

### MEDIATION EFFECT OF FRIENDS' SUPPORT ON THE RELATIONSHIP BETWEEN SEX-RELATED SYMPTOMS AND QUALITY OF LIFE IN PATIENTS AFTER RADICAL PROSTATECTOMY

Keum-hee Nam<sup>1</sup>, JaeLan Shim<sup>2,\*</sup>

<sup>1</sup>Department of Nursing, Kosin University, Busan, South Korea

<sup>2</sup>Department of Nursing, Dongguk University, Gyeongju, South Korea

\*Corresponding Author: JaeLan Shim: Email: [jrshim@dongguk.ac.kr](mailto:jrshim@dongguk.ac.kr)

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#### ABSTRACT

##### Background and objective

With the increase in the survival rate of patients undergoing prostate cancer surgery, management of the quality of life has become important. Particularly, since sex-related disabilities of patients immensely affect their quality of life, management of the same is of utmost necessity. This study aimed to investigate whether support from friends could play a mediating role in patients with prostate cancer, after radical prostatectomy, for the management of sex-related symptoms and improvement of the quality of life.

##### Material and methods

This descriptive survey was conducted on 212 patients, aged 20 years or older, diagnosed with prostate cancer, and subjected to radical prostatectomy, in two South Korean University Hospitals. Data were collected from June 20 to August 10, 2017, using self-report questionnaires. Data were analyzed using the *t*-test, Pearson's correlation coefficient, and multiple regression analysis. A mediation analysis was performed according to Baron and Kenny, along with bootstrapping methods.

##### Results

Patients' quality of life was significantly correlated with the experience of sex-related symptoms ( $r = -0.65$ ,  $P < 0.001$ ) and support from friends ( $r = 0.47$ ,  $P < 0.001$ ); the latter had a significant negative correlation with the experience of sex-related symptoms ( $r = -0.35$ ,  $P < 0.001$ ). Support from friends showed a partial mediating effect in the correlation between the experience of sex-related symptoms and quality of life (95% CI,  $-0.65$  to  $-0.06$ ).

## Conclusions

Our findings indicated the necessity of psychosocial nursing programs that could utilize the support from friends to improve the quality of life of patients with prostate cancer following radical prostatectomy.

**Keywords:** *friend; prostatic neoplasm; quality of life; sexuality; symptom*

## INTRODUCTION

Prostate cancer is the second most prevalent cancer in men,<sup>1</sup> and according to the Annual Report of Cancer Statistics in Korea, it is also the fourth most prevalent cancer in South Korea, following gastric, lung, and colorectal cancer.<sup>2</sup>

The 10-year survival rate, following the diagnosis of prostate cancer, has increased from 46.3% in 1993 to 91.7% in 2013, and is the highest survival rate among various cancers, owing to the constant development of medical technology.<sup>2</sup> Accordingly, management of the quality of life (QoL) of patients is now of paramount importance.

Physical side effects, such as erectile dysfunction, loss of libido, and urinary incontinence, have been reported as the most common complications after radical prostatectomy (which is one of the treatments of prostate cancer), with 60–70% manifestation; they are also the key factors that could sharply lower the QoL of patients with prostate cancer.<sup>3,4</sup> In particular, patients with prostate cancer treated with radical prostatectomy reportedly have a lower QoL than those who receive radiation therapy or androgen deprivation therapy, due to post-surgery physical complications.<sup>5</sup> Such patients experience serious crisis regarding their value of existence owing to their loss of masculinity and sexual dysfunction; they feel despair, sense a crisis in their marital relationship, experience dissatisfaction in life, and feel alienated.<sup>6,7</sup>

Patients with prostate cancer might experience a crisis, both at home and at work, due to the unexpected occurrences of post-surgery symptoms, such as urinary incontinence and erectile dysfunction, and might face negative psychosocial problems, such as anxiety and depression; hence, their QoL

might be compromised, raising doubts about the need of surgery and treatment.<sup>8,9</sup>

Social support could play a vital role in improving the QoL of such patients, by helping them to solve the problems, reduce their seriousness, and enable effective management of the crisis through buffering action that would prevent emotional responses of the individuals under stressed situations.<sup>10</sup>

Most previous studies on patients with prostate cancer have emphasized the importance of support from a spouse or from a peer group that has experienced the same disease and treatment process.<sup>7,9,11,12</sup> Specifically, patients with prostate cancer have been reported to resolve mental stress by consulting their friends or colleagues about physical and sexual problems, rather than consulting their spouses, despite the latter being considered the closest person to notice physical changes that might have occurred after surgery.<sup>13</sup> The overall happiness of patients, who, in addition to their families, had consulted their friends about the treatment methods prior to the treatment, was found to be significantly improved compared to that of others that did not.<sup>14</sup> Therefore, for patients with prostate cancer, support from friends to whom they could express their feelings seems to be important.

Walsh and Hegarty,<sup>15</sup> however, reported that patients with prostate cancer might as well withdraw from social interactions owing to the fear of false prejudice or spread of rumors regarding their physical side effects after prostate cancer treatment. This was observed in many patients who feared negative evaluation from others, and if the fear was strong enough, they tended to avoid situations that might provoke social comparisons, eventually causing

maladaptation.<sup>16</sup> For patients with sex-related symptoms, support from friends is considered necessary, since it would ensure open expression of their fear and the need for help.<sup>15</sup>

Many previous studies have determined social support for patients with prostate cancer, following radical prostatectomy, to possibly be helpful for their physical and emotional adjustment in various crises, including sexual dysfunction.<sup>6,7,12</sup> However, relevant research emphasizing the importance of friends' support, in addition to all other social support, has remained relatively insufficient.

The present study attempted to contribute to the development of active nursing interventions for the improvement of QoL of patients with prostate cancer, after radical prostatectomy, by investigating whether support from friends could act as a mediating factor in the impact of sex-related symptoms in patients on their QoL, and by examining its effect on the mediating process.

## METHODS

### *Study design*

This retrospective study aimed to determine the relationship between the experience of sex-related symptoms and QoL of patients with prostate cancer following radical prostatectomy and to investigate the mediating effect of the support from friends.

### *Participants*

The participants of this study were patients aged 20 years or older, who had been diagnosed with prostate cancer and had undergone radical prostatectomy at two University Hospitals in South Korea. Patients were included if they understood the purpose of the study and if they voluntarily decided to participate as patients with prostate cancer who had undergone radical prostatectomy  $\geq 1$  month prior to inclusion (this  $\geq 1$  month was chosen to ensure that the daily activities of patients were restored). Patients were excluded if they were unaware of their prostate cancer, exhibited

difficulty in answering the questionnaire, and were aged 19 years or younger.

Sample size of the present study was determined to be sufficient, as per the G\*Power 3.1 Program for regression analysis with a significance level of 0.05, the medium effect size of 0.15, power of the test of 0.80 according to Cohen's rule, and a total of eight variables being 109.

### *Ethical consideration*

The present study was approved by the Institutional Review Board (NO: S2017-0718) before data collection. The investigator explained the purpose, methods, benefits, potential risks, and possible discomfort of the present study to the participants and received a voluntarily signed informed consent form before conducting the study.

### *Measurements*

#### *Demographic and clinical characteristics*

The general characteristics of participants, such as age, having a spouse, religion, and education, were collected via a questionnaire, whereas disease-related characteristics, such as time after surgery, and occurrence of metastasis and recurrence were determined from clinical records.

#### *Experience of sex-related symptoms*

Experience of sex-related symptoms by patients was evaluated using two criteria of sex life area, and four criteria of sexual function area of the Korean version of EORTC QLQ-PR25, developed by the European Organization for Research and Treatment of Cancer (EORTC) QOL in 2008<sup>17</sup> with permission from the developers. Measurements were based on a four-point Likert scale, each item being scored from 1 point for "strongly disagree" to 4 points for "strongly agree". The higher the score, the greater the experience of a symptom reported in the applicable area. The reliability of the methodology, estimated by Cronbach's  $\alpha$ , was 0.70–0.86 at the time of its development, while that in the present study was 0.93.

### *Support from friends*

Four items regarding the support from friends, the revised version of the Multi-dimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al.,<sup>18</sup> for use in South Korea through amendments and supplements, was used with permission from the developers. Measurements used a five-point Likert scale, ranging from 1 point for “strongly disagree” to 5 points for “strongly agree”; the higher the score, the greater the perceived support reported from friends. The reliability of the methodology, measured by Cronbach’s  $\alpha$ , was 0.85 at the time of its development, whereas in the present study it is 0.95.

### *Quality of life*

For measurement of QOL, the QOL Scale for Korean Patients with Cancer (C-QOL) developed by Lee<sup>19</sup> was used with permission from the developers. Each item was scored on a five-point Likert scale, ranging from 5 points for “strongly disagree” to 1 point for “strongly agree”; and higher the scores, higher the QOL reported. Negative items were reverse-scored. The scale consisted of a total of 20 items in four sub-areas, including physical condition (five items), emotional status and worries (eight items), social function (three items), and coping function (four items). The reliability of the methodology by Lee,<sup>19</sup> measured by Cronbach’s  $\alpha$ , was 0.81 at the time of its development, whereas that for the QOL in the present study was given by Cronbach’s  $\alpha = 0.93$ .

### *Data collection*

Data were collected from June 20 to August 10, 2017, after explaining the study and obtaining appropriate permissions, with cooperation from the director of nursing, head nurse, director of urology, and urologist of the relevant hospitals. The investigator fully explained the purpose, methods of the study, and content of the questionnaire to all patients, who agreed to participate and met the selection criteria after ambulatory care. Following

the receipt of written informed consent from all participants, the investigator provided a structured questionnaire, which was filled in by the participants. The investigator finally collected the completed questionnaires between June 1 and July 15, 2017.

### *Statistical analysis*

The collected data were analyzed using the SPSS Win version 21.0 software, as follows:

1. General characteristics and disease-related characteristics were analyzed using real numbers and percentages, whereas the experience of sex-related symptoms, support from friends, and the QOL of participants were analyzed using averages and standard deviations.
2. Correlations between the experience of sex-related symptoms, support from friends, and QOL were analyzed using Pearson’s correlation coefficients.
3. Significance of the mediating effects of friends’ support (mediating variable) in the relationship between the experience of sex-related symptoms and quality of life was tested using the PROCESS macro of SPSS by Hayes.<sup>20</sup>
4. The significance level of all statistics was set at  $P < 0.05$ .

## RESULTS

### *Demographic and clinical characteristics*

The average age of participants was  $68.32 \pm 6.38$  years. The general and disease-related characteristics are presented in Table 1.

### *Experience of sex-related symptoms, support from friends, and quality of life of participants*

The experience of sex-related symptoms, support from friends, and quality of life of participants are presented in Table 2.

**TABLE 1** Demographic and Clinical Characteristics (N = 212).

Variable	Category	n (%)	M ± SD	Range
Age (years)	≤60	21 (9.9)	68.3 ± 6.3	(51–85)
	60–69	103 (48.6)		
	70–79	81 (38.2)		
	>80	7 (3.3)		
Spouse	Yes	170 (80.2)		
	No	42 (19.8)		
Religion	Christian	56 (26.4)		
	Catholic	45 (21.2)		
	Buddhist	43 (20.3)		
	None	68 (32.1)		
Education	Middle school	9 (4.2)		
	High school	151 (71.2)		
	≥College	52 (24.5)		
Occupation	Yes	86 (40.6)		
	No	126 (59.4)		
Duration postsurgery (months)	Less than 6	49 (23.1)		
	6–<12	32(15.1)		
	≥12	131 (61.8)		
Metastasis	Yes	19 (9.0)		
Recurrence of disease	Yes	31 (14.6)		

M: mean; SD: standard deviation; N: number of patients

**TABLE 2** Sex-related Symptoms, Support from Friends, and QOL (N = 212).

Variables	Mean ± SD	Range	Min	Max
Sex-related symptoms	2.83 ± 0.71	1–5	1.20	4.00
Support from friends	3.32 ± 0.78	1–5	1.00	5.00
Quality of life	3.20 ± 0.69	1–5	1.52	4.76

N: number of patients

*Correlations across the sex-related symptoms, support from friends, and quality of life of the participants*

Correlations across the sex-related symptoms, support from friends, and QOL of the participants are presented in Table 3. QOL was demonstrated

to be significantly correlated with the experience of sex-related symptoms ( $r = -0.65, P < 0.001$ ) and support from friends ( $r = 0.47, P < 0.001$ ), whereas the latter was shown to have a significant negative correlation with the experience of sex-related symptoms ( $r = -0.35, P < 0.001$ ).

**Mediating effect of friends' support on the experience of sex-related symptoms and the quality of life**

Results of the analysis of the mediating effect of friends' support on the experience of sex-related symptoms in patients with prostate cancer after radical prostatectomy and their QOL are presented in Table 3.

Multiple regression analysis was performed to test the mediating effects of support from friends. Assumptions of regression analysis were verified, before testing the mediating effect, by a Durbin–Watson coefficient close to 2 (1.67–1.96), thus indicating no autocorrelation; no multicollinearity was found among the independent variables with variance inflation factors less than 10 (1.00–1.14) (Table 4).

To test the mediating effect of friends' support on the influence of sex-related symptoms and hence the QOL, a test was performed using the three steps suggested by Baron and Kenny<sup>21</sup> (Figure 1, Table 4).

Results of the first step showed a significant influence of the independent variable ( $\beta = -0.35$ ,

$P < 0.001$ ), the experience of sex-related symptoms, on the mediating variable, support from friends, with an explanatory power of 12%.

Results of the second step showed a significant influence of the independent variable ( $\beta = -0.65$ ,  $P < 0.001$ ), the experience of sex-related symptoms, on the dependent variable, QOL, with an explanatory power of 41%. In the third step, sex-related symptoms and the mediating variable (support from friends) were entered as independent variables, while the QOL was entered as the dependent variable, and results showed significant effects of both sex-related symptoms ( $\beta = -0.55$ ,  $P < 0.001$ ) and support from friends ( $\beta = 0.28$ ,  $P < 0.001$ ). More specifically, the experience of sex-related symptoms showed a significant effect on the QOL when the support from friends was entered as the mediating variable in the third step, although the regression coefficient  $\beta$  was reduced from  $-0.65$  in the second step to  $-0.55$ . The explanatory power of these variables was shown to be 48%. Results of bootstrapping showed the statistical significance of the indirect effect, since the lower and upper limits of

**TABLE 3** Correlation across Sex-related Symptoms, Support from Friends, and Quality of Life (N= 212).

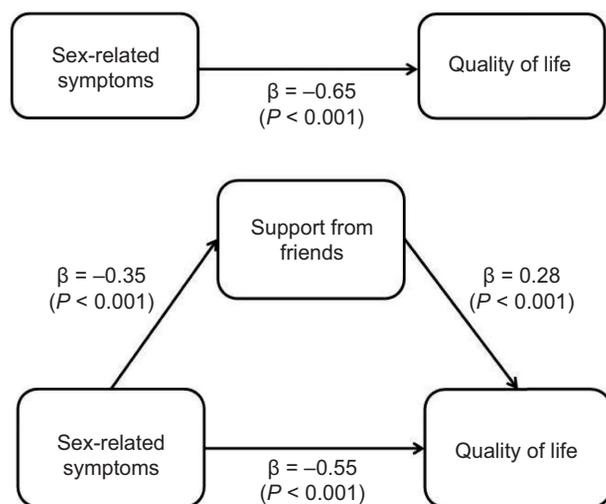
	Sex-related symptoms r (P)	Support from friends r (P)	Quality of life r (P)
Sex-related symptoms	1		
Friends' support	-0.35 (<0.001)	1	
Quality of life	-0.65 (<0.001)	0.47 (<0.001)	1

N: number of patients

**TABLE 4** Mediating Effects of Friends' Support on the Relationship between Sex-related Symptoms and Quality of Life (N= 212).

Causal steps	B	$\beta$	Adj R <sup>2</sup>	F	P
Step 1. Sex-related symptoms → Support from friends	-0.39	-0.35	0.12	29.76	<0.001
Step 2. Sex-related symptoms → Quality of life	-0.62	<b>-0.65</b>	0.41	149.66	<0.001
Step 3. Sex-related symptoms and support from friends → Quality of life					
(1) Sex-related symptoms → Quality of life	-0.53	<b>-0.55</b>	0.48	97.47	< 0.001
(2) Support from friends → Quality of life	0.24	<b>0.28 (P &lt; 0.001)</b>			

B: unstandardized regression coefficient;  $\beta$ : standardized regression coefficient; Adj: adjusted; N: number of patients



**FIGURE 1** Mediating effects of support from friends between experienced sex-related symptoms and quality of life.

the confidence interval ranged from  $-0.65$  to  $-0.06$ , not including zero<sup>22</sup> (Table 4).

## DISCUSSION

The present study was conducted to determine the relationship between the experience of sex-related symptoms and QOL of patients with prostate cancer after radical prostatectomy; also, to investigate any mediating effect of the support from friends.

The average score of QOL of patients with prostate cancer that have undergone radical prostatectomy was 3.20 out of 5 points. Although it was difficult to compare, since different methodologies of measurements were used, the quality of life of participants in the present study was relatively higher than that reported (2.40 out of 4 points) for 117 patients, who had undergone prostatectomy due to prostate cancer at a University Hospital.<sup>23</sup>

The present study demonstrated the experience of sex-related symptoms in patients with prostate cancer after radical prostatectomy to have a moderate

negative effect on their QOL. In a study by Sanda et al.,<sup>24</sup> who investigated the QOL of 1201 patients with prostate cancer, QOL was reported to be influenced by factors related to urinary, sexual, bowel, and hormonal function, depending on the treatment method used. In particular, they reported 44% or more of patients to complain of erectile dysfunction after prostatectomy, the dysfunction being a major factor negatively influencing the QOL, consistent with the results of the present study. Since it has previously been reported that radical prostatectomy and experience of sex-related symptoms resulted in patients describing themselves as “only half man”<sup>6</sup> or “gave emotional pain to African Americans who have traditional male beliefs”,<sup>13</sup> the significance of these problems should be recognized and addressed, even though they do not directly affect their survival. In the case of sexual dysfunction reported in patients with prostate cancer after radical prostatectomy, effects of techniques, including nerve preservation, were found to be minimal.<sup>25</sup> Owing to the possibilities of additional risks, such as from anesthesia and bleeding, medical treatments only seem to be limited in resolving difficulties and improving the QOL of patients. Qualitative studies have shown patients with prostate cancer to strongly believe in not showing emotions or crying, so as to provide strength to their spouses or families.<sup>7</sup> However, such suppression of emotions, particularly if they wished to express them otherwise, could bring about social isolation and maladjustment.<sup>16</sup> After treatment of cancer, support from friends, positive interpretation, and acceptance, could be supplemented as coping strategies.<sup>26</sup> The establishment of practical psychosocial nursing strategies that could be utilized by patients with prostate cancer to openly and inclusively express their agony related to sex-related symptoms might help to improve their QOL.

The results of the present study confirmed the statistically significant partial mediating effect of friends’ support on the relationship between the experience of sex-related symptoms and QOL of patients with prostate cancer after

radical prostatectomy. Even though the experience of sex-related symptoms was found to negatively influence the QOL of patients, support from friends acted as a buffer and reduced the negative influence. A study on an African-American patient, who had undergone radical prostatectomy, emphasized the importance of unstructured social support (spouse, friends, and colleagues) and structured social support (organized social support group), consistent with the findings of the present study. Due to the lack of studies investigating the mediating effect of support from friends, direct comparisons were limited; however, the partial mediating effect of friends' support in the present study was shown to be similar to the findings by Khalil and Abed,<sup>27</sup> who confirmed the partial mediating effect of social support on the relationship between depression and QOL of Jordanian patients receiving hemodialysis. In their study, social support for Jordanian patients receiving hemodialysis was found to reduce the negative effect of depression on their QOL. Among the subdomains of social support, support from friends, in particular, scored higher than that from family, suggesting the former to play a bigger role in improving the QOL than the latter.

In previous studies, patients with prostate cancer were reported to consider their spouses as the greatest source of emotional support in the initial stage of the disease, as well as during treatment; however, as time passed, both patients and spouses were exhausted and the former felt the lack of full emotional support.<sup>28,29</sup> In a study investigating the opinions on support from the spouse or family of patients with ostomy, patients were reported to always get support from their family members. However, the longer the duration of the disease, the greater were the socio-economic hardships: patients cannot fit in the society, the family members may not retain the economic security, and the situation may eventually lead to weaker support of the family to patients.<sup>30</sup> Since the experience of sex-related symptoms after radical prostatectomy could reduce the self-esteem of a man or cause a negative perception

in the spouse, additional coping strategies would be recommended, rather than relying only on family support. In addition, interventions that could positively affect the QOL of patients with prostate cancer would be necessary, through a continuous re-evaluation of multilaterally generated networks, such as the support from friends, reflecting upon the recent social changes, such as the increasing elderly population and single-person households in South Korea.

The limitation of the present study was that participants were sampled from patients with prostate cancer, who had undergone radical prostatectomy at some tertiary care medical institution; hence, care should be exercised in the generalization of the results. Nonetheless, the significance of the present study lay in testing the effects of friends' support as a measure to improve the impact of sex-related symptoms (which has not been attempted in previous studies), which is a sensitive area for patients with prostatectomy, as well as to enhance the quality of their life. Accordingly, replication and intervention studies that could identify factors possibly improving the QOL of patients that have undergone surgery at multiple institutions should be conducted in the future. Also, it is recommended to attempt a longitudinal study of QOL changes before and after surgery by comparing QOL before and after surgery in patients with prostate cancer.

## CONCLUSIONS

The present study attempted to test the mediating effect of friends' support on the experience of sex-related symptoms, and hence, the QOL of patients with prostate cancer after radical prostatectomy. Results showed the QOL of patients to be significantly correlated with the experience of sex-related symptoms and support from friends. The latter was found to have partial mediating effects on the relationship between the experience of sex-related symptoms and QOL of patients with prostate cancer. Therefore, it would be necessary to

develop and apply active integrated interventions, with support from friends, to improve the QOL of patients with prostate cancer after undergoing radical prostatectomy. The present study could provide important basic data for the development of nursing intervention programs toward improving the QOL of patients with prostate cancer, since the necessity of friends' support for patients with prostate cancer, following radical prostatectomy, was confirmed.

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