

Effects of the Newman nursing model on quality of life and pelvic floor muscle recovery in patients with postpartum pelvic floor dysfunction

Efeitos do modelo de enfermagem de Newman na qualidade de vida e recuperação muscular do assoalho pélvico em pacientes com disfunção do assoalho pélvico pós-parto

Efectos del modelo de enfermería de Newman en la calidad de vida y recuperación muscular del suelo pélvico en pacientes con disfunción del suelo pélvico posparto

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Abstract

Objective: We aimed to evaluate the effects of the Newman nursing model on the quality of life and pelvic floor muscle recovery in patients with postpartum pelvic floor dysfunction.

Methods: Eighty-eight patients with postpartum pelvic floor dysfunction treated from January to April 2023 were divided into observation and control groups (n=44) using a random number table. The control group was given routine nursing, based on which the observation group was given Newman nursing. The quality of life was assessed by the Short Form-36 Health Status Questionnaire. The pelvic floor function was evaluated using the Pelvic Floor Impact Questionnaire-7 (PEIQ7) and Pelvic Organ Prolapse Quantification (POPQ).

Results: After intervention, the scores of role physical, language communication, physical functioning, social functioning and motor functioning of the observation group were higher than those of the control group (P<0.05). The Self-rating Anxiety Scale and Self-rating Depression Scale scores of the observation group were lower than those of the control group. The awareness rate of disease knowledge of the observation group was higher than that of the control group (P<0.05). The observation group had higher class I and class II muscle fiber potentials, whereas lower class I and class II muscle fiber fatigue degrees than those of the control group (P<0.05). The PEIQ7 and POPQ scores of the observation group were lower than those of the control group (P<0.05).

Conclusion: Newman nursing helps improve the pelvic floor function, quality of life and awareness of the disease knowledge, and relieve anxiety, depression and other adverse emotions.

Resumo

Objetivo: Avaliar os efeitos do modelo de enfermagem de Newman na qualidade de vida e recuperação muscular do assoalho pélvico em pacientes com disfunção do assoalho pélvico pós-parto.

Métodos: Oitenta e oito pacientes com disfunção do assoalho pélvico pós-parto tratadas de janeiro a abril de 2023 foram divididas em grupo Observação e Controle (n=44) por meio de tabela de números aleatórios. O grupo Controle recebeu enfermagem de rotina e o grupo Observação recebeu cuidados de enfermagem de Newman. A qualidade de vida foi avaliada pelo *Short Form-36 Health Status Questionnaire*. A função do assoalho pélvico foi avaliada por meio do *Pelvic Floor Impact Questionnaire-7* (PFIQ7) e da *Pelvic Organ Prolapse Quantification* (POPQ).

Resultados: Após a intervenção, as pontuações de aspectos físico, emocional, capacidade funcional, social e motor do grupo Observação foram superiores às do grupo Controle (P<0,05). As pontuações da Escala de Autoavaliação de Ansiedade e da Escala de Autoavaliação de Depressão do grupo Observação foram inferiores às do grupo Controle. O nível de conhecimento sobre a doença foi maior no grupo Observação do que no

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grupo Controle ($P < 0,05$). O grupo Observação apresentou maior força das fibras musculares tipo I e II, e menores graus de fadiga das fibras musculares tipo I e II do que o grupo Controle ($P < 0,05$). As pontuações PEIQ7 e POPQ do grupo Observação foram inferiores às do grupo Controle ($P < 0,05$).

Conclusão: O modelo de enfermagem de Newman ajuda a melhorar a função do assoalho pélvico, a qualidade de vida e o conhecimento sobre a doença, além de aliviar a ansiedade, a depressão e outras emoções adversas.

Resumen

Objetivo: Evaluar los efectos del modelo de enfermería de Newman en la calidad de vida y recuperación muscular del suelo pélvico en pacientes con disfunción del suelo pélvico posparto.

Métodos: Un grupo de 88 pacientes con disfunción del suelo pélvico posparto, tratadas de enero a abril de 2023, fue dividido en dos grupos, uno de observación y otro de control ($n=44$) mediante una tabla de número aleatorios. El grupo de control recibió cuidados de enfermería de rutina y el grupo de observación recibió cuidados de enfermería de Newman. Se utilizó el *Short Form-36 Health Status Questionnaire* para evaluar la calidad de vida. La función del suelo pélvico se evaluó mediante el *Pelvic Floor Impact Questionnaire-7* (PFIQ7) y la *Pelvic Organ Prolapse Quantification* (POPQ).

Resultados: Después de la intervención, el puntaje de los aspectos físico, emocional, social, motor y de la capacidad funcional del grupo de observación fue más alto que el del grupo de control ($P < 0,05$). El puntaje de la Escala de Autoevaluación de Ansiedad y de la Escala de Autoevaluación de Depresión del grupo de observación fue más bajo que el del grupo de control. El nivel de conocimiento sobre la enfermedad fue mayor en el grupo de observación que en el grupo de control ($P < 0,05$). El grupo de observación presentó mayor fuerza de las fibras musculares tipo I y II y un nivel menor de fatiga de las fibras musculares tipo I y II que el grupo de control ($P < 0,05$). El puntaje de PEIQ7 y POPQ del grupo de observación fue más bajo que el del grupo de control ($P < 0,05$).

Conclusión: El modelo de enfermería de Newman ayuda a mejorar la función del suelo pélvico, la calidad de vida y el conocimiento sobre la enfermedad, además de calmar la ansiedad, la depresión y otras emociones adversas.

Introduction

The pelvic floor function in women is maintained primarily by ligaments, pelvic floor muscles and fascia. During pregnancy, the increase in fetal weight, amniotic fluid volume and uterus weight and volume compresses pelvic floor muscles and ligaments. Additionally, the expansion of birth canal during delivery easily leads to postpartum pelvic floor dysfunction.⁽¹⁾ This condition, recognized as a common gynecological disease in clinical practice, is often manifested as sexual dysfunction, urinary incontinence and pelvic organ prolapse, then seriously impacting the patients' quality of life and physical and mental health.⁽²⁾ Therefore, implementing effective interventions is of high clinical value for pelvic floor muscle rehabilitation.⁽³⁾

The Newman nursing model conceptualizes the body and its environment as a complete and open system, and reduces the negative impact of the environment on the individual through a holistic approach.⁽⁴⁾ In contrast to traditional nursing models, it focuses on the intervention of patients' prognostic and psychological factors. The Newman nursing intervention is of positive significance to improving the health and rehabilitation of patients.⁽⁵⁾ Barbosa *et al.* reported that the Newman health system relieved the negative emotions, enhanced the positive response to disease and facilitated the postoperative

rehabilitation of patients with gestational diabetes mellitus.⁽⁶⁾ However, there are few studies exploring the application of Newman nursing to patients with postpartum pelvic floor dysfunction.

Therefore, the effects of the Newman nursing model on the quality of life and pelvic floor muscle recovery of patients with postpartum pelvic floor dysfunction were assessed in this study, aiming to provide valuable references for clinical nursing intervention.

Methods

Eighty-eight patients with postpartum pelvic floor dysfunction treated in our hospital from January to April 2023 were selected and divided into an observation group ($n=44$) and a control group ($n=44$) using a random number table. In the observation group, the mean age was (35.34 ± 2.73) years, including 29 primiparas and 15 multiparas. The pelvic floor muscle strength was grade 0 in 11 cases, grade I in 9 cases, grade II in 14 cases and grade III in 10 cases. In the control group, the patients were aged (35.39 ± 2.77) years on average, including 31 primiparas and 13 multiparas. The pelvic floor muscle strength was grade 0 in 9 cases, grade I in 11 cases, grade II in 12 cases and grade III in 12 cases. There were no statistically significant differences in baseline data between the two groups ($P > 0.05$).

The inclusion criteria were as follows: Patients meeting the diagnostic criteria for postpartum pelvic floor dysfunction in *Obstetrics and Gynecology*,⁽⁷⁾ those aged 20 years and above, and those who were informed of the purpose of the study and willing to cooperate.

The exclusion criteria involved patients with a history of pelvic or vaginal surgery, those complicated with mental disorders, cognitive dysfunction or communication disorders, or those with gestational hypertension, diabetes mellitus or heart disease.

The control group was given routine intervention. Specifically, the medical staff explained to the patients regarding the causes, adverse effects and treatment methods of pelvic floor dysfunction, instructed them to carry out pelvic floor muscle exercise (PFME), informed them of relevant precautions, and provided dietary guidance. The dietary recommendations included eating more fruits and vegetables while avoiding spicy and stimulating foods to prevent constipation.

On the above basis, the observation group received Newman nursing as follows:

1. The patients' medical records were consulted to comprehensively evaluate their physiological, social, cultural, psychological and developmental variables.
2. Primary nursing intervention: Nurses and psychologists were responsible for communicating with the patients, guiding them to express their inner thoughts or confusions, and solving their problems to maintain a good doctor-nurse-patient relationship and to improve the patients' treatment compliance. According to the disease characteristics, health knowledge manuals were prepared, and popular science videos were played to enhance the patients' confidence in treatment. Moreover, mindfulness therapy was performed to guide the patients to restore inner peace, once per day, 30 min each time until discharge.
3. Secondary nursing intervention: The patients were instructed to receive PFME, involving the tightening of the anus for no less than 3 s followed by relaxation, 15-30 min per time and 2-3 times per day. The concentration and du-

ration of the exercises were rationally arranged based on the individual patient's condition. Muscle electrical stimulation: The urethral sphincter was stimulated using a pelvic floor rehabilitation pump. During PFME, the patient's legs were awakened by functional electrical stimulation if the pelvic floor muscles were not in good condition. The electrical stimulation therapy lasted for one month, twice a day, and then the therapeutic effect was observed. Vaginal dumbbell: The vaginal dumbbell was placed and clamped in the vagina, and the dumbbell weight was gradually increased with the training time to enhance the vaginal contractility, about 15 min per time, once a day.

4. Tertiary nursing intervention: The patients were informed of the precautions in the daily nursing processes and guided to carry out rehabilitation training of elevator ani muscle in daily life, and the family members were instructed to encourage the patients. All patients were followed up for 3 months.

The quality of life compared between the two groups before and after treatment by the Short Form-36 Health Status Questionnaire (SF-36) involving role physical, language communication, physical functioning, social functioning and motor functioning. The score was calculated by: $[(\text{the score of the dimension} - \text{the possible lowest score of the dimension}) / (\text{the highest score} - \text{the lowest score})] \times 100\%$. The total score of each dimension is 100 points, and a higher score means better quality of life.⁽⁸⁾

The anxiety of patients was assessed using the Self-rating Anxiety Scale (SAS):⁽⁹⁾ Using a 4-level scoring method, SAS mainly evaluates the frequency of symptoms: "1 point": little or no, "2 points": a little, "3 points": a considerable amount, and "4 points": most or all. The scores of 20 items were added up to a total score after self-evaluation, and then the total score was multiplied by 1.25 to obtain the standard score (the integer part). A higher standard score indicates severer anxiety symptoms. Besides, the depression of patients was assessed by the Self-rating Depression Scale (SDS).⁽¹⁰⁾ Using a 4-level scoring method, SDS consists of 20 items, including

10 positive scoring items (scored 1-4 points) and 10 negative scoring items (scored 4-1 points). The scores of the items were added up to a total raw score, and then multiplied by 1.25 to obtain the standard score (the integer part). A higher standard score suggests severer depression symptoms.

The awareness rate of disease knowledge was evaluated using the self-made disease knowledge assessment scale, mainly including medication precautions, eating habits, and daily precautions. The total score was 100 points: 80-100 points: full awareness, 60-79 points: partial awareness, and ≤ 59 points: no awareness. The awareness rate was calculated by: $[(\text{full awareness} + \text{partial awareness})/\text{total number of cases}] \times 100\%$.

The pelvic floor muscle function was evaluated through muscle potentials and fatigue degree. Class I and class II muscle fiber potentials and muscle fiber fatigue degrees were detected by a pelvic floor therapeutic instrument.

The pelvic floor function was evaluated using the Pelvic Floor Impact Questionnaire-7 (PEIQ7)⁽¹¹⁾ and Pelvic Organ Prolapse Quantification (POPQ)⁽¹²⁾ before and after intervention. PEIQ7 involves 7 dimensions, with a total score of 0-21 points, and a higher score means severer pelvic floor dysfunction. POPQ (grade 0-VI) uses a 6 (0-5)-level scoring method, and a higher score indicates severer pelvic organ prolapse.

SPSS24.0 software was used for statistical analysis. The measurement and count data were described by mean \pm standard deviation ($\bar{x} \pm s$) and [n(%)], and compared by the independent-samples *t*-test and χ^2 test, respectively. The test level was set at $\alpha=0.05$.

Results

Quality of life

There were no significant differences in the scores of role physical, language communication, physical functioning, social functioning and motor functioning between the two groups before intervention ($P>0.05$). After intervention, the scores all rose in both groups compared with those before intervention, and they were higher in the observation group than those in the control group ($P<0.05$) (Table 1).

Anxiety and depression

Neither SAS nor SDS had a significant difference between the two groups before intervention ($P>0.05$). After intervention, both SAS and SDS scores decreased in the two groups compared with those before intervention, and they were lower in the observation group than those in the control group ($P<0.05$) (Table 2).

Awareness rate of disease knowledge

The awareness rate of disease knowledge in the observation group (88.64%) was higher than that in the control group (59.09%) ($P<0.05$) (Table 3).

Pelvic floor muscle recovery

Before intervention, no significant differences were found in class I and class II muscle fiber potentials and muscle fiber fatigue degrees between the two groups ($P>0.05$). After intervention, class I and class II muscle fiber potentials increased in both groups, which were higher in the observation group

Table 1. Quality of life scores

Group	Role physical (point)	Language communication (point)	Physical functioning (point)	Social functioning (point)	Motor functioning (point)
Before intervention					
Observation (n=44)	46.15 \pm 3.82	46.46 \pm 3.14	43.02 \pm 5.52	44.74 \pm 5.18	43.41 \pm 5.20
Control (n=44)	46.05 \pm 3.60	46.90 \pm 2.88	42.28 \pm 5.66	45.10 \pm 4.30	43.77 \pm 4.65
<i>t</i>	0.119	0.645	0.585	0.334	0.322
p-value	0.906	0.521	0.561	0.739	0.748
After intervention					
Observation (n=44)	80.97 \pm 4.79 ^a	78.90 \pm 4.67 ^a	79.69 \pm 5.08 ^a	80.62 \pm 4.80 ^a	80.49 \pm 4.75 ^a
Control (n=44)	62.33 \pm 4.91 ^a	67.90 \pm 6.04 ^a	63.02 \pm 4.93 ^a	64.21 \pm 5.65 ^a	62.69 \pm 6.56 ^a
<i>t</i>	16.970	8.998	14.706	13.832	13.725
p-value	<0.001	<0.001	<0.001	<0.001	<0.001

^a $p<0.05$ vs. before intervention. The measurement data were described by mean \pm standard deviation ($\bar{x} \pm s$) and compared by the independent-samples *t*-test

Table 2. Anxiety and depression scores

Group	SAS score (point)	SDS score (point)
Before intervention		
Observation (n=44)	51.02±2.14	49.87±1.98
Control (n=44)	51.11±2.09	49.91±1.97
<i>t</i>	0.188	0.089
p-value	0.852	0.929
After intervention		
Observation (n=44)	32.05±1.42*	34.87±1.33*
Control (n=44)	41.22±1.58*	44.08±1.41*
<i>t</i>	26.957	29.674
p-value	<0.001	<0.001

*p<0.05 vs. the same group before intervention. SAS - Self-rating Anxiety Scale; SDS - Self-rating Depression Scale. The measurement data were described by mean ± standard deviation (x ± s) and compared by the independent-samples *t*-test

Table 3. Awareness rate of disease knowledge [n (%)]

Group	Full awareness	Partial awareness	No awareness	Awareness rate
Observation (n=44)	17(38.64)	22(50.00)	5(11.36)	39(88.64)
Control (n=44)	11(25.00)	15(34.09)	18(40.91)	26(59.09)
χ^2				9.948
p-value				0.002

The count data were described by [n(%)] and compared by the χ^2 test

than those in the control group ($P<0.05$). After intervention, class I and class II muscle fiber fatigue degrees decreased in both groups, which were lower in the observation group than those in the control group ($P<0.05$) (Table 4).

Table 4. Pelvic floor muscle recovery

Group	Class I muscle fiber potential (μ V)	Class I muscle fiber fatigue degree (%/s)	Class II muscle fiber potential (μ V)	Class II muscle fiber fatigue degree (%/s)
Before intervention				
Observation (n=44)	15.66±2.34	10.11±1.24	14.82±2.47	9.48±1.58
Control (n=44)	15.59±2.17	10.19±1.37	14.93±2.51	9.54±1.62
<i>t</i>	0.146	0.287	0.207	0.176
P	0.885	0.775	0.836	0.861
After intervention				
Observation (n=44)	27.95±3.2 ^a	2.58±1.4 ^a	27.84±2.4 ^a	2.33±0.4 ^a
Control (n=44)	22.47±3.4 ^a	5.69±1.7 ^a	20.29±2.3 ^a	4.79±1.0 ^a
<i>t</i>	7.622	8.991	14.692	13.947
P	<0.001	<0.001	<0.001	<0.001

*p<0.05 vs. before intervention. The measurement data were described by mean ± standard deviation (x ± s) and compared by the independent-samples *t*-test

Pelvic floor dysfunction

Before intervention, there were no significant differences in PEIQ7 and POPQ scores between the two groups ($P>0.05$). After intervention, both PEIQ7 and POPQ scores reduced in the two groups, and they were lower in the observation group than those in the control group ($P<0.05$) (Table 5).

Table 5. Pelvic floor dysfunction score

Group	PEIQ7 (point)	POPQ (point)
Before intervention		
Observation (n=44)	9.39±0.77	3.79±0.45
Control (n=44)	9.41±0.81	3.88±0.53
<i>t</i>	0.1119	0.859
P	0.906	0.393
After intervention		
Observation (n=44)	2.44±0.97*	1.66±0.57*
Control (n=44)	3.89±0.74*	2.94±0.58*
<i>t</i>	7.884	10.441
P	<0.001	<0.001

*p<0.05 vs. the same group before intervention. PEIQ7 - Pelvic Floor Impact Questionnaire-7; POPQ - Pelvic Organ Prolapse Quantification. The measurement data were described by mean ± standard deviation (x ± s) and compared by the independent-samples *t*-test

Discussion

The Newman system model is a systematic intervention model based on the Gestalt psychology integrating Selye's theory of stress and adaptation, Bertalanffy system theory and Caplan G three-level prevention theory.⁽¹³⁾ It posits that each individual is an open system interacting with interpersonal, internal and external factors and environment, and is a complex composed of human psychology, physiology, society, growth and spirit. All these factors collectively affect the disease state and physical health of patients.^(3,14,15) According to the Newman system, individuals interact with the external environment and constantly seek balance, and this process has a relationship with the dynamic balance of normal defense mechanisms.⁽¹⁶⁾ The Newman nursing procedures include diagnosis making, goal setting and result evaluation.⁽¹⁷⁾ Through etiological defense, symptomatic defense, and rehabilitation treatment, the Newman system helps patients restore a balance state and maintain individual health.^(18,19)

In this study, the quality of life of the observation group was improved after intervention. Probably, during patient-centered Newman nursing, the three-level preventive nursing intervention in terms of psychology, symptoms and prevention was given to patients according to their actual situation, which further improved the self-care consciousness.⁽¹⁶⁾ In the secondary preventive nursing process, patients were instructed on the correct implementation of PFME and informed of relevant precautions to benefit the outcome, thereby ameliorating the quality of life.⁽¹³⁾ Patients with pelvic floor dysfunction are susceptible to anxiety, depression and other

adverse emotions.⁽²⁰⁾ In the Newman nursing process, the stressor and responses of patients were accurately assessed, based on which targeted intervention measures were developed. Moreover, the medical staff actively communicated with the patients, guided their family members to provide care and encouragement, fostering a sense of comprehensive support. This approach thus relieved anxiety, depression and other adverse emotions. The findings are consistent with those in a previous literature.⁽²¹⁾

In this study, the awareness rate of disease knowledge in the observation group after intervention was higher than that before intervention and in the control group. Possibly, in the primary and tertiary nursing processes of the Newman nursing model, the medical staff communicated with patients, enabled them to deepen the cognition of the disease and maintained a good nurse-patient relationship. In addition, the status of pelvic floor muscle recovery in the observation group was better than that in the control group after intervention, and the pelvic floor dysfunction was also milder, suggesting that Newman nursing was beneficial to improving the pelvic floor muscle function. We postulated that the implementation of PFME and the explanation of the key points of elevator ani training and daily precautions played crucial roles.

However, the sample size in this study is small, so it is necessary to enlarge the sample size in future studies to further verify the conclusion, and to provide corresponding references for the nursing of patients with pelvic floor dysfunction.

Conclusion

In conclusion, Newman nursing helps alleviate pelvic floor dysfunction, improve the quality of life and awareness of the disease knowledge, and relieve anxiety, depression and other adverse emotions.

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Collaborations

Wang W, Xie K, Wu X and He J contributed to the conception and design of the study, data collection, analysis and interpretation, writing of the article, its clinical review and approval of its final version.

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