Observational Study

Self-perceived burden and influencing factors in patients with cervical cancer administered with radiotherapy

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BACKGROUND

Cervical cancer is the fourth commonest malignancy in women around the world. It represents the second most commonly diagnosed cancer in South East Asian women, and an important cancer death cause in women of developing nations. Data collected in 2018 revealed 5690000 cervical cancer cases worldwide, 85% of which occurred in developing countries.

AIM

To assess self-perceived burden (SPB) and related influencing factors in cervical cancer patients undergoing radiotherapy.

METHODS

Patients were prospectively included by convenient sampling at The Fifth Affiliated Hospital of Sun Yat-Sen University, China between March 2018 and March 2019. The survey was completed using a self-designed general information questionnaire, the SPB scale for cancer patients, and the self-care self-efficacy scale, Strategies Used by People to Promote Health, which were delivered to patients with cervical cancer undergoing radiotherapy. Measurement data are expressed as the mean ± SD. Enumeration data are expressed as frequencies or percentages. Caregivers were the spouse, offspring, and other in 46.4, 40.9, and 12.7%, respectively, and the majority were male (59.1%). As for pathological type,
90 and 20 cases had squamous and adenocarcinoma/adenosquamous carcinomas, respectively. Stage IV disease was found in 12 (10.9%) patients.

RESULTS
A total of 115 questionnaires were released, and five patients were excluded for too long evaluation time (n = 2) and the inability to confirm the questionnaire contents (n = 3). Finally, a total of 110 questionnaires were collected. They were aged 31-79 years, with the 40-59 age group being most represented (65.4% of all cases). Most patients were married (91.8%) and an overwhelming number had no religion (92.7%). Total SPB score was 43.13 ± 16.65. SPB was associated with the place of residence, monthly family income, payment method, transfer status, the presence of radiotherapy complications, and the presence of pain (P < 0.05). The SPB and self-care self-efficacy were negatively correlated (P < 0.01). In multivariate analysis, self-care self-efficacy, place of residence, monthly family income, payment method, degree of radiation dermatitis, and radiation proctitis were influencing factors of SPB (P < 0.05).

CONCLUSION
Patients with cervical cancer undergoing radiotherapy often have SPB. Self-care self-efficacy scale, place of residence, monthly family income, payment method, and radiation dermatitis and proctitis are factors independently influencing SPB.

Key Words: Cervical cancer; Radiotherapy; Self-perceived burden; Influencing factors; Self-perceived burden; Prospective research

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Core Tip: Cervical cancer is the fourth commonest malignancy in women around the world. The present study aimed to assess self-perceived burden (SPB) and related influencing factors in cervical cancer patients undergoing radiotherapy. The survey was completed using a self-designed general information questionnaire, the SPB scale for cancer patients, and the self-care self-efficacy scale, Strategies Used by People to Promote Health. The results suggested that patients with cervical cancer undergoing radiotherapy often have SPB. Self-care self-efficacy scale, place of residence, monthly family income, payment method, and radiation dermatitis and proctitis are factors independently influencing SPB.

INTRODUCTION
Cervical cancer is the fourth commonest malignancy in women around the world[1]. Individuals with cervical cancer tend to be younger than previously reported[2,3]. External beam radiation and brachytherapy are often applied for cervical cancer treatment[4]. After diagnosis with cervical cancer, the women have short-term and long-term psychophysical and sexual problems; for example, undergoing brachytherapy could be perceived as a negative, humiliating experience resulting in pain, fear, fatigue, financial issues, among others[5,6].

The psychological pressure of long-term treatment, care, and financial and emotional problems generally results in the negative experience of self-perceived burden (SPB), as demonstrated in other cancers, including breast cancer and hematologic malignancies[7,8]. Currently, studies assessing SPB in cervical cancer patients undergoing radiotherapy are scarce, and the effects of radiotherapy on mental and physical health in such individuals are not completely understood.
Therefore, the present study aimed to assess SPB and related influencing factors in cervical cancer patients undergoing radiotherapy. Our findings will provide a reference for reducing SPB in these patients.

MATERIALS AND METHODS

Patients

Patients were prospectively included by convenient sampling at The Fifth Affiliated Hospital of Sun Yat-Sen University, China between March 2018 and March 2019. The inclusion criteria were: (1) Pathological diagnosis of cervical cancer; (2) Consciousness; (3) Current radiotherapy; (4) Age ≥ 18 years; (5) Ability to read the questionnaire and answer the questions correctly; and (6) Agreement to voluntarily participate in the survey. The exclusion criteria were: (1) Cognitive impairment and mental disease history; (2) Other organ ailments, including respiratory and cardiovascular system diseases; and (3) No caregiver during radiotherapy. The study was approved by the ethics committee of Sun Yat-Sen University, and signed informed consent was provided by each participant.

Questionnaires

The survey was completed by distributing questionnaire forms to eligible subjects, including a self-designed general information questionnaire, and the SPB and self-care self-efficacy scales.

The general information questionnaire mainly assesses parameters such as age, nationality, place of residence, marital status, religion, occupation, education level, monthly family income, payment method, situation of caregivers, and disease information, obtained from medical records.

The SPB scale for cancer patients (SPBS-CP) was proposed by Ren et al referring to the global SPB assessment tool, which includes care burden (items 1-4), financial/family burden (items 5-11), emotional burden (items 12-17), and treatment burden (items 18-21). A 5-level Likert scale was used for scoring from "never" to "always" (1-5). After summing the scores obtained for various items, the SPB level of patients was measured as follows: SPB < 30, no obvious burden; 30 ≤ SPB < 50, mild burden; 50 ≤ SPB < 70, moderate burden; SPB ≥ 70 severe burden. Content validity was 0.81, for a Cronbach’s coefficient of 0.938.

The strategies used by people to promote health scale was developed by Lev et al in 1996, and further modified by Qian et al from China in 2011. It includes the three dimensions of positive attitudes (15 items), self-decision-making (3 items), and self-decompression (10 items), with a total of 28 items. A 5-level Likert scale was used for scoring, from "no confidence" to "very confident" (1-5), and total scores were 28-140. The higher the score, the greater the confidence in self-care by patients. The Cronbach’s α for this scale was 0.970.

Radiation Therapy Oncology Group classification criteria for acute radiation injury were used for radiation complications, and the digital scoring method was used for pain assessment.

Survey and quality control

Based on informed consent, unified guidance was applied by the investigators to perform the one-to-one questionnaire survey. The questionnaires were collected on the spot. Then, the filled questionnaires were assessed by two investigators, who immediately input the data into the system.

Statistical analysis

SPSS 21.0 software (SPSS, United States) was used for data analyses. Measurement data are expressed as the mean ± SD. Enumeration data are expressed as frequencies or percentages. Total SPB score was considered a continuous variable, and analyzed by the Kolmogorov-Smirnov test for normality of distribution. The t-test and analysis of variance were used to evaluate measurement data. Spearman correlation analysis was carried out to analyze the correlation between SPB and self-care self-efficacy scale score. Multivariate linear regression analysis of influencing factors of SPB in cervical cancer patients undergoing radiotherapy was performed. Using the SPB score as the dependent variable, parameters in general patient information with P < 0.05 in univariate analysis and self-care self-efficacy scale score as independent variables were assessed by stepwise multivariate linear regression. Two-sided P < 0.05 was
RESULTS

Patient general data
A total of 115 questionnaires were released, and five patients were excluded for too long evaluation time (n = 2) and the inability to confirm the questionnaire contents (n = 3). Finally, a total of 110 questionnaires were collected. They were aged 31-79 years, with the 40-59 age group being most represented (65.4% of all cases). Most patients were married (91.8%) and an overwhelming number had no religion (92.7%). Caregivers were the spouse, offspring, and other in 46.4, 40.9 and 12.7%, respectively, and the majority were male (59.1%). As for pathological type, 90 and 20 cases had squamous and adenocarcinoma/adenosquamous carcinomas, respectively. Stage IV disease was found in 12 (10.9%) patients. Table 1 shows the characteristics of cervical cancer patients undergoing radiotherapy.

SPB subscores and self-care self-efficacy scale scores and correlations with total SPB score in cervical cancer patients undergoing radiotherapy
The SPB scale was used to evaluate SPB levels in cervical cancer patients undergoing radiotherapy. The total SPB score was 43.13 ± 16.65. The financial/family burden score was the highest (16.89 ± 6.44), while treatment burden had the lowest score (7.31 ± 3.48). Meanwhile, total self-care self-efficacy scale score was 99.52 ± 25.34. Correlation analysis indicated that SPB and self-care self-efficacy scale scores were negatively correlated, with statistical significance (r = -0.701, P < 0.01). Detailed data are provided in Table 2.

Univariate analysis of SPB scores based on general parameters of cervical cancer patients undergoing radiotherapy
A univariate analysis was performed to assess the correlations of various patient parameters with SPB score. As shown in Table 3, place of residence, monthly family income per capita, payment method, metastasis, pain, and radiation-associated complications (dermatitis, proctitis, and cystitis) were correlated with SPB score (P < 0.05).

Factors independently affecting SPB
Multivariate regression analysis showed that self-care self-efficacy scale score, place of residence, monthly family income, payment method, and radiation and radiation proctitis in cervical cancer patients undergoing radiotherapy independently affected SPB, with statistical significance. The combined total variance was 75.1%, as shown in Table 4.

DISCUSSION
Studies conducted in many countries revealed salient SPB among cancer patients. However, studies assessing SPB in cervical cancer patients undergoing radiotherapy are scarce.

This study demonstrated that mild to moderate SPB is common in patients with cervical cancer undergoing radiotherapy. In addition, self-management effectiveness, the place of residence, monthly family income, payment method, and some radiation complications independently affected SPB.

In this study, total SPB score in cervical cancer patients undergoing radiotherapy was 43.13 ± 16.65, reflecting a mild to moderate level overall, corroborating the finding of Zheng et al[14]. There were 44 (40%), 28 (25.5%), and 9 (8.2%) patients with mild, moderate, and severe SPB, respectively. The above results suggested that the assessed patients generally had SPB, with some even showing moderate and severe levels, which is worthy of attention from clinical staff. To help patients with mild SPB, the medical staff should provide timely psychological counseling, apply effective psychological nursing, and provide health education, to avoid progression to moderate and severe levels.

Financial/family burden showed the highest subscores (16.89 ± 6.44) among all dimensions, in agreement with previous studies assessing SPB in patients undergoing radiotherapy.
Table 1 General information of cervical cancer patients undergoing radiotherapy (n = 110)

| Item                                      | Cases (n) | %     | Variable                                      | Cases (n) | %     |
|-------------------------------------------|-----------|-------|-----------------------------------------------|-----------|-------|
| Age (yr)                                  |           |       | Times of current radiotherapy                 |           |       |
| 31-39                                      | 10        | 9.1   | 1-10                                          | 25        | 22.7  |
| 40-59                                      | 72        | 65.4  | 11-20                                         | 51        | 46.4  |
| 60-79                                      | 28        | 25.5  | > 20                                          | 34        | 30.9  |
| Residence                                 |           |       | Pathological type                             |           |       |
| Rural area                                 | 59        | 53.6  | Squamous carcinoma                            | 90        | 81.8  |
| City                                       | 51        | 46.4  | Adenocarcinoma or adenosquamous carcinoma     | 20        | 18.2  |
| Marital status                            |           |       | Tumor stage                                   |           |       |
| Single or widowed                         | 9         | 8.2   | Stage I                                       | 27        | 24.6  |
| Married                                    | 101       | 91.8  | Stage II                                      | 34        | 30.9  |
| Religion                                  |           |       | Stage III                                     | 37        | 33.6  |
| Yes                                       | 8         | 7.3   | Radiation way                                 | 71        | 64.5  |
| Education level                           |           |       | Metastasis                                    |           |       |
| Primary school or below                   | 54        | 49.1  | In vitro + intracavity                        | 39        | 35.5  |
| Junior high school                        | 36        | 32.7  | Recurrence                                    |           |       |
| Senior high school                        | 8         | 7.3   | No                                            | 104       | 94.5  |
| College degree or above                   | 12        | 10.9  | Yes                                           | 6         | 5.5   |
| Monthly family income per capita          |           |       |                                               |           |       |
| < 3000                                    | 31        | 28.1  | No                                            | 85        | 77.3  |
| 3000-5000                                 | 50        | 45.5  | Yes                                           | 25        | 22.7  |
| > 5000                                    | 29        | 26.4  | Radiation dermatitis                          | 36        | 32.7  |
| Payment method                            |           |       |                                               |           |       |
| Self-paying                                | 26        | 23.6  | 1                                             | 68        | 61.8  |
| Networking inside and outside province    | 17        | 15.5  | > 2                                           | 6         | 5.5   |
| Health care in the city                   | 67        | 60.9  | Radiation proctitis                           |           |       |
| Caregiver                                 |           |       |                                               |           |       |
| 18-39                                     | 48        | 43.6  | 1                                             | 15        | 13.6  |
| 40-59                                     | 37        | 33.7  | > 2                                           | 8         | 7.3   |
| 60-                                       | 25        | 22.7  | Pain                                          |           |       |
| Gender of caregiver                       |           |       |                                               |           |       |
| Female                                    | 45        | 40.9  | Yes                                           | 32        | 29.1  |
| Male                                      | 65        | 59.1  |                                               |           |       |

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Table 2 Self-perceived burden subscores and self-care self-efficacy scale scores and correlations with total self-perceived burden score in cervical cancer patients undergoing radiotherapy (n = 110)

| Item                       | (Score, mean ± SD) | Total score of SPB | r    | p     |
|----------------------------|--------------------|--------------------|------|-------|
| Financial/family burden    | 16.89 ± 6.44       | 43.13 ± 16.65      | 0.914| < 0.05|
| Care burden                | 8.90 ± 4.22        |                    | 0.835| < 0.05|
| Treatment burden           | 7.31 ± 3.48        |                    | 0.770| < 0.05|
| Emotional burden           | 10.10 ± 5.03       |                    | 0.872| < 0.05|
| Total score of SPB         | 43.13 ± 16.65      |                    |      |       |
| Total score of self-care self-efficacy scale | 99.52 ± 25.34 | | -0.701| < 0.05|

SPB: Self-perceived burden.

as a whole to tackle problems together. By facilitating meaningful dialogue between family members, patients’ feelings of SPB can be alleviated [17]. Therefore, in clinics, patients with poor family finances and low income should be paid particular attention to, and their medical needs should be timely met and medical information and assistance should be provided to them to reduce the burden on their families.

This study showed that the lower the self-care self-efficacy scale score in cervical cancer patients undergoing radiotherapy, the higher the SPB. Patients with low self-care self-efficacy scale scores often have less positive attitudes, less enthusiasm to seek self-decompression methods, and lack of self-decision-making ability, leading to an increased psychological burden [18, 19]. Therefore, the clinical staff could reduce the SPB by improving self-care self-efficacy in patients.

As shown above, place of residence was another factor independently affecting SPB in patients with cervical cancer undergoing radiotherapy. The patients living in rural areas accounted for 53.6%, and showed higher SPB scores compared with urban residents, in agreement with the findings by Gong et al [20]. The rural patients also had a lower education level and worried about medical costs. Besides, radiotherapy time was long, and the rural patients had reduced access to medical information, resulting in worries, anxiety, and increased psychological burden. Therefore, the medical staff should pay attention to patients from rural areas, providing proper psychological counseling, specific guidance, and help based on their actual situation, which might alleviate their psychological pressure.

Other parameters independently determining SPB included the monthly family income and payment method. The above results showed that the poorer the family, the higher the SPB, consistent with multiple studies [21-24]. The patients with relatively high family income and medical insurance had no overt worries during treatment and nursing, which provided some comfort. Therefore, the medical staff should focus on patients with poor family financial conditions and those paying all medical bills by themselves to subscribe for medical insurance, providing some medical information and assistance to reduce medical expenses, which could decrease the burden and relieve their worries regarding the medical treatment.

Finally, the severity of radiotherapy complications in this study independently affected SPB, which is consistent with multiple studies of cancer patients [16, 25, 26] in China. Studies from other countries also found that cancer patients’ high SPB was precipitated by suffering from severe symptom distress and heavy functional [7, 27]. The incidence of radiation dermatitis in radiotherapy of cervical cancer reaches 93.8% [28]. Patients with radiation dermatitis show symptoms such as pruritus, dehumidification, and skin damage in the radiation field, or even bleeding, exudation, and pain in serious cases. Meanwhile, radiation proctitis often occurs at 1-2 wk after radiotherapy, with an incidence of 53%-100% [29]. In this study, 75.5% of patients had radiation proctitis, with grade 1 showing a relatively high incidence and accounting for 48.2%. The most common symptoms of radiation enteritis include diarrhea and increased frequency of defecation, accompanied by anal pain and fall-swell feeling. The affected patients may experience dizziness, gastrointestinal dysfunction, electrolyte imbalance, and even intestinal fistula, and need to discontinue radiotherapy in severe cases. Such symptoms could prolong treatment time, and increase hospitalization duration and cost, pain, and anxiety, subsequently increasing SPB. While paying attention to treatment effects, the medical staff should also dynamically
Table 3: Univariate analysis of self-perceived burden scores based on general data in cervical cancer patients undergoing radiotherapy (n = 110)

| Item                                      | Case (n) | mean ± SD         | t/F   | P      | Pairwise comparison |
|-------------------------------------------|----------|-------------------|-------|--------|---------------------|
| **Age (yr)**                              |          |                   |       |        |                     |
| (1) 31-39                                 | 10       | 48.60 ± 24.075    | 0.620 | 0.540  |                     |
| (2) 40-49                                 | 72       | 42.83 ± 15.959    |       |        |                     |
| (3) 60-79                                 | 28       | 41.93 ± 15.604    |       |        |                     |
| **Residence**                             |          |                   |       |        |                     |
| (1) Rural area                            | 59       | 49.44 ± 16.406    | 4.667 | < 0.05 | (1) > (2)           |
| (2) City                                  | 51       | 35.82 ± 13.811    |       |        |                     |
| **Marital status**                        |          |                   |       |        |                     |
| (1) Single or widowed                     | 9        | 43.89 ± 19.637    | 4.667 | < 0.05 | (1) > (2)           |
| (2) Married                               | 101      | 43.06 ± 16.471    |       |        |                     |
| **Religion**                              |          |                   |       |        |                     |
| (1) No                                    | 102      | 43.58 ± 16.766    | 1.015 | 0.312  |                     |
| (2) Yes                                   | 8        | 37.38 ± 14.851    |       |        |                     |
| **Education level**                       |          |                   |       |        |                     |
| Primary school or below                   | 54       | 43.17 ± 15.779    | 0.044 | 0.987  |                     |
| Junior high school                        | 36       | 43.04 ± 17.064    |       |        |                     |
| Senior high school                        | 8        | 44.88 ± 27.205    |       |        |                     |
| College degree or above                   | 12       | 42.08 ± 12.117    |       |        |                     |
| **Family per capita monthly income**      |          |                   |       |        |                     |
| < 3000                                    | 31       | 56.77 ± 18.353    | 24.572| < 0.05 | (1) > (2)           |
| 3000-5000                                 | 50       | 41.06 ± 12.904    | (2) > (3)|       |                     |
| > 5000                                    | 29       | 32.10 ± 9.344     | (1) > (3)|       |                     |
| **Payment method**                        |          |                   |       |        |                     |
| Self-paying                               | 26       | 56.27 ± 16.185    | 13.051| < 0.05 | (1) > (2)           |
| Networking inside and outside province    | 17       | 40.53 ± 13.172    | (2) > (3)|       |                     |
| Health care in the city                   | 67       | 38.69 ± 15.060    |       |        |                     |
| **Caregiver**                             |          |                   |       |        |                     |
| Spouse                                    | 51       | 40.31 ± 17.136    | 1.418 | 0.247  |                     |
| Offspring                                 | 45       | 45.18 ± 13.890    |       |        |                     |
| Other                                     | 14       | 46.79 ± 21.959    |       |        |                     |
| **Caregiver age (yr)**                    |          |                   |       |        |                     |
| (1) 18-39                                 | 48       | 45.85 ± 16.720    | 1.183 | 0.310  |                     |
| (2) 40-59                                 | 37       | 41.49 ± 15.073    |       |        |                     |
| (3) 60-                                  | 25       | 40.32 ± 18.538    |       |        |                     |
| **Gender of caregiver**                   |          |                   |       |        |                     |
| (1) Female                                | 45       | 46.04 ± 16.628    | 1.538 | 0.127  |                     |
| (2) Male                                  | 65       | 44.01 ± 16.605    |       |        |                     |
| **Times of current radiotherapy**         |          |                   |       |        |                     |
| (1) 1-10                                  | 25       | 42.16 ± 16.570    | 0.096 | 0.909  |                     |
| (2) 11-20                                 | 51       | 42.98 ± 16.861    |       |        |                     |
evaluate psychological changes and needs, to reduce the psychological burden. In addition, effective symptom management and comfortable care are also important measures to reduce SPB.

The limitations of this study should be mentioned. First, this was a single-center study, with a relatively small sample size. In addition, there was no follow-up of the patients after the survey. Therefore, further large multi-center studies are required to confirm these findings and better assist cervical cancer patients undergoing radiotherapy.

**CONCLUSION**

Studies by domestic and foreign scholars have shown that SPB is closely related to the quality of life, including a good death[30], dignity[31], etc. In addition, the burden of
self-perception is also related to the patient's end-of-life decision on euthanasia and suicidal behavior[32]. Other studies have shown that cancer patients and patients with severe chronic diseases worry about being a burden on their families, which is a 'community test', leading to negative emotional reactions such as guilt, depression, and sense of burden in patients, which seriously affects the mental health of cancer patients[32-34]. Overall, patients with cervical cancer undergoing radiotherapy often have moderate to severe SPB. Self-care self-efficacy scale score, place of residence, monthly family income, payment method, and radiation dermatitis and proctitis are factors independently influencing SPB. In clinics, the medical staff should pay attention to improving the patients' self-care self-efficacy, focus on rural and low-income patients, and provide effective symptom management to cervical cancer patients undergoing radiotherapy, which could reduce SPB and improve prognosis and the quality of life.

### Table 4 Multivariate analysis of factors potentially affecting self-perceived burden in cervical cancer patients undergoing radiotherapy

| Variable                          | Partial regression coefficient | Standard error | Standardized partial regression coefficient | t    | P value |
|----------------------------------|--------------------------------|----------------|-------------------------------------------|------|---------|
| Self-management effectiveness    | -0.303                         | 0.036          | -0.462                                    | -8.431 | 0.000   |
| Residence                        | -4.110                         | 1.784          | -0.124                                    | -2.304 | 0.023   |
| Family per capita monthly income | -5.231                         | 1.242          | -0.233                                    | -4.211 | 0.000   |
| Payment method                   | -3.515                         | 1.027          | -0.178                                    | -3.424 | 0.001   |
| Radiation dermatitis             | 6.540                          | 1.672          | 0.219                                     | 3.912  | 0.000   |
| Radiation proctitis              | 3.814                          | 1.226          | 0.166                                     | 3.110  | 0.002   |

$R^2 = 0.751$.

### ARTICLE HIGHLIGHTS

#### Research background
Cervical cancer is the fourth commonest malignancy in women around the world. Individuals with cervical cancer tend to be younger than previously reported. The psychological pressure of long-term treatment, care, and financial and emotional problems generally results in the negative experience of self-perceived burden (SPB). Studies by domestic and foreign scholars have shown that SPB is closely related to the quality of life, including a good death, dignity, etc.

#### Research motivation
Studies conducted in many countries revealed salient SPB among cancer patients. However, studies assessing SPB in cervical cancer patients undergoing radiotherapy are scarce.

#### Research objectives
This study aimed to assess SPB and related influencing factors in cervical cancer patients undergoing radiotherapy.

#### Research methods
One-hundred and ten patients with cervical cancer undergoing radiotherapy were selected for questionnaire survey. Research data of these patients were summarized and analyzed.

#### Research results
Total SPB score was 43.13 ± 16.65. SPB was associated with the place of residence, monthly family income, payment method, transfer status, the presence of radiotherapy complications, and the presence of pain ($P < 0.05$). The SPB and self-care self-efficacy were negatively correlated ($P < 0.01$). In multivariate analysis, self-care self-efficacy, place of residence, monthly family income, payment method, and degree of radiation
management to cervical cancer patients undergoing radiotherapy, which could reduce self-efficacy, focus on rural and low-income patients, and provide effective symptom control in clinics, the medical staff should pay attention to improving the patients' self-care efficacy scale score, place of residence, monthly family income, payment method, and dermatitis and radiation proctitis were influencing factors of SPB (P < 0.05).

Research conclusions
Patients with cervical cancer undergoing radiotherapy often have SPB. Self-care self-efficacy scale score, place of residence, monthly family income, payment method, and radiation dermatitis and proctitis are factors independently influencing SPB.

Research perspectives
In clinics, the medical staff should pay attention to improving the patients' self-care self-efficacy, focus on rural and low-income patients, and provide effective symptom management to cervical cancer patients undergoing radiotherapy, which could reduce SPB and improve prognosis and the quality of life.

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