self-decompression	-0.362**	-0.351**	0.738**	0.613**	-				29.475	8.29
6 Negative emotions	0.931**	0.929**	-0.421**	-0.329**	-0.383**	-			28.312	7.58
7 Self-efficacy	-0.393**	-0.414**	0.955**	0.790**	0.895**	-0.434**	-		84.125	21.13
8 social support	-0.230**	-0.164**	0.330**	0.381**	0.297**	-0.212**	0.356**	-	35.798	6.69

Table 3
Samples Regression Weights

			Estimate	S.E.	C.R.	P
Self-efficacy	<-	Social support	0.63	0.1	6.318	***
Negative emotions	<-	Self-efficacy	-0.154	0.023	-6.682	***
Positive attitude	<-	Self-efficacy	1			
Self decision-making	<-	Self-efficacy	0.217	0.014	15.131	***
Self-decompression	<-	Self-efficacy	0.605	0.039	15.434	***
anxiety symptoms	<-	Negative emotions	1			
Depressive symptoms	<-	Negative emotions	1.05	0.119	8.824	***

Figures

Figure 1

A mediation model for the relationships among self-efficacy in patients with prostate cancer between anxiety symptoms, Depressive symptoms and Social support.

Note: Standardized path coefficients were presented. All path coefficients were statistically at least significant at $p < 0.05$.