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## Using Levine's conservation model in postpartum care: a randomized controlled trial

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### ABSTRACT

This randomized controlled trial was conducted with 117 puerperae who were assigned into 2 groups: the intervention group and the control group. While the participants in the intervention group participated in a full program based on the module trainings, the participants in the control group received routine care. There was a significant difference between the women in the intervention and control groups in terms of the variables such as fatigue, sleep, and quality of life. The women in the intervention group experienced less fatigue, and their quality of sleep and quality of life improved considerably. Levine's conservation model enables the provision of the integrative care to women in their postpartum period.

### ARTICLE HISTORY

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## Background

The postnatal period – defined as the first six weeks after birth – is critical to the health and survival of the mother and her newborn. This period is physiologically, emotionally and socially critical not only for the women who give birth but also for their family. Women in this period try to cope with both the changes occurring in their body and the additional responsibilities they assume for being a mother. Women experience very important physical, emotional and social problems affecting their well-being, health status and quality of life in the postpartum period (Van der Woude et al., 2015). Some factors negatively affect women's adaptation to their postpartum period. Among them are fatigue (Thomas & Spieker, 2016), sleeping problems (Song et al., 2010), nutrition problems and infections (Falciglia et al., 2014) and problems related to breastfeeding and nipple care (Bagcı & Altuntug, 2016). In a study conducted in our country, Turkey, it was reported that women experienced many problems in the postpartum period and that they could not cope with these problems; therefore, they suffered

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from trauma in the postpartum period (Kirca & Ozcan, 2018). In order for women to go through their postpartum period without any problems, to be able to perform self-care and to have a quality of life not affected negatively, they need a qualified, comprehensive and integrative nursing care (Bahrami et al., 2013). Lack of care in this period may result in death or disability as well as missed opportunities to promote healthy behaviors, affecting women, newborns, and children. Giving a model-based care to mothers to improve their quality of life in the postpartum period will also improve the quality of the care.

### ***Levine's conservation model***

One theory of nursing models that can be applied to women in the postpartum period is the LCM that describes a complex way that allows individuals to continue functioning even though they are faced with very severe challenges/obstacles (Alligood, 2017). The conservation model according to Levine focuses on adaptation so that individuals can maintain the integrity of the individual using the principle of conservation (Levine, 1989). LCM has three basic components which comprise the conceptual roof of the model: adaptation, conservation and wholeness. The concept of conservation has 4 basic principles: conservation of individuals' energy and their structural, personal and social integrity. Here the goal, according to Levine's model, is to accomplish wholeness in the patient and to help the person remain healthy (Karagozoglu, 2018; Levine, 1967, 1988, 1996). The model is practiced by following the 4 conservation principles. To conserve energy, a balance should be established between adequate resting, nutrition and exercising. To conserve structural integrity, physical deterioration should be prevented and recovery should be accelerated. To conserve personal integrity, the person should approve of and believe in his/her own uniqueness. To conserve social integrity, the individual should be appreciated as a social being. It involves recognition of the presence of human interaction and particularly of the importance of the individual for others (Levine, 1967, 1988, 1996).

Nurses are expected to play a role in increasing an individual's adaptation to postpartum period through interventions carried out based on the principles of energy conservation, conservation of structural integrity, conservation of personal integrity and conservation of social integrity. Women in the postpartum period are to overcome threats from both the internal and external environment. The changes women experience in their bodies in the process of returning to their pre-pregnancy state are associated with their internal environment. In the postpartum period, some changes occur

in the external environment due to various physical, social and psychological stressors (Levine, 1988, 1989).

As is reported in the literature, Levine's Conservation Model can be used in the provision of care to preterm infants, elderly people, cancer patients and congestive heart failure patients (Abumaria et al., 2015; Mefford, 2004; Mock et al., 2007; Schaefer & Shober Potylycki, 1993). A review of the literature revealed that LCM has not been used in nursing care given to women in their postpartum period. Nurses play a role as a conservator who facilitates and helps the conservation of integrity in postpartum women who experience impaired structural, personal, social integrity (Karagozoglu, 2018). The purpose of this randomized-controlled study is to identify the application of LCM in the nursing process in women with postpartum period and to investigate the effect of postpartum care given in line with LCM on primiparae.

### ***Study hypotheses***

1. Care given based on the conservation of structural, personal, social integrity sub-component of LCM improves the quality of life of women in the intervention group compared to the control group.
2. Care given based on the conservation of energy sub-component of LCM increases sleep quality and energy, decreases fatigue levels in women in the intervention group compared to the control group.

### **Materials and methods**

#### ***Research design***

This study consisted of two phases. In the first phase, the LCM Program was adapted. In the second phase, a 2-group randomized controlled trial with a prospective pretest-posttest experimental design was conducted to evaluate the model's effectiveness. This experimental research was carried out between July 2016 and June 2017. The research and reporting methodology followed the CONSORT guidelines.

#### ***Adaptation process of the LCM program***

LCM was used as the theoretical framework of this study. A literature review was used to determine the contents of the intervention program. In the literature, there is a gap related to studies in which the LCM is used in the postpartum period. However, different studies using LCM were used as guidelines (Mefford, 2004; Mock et al., 2007). In line with these studies, an

eight-session nursing care program based on LCM was provided to the women in the intervention group. Of the eight sessions, the first one was held in the hospital and the others at the participants' homes at different times within a period of 12 weeks. Each session lasted approximately 60-120 min, according to the educational and practical contents. The women were given trainings on different subjects based on the module during each session. In these trainings, leaflets containing information about breastfeeding, personal hygiene, fatigue, sleep, nutrition and Pilates exercises prepared by the researchers in the light of the literature data were used. (James, 2014; Runquist, 2007; Taylor & Johnson, 2010). In this study, Pilates exercises designed exclusively for postpartum women include the following 13 movements selected from two reference books: Fitness Professional's Handbook, and "Women's Health and Fitness Guide": Bridging, Hundred, Roll Up, One Leg Circle (both ways), Rocker with close legs, Single Straight Leg Stretch, Double Leg Stretch, Spine Stretch Forward, Single Leg Kick, Side Kick up and down, Side Kick circles, Rest position (stretch and relaxation) and Curling. The trainings on the Pilates exercises were provided to the women in the intervention group during the home visits by the researcher who was also a Pilates trainer. An appropriate setting was prepared at the homes of women so that they could do the Pilates exercises easily.

The nursing interventions performed in this study in line with the four principles of LCM in women in their postpartum period and the data collection instruments are shown in Table 1. The conceptual (C), theoretical (T) and experimental (E) structures of the research based on LCM are presented in Figure 1.

### **Participants**

Participants for this study were recruited from the women admitted to the delivery room at a hospital in a city located in the east of Turkey. The inclusion criteria were as follows: (i) being between the ages of 18 and 35; (ii) being primiparae; (iii) being able to speak, read, and write in Turkish; (iv) giving a full term (between weeks 38 and 42) vaginal delivery; (v) having a hemoglobin value of at least 10 mg/dl; (vi) having experienced risky conditions during gestation or delivery; (vii) having undergone mediolateral episiotomy (because episiotomy impairs the integrity of a tissue. Healing such episiotomy incisions as soon as possible is quite important to conserve structural integrity). The exclusion criteria were as follows: (i) being lost to follow-up; (ii) being unable to communicate; (iii) withdrawing from the study voluntarily. In this study, seven women were excluded: because three moved to another city, one was unable to communicate, and three wished

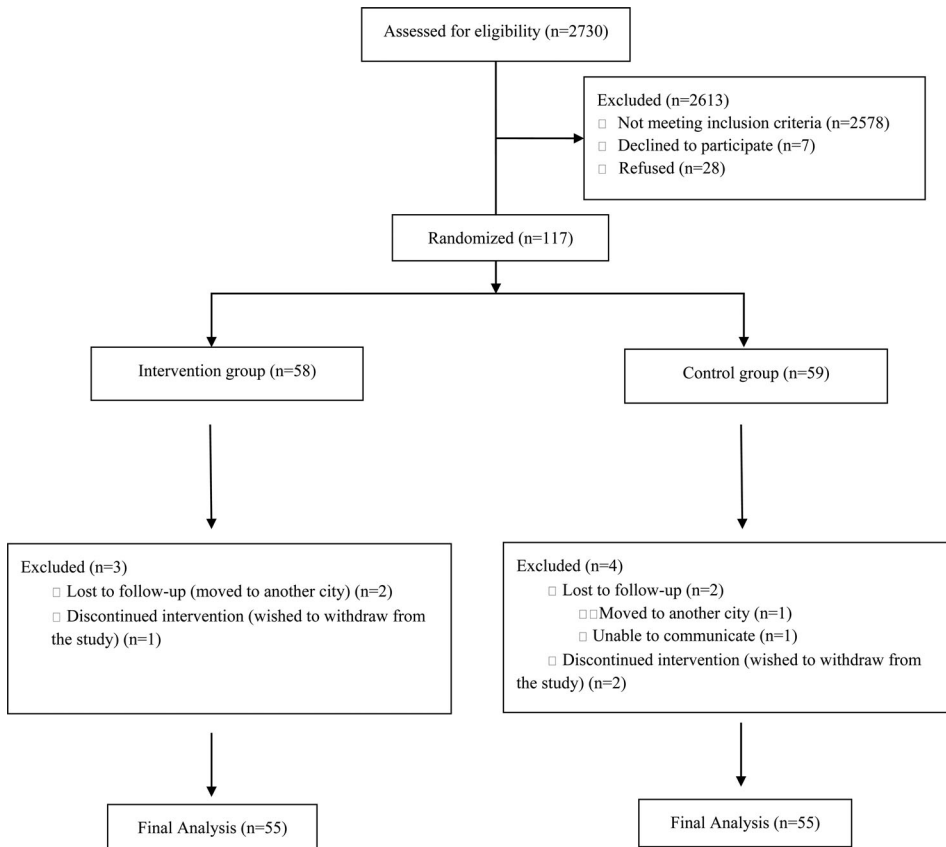
**Table 1.** Adaptation of Levine's conservation model in women in their postpartum period.

Conservation Principle	Goal	Variables	Nursing Interventions	Data Collecting Instruments	Intervention period
<b>Conservation of Energy</b>	To conserve the energy of puerperae, to reduce their fatigue, to improve their sleep quality	<ul style="list-style-type: none"> <li>Fatigue</li> <li>Sleep quality</li> </ul>	<ul style="list-style-type: none"> <li>Module-based training on fatigue and sleep</li> <li>Module-based training on nutrition</li> <li>Pilates exercises (between postpartum 15<sup>th</sup> and 80<sup>th</sup> days)</li> </ul>	<ul style="list-style-type: none"> <li>VAS-F*</li> <li>PSQI**</li> </ul>	Between postpartum 4 <sup>th</sup> and 7 <sup>th</sup> days
<b>Conservation of Structural Integrity</b>	To accelerate the recovery of puerperae, to protect them from infections	<ul style="list-style-type: none"> <li>Prevention of infections</li> <li>Wound healing</li> </ul>	<ul style="list-style-type: none"> <li>Module-based training on proper breastfeeding</li> <li>Module-based training on personal hygiene habits (between postpartum 8<sup>th</sup> and 14<sup>th</sup> days)</li> <li>Module-based training on lochia control</li> <li>Module-based training on nutrition (between postpartum 8<sup>th</sup> and 14<sup>th</sup> days)</li> <li>Pilates exercises (between 15<sup>th</sup> and 80<sup>th</sup> postpartum days)</li> <li>Pilates exercises (between 15<sup>th</sup> and 80<sup>th</sup> postpartum days)</li> <li>Diary keeping (between 1<sup>st</sup> and 14<sup>th</sup> postpartum days)</li> <li>Researcherphone kept open 24/7</li> <li>Home visits by the researcher</li> <li>Researcher phone kept open 24/7</li> </ul>	<ul style="list-style-type: none"> <li>WHOOQL*** Items of the physical health domain</li> </ul>	Between postpartum 1 <sup>st</sup> and 3 <sup>rd</sup> days
<b>Conservation of Personal Integrity</b>	To maintain body images of puerperae, to promote self-appreciation in them, to minimize their psychological changes	<ul style="list-style-type: none"> <li>Body image</li> <li>Psychological changes</li> </ul>	<ul style="list-style-type: none"> <li>Researcherphone kept open 24/7</li> <li>Home visits by the researcher</li> <li>Researcher phone kept open 24/7</li> </ul>	<ul style="list-style-type: none"> <li>WHOOQL*** Items of the psychological health domain</li> </ul>	Between postpartum 1 <sup>st</sup> and 80 <sup>th</sup> days
<b>Conservation of Social Integrity</b>	To reduce or prevent impairment of social relationships in puerperae, to organize the external environment	<ul style="list-style-type: none"> <li>Social relationships</li> <li>Environment</li> </ul>	<ul style="list-style-type: none"> <li>Researcherphone kept open 24/7</li> <li>Home visits by the researcher</li> <li>Researcher phone kept open 24/7</li> </ul>	<ul style="list-style-type: none"> <li>WHOOQL*** Items of the social relationships domain</li> <li>WHOOQL Items of the environment domain</li> </ul>	Between postpartum 1 <sup>st</sup> and 80 <sup>th</sup> days

\*VAS-F: The Visual Analogue Scale for Fatigue.

\*\*PSQI: Pittsburgh Sleep Quality Index.

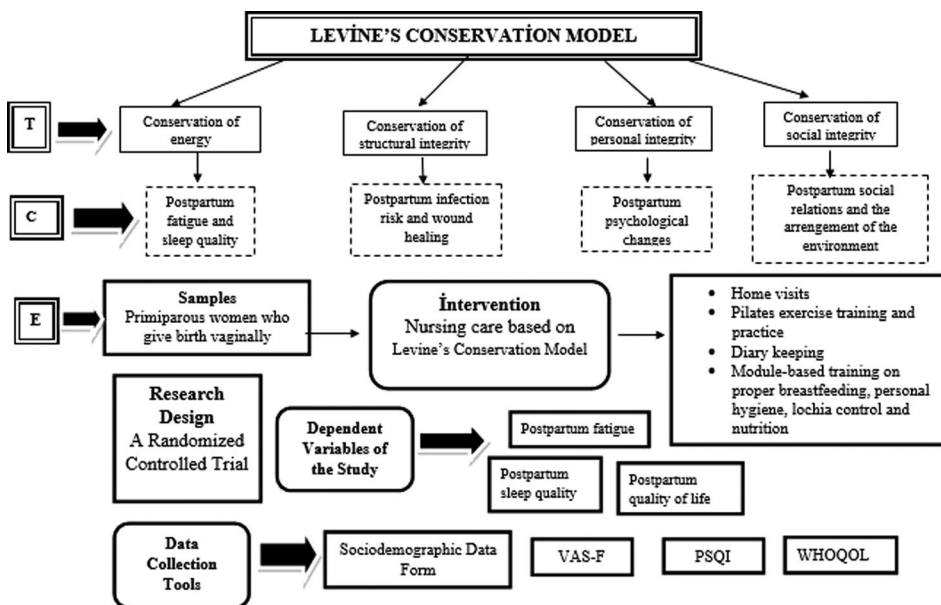
\*\*\*WHOOQL: The WHO Quality of Life Assessment Scale.



**Figure 1.** CONSORT diagram. Passage of participants through each trial stage.

to withdraw from the study, as reported in the participant flow diagram (Figure 2). In the final analysis, 110 women were included.

The sample size was calculated by a statistician using the PASS 2008 statistical program. In the original study of postpartum fatigue (Alp & Mete, 2008), the mean score was  $5.1 \pm 2.00$ . This gives an effect size of 0.05. In this study, it was calculated that the average of fatigue would be 1 point ( $4.1 \pm 1.6$ ) lower than that in the study of Alp and Mete (2008), and it was calculated as 55 for each group for an estimated effect size of 0.95 with alpha value of 0.05 and power of 0.8. Considering the possibility of losses or withdrawals during the study, it was decided to enroll 117 women in the study who were randomly assigned to the intervention group ( $n = 58$ ) or control group ( $n = 59$ ). Simple randomization was performed by the statistician using the SPSS 20.0 package program on the computer. The “simple randomization method” was chosen to obtain an equal number of participants in the two groups. A sealed envelope method was used in randomization; half of the women were randomly assigned to the intervention group ( $n = 58$ ) and the other half to the control group ( $n = 59$ ). In addition, we



**Figure 2.** The conceptual (C)- theoretical (T)- experimental (E) structure of the research based on the Levine's conservation model.

used sequentially numbered, opaque, sealed envelopes. We ensured that the envelopes were opened sequentially, only after the envelope was irreversibly assigned to the participant. The participants were blinded to treatment allocation. The researcher delivered the intervention; therefore, she was not blinded to allocation.

The women in the control group received only the standard nursing care given after birth. Standard nursing care contains solely breastfeeding training. In Turkey, no home visits are paid to women in the postpartum period. The women in the control group were visited before they were discharged from the hospital to obtain their contact information and to administer them the pretest. A home visit at the end of postpartum month 3 was also planned and they were administered the posttest. After collecting the posttest data, the trainings given to the women in the intervention group on nutrition, sleep, fatigue and Pilates exercises were also given to the women in the control group in consideration of the ethical dimension of the study. They were trained on Pilates exercises by the researcher only once at home. After their all training, the relevant leaflets were given to them.

### **Procedure and ethical considerations**

The study was approved by the Ethics Committee of Ataturk University, Faculty of Health Sciences (code number: 2016-03-5). Additionally,

corporate approvals were obtained from the hospitals where the participants were recruited. Finally, an informed consent form was obtained from each participant. The participants were not given detailed information about the true nature of the research.

## **Instruments**

### ***Sociodemographic data form***

This form including 5 questions was developed by the researchers to obtain data on the participants' sociodemographic characteristics.

*The World Health Organization (WHO) Quality of Life Assessment Scale (WHOQOL)*, (World Health Organization, 1996): The scale translated into Turkish and revised by Eser et al. (1999) was used to measure the quality of life of women. The self-reported questionnaire consisted of 27 items rated on a 5-point Likert scale. The scale has four domains: physical health, psychological health, social relationships, environment and general health. Each domain assesses the quality of life independently of the others. The higher the score obtained from this scale is the better the quality of life is. In this study, the Cronbach's alpha value was 0.89.

*The Visual Analogue Scale for Fatigue (VAS-F)*: The scale translated into Turkish and revised by Yurtsever and Bedük (2003) was used to measure the level of fatigue in women. Of the 18 items in the scale, 13 measure the level of fatigue and the remaining five measure the level of energy. The scale has a ten-centimeter horizontal line for each item with one end corresponding to "positive expressions" and the other end corresponding to "negative expressions". The patient marks a point on the line corresponding to the severity level of his/her feeling. Then, the point marked for each item is measured with a ruler and evaluated objectively. Higher scores obtained from the items related to fatigue and lower scores obtained from the items related to energy indicate higher severity of fatigue. In this study, the Cronbach's alpha value was 0.90.

*Pittsburg Sleep Quality Index (PSQI)*: The index translated into Turkish and revised by Agargün et al. (1996) was used to measure the sleep quality of women over the last month based on their statements. There are 19 questions in the index relating to sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction. Each question in the index is rated on a 4-point scale ranging from 0 to 3. While a score of zero shows that the person has no trouble sleeping, a score of three indicates that the person has serious trouble sleeping. Higher total scores indicate poorer sleep quality. In this study, the Cronbach's alpha value was 0.85.

**Table 2.** Demographic characteristics of the women in the intervention and control groups ( $n = 110$ ).

		Intervention ( $n = 55$ )		Control ( $n = 55$ )		Test and p values				
		n	%	n	%					
<b>Education Status</b>	Primary school	8	14.5	10	18.0	$\chi^2=0.780$ $p = 0.941$				
	High school	17	30.9	18	32.7					
	Associate degree	10	18.2	7	12.7					
	Undergraduate	16	29.1	16	29.1					
	Postgraduate and higher	4	7.3	4	7.3					
<b>Occupational Status</b>	Employed	16	29.1	21	38.2	$\chi^2=1.018$ $p = 0.313$				
	Not employed	39	70.9	34	61.8					
<b>Social Security</b>	Yes	54	98.2	52	94.5	$p = 0.618^*$				
	No	1	1.8	3	5.5					
		Intervention ( $n = 55$ )			Control ( $n = 55$ )			Test and p values		
		Min-Max	Mean	SD**	Min-Max	Mean	SD**			
<b>Age</b>		18	35	25.16	4.0	18	35	25.09	4.5	$t = 0.089$ $p = 0.929$
<b>Income (\$)</b>		118	1154	387.57	205.33	128	1354	388.38	208.94	$U = 1245.000$ $P = 0.081$

\*Fisher's Exact Test.

\*\*SD: Standard Deviation.

### Data analysis

The data were analyzed using the SPSS Windows 20 package program. In the analysis of the data, frequency, percentages, minimum and maximum values, arithmetic mean and standard deviation were used. The homogeneity of the two groups was assessed by the t-test and chi-squared test. A Shapiro-Wilk test was used to test whether the data had normal distribution. A p value of  $<0.05$  indicated statistical significance.

### Results

In order to confirm the homogeneity of the groups after randomization, the independent variables such as age, education, and occupational status of the women in the intervention and control groups were compared using the chi-square and t test. As is seen in Table 2, there was no statistically significant difference between the groups. According to the t test results in our study conducted with 110 participants (55 in the intervention group, 55 in the control group), the effect size and the power of the study were 1.77 (high level) and 0.99 respectively at the 95% confidence interval and 0.05 significance level.

### Effectiveness of the conservation of energy program

In the independent-samples t-tests used to compare the energy ( $t=-3.930$ ,  $p < 0.001$ ) and fatigue ( $t=5.306$   $p < 0.001$ ) levels of the women in the

intervention and control groups, a statistically significant difference was determined between the two groups (Table 3).

There was no significant difference between the mean pretest scores obtained by the women in the intervention and control groups from the sleep quality item ( $t=-0.239$ ,  $p < 0.05$ ); however, the difference between their mean posttest scores was statistically significant ( $t=-9.135$ ,  $p < 0.001$ ). There was no significant difference between the mean pretest ( $t=0.414$ ,  $p > 0.05$ ) and posttest ( $t=-1.175$ ,  $p > 0.05$ ) scores obtained by the women in the intervention and control groups from the sleep duration item (Table 3).

### ***Effectiveness of the conservation of the structural integrity program***

While no statistically significant difference was found between the mean pretest WHOQOL-Physical health domain scores of the women in the intervention and control groups, there was a highly significant difference between their mean posttest scores ( $p < 0.001$ ) (Table 4).

### ***Effectiveness of the conservation of the personal integrity program***

While no statistically significant difference was found between the mean pretest WHOQOL-Psychological health domain scores of the women in the intervention and control groups, there was a highly significant difference between their mean posttest WHOQOL-Psychological health domain scores ( $p < 0.001$ ) (Table 4).

### ***Effectiveness of the conservation of the social integrity program***

A significant difference was found between the mean pretest WHOQOL-Social relationships domain scores of the women in the intervention and control groups ( $p < 0.05$ ) and there was a highly significant difference between their mean posttest scores ( $p < 0.001$ ). A significant difference was found between the mean pretest WHOQOL-Environment domain scores of the women in the intervention and control groups ( $p < 0.05$ ) and there was a highly significant difference between their mean posttest scores ( $p < 0.001$ ) (Table 4).

## **Discussion**

Data analysis revealed that the nursing care based on LCM ensured the provision of integrative care to women in their postpartum period. The nursing care based on LCM increased the quality of life and sleep quality, decreased fatigue levels in the intervention group compared to the control group. It was considered appropriate to discuss the results as a whole. In

Table 3. Comparison of the the conservation of energy sub-component of Levine's conservation model.

VAS-F* Fatigue and Energy sub-components	n	Intervention		Control		Test and p values
		Mean	SD***	Mean	SD***	
<b>Fatigue</b>						
Pretest	55	60.36	20.78	77.31	24.10	t = 3.949 p = 0.000
Posttest	55	41.73	16.06	81.16	11.00	t = 15.022 p = 0.000
<b>Energy</b>						
Pretest	55	t = 5.306 26.62	8.64	t = -1.073 26.89	p = 0.288 9.2	t = -0.160 p = 0.873
Posttest	55	34.13	8.84	26.49	6.8	t = 5.083 p = 0.000
<b>Test and p values</b>						
		t = -3.930	p = 0.000	t = 0.279	p = 0.782	-
<b>PSQI** sub-components</b>						
<b>Subjective sleep quality</b>						
Pretest	55	0.09	0.48	0.09	0.35	U = 1461.000, p = 0.434
Posttest	55	0.05	0.23	0.53	0.79	U = 1008.500, p = 0.000
<b>Test and p values</b>						
Pretest	55	Z = -0.412, 1.40	p = 0.680 0.53	Z = -3.373, 1.35	p = 0.001 0.55	U = 1415.000, p = 0.482
Posttest	55	1.13	0.34	1.65	0.52	U = 739.000, p = 0.000
<b>Test and p values</b>						
Pretest	55	Z = -3.873, 7.02	p = 0.000 1.79	Z = -3.900, 6.89	p = 0.000 1.51	t = 0.414 p = 0.680
Posttest	55	6.21	1.10	6.46	1.19	t = -1.175 p = 0.243
<b>Test and p values</b>						
Pretest	55	t = 2.672, 1.18	p = 0.010 1.23	t = 1.571, 1.44	p = 0.122 1.10	t = -1.141 p = 0.256
Posttest	55	1.42	0.98	1.33	0.96	t = 0.492 p = 0.624
<b>Test and p values</b>						
		t = -1.081, p = 0.284		t = 0.558, p = 0.579		-

Table 3. Continued

Sleep Disturbances	Pretest	55	1.91	0.65	1.84	0.79	t = 0.529 p = 0.598
	Posttest	55	1.5	0.40	1.91	0.59	t = -8.900 p = 0.000
Sleep medication	<b>Test and p values</b> Pretest	55	t = -8.378, p = 0.000 0.62	0.87	t = -0.482, p = 0.632 0.91	0.95	U = 1245.000 P = 0.081
	Posttest	55	0.49	0.69	1.04	0.69	U = 876.500 p = 0.000
Daytime dysfunction	<b>Test and p values</b> Pretest	55	Z = -0.896, p = 0.370 1.71	0.81	Z = -0.715, p = 0.474 1.53	0.90	t = 1.114 p = 0.268
	Posttest	55	1.00	0.69	1.91	0.59	t = -7.423 p = 0.000
PSQI**_Total	<b>Test and p values</b> Pretest	55	t = -5.016, p = 0.000 13.93	2.19	t = -2.709, p = 0.009 14.03	2.43	t = -0.239 p = 0.812
	Posttest	55	11.35	1.76	14.83	2.21	t = -9.135 p = 0.000
	<b>Test and p values</b>		t = 6.970, p = 0.000		t = -1.725, p = 0.090		

\*VAS-F: The Visual Analogue Scale for Fatigue.

\*\*PSQI: Pittsburgh Sleep Quality Index.

\*\*\*SD: Standard Deviation.

**Table 4.** Comparison of the the conservation of structural, personal and social integrity sub-component of Levine's conservation model.

Parameters	n	Intervention		Control		Test and p values
		Mean	SD	Mean	SD	
WHOQOL*-Physical Health Domain	Pretest	57.14	16.76	59.22	16.54	t=-0.654 p=0.514
	Posttest	72.66	13.24	45.97	13.43	t=10.492 p=0.000
WHOQOL*-Psychological Health Domain	Pretest	t=-5.387, p=0.000 67.72	15.24	t=4.609, p=0.000 63.48	16.25	t=1.412 p=0.161
	Posttest	73.18	14.40	37.12	13.61	t=13.492 p=0.000
WHOQOL-Social relationships Domain	Pretest	t=-1.929, p=0.056 68.03	15.19	t=9.221, p=0.000 54.54	27.53	t=3.180 p=0.002
	Posttest	68.48	26.06	26.06	22.16	t=10.723 p=0.000
WHOQOL-Environment Domain	Pretest	t=-1.38, p=0.891 71.93	14.35	t=5.976, p=0.000 64.54	17.64	t=2.408 p=0.018
	Posttest	74.94	13.31	42.95	18.26	t=10.495 p=0.000
WHOQOL-General Health Domain	Pretest	t=-1.141, p=0.257 71.63	15.00	t=6.305, p=0.000 68.36	16.52	t=1.087 p=0.279
	Posttest	80.18	14.46	56.18	12.54	t=9.296 p=0.000
<b>Test and p values</b>		<b>t=-3.041, p=0.003</b>		<b>t=4.354, p=0.000</b>		

\*WHOQOL: The WHO Quality of Life Assessment Scale.

\*\*SD: Standard Deviation.

this section, the results obtained at this stage of the study are discussed under the following headings.

- Conservation of energy
- Conservation of structural integrity
- Conservation of personal integrity
- Conservation of social integrity

**Conservation of energy** is based on nursing interventions aimed at maintaining the balance between an individual's activity status and his/her current energy level. At the core of the conservation model lie the economic use of energy and the avoidance of energy consumption (Levine, 1989). Conservation of energy is essential for the maintenance of physiological, psychological and social functions. It is extremely important that all nursing interventions planned and implemented specific to patient care within the scope of the conservation model should be aimed at preserving the energy of the individual (Levine, 1989). Increasing energy production is as essential as the conservation of energy. If energy is not preserved, fatigue occurs.

In this experimental study, the interventions undergone by the women in the intervention group decreased their fatigue levels. Because the women in the control group underwent no interventions, there was no significant change in their levels of fatigue. In order for the women in the intervention group to conserve their energy, they were given trainings on nutrition, Pilates exercising and improvement of the quality of sleep. In their meta-analysis, Fleming and Herring (2018) concluded that Pilates exercises increased energy in a statistically significant way. In a study conducted by Ashrafinia et al. (2014) with women to reduce their postpartum fatigue levels, they had the women in the intervention group do Pilates exercises and found that the Pilates exercises reduced their postpartum fatigue levels considerably. In a study performed by Gholami et al. (2017), face-to-face trainings on energy conservation techniques were provided, and the training given reduced the fatigue levels of the women considerably. In the present study, it was also found that face-to-face training increased the effectiveness of the care given using LCM and was effective in reducing fatigue levels of the women in the intervention group.

Impairment of sleep quality causes individuals to feel tired (Song et al., 2010). Nurses should make interventions to reduce mothers' fatigue levels, to improve their sleep quality and to prevent any sleep disturbances from occurring (Rychnovsky & Hunter, 2009). In the present study, the participating women's sleep qualities were investigated because it was a major factor affecting their fatigue levels. After the interventions undergone by the

women in the intervention group, their sleep quality improved. The results of the present study also suggest that the Pilates exercises and the training provided positively contributed to the sleep quality. In another study, the sleep training given in the postpartum period improved the participants' sleep quality (Kempler et al., 2012). On the other hand, duration of sleep was the only item not affected by the nursing practices. The mean sleep durations of the women both in the intervention and control groups were 6 h in the present study. That is probably because the participants had to wake up several times to look after babies, which interrupted their sleep and caused them to have insufficient sleep. It has been reported that the sleeps of women in their postpartum periods are interrupted more than the sleeps of normal healthy people and that they can sleep 5 h on average (Montgomery-Downs et al., 2010). Based on the results of this study, it can be concluded that care given to women in line with the conservation of energy sub-component of LCM improved their sleep quality and decreased their fatigue levels compared to women in the control group.

**Conservation of structural integrity** focuses on the process of recovery. In other words, injuries should be prevented in the person and if there are injuries, effort should be made to heal them as soon as possible. The main responsibility of professional nurses is to plan and implement nursing interventions to prevent injuries, and to support recovery in a way to conserve the structural integrity of the individual (Alligood, 2017). In the present study, as recommended in the literature, the nursing interventions included module-based, question-answer type one-to-one trainings on general hygiene rules to help women to heal impaired tissue integrity and to prevent infections and pain based on the conservation of structural integrity sub-component of LCM. The mean physical health posttest score of the women increased after they underwent these nursing interventions. In the current study, the trainings provided to prevent these problems were effective. The episiotomies done during delivery have been reported to cause discomfort in women and consequently to negatively affect the physical health of women (Sheikhan et al., 2012). Healing such episiotomy incisions as soon as possible is quite important to conserve structural integrity. Correct hygiene habits should be employed to prevent infections in the episiotomy site in the postpartum period.

Another tissue of the women vulnerable to impaired tissue integrity in their postpartum period is the nipples. Studies have reported that of the women in their postpartum period, 61% breastfeed their babies in an incorrect position, 52% fail to latch (Kronborg & Vaeth, 2009), 52.3% experience problems (cracks, wounds) in their breasts and 32.1-48.3% have problems in breastfeeding (Bagcı & Altuntug, 2016). In the present

study, as recommended in the literature, the nursing interventions included module-based, question-answer type one-to-one trainings on breastfeeding.

It has also been reported that having a diet rich in proteins, vitamin C and iron, and intake of sufficient liquid accelerate wound healing, maintain general wellness of the body and thus prevent infections (James, 2014). In several studies, it has been found that while 13.2-30.1% of women in their postpartum period experience nutritional problems, 46% are not able to get adequate nutrition, and that women who experience nutritional problems have poorer quality of life (Bagcı & Altuntug, 2016). In several other studies, it has been also shown that trainings given to regulate eating, to form a healthy and balanced eating menu and to increase consumption of fruits and vegetables have been effective on the physical health of women (Falciglia et al., 2014). Based on the results of the present study, it can be concluded that care given to women in line with the conservation of structural integrity sub-component of LCM improves their quality of life compared to women in the control group.

***Conservation of personal integrity*** focuses on an individual's feelings about self. Levine considers a person's recognition and appreciation of self as a strong indication of integrity. Levine thinks that for patients to appreciate themselves, they must be shown respect and attention while receiving care from nurses (Alligood, 2017). Nurses should bear in mind that the body, emotions and communication ability of a woman may change after she gives birth. This is due to the adaptation process and hormonal changes in the postpartum period. Thus, when giving care to these women, nurses should take these changes into account. Women may not want to share their negative feelings because they are afraid of being misperceived by others in this period. This is why the women in this study were asked to keep a diary to record their positive or negative feelings and thoughts which they would avoid sharing with others. In the present study, the women in the intervention group were asked to do Pilates exercises to prevent them from experiencing psychological problems and to enable them feel better they were given support through home visits and phone conversations and were advised to keep a diary. Higher test scores of the women in the intervention group indicate that their psychological health was at a good level. In their study, Shorey et al. (2015) gave trainings to women through home visits and provided support to them through phone calls, and found that their psychological health was affected positively. In the literature, it has been reported that Pilates and yoga exercises given in the postpartum period are beneficial for the improvement of psychological health and quality of life of women (Ko et al., 2013). Based on the results of this study it can be concluded that care given to women in line with the

conservation of personal integrity sub-component of LCM improves quality of life compared to women in the control group.

**Conservation of social integrity** is based on the premise that an individual's life will be valuable if the individual is able to interact with the social environment. Levine believes that individuals are social beings, and that their establishing good relationships with other people will make them feel good (Alligood, 2017; Levine, 1989). While giving care to women who are in the postpartum period, nurses should give priority to those women's social relationships (Phang et al., 2015). There was a highly significant difference between the intervention and control groups in terms of their scores for the social relationships. This is probably because the researchers, family members and relatives provided social support starting from the very first day after delivery to the women in the intervention group who newly gave birth. Social support can be provided to women in their postpartum period by their spouses and other people. Mothers are stressed especially when the support decreases (Tammentie et al., 2004). Support also has a positive impact on the well-being of the mother and her adaptation to motherhood (Phang et al., 2015). In this adaptation process, individuals maintain their wholeness in their internal and external environments (Levine, 1989). To be able to provide integrative care, it is very important that the changes occurring in an individual's internal and external environments should be in harmony with each other. Nurses should be aware of the changes in the internal and external environments of a woman who has given birth. The changes women experience in their bodies in the process of returning to their pre-pregnancy state are associated with their internal environment. In the postpartum period, some changes occur in the external environment due to the objects belonging to the baby. Women need to redesign their external environment to adapt to this new situation. Placing the objects required to give care to the baby at easy-to-access places will facilitate adaptation to the external environment. Based on the results of this study it can be concluded that care given to women in line with the conservation of social integrity sub-component of LCM improves quality of life compared to women in the control group.

### **Limitations of the study**

The procedure of masking is used in many quantitative studies to prevent bias stemming from human awareness. Masking involves concealing information from participants, care providers, data collectors or data analysts (Nahcivan, 2015). A key limitation of the current study is that due to the nature of the study, it was not possible to blind the participants to group assignment. Additionally, because the study was conducted for a doctoral

thesis, the interviews and interventions were carried out by the same researcher who was not therefore blinded to group assignment. The results obtained from this study are applicable only to the women surveyed, and they cannot be generalized to other women.

## Conclusion

The results of the present study confirm all hypotheses. The conservation model can be applied while women are provided nursing care in the postpartum period. The LCM provides an overview of the framework for interventions to support the adaptation to motherhood process in women in the postpartum period through a series of interventions aimed at increasing the ability to conserve energy, structural integrity, personal integrity and social integrity. The intervention program, developed in accordance with LCM, will serve as a useful reference in developing standardized guidelines for increasing the sleep quality and quality of life, decreasing fatigue levels, and it is expected to bridge the gap between model and practice by applying family-centered care to the practical base of postpartum care. The intervention in the present study is routinely feasible in our country. Health policies in our country are also aimed at increasing home visits in the postpartum period. In Turkey, the Ministry of Health requests that women should be evaluated at least 3 times after birth at home or in a healthcare institution (Celen et al., 2018). The content of these evaluations can also be revised according to the findings of the present study.

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## Disclosure statement

All authors declare that they have no conflict of interest.

## Author contribution

1. the conception and design of the study, or acquisition of data, or analysis and interpretation of data: Sadiye Ozcan, Gülsen Eryılmaz
2. drafting the article or revising it critically for important intellectual content: Sadiye Ozcan, Gülsen Eryılmaz
3. final approval of the version to be submitted: Sadiye Ozcan, Gülsen Eryılmaz

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