

Original Article

Effects of mindfulness-based stress reduction on cervical cancer patients undergoing concurrent radiochemotherapy

Fan An¹, Xin Dan¹, Yun An², Li Zhou¹

¹Department of Gynaecology and Obstetrics, West China Second University Hospital, Sichuan University, Key Laboratory of Birth Defects and Related Diseases of Women and Children (Sichuan University), Ministry of Education, Chengdu 610041, Sichuan, China; ²Department of Medical Insurance, Sichuan Provincial People's Hospital Friendship Hospital, Chengdu 610000, Sichuan, China

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Abstract: Objective: The research in this paper was designed to investigate the effect of mindfulness-based stress reduction on the syndromes, self-perceived burden and quality of life of cervical cancer patients undergoing concurrent radiochemotherapy. Methods: In total, 109 patients with cervical cancer who were admitted to our hospital from February 2015 to May 2018 were enrolled and given concurrent radiochemotherapy. Then based on the method of nursing intervention, they were divided into two groups: control group (CG, n=54), and observation group (OG, n=55). Patients in the CG were treated with conventional nursing care whilst those in the OG were treated with, mindfulness-based stress reduction in addition to the intervention of the CG. Outcome measures included scores of the self-rating anxiety scale (SAS), self-rating depression scale (SDS), Anderson Symptom Assessment Scale (MDASI), self-perceived burden scale (SPBS), revision of Piper fatigue scale, and quality of life scale. Results: (1) After nursing care, patients in the OG reported lower SAS and SDS scores than those in the CG ($P < 0.05$). (2) By the MDASI scale, patients in the OG had lower scores in numbness, vomiting, sadness, dry, lethargy, decreased appetite, forgetfulness, anhelation, distress, restlessness, nausea, fatigue, and pain after nursing care compared with the CG ($P < 0.05$). (3) SPBS scores after nursing care in the OG were lower than those in the CG ($P < 0.05$). (4) Scores of cancer-related fatigue in the OG after nursing care were less than those in the CG ($P < 0.05$). (5) Quality of life scores in the OG after nursing care were greater than those in the CG ($P < 0.05$). Conclusions: Mindfulness-based stress reduction for cervical cancer patients undergoing concurrent radiochemotherapy is beneficial and able to reduce their clinical symptoms, mental stress, self-perceived burden and cancer-related fatigue, and therefore improves their quality of life.

Keywords: Cervical cancer, concurrent radiochemotherapy, mindfulness-based stress reduction, syndrome, self-perceived burden, fatigue, quality of life

Introduction

Cervical cancer is one of the most common gynecological malignancies, with an incidence second only to breast cancer [1]. China has witnessed the development of cervical cancer in patients that are becoming younger in their average age with higher morbidity and death [2, 3]. Clinical treatments of cervical cancer include surgery, chemotherapy, and radiotherapy. However, subtle symptoms in the early stage allow most cases to progress to middle and advanced stages before they see a doctor and as such have lost the best opportunity for surgi-

cal treatment. Concurrent chemoradiotherapy is now the primary method of treatment for these patients [4, 5].

Patients with advanced cervical cancer suffer from, not only pain caused by the disease itself but also toxic side effects of chemoradiotherapy, such as pain, fatigue, vomiting, and nausea and other physical discomforts. These have a great impact on their quality of life as well as increase the financial burdens that the family bear, that can sometimes lead to psychological guilt, which is a self-perceived burden (SPB) [6, 7]. Although psychological or exercise therapies

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improve their quality of life often the methods used are often more complicated and less operable. It is necessary to find systematic and highly feasible ways for improved treatment in patients with cervical cancer [8]. Mindfulness-based stress reduction, also called Mindfulness meditation, offers various types of standard group training courses that are based on “no comments” and “live in the moment” principles that lead patients to naturally accept the illness, and the thoughts and emotions they have [9, 10]. It has been used in clinical studies for cancer intervention and found to be conducive to improve cancer patient’s syndromes, negative emotions, self-perceived burden, sleep quality and cancer-related fatigue [11].

In view of this, this study was designed to investigate the effects of mindfulness-based stress reduction in cervical cancer patients undergoing concurrent chemoradiotherapy.

Material and methods

Material

A total of 109 patients with cervical cancer admitted to our hospital from February 2015 to May 2018 were enrolled and given concurrent radiochemotherapy. Then based on the method of nursing intervention, they were divided into two groups: control group (CG, n=54), and observation group (OG, n=55). Patients in the CG were managed with conventional nursing care whilst those in the OG managed with mindfulness-based stress reduction in addition to the concurrent radiochemotherapy given to the CG. (1) Inclusion criteria: patients who have signed the informed consent; are ≥ 18 years old; are confirmed with cervical cancer by histopathological examination; are in stage IIb-IVa; are able to receive concurrent chemoradiotherapy; are free of cognitive and mental disorders; and have clear language expression, were included. The study was approved by Medical Ethics Committee of our hospital. (2) Exclusion criteria: patients who are unable to tolerate concurrent chemoradiotherapy; withdrew from the study; have cognitive or mental disorders; other malignant tumors or any other serious diseases; or have been found with distant metastasis or local recurrence, were excluded.

Methods

Patients in the CG were treated with conventional nursing care: the medical staff during the

concurrent chemoradiotherapy offers the patient education for the disease, dietary guidance, prevention and treatment of adverse reactions, and positive social as well as psychological support.

In addition to the nursing care provided to the CG, Patients in the OG were also treated with mindfulness-based stress reduction from Monday to Saturday each day for 2 hours from 15:00-17:00 and 19:00-21:00. Patients were allowed to choose the teaching hours as their capacity allows.

Week 1: The theme of the interventions was “mindful breathing”. Before the lecture, the patients were allowed to introduce themselves and say hello to others. Later in about 20 min, they were given the knowledge of mindfulness-based stress reduction. Then at about 50 minutes in, they were exercising mindful breathing and guided to live in the moment. After the lecture, they were encouraged for 20 min to express any doubts about the learning so that they can be corrected and encouraged to communicate and share experiences with others. The homework was doing mindfulness breathing exercises every day.

Week 2: The theme of the intervention was “mindful meditation”. Before the lecture, the patients review the mindful breathing learned last week, and they were taught the concepts, methods, and precautions relating to the meditation for 20 minutes. During the class, classical music *High Mountain and Flowing Water* was played and guides the patients to use mindfulness breathing and make comments on their feelings, thoughts, and emotions for 50 minutes. After class, see week 1. The homework was using mindfulness breathing and meditation exercises every day.

Week 3: The theme of the intervention was “body scan”. Before the lecture the patients reviewed the meditation learned last week and were taught the concepts, methods and related precautions of body scanning for 20 minutes. In class (50 min), following the classical music *Autumn Moon Over Han Palace* which was played, they scanned their body top-to-bottom and paid attention to any feelings. If some discomfort occurs, they were asked to imagine that it disappears with the breath. After class, see week 1. The homework was using mindful-

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ness breathing and meditation and body scan exercises every day.

Week 4: The theme of the intervention was “walking meditation”. Before the lecture the patients reviewed the body scanning learned last week and were taught the concepts, methods and related precautions of walking meditation for 20 minutes. In class (50 min), following the classical music *Dialog Between Fisherman And Woodcutter* being played, they took a mindful breath and then imagine that they are walking for the first time and feeling the movement of the body and contact with the ground. After class, see week 1. The homework was using mindfulness breathing, meditation and body scanning and walking meditation exercises every day.

Week 5: The theme was “eight-sectioned exercise”. Before the lecture the patients reviewed what they learned last week and were taught the essentials and precautions of eight-sectioned exercises for 20 minutes. In class (50 min), they were assisted to learn the first three sections and pay attention to any changes in emotions, physical sensations and breathing. After class, see week 1. The homework was using mindfulness breathing, meditation, body scanning, walking meditation and the last sections every day.

Week 6: The theme of the intervention was “emotional regulation”. Before the lecture the patients reviewed what they learned last week and were taught the correct ways of mindfulness emotional regulation for 20 minutes. In class, they practiced meditation and mindful breathing, and applied them to the real life with a peaceful, self-caring attitude.

Before treatment, the SAS and SDS scales were taken in patients of both groups to assess negative emotions; the MDASI scale was used to assess the symptoms of appetite loss, non-peaceful sleep, numbness, sadness, dry mouth, distress, lethargy, forgetfulness, shortness of breath, nausea, fatigue, and pain; the SPBS scale was used to assess the self-perception burden; and the FACT-CX scale was used to assess the quality of life.

Outcome measures

Negative emotions: Before and after nursing care both groups of patients used the self-rat-

ing anxiety scale (SAS) and self-rating depression scale (SDS) to evaluate their negative emotions. SAS has a cut-off value of 50, and SDS 53. A higher score suggests more serious anxiety and depression [12, 13].

Syndromes: Patients in both groups used the Anderson Symptom Assessment Scale (MDASI) to measure the changes in symptoms before and after the care. The scale includes two parts of which the first one was the focus in this study; including appetite loss, restlessness, numbness, sadness, dry mouth, distress, drowsiness, forgetfulness, anhelation, nausea, fatigue, pain and others. Zero is scored as asymptomatic and 10 is the most severe [14]. The Cronbach's α coefficient is 0.922.

Self-perceived burden: Before and after nursing care, patients in both groups the self-perceived burden scale (SPBS) for evaluation. The scale offers three dimensions of physical burden, emotional burden, and economic burden covering 19 items of which each is scored by Likert 5. The total score is derived by summing the score under each item. A higher total score suggests more self-perceived burden [15]. The Cronbach's α coefficient is 0.888.

Cancer-related fatigue: Before and after nursing care the revised Piper fatigue scale was used to evaluate the cancer-related fatigue of the two groups of patients. The scale includes four dimensions of behavior, cognition, feeling and emotion. The total score could be 0-10. A higher total score suggests more severe fatigue [16]. The Cronbach's α coefficient is 0.915.

Quality of life: Before and after nursing, Functional Assessment of Cancer Therapy-Cervix Trial (FACT-CX) was used to assess the quality of life of patients in the two groups. It offers in 42 items with 5 dimensions of cervical cancer specificity, function, emotion, society/family and physiology. The total score is 168 directly proportional to the quality of life [17, 18]. The Cronbach's α coefficient is 0.908.

Statistics

SPSS 22.0 was used for statistical analysis. Measurement data were expressed as mean \pm standard deviation, where those in normal distribution were subject to independent sample t-test; otherwise Mann-Whitney U was applied.

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Table 1. General data of patients in both groups [n (%)]/($\bar{x} \pm s$)

Item	OG (n=55)	CG (n=54)	t/ χ^2	P
Age (years)	48.52 \pm 1.28	48.49 \pm 1.22	0.125	0.901
clinical staging (n)				
I	25 (45.45)	23 (42.59)	0.091	0.763
II	30 (54.55)	31 (57.41)		
Education level (n)				
Primary school	12 (21.82)	13 (24.07)	0.125	0.885
Junior high school or technical secondary school	27 (49.09)	25 (46.30)		
High school	8 (14.55)	7 (21.96)		
Junior college and above	8 (14.55)	9 (16.67)		

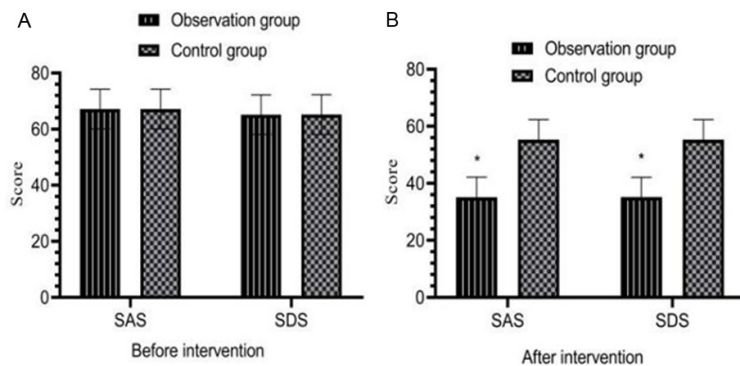


Figure 1. Comparison of SAS & SDS scores before and after nursing. SAS & SDS scores before nursing indicated insignificant differences between the groups, $P > 0.05$. After nursing, SAS & SDS scores in the observation group were lower than those in the control group ($P < 0.05$). *indicates that compared with the control group, $P < 0.05$.

CG with stage I and II cervical cancer were 23 (42.59%), & 31 (57.41%), respectively, and the number of cases with an education level of primary school, Junior high school or technical secondary school, high school, junior college and above were 13 (24.07%), 25 (46.30%), 7 (21.96%), & 9 (16.67%) respectively. There were no statistically significant differences between the two groups in age, clinical stage, and educational level ($P > 0.05$) (Table 1).

SAS & SDS scores before and after nursing in both groups

Intra-group comparisons were measured by Paired t test. Enumeration data was expressed as [n (%)], and comparisons between groups used chi-squared test. $P < 0.05$ indicated a statistically significant difference.

Before nursing care, SAS and SDS scores in the OG were (62.15 ± 1.25) and (60.18 ± 2.88), respectively. The same in the CG were (62.19 ± 1.21) and (60.20 ± 2.82). The differences were not significant ($P > 0.05$) (Figure 1).

Results

General data of patients in both groups

Patients in the OG were aged between 22-60 years old with an average of (48.52 ± 1.28). The number of cases in the OG with stage I and II cervical cancer were 25 (45.45%), & 30 (54.55%), respectively, and the number of cases with an education level of primary school, Junior high school or technical secondary school, high school, junior college and above were 12 (21.82%), 27 (49.09%), 8 (14.55%), & 8 (14.55%) respectively. Patients in CG were aged between 23-59 years old with an average of (48.49 ± 1.22). The number of cases in the

After nursing care, SAS and SDS scores in the OG were (30.12 ± 0.25) and (30.28 ± 0.19), respectively. The same in the CG were (50.29 ± 1.18) and (50.32 ± 1.09). The differences were significant ($P < 0.05$) (Figure 1).

MDASI scores before and after nursing in both groups

Before nursing, by the MDASI scale the scores of numbness, vomiting, sadness, dry mouth, lethargy, loss of appetite, forgetfulness, anhelation, distress, unpeaceful sleep, nausea, fatigue, and pain in the OG were (7.85 ± 0.25), (7.56 ± 0.18), (7.19 ± 0.96), (7.56 ± 0.63), (7.62 ± 1.22), (7.45 ± 0.23), (7.96 ± 0.63), ($7.66 \pm$

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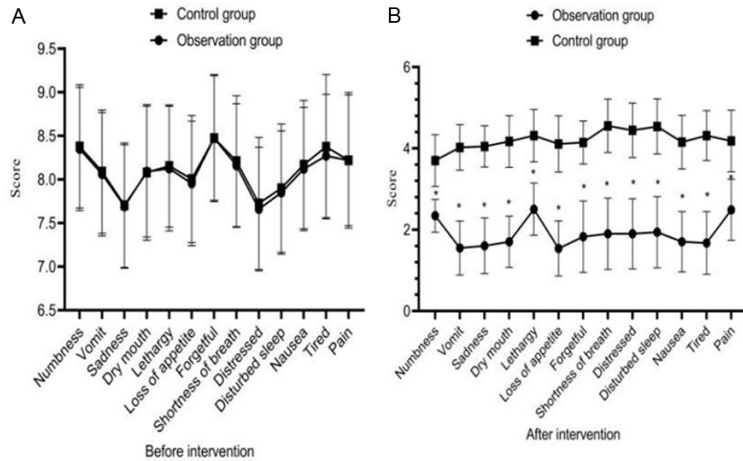


Figure 2. Comparison in MDASI scores before and after nursing. By MDASI scale, there was little difference between the groups in scores of numbness, vomiting, sadness, dry, drowsiness, loss of appetite, forgetfulness, anhelation, distress, disturbed sleep, nausea, fatigue, and pain before nursing, $P > 0.05$. After nursing, scores in the OG of numbness, vomiting, sadness, dry, drowsiness, loss of appetite, forgetfulness, anhelation, distress, disturbed sleep, nausea, fatigue, and pain were inferior to those in the CG, $P < 0.05$. *indicates $P < 0.05$ as compared with the CG.

Table 2. SPBS scores before and after nursing in both groups ($\bar{x} \pm s$, points)

Groups	Before	After
CG (n=54)	35.16 \pm 4.15	32.28 \pm 3.28#
OG (n=55)	35.19 \pm 4.13	28.15 \pm 1.22#.*
T	0.038	8.743
P	0.969	0.000

Note: #indicates $P < 0.05$ as compared with those before nursing; *indicates $P < 0.05$ as compared with those in CG.

0.28), (7.16 \pm 0.27), (7.35 \pm 0.27), (7.62 \pm 0.25), (7.77 \pm 0.26), (7.67 \pm 0.65), respectively. There were not significant differences as compared with those in CG who's scores were: (7.88 \pm 0.23), (7.59 \pm 0.15), (7.20 \pm 0.92), (7.53 \pm 0.61), (7.66 \pm 1.21), (7.49 \pm 0.21), (7.97 \pm 0.61), (7.68 \pm 0.25), (7.19 \pm 0.25), (7.38 \pm 0.25), (7.65 \pm 0.23), (7.79 \pm 0.21), and (7.69 \pm 0.61) respectively ($P > 0.05$) (Figure 2).

After nursing, the scores mentioned above were (2.06 \pm 0.11), (1.08 \pm 0.06), (1.12 \pm 0.13), (1.26 \pm 0.22), (2.05 \pm 0.12), (1.06 \pm 0.13), (1.21 \pm 0.13), (1.28 \pm 0.05), (1.29 \pm 0.09), (1.32 \pm 0.15), (1.18 \pm 0.08), (1.13 \pm 0.05), & (1.96 \pm 0.23) respectively in the OG. Which were all lower than those in the CG: (3.25 \pm 0.25), (3.63 \pm 0.85), (3.69 \pm 0.78), (3.72 \pm 0.69), (3.86 \pm 0.68), (3.62 \pm 0.62), (3.77 \pm

0.59), (4.09 \pm 0.68), (3.97 \pm 0.85), (4.06 \pm 0.72), (3.69 \pm 0.15), (3.88 \pm 0.12), and (3.65 \pm 0.18) respectively. With the differences being significant ($P < 0.05$) (Figure 2).

SPBS scores before and after nursing in both groups

Little significant difference was found in SPBS scores between the two groups before nursing ($P > 0.05$). After nursing care, the SPBS scores in both groups clearly decreased ($P < 0.05$) and those in the OG were less compared with the CG ($P < 0.05$) (Table 2).

Cancer-related fatigue scores before and after nursing in both groups

Little significant difference was found in cancer-related fatigue scores between the two groups before nursing ($P > 0.05$). After nursing care, the cancer-related fatigue scores in both groups clearly decreased ($P < 0.05$) and those in the OG were lower compared with CG ($P < 0.05$) (Table 3).

Quality of life scores before and after nursing in both groups

Also, there was little significant difference in quality of life scores between the two groups before nursing ($P > 0.05$). After nursing care, the scores in both groups increased ($P < 0.05$) and those in the OG were superior to those in CG ($P < 0.05$) (Table 4).

Discussion

For cancer patients, the self-perceived burden refers to the psychological guilt the patients feel due to the requirements for care they need from others during the diagnosis and treatment [19]. Cervical cancer patients feel more self-perceived burden because of the pain caused by the disease and also the psychological pressure derived from public opinions [20]. In this study, patients in the OG showed smaller SPBS, SAS, and SDS scores than those in the CG ($P < 0.05$) after nursing care suggesting that mind-

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Table 3. Cancer-related fatigue scores before and after nursing in both groups ($\bar{x} \pm s$, points)

Groups	Before	After
CG (n=54)	5.36 ± 0.85	4.32 ± 0.52 [#]
OG (n=55)	5.39 ± 0.82	2.32 ± 0.28 ^{#,*}
<i>T</i>	0.188	25.064
<i>P</i>	0.852	0.000

Note: [#]indicates $P < 0.05$ as compared with those before nursing; ^{*}indicates $P < 0.05$ as compared with those in CG.

Table 4. Quality of life scores before and after nursing in both groups ($\bar{x} \pm s$, points)

Groups	Before	After
CG (n=54)	58.96 ± 10.58	95.12 ± 13.28 [#]
OG (n=55)	59.02 ± 10.62	148.88 ± 12.88 ^{#,*}
<i>T</i>	0.029	21.455
<i>P</i>	0.977	0.000

Note: [#]indicates $P < 0.05$ as compared with those before nursing; ^{*}indicates $P < 0.05$ as compared with those in CG.

fulness-based stress reduction helped reduce the psychological stress and self-perceived burden. This may be explained by the fact that mindfulness, a stable state of mind, leads the patients to pay more attention to themselves and have a more positive attitude towards the disease, pain and stress [21, 22].

The mindfulness-based stress reduction used here has been improved and assisted by light music and mindfulness yoga with classic music in traditional Chinese medicine and the eight-sectioned exercises which focuses on thoughts, posture and breathing. Meditation training makes it easier for the patients to have access to being calm and therefore allow any misperceptions or negative emotions corrected. This leads them to a natural acceptance of the illnesses, emotions, and thoughts they have that reduce self-perceived burden.

Cancer-related fatigue is a common symptom in cancer patients after radiochemotherapy [23]. In this study, the relatively high cancer-related fatigue scores of both groups of patients before the nursing decreased the interventions and the extent to which the scores declined in the OG was larger than that in the CG. It has been suggested that mindfulness-based stress

reduction helps to reduce the fatigue symptoms of patients. Mindfulness-based stress reduction emphasizes focusing on oneself, and teaches the patient to treat their reactions and symptoms related to the disease objectively which in return gives them empowered and progressive thoughts to fight the illness. Besides, the eight-sectioned exercise is an aerobic exercise that helps patients maintain physical vitality and reduce fatigue [24].

As the results showed, all MDASI scores in the OG were lower than those in the CG after nursing care ($P < 0.05$). This further proved the efficiency of mindfulness-based stress reduction in reducing symptoms. Among various reasons, it is believed that the eight-sectioned exercise has the effect of promoting qi to activate blood, and reduces attention-deficit disorder, sleep disturbance, anxiety and mental stresses. Mindfulness-based stress reduction combined with classic music and eight-sectioned exercise further relieved their psychological stress and negative emotions [25]. Furthermore, the communication between patients also played a great role in relieving mental stress.

Comprehensive evaluation of quality of life covered all aspects of family, function, psychology and physiology, etc. and was used to mirror the extent to which the patients' life is affected by the disease [26]. In this study, lower quality of life scores in both groups increased following the interventions but the extent to which the scores were increased in the OG was greater than that in the CG, suggesting mindfulness-based stress reduction is effective in improving the quality of life of patients with cervical cancer. "no comments" and "conscious awareness" were the core attitudes of mindfulness-based stress reduction. "Conscious awareness" means finding a way by which the patient's active attention is focused on the patient them self. The focus is on prevention. "No comments" is a way to teach patients to treat life with a positive attitude. The focus is on treatment. Together, these cores effectively improve their physical and psychological status, reduce or eliminate adverse effects of chemoradiotherapy and the disease itself, and therefore improve the quality of life.

In summary, mindfulness-based stress reduction for cervical cancer patients undergoing chemoradiotherapy is beneficial to improve the

clinical symptoms and psychological state, reduce self-perceived burden and cancer-related fatigue, as well as improve quality of life.

The small sample size used in this study may be improved with larger cohorts. Further research focusing on large sample size, longer period of time for the study and more accepts that are be investigated will improve this investigation.

Disclosure of conflict of interest

None.

Address correspondence to: Li Zhou, Department of Gynaecology and Obstetrics, West China Second University Hospital, Sichuan University, Key Laboratory of Birth Defects and Related Diseases of Women and Children (Sichuan University), Ministry of Education, No.1416, 1rd section of Chenglong Avenue, Chengdu 610041, Sichuan, China. Tel: +86-028-88570604; E-mail: my6lib@163.com

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