Effects of a health education mode based on the theory of planned behavior on the postoperative lifestyle of patients with cervical cancer

Efeitos de uma modalidade de educação em saúde baseada na teoria do comportamento planejado sobre o estilo de vida pós-operatório de pacientes com câncer cervical

Efectos de una modalidad de educación para la salud basada en la teoría del comportamiento

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Abstract

Objective: To develop a health education mode based on the theory of planned behavior (TPB), and to explore the influence of this mode on the postoperative lifestyle of patients with cervical cancer.

Methods: A total of 122 patients diagnosed from January 2019 to June 2020 were divided into control and education groups (n=61) using a random number table. Control group received traditional health education after operation, while education group was given TPB-based health education after operation. Their general data, medication compliance, dietary compliance, discharge time, incidence of complications, lifestyle, quality of life (QOL) and mental state before and after operation were compared.

Results: No significant differences were found in general data, preoperative lifestyle score, QOL score and mental state score between the two groups (P>0.05). In education group, the medication compliance and dietary compliance scores were significantly higher than those in control group, while the discharge time and the total incidence of complications were earlier and lower than those in control group (P<0.05). After operation, the scores of self-realization, interpersonal relationship, nutrition, physical activity, health responsibility, stress management, physical dimension, social/family dimension, emotional dimension and functional dimension significantly rose, while the distress thermometer and problem list scores declined in both groups, and education group had better improvement in scores than control group (P<0.05).

Conclusion: Theory of planned behavior health education mode can improve the postoperative treatment compliance, reduce postoperative complications, and ameliorate the lifestyle, quality of life and mental state of patients with cervical cancer.

Resumo

Objetivo: Desenvolver uma modalidade de educação em saúde baseado na teoria do comportamento planejado (TCP) e explorar sua influência no estilo de vida pós-operatório de pacientes com câncer cervical.

Métodos: Um total de 122 pacientes diagnosticados de janeiro de 2019 a junho de 2020 foram divididos nos grupos Controle e Educação (n = 61) usando uma tabela de números aleatórios. O grupo Controle recebeu educação em saúde tradicional após a cirurgia, enquanto o grupo Educação recebeu educação em saúde baseada em TCP após a cirurgia e seus dados gerais, adesão à medicação, adesão à dieta, tempo de alta, incidência de complicações, estilo de vida, qualidade de vida (QV) e estado mental antes e depois da cirurgia foram comparados.

Resultados: Não foram encontradas diferenças significativas nos dados gerais, pontuação de estilo de vida pré-operatório, pontuação de qualidade de vida e pontuação de estado mental entre os dois grupos (P>0,05). No grupo Educação, as pontuações de adesão à medicação e adesão à dieta foram significativamente maiores

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do que no grupo Controle, enquanto o tempo de alta e a incidência total de complicações foram mais precoces e menores do que no grupo Controle (P <0,05). Após a cirurgia, as pontuações de autorrealização, relacionamento interpessoal, nutrição, atividade física, responsabilidade pela saúde, gestão do estresse, dimensão física, dimensão social/familiar, dimensão emocional e dimensão funcional aumentaram significativamente, enquanto as pontuações do termômetro de sofrimento e da lista de problemas diminuíram em ambos os grupos, e a melhora nas pontuações foi maior no grupo Educação do que o grupo Controle (P <0,05).

Conclusão: A modalidade de educação em saúde baseada na TCP pode melhorar a adesão ao tratamento pós-operatório, reduzir as complicações pós-operatórias e melhorar o estilo de vida, a qualidade de vida e o estado mental de pacientes com câncer cervical.

Resumen

Objetivo: Elaborar una modalidad de educación para la salud basada en la teoría del comportamiento planeado (TCP) e investigar su influencia en el estilo de vida posoperatorio de pacientes con cáncer cervical.

Métodos: Un total de 122 pacientes diagnosticados de enero de 2019 a junio de 2020 fueron divididos entre los grupos Control y Educación (n=61) por medio de una planilla de número aleatorios. El grupo Control recibió educación para la salud tradicional luego de la cirugía, mientras que el grupo Educación recibió educación para la salud basada en la TCP después de la cirugía; se compararon los datos generales, la adherencia a la medicación, la adherencia a la dieta, el tiempo de alta, la incidencia de complicaciones, el estilo de vida, la calidad de vida (CV) y el estado mental antes y después de la cirugía.

Resultados: No se encontraron diferencias significativas entre los dos grupos en datos generales, puntaje de estilo de vida preoperatorio, puntaje de calidad de vida y puntaje de estado mental (P>0,05). En el grupo Educación, los puntajes de adherencia a la medicación y adherencia a la dieta fueron significativamente más altos que en el grupo Control; mientras que el tiempo de alta fue anterior y la incidencia total de complicaciones fue menor que en el grupo Control (P <0,05). Después de la cirugía, los puntajes de autorrealización, relaciones interpersonales, nutrición, actividad física, responsabilidad por la salud, gestión del estrés, dimensión física, dimensión social/familiar, dimensión emocional y dimensión funcional aumentaron significativamente; mientras que los puntajes del termómetro de sufrimiento y de la lista de problemas disminuyeron en ambos grupos y la mejora de los puntajes fue mayor en el grupo Educación que en el grupo Control (P <0,05).

Conclusión: La modalidad de educación para la salud basada en la TCP puede mejorar la adherencia al tratamiento posoperatorio, reducir las complicaciones posoperatorias y mejorar el estilo de vida, la calidad de vida y el estado mental de paciente con cáncer cervical.

Introduction

Cervical cancer is the most common and frequently-occurring malignancy among females.[1] This cancer commonly endangers the middle-aged and elderly females, and its incidence rate has been increasing annually.[2] There are more than 130,000 new cases of cervical cancer every year in China, accounting for 28% of the total globally.[3] For cervical cancer, it is a long development process from precancerous lesions to carcinoma and then to invasive carcinoma. The progression and aggravation of cervical cancer can be effectively blocked by early screening, diagnosis and treatment.[4] With the popularization of ThinPrep cytologic test and human papillomavirus test, cervical cancer can be detected early and treated promptly.[5] Early cervical cancer (stage Ia-IIa) is primarily treated with surgery, and the 5-year survival rate can reach 80% and above.[6] Although patients' lives can be saved by early screening and surgery, their body functions are affected after surgery, and the patients and their family members may be terrified of cervical cancer, thus reducing the quality of life (QOL). Therefore, health education is necessary after cervical cancer treatment to improve the awareness of cervical cancer and to ensure a healthy lifestyle.

Traditional health education after cervical cancer is less scientific and targeted, and patients are generally less willing to accept and stick to the education for a long time, failing to achieve the desired effect.[7] The traditional health education mode works only in the hospitalization period, and it focuses on the preparation after admission and before operation and some precautions during postoperative recovery. After discharge, the physical and mental problems of patients in the recovery period can no longer be solved. The risk of depression after treatment is higher than 30% in patients with cervical cancer.[8-10] In contrast, the theory of planned behavior (TPB) can effectively explain and predict the occurrence and change of individual behaviors.[11] It is advocated by the TPB-based health education mode that perceived behavioral control be performed, and patients' positive attitudes and subjective norms towards healthy lifestyles be improved in a scientific way, thereby enhancing the individual behavioral intentions, improving their QOL and keeping their mental health.[12]

In the present study, therefore, the influence of TPB-based health education mode on the postoperative lifestyle of patients with cervical cancer was explored through comparing the postoperative recovery, and lifestyle, QOL and mental state before and after operation with control group receiving traditional health education.

Methods

A total of 122 patients diagnosed with cervical cancer and undergoing operation in Second People's Hospital of Changzhou City from January 2019 to June 2020 were selected and divided into control and education groups (n=61) using a random number table. In control group, there were 24 cases of squamous cell carcinoma, 20 cases of adenocarcinoma, and 17 cases of squamous adenocarcinoma. In education group, there were 27 cases of squamous cell carcinoma, 23 cases of adenocarcinoma, and 11 cases of squamous adenocarcinoma. The present study was approved by the Ethics Committee of our hospital, and all the subjects and their families voluntarily participated and signed the informed consent.

Inclusion criteria were as follows: 1) patients pathologically diagnosed with stage Ia-IIIb cervical cancer by cervical biopsy,[13] 2) those undergoing treatment for the first time, 3) those with a KPS score >80 points,[14] 4) those without hepatic-renal dysfunction, and cardiovascular disease, and 5) those with complete clinical data.

Exclusion criteria were as follows: 1) patients with non-primary cervical cancer, 2) those with severe complications of chemotherapy, such as infection and hematuria, 3) those complicated with other tumors, 4) those unable to cooperate in follow-up, or 5) other reasons.

The general data of the 122 patients were collected through electronic medical records, including age, occupation (employed, unemployed/retired), marital status (married, single/divorced), childbearing age (≤20 years old, 21-25 years old, 26-30 years old, ≥31 years old), number of children (0, 1, 2 and above), educational level (junior high school and below, technical secondary school or senior high school, junior college or university and above), operation method (Method 1: laparoscopic extensive total hysterectomy + bilateral adnexectomy + pelvic lymph node dissection, Method 2: laparoscopic extensive total hysterectomy + bilateral adnexectomy + pelvic lymph node dissection + cystoscopic ureteral stent implantation, Method 3: laparoscopic extensive total hysterectomy + bilateral adnexectomy + pelvic lymph node dissection + abdominal aortic lymph node dissection, Method 4: laparoscopic extensive total hysterectomy + bilateral adnexectomy), and whether to undergo chemotherapy and radiotherapy.

Patients in control group received routine health education after operation: One professional nurse reasonably arranged and guided the patient's diet, medication, work and rest, daily precautions and rehabilitation exercise in a one-on-one manner. The patient was followed up by telephone twice a month after discharge to help solve their problems.

Patients in education group received TPB-based health education after operation: The TPB protocol was developed by 2 gynecologists with a postgraduate degree and 3 nurses with a postgraduate degree, and 4 nurses with an undergraduate degree were responsible for implementation of the TPB protocol, data collection and follow-up. The healthy education team consisted of 10 members. All nurses were senior nurses and supervisor nurses with more than 5 years of work experience, so that patients could receive professional health education after operation. Specifically, an appropriate health education program was customized for each patient. Patients were informed of the time, purpose and method of health education in advance, and the content of health education was explained to patients using brochures, PPT and videos. The doctors above the level of deputy chief physician and nurse specialists above the level of co-chief superintendent nurse were invited for lectures on health-related knowledge after cervical cancer surgery. The patients' questions were answered on the spot, and their misunderstandings were discovered, based on which the health education program was improved. The health education was given in three

stages. The general data and living habits of patients should be known well, so as to customize an appropriate health education program. TPB-based health education was started from 3 d after operation, so as to make patients have a preliminary understanding of cervical cancer-related knowledge, help eliminate the possible negative emotions after operation, and clarify the improvement in future QOL by a healthy lifestyle after operation. Moreover, the patient's spouse or relatives were invited in health education to enhance the patient's trust and compliance in health education. After discharge, the patients were followed up by telephone or WeChat every week, helping them solve the problems in daily life.

1) Before operation, the lifestyle was assessed in the two groups using Healthy Lifestyle Behavior Scale II.[15] The scale consists of 52 items in 6 aspects, including self-realization, interpersonal relationship, nutrition, physical activity, health responsibility and stress management. There are 4 options "never, sometimes, often, always" for each item, corresponding to 1, 2, 3 and 4 points, respectively. The higher the score, the healthier the lifestyle. QOL was assessed using the Functional Assessment of Cancer Therapy-Cervix (FACT-Cx).[16] FACT-Cx consists of Functional Assessment of Cancer Therapy-General (FACT-G) and Cervical Cancer Score (CCS). FACT-G v4.0 used in this study consists of 27 items in 4 fields, *i.e.* physical dimension (7 items), social/family dimension (7 items), emotional dimension (6 items) and functional dimension (7 items). 0 points (not satisfied at all)-4 points (very satisfied) were given to each item using the Likert 5-level scoring method.[17] The higher the score, the better the QOL. CCS covers 15 items specifically for cervical cancer, and it was scored in the same way as FACT-G. The preoperative lifestyle was recorded in the two groups, and the mental state was detected using Distress Management Screening Measure (DMSM).[18] DMSM consists of Distress Thermometer (DT) and Problem List (PL). DT is an analog scale including 11 scales from 0-10 points, and the corresponding pain degree is enhanced with the increase in the score. There are 40 items in 5 fields in PL, and it was scored in the same way as FACT-G. 2) After operation, the medication compliance, dietary compliance and discharge time were compared between the two groups, the former two of which were scored using the Likert 5-level scoring method. The incidence rate of complications such as postoperative infection and urinary retention was recorded. At 3 months after operation, the lifestyle, QOL and mental state were detected and compared again between the two groups.

SPSS 20.0 software (IBM Inc., USA) was used for statistical analysis. Numerical data were expressed as cases, and compared between two groups by the χ^2 test. Normally distributed measurement data were expressed as ($\bar{x} \pm s$), and compared between two groups by the *t* test. $P<0.05$ was considered statistically significant.

Results

General data

There were no significant differences in the general data between control group and education group ($P>0.05$) (Table 1).

Postoperative medication compliance, dietary compliance and discharge time

In education group, the postoperative medication compliance and dietary compliance scores were higher than those in control group ($P<0.05$). The discharge time was earlier in education group than that in control group ($P<0.05$) (Table 2).

Postoperative complications

The incidence rate of postoperative complications in education group was lower than that in control group ($P<0.05$) (Table 3).

Lifestyle scores before and after operation

The preoperative lifestyle score had no significant difference between the two groups ($P>0.05$). After operation, the scores of self-realization, interpersonal relationship, nutrition, physical activity, health responsibility and stress management all significantly rose in both groups, and they were significantly higher in education group than those in control group ($P<0.05$) (Table 4).

Table 1. General data

Item	Control Group (n=61) n(%)	Education Group (n=61) n(%)	t/χ^2	p-value
Age (Y)	48.65±10.273	47.24±9.661	0.781	0.436
Occupation				
Employed	27(44.26)	29(47.54)	0.132	0.716
Unemployed/retired	34(55.74)	32(52.46)		
Marital status				
Married	58(95.08)	56(91.80)	0.535	0.464
Single/divorced	3(4.92)	5(8.20)		
Childbearing age				
≤20 Y	2(3.28)	1(1.64)	0.691	0.875
21-25 Y	29(47.54)	30(49.18)		
26-30 Y	23(37.70)	21(34.43)		
≥31 Y	7(11.48)	9(14.75)		
Number of children				
0	0(0.00)	1(1.64)	1.414	0.493
1	41(67.21)	37(60.66)		
≥2	20(32.79)	23(37.70)		
Educational level				
Junior high school and below	32(52.46)	34(55.74)	0.482	0.786
Technical secondary school or senior high school	16(26.23)	17(27.87)		
Junior college or university and above	13(21.31)	10(16.39)		
Operation method				
Method 1	49(80.33)	52(85.25)	1.534	0.675
Method 2	6(9.84)	3(4.92)		
Method 3	2(3.28)	1(1.64)		
Method 4	4(6.55)	5(8.19)		
Chemotherapy				
Yes	23(37.70)	30(49.18)	1.635	0.201
No	38(62.30)	31(50.82)		
Radiotherapy				
Yes	10(16.39)	8(13.11)	0.261	0.610
No	51(83.61)	53(86.89)		

Table 2. Postoperative medication compliance, dietary compliance and discharge time ($\bar{x} \pm s$)

Group	n	Medication compliance (point)	Dietary compliance (point)	Discharge time (d)
Control	61	18.03±1.26	22.14±1.77	13.82±3.15
Education	61	23.91±2.42	29.33±2.54	12.37±2.68
t		16.832	18.139	2.738
p-value		0.000	0.000	0.007

Table 3. Postoperative complications

Complication	Control Group (n=61) n(%)	Education Group (N=61) n(%)	χ^2	p-value
Incision infection	9(14.75)	2(3.28)	4.896	0.027
Urinary system infection	8(13.11)	2(3.28)	3.921	0.048
Systemic infection	4(6.56)	0(0.00)	4.136	0.042
Urinary retention	7(11.48)	3(4.92)	4.816	0.028
Total incidence	28(45.90)	7(11.48)	17.669	0.000

QOL scores before and after operation

There was no significant difference in the preoperative QOL score between the two groups (P>0.05). After operation, the scores of physical dimension, social/family dimension, emotional dimension and functional dimension all significantly rose in both groups, and they were significantly higher in education group than those in control group (P<0.05) (Table 5).

Mental state scores before and after operation

The preoperative mental state score had no significant difference between the two groups (P>0.05). After operation, both DT score and PL score significantly declined in the two groups, and they were significantly lower in education group than those in control group (P<0.05) (Table 6).

Discussion

At present, cervical cancer is primarily treated with surgery in combination with chemoradiotherapy. Although the survival rate of patients can be effectively raised by surgery and chemoradiotherapy, adverse reactions such as endocrine dysfunction, nausea and vomiting, and body pain will be caused, and it will take a long time for patients to adapt to the changes in their bodies,[19] during which these changes will lead to negative emotions such as pain, self-abasement and fear, greatly affecting patients' mental health and reducing their QOL. Therefore, it has become the emphasis of nursing after cervical cancer surgery to give patients comprehensive health education after operation, help deepen their understanding of cervical cancer, and develop a healthy lifestyle and a positive attitude toward life.

From April 2020, TPB proposed by Ajzen[20,21] has been extensively studied and has become one of the most applied theories in business and management, environmental science, health sciences, and educational research. As a proxy for actual control, TPB contributes to the prediction of questionable behavior.[22] Willis et al. studied TPB with key additional predictors from the social identity approach, and managed to predict the intentions for student binge drinking.[23] Besides, Caputo successfully predicted the alcohol consumption risks among adolescents by applying TPB in combination with the

Table 4. Lifestyle scores before and after intervention (point,$\bar{x} \pm s$)

Group	n	Self-realization		Interpersonal relationship		Nutrition		Physical activity		Health responsibility		Stress management	
		Before operation	After operation	Before operation	After operation	Before operation	After operation	Before operation	After operation	Before operation	After operation	Before operation	After operation
Control	61	20.14±2.64	21.59±2.78*	19.42±2.47	21.82±2.51*	16.25±3.42	18.16±3.29*	15.12±2.04	16.47±3.81*	17.59±2.68	18.65±2.59*	17.18±3.17	18.37±3.23*
Education	61	19.71±2.58	27.31±3.04*	20.11±2.62	25.43±2.77*	16.84±3.63	21.37±3.52*	15.41±2.35	20.84±2.75*	18.22±2.14	22.65±3.21*	17.64±2.96	23.41±2.78*
t		0.910	10.845	1.497	7.543	0.924	5.203	0.728	7.264	1.435	7.574	0.828	9.237
p-value		0.365	0.000	0.137	0.000	0.357	0.000	0.468	0.000	0.154	0.000	0.409	0.000

*P<0.05 *vs.* before operation

Table 5. QOL scores before and after intervention (point,$\bar{x} \pm s$)

Group	n	Physical dimension		Social/family dimension		Emotional dimension		Functional dimension	
		Before operation	After operation	Before operation	After operation	Before operation	After operation	Before operation	After operation
Control	61	13.47±1.54	14.74±1.84*	20.38±2.33	21.26±2.87*	12.49±1.82	14.25±2.26*	17.37±3.85	19.03±4.18*
Education	61	13.59±1.62	18.63±1.75*	20.47±2.61	25.44±2.68*	13.05±1.71	18.70±2.19*	17.62±3.66	23.96±5.87*
t		0.419	11.965	0.201	8.314	1.751	11.044	0.368	5.343
P		0.676	0.000	0.841	0.000	0.082	0.000	0.714	0.000

*P<0.05 *vs.* before operation

Table 6. Mental state scores before and after intervention (point,`x ± s)

Group	n	DT score		PL score	
		Before operation	After operation	Before operation	After operation
Control	61	7.86±2.54	5.39±3.14*	82.45±10.69	65.18±11.72*
Education	61	7.61±2.68	4.28±2.50*	84.31±11.28	57.93±10.47*
t		0.529	2.160	0.935	3.603
p-value		0.598	0.033	0.352	0.000

*P<0.05 *vs.* before operation

prototype-willingness mode.[24] Hence, TPB plays a central role in health-related fields.

In the present study, the postoperative medication compliance, dietary compliance, incidence of complications, discharge time, lifestyle score, QOL score and mental state score in education group were all superior to those in control group (P<0.05). TPB is a behavioral theory widely applied in clinical nursing recently,[25] and it is believed that behavioral attitudes, subjective norms and perceived behavioral control are three determinants for behaviors.[26] Behavioral attitudes are individual's positive or negative assessment of behaviors, subjective norms are social pressures perceived by individuals in specific behavior, and perceived behavioral control is individual's previous experience and expected hindrance.[27] To achieve better results of postoperative health education, TPB-based health education mode was set up in the present study. Specifically, experienced gynecologists and nurses as the health education team developed a professional and individualized education program for each patient, so that the patient could accept health education-related knowledge more easily, weakening subjective norms. Doctors and nurses explained the precautions in diet, medication and daily activities during ward rounds, communicated with patients and solved their mental problems. The patients' families were encouraged to participate in health education together with patients to deepen their understanding of cervical cancer. Their families were also asked to express their expectations for patients' positive and healthy life, thereby enhancing patients' positive behavioral attitude. Moreover, senior doctors were invited to answer patients' questions and reduce patients' misunderstanding of cervical cancer through their authoritativeness, so that the patients could spontaneously improve their daily living habits after operation. With PPT and videos, the patients could easily understand professional knowledge about cervical cancer, and increase their interest in learning. The effect of health education could be prolonged with weekly follow-up, through which solutions to difficulties in daily life were provided, patients' mental pressure was relieved, and the expected hindrance in perceived behavioral control was reduced. Finally, the patients could keep a positive mental state and take the initiative in self-health management.

Regardless, this is only a single-center study with a small sample size, so the results may be biased. Additionally, the cost of TPB was not studied.

Thus, further multicenter studies with larger sample sizes are still in need.

Conclusion

In conclusion, TPB-based health education mode can improve the postoperative treatment compliance, reduce postoperative complications, and ameliorate the lifestyle, QOL and mental state of patients with cervical cancer, so it is worthy of popularization and application in clinical nursing.

Collaborations

Di C and Wang B contributed substantially to study design and data conception, Wang B contributed to data analysis, article writing and relevant critical review of the intellectual content and final approval of the version to be published.

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