- *Basic Research*

Effect of Levin's Conservation Model Application on Fatigue and Sleep Quality among Postpartum Women

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Abstract

Background: Because of the physiological, social, and psychological changes that occur after giving birth, the postpartum period is crucial for both women and their families. These changes all have an impact on how well women sleep. **Aim:** This research aimed to evaluate effect of Levin's conservation model application on fatigue and sleep quality among postpartum women. **Design**: A quasi-experimental research design (two-Groups, time series pre /post- test quasi-experimental design). **Sample**: 76 pregnant women. **Setting**: The present research conducted at antenatal outpatient clinic and postpartum unit in Obstetrics and gynecological department at Benha University Hospital, Egypt. **Tools:** Three tools were used for data collection: A structured interviewing questionnaire which encompassed two major parts: demographic data, women's knowledge questionnaire, The Visual Analogue Scale for fatigue and Pittsburg Sleep Quality Index. **Results:** There were highly statistically significant difference between study and control group regarding total subjective sleep quality, total sleep latency, total sleep duration, total sleep disturbance and overall score of quality and patterns of sleep 6 weeks after intervention (P= <0.001). Also, there were highly statistically significant difference between study and control group regarding mean score of total fatigue and total energy at 6 weeks after intervention. While there was positive statistically significant correlation between total fatigue and total sleep quality disturbance among studied sample in the both groups at pre and post intervention phase. **Conclusion:** The application of conservation model was effective in alleviating level of fatigue and improving sleep quality among postpartum women. **Recommendations**. All postpartum women are advised to use the conservation approach in order to conserve energy and demonstrate higher-quality sleep.

Keywords: Fatigue, Levin's Conservation Model, Postpartum Women, Sleep Quality

Introduction

In fact, the postpartum period is a critical period that causes stress associated with fatigue, mood swings and sleep disturbances. Postpartum women do not sleep regularly and experience sleep deprivation, split sleep, and significant fatigue, mainly because of caring for the infant who wakes up frequently during the night *(23)*. Becoming a mother is an important aspect of every woman's life, and it is a sensitive time when women are very vulnerable. At this time, women try to cope with both the changes in the body and responsibility as mothers. Several factors adversely affect women's adaptation to this period, including fatigue and sleep problems *(10)*.

Because postpartum women typically sleep less and of poorer quality in the first few days after childbirth than at other times of reproductive age, postpartum women experience altered sleep patterns and increased fatigue. As a result, postpartum women often take more daytime naps, decrease total sleep time, and decrease sleep efficiency compared to late pregnancy, all of which impact sleep quality. Additionally, some demographic and clinical characteristics are significantly associated with poor sleep quality *(27)*.

Fatigue is one of the most common problems new mothers face, affecting nearly two-thirds of them at some point, but postpartum fatigue is more than just regular sleepiness. Postpartum fatigue is characterized by overwhelming fatigue, leaving women physically and mentally exhausted, lacking energy, and unable to concentrate. Associated fatigue symptoms include lack of energy, depression or Includes anxiety, difficulty concentrating and sleep disturbances *(26)*.

Postpartum fatigue (PPF) is defined as decreased physical and mental performance associated with feeling tired. About 64% of new moms experience postpartum fatigue, making it the most common and persistent problem women face when adjusting to motherhood. A significant proportion of women (38.8%, 27.1%, 11.4%) experienced fatigue 10 days, 1 month, and 3 months after giving birth, respectively *(12)*.

Postpartum fatigue is a dynamic phenomenon that stabilizes or worsens over time after childbirth. PPF has been shown to adversely affect maternal health and neonatal development. Similarly, fatigue can reduce maternal concentration and increase the incidence of postpartum depression. As a result, mothers may be at increased risk of harming newborns and may interfere with healthy mother-infant interactions. It can also cause premature weaning from breastfeeding *(3)*.

In addition, poor postnatal sleep quality due to night feeding is a common phenomenon, and frequent nocturnal awakenings in infants may be an important indicator of physical and mental health in postnatal women. A population-based longitudinal study conducted in Norway found that sleep duration decreased after childbirth and sleep problems such as

sleep onset latency, wakefulness from sleep onset, and sleep efficiency were more prevalent at 8 weeks postpartum than at 3 weeks gestation or 2 years postpartum was shown to be significantly higher *(15)*. Poor sleep quality has been found to be associated with fatigue, stressful life events, worsening partner relationships, and inadequate physical and emotional care of children. Poor sleep quality is often ignored by medical professionals and is under-researched *(2)*.

One model of care applicable to postpartum women is the Levine Preservation Model (LCM). Levine's model of preservation focuses on adaptations to enable individuals to maintain the personal integrity using the principles of preservation *(1)*. This model contains four basic principles: conservation of energy, structural, personal and social integrity. Here, according to Levine's model, the goal is to help patients achieve wholeness and stay healthy *(14)*.

Nurses play a role in enhancing a person's adaptation to the postnatal period through interventions based on the principles of energy conservation, structural integrity maintenance, personal integrity maintenance, and social integrity maintenance. Postpartum women must overcome threats from both internal and external environments. Changes in the body as a woman returns to pre-pregnancy state are related to the internal environment. During the postpartum period, various physical, social, and psychological stressors cause some changes in the external environment *(23)*.

Nurses play an important role in promoting the health of both mother and child from immediately after childbirth to the early postpartum period, and support the physiological and emotional adjustment of postpartum mothers. Nurses are best suited to monitor and assess levels of fatigue and sleep disturbance *(6)*.

Significance

The postpartum period is a sensitive and stressful time associated with fatigue, mood swings and sleep disturbances. Prevention of postnatal maternal sleep disturbances and fatigue is an important part of comprehensive health services because of its potential public health benefits. Despite a long history of studying the effects of sleep disorders and sleep deprivation in vulnerable populations, more than 50% of women still suffered from excessive daytime sleepiness on weekdays. Little is known about how sleep disturbances affect the performance of new moms. Although it is clear that the development of maternal-infant sleep in the immediate postnatal period has been largely unstudied *(5)*. It is reported that 78% of women reported poorer quality of sleep during childbirth than at any other stage of life *(11)*.

Postpartum fatigue, specifically, affects more than 60% of mothers, making this the most common problem for women during the postpartum period. Fatigue leads to a decreased

capacity for physical and mental activity. PPF is a dynamic phenomenon that may stabilize or worsen as the postpartum period progresses. It has been shown that PPF has a negative impact on the mother's health and the newborn's development *(3)*. From two decades ago on, fatigue has been considered as the fifth cause for postpartum concerns among women. Its rate increases from 20% in ante-partum period to 50-64% in postpartum period. Research shows that high levels of fatigue among infants' mothers bring about stress in parents, feeling of incapability and dissatisfaction, high irritability, and hopelessness, as well as impaired parents-infant communication. Fatigue is also associated with depression, stress and signs of anxiety *(22)*.

Postpartum fatigue affects more than 60% of mothers and is the most common problem for postpartum women. Fatigue leads to poor physical and mental performance. PPF is a dynamic phenomenon that stabilizes and worsens over postnatal time. PPF has been shown to adversely affect maternal health and neonatal development *(3)*. For two decades, fatigue has ranked as the fifth cause of postpartum distress in women. The rate increases from 20% prenatal to 50-64% postpartum. Studies have shown that high levels of maternal fatigue in early childhood lead to parental stress, feelings of helplessness and frustration, high levels of frustration and hopelessness, and impaired parent-child communication. Fatigue is also associated with symptoms of depression, stress and anxiety *(22)*.

1.2 Aim of the research:
This research aimed to evaluate the effect of Levin's conservation model application on fatigue and sleep quality among postpartum women.

1.3 Research hypotheses:
H1: Post-partum women who receive care based on the Levine's Conservation model will exhibit better quality of sleep compared to those in the control group.
H2: Post-partum women who receive care based on the Levin's Conservation model will exhibit less level of fatigue compared to those in the control group.

1.4 Operational definition:
Levin's Conservation Model:
A nursing model applicable to postpartum women that helps women navigate the postpartum period with ease, care for themselves and improve their quality of life through main categories including energy conservation , structural integrity and personal integrity

2. Subjects and method:

2.1. Research Design
A quasi-experimental research (pre/post design) was used, two groups were studied.

2.2. Setting
This research was conducted at antenatal outpatient clinic and postpartum unit in Obstetrics and gynecological department in Benha University Hospital. *The antenatal outpatient clinic* includes 2 rooms located at the outpatient clinics building in the ground

floor that provides obstetrics and gynecology healthcare services that includes family planning, antenatal care, counseling, care for high risk pregnancy, delivery care and follow up services from 9am-12pm. *The postpartum unit* is in the ground floor included 6 rooms, preliminary examination room, antenatal reception room has 6 beds, operating room, recovery room, birthing room and post-partum room has 4 beds.

2.3. Sampling

A purposive sample of 76 pregnant women who attended the aforementioned setting for a period of six months were divided into two groups at random: the control group, which consisted of 38 women who received only routine hospital care, and the study group, which consisted of 38 women who received Levine's conservation model in addition to routine hospital care.

The studied women were selected according to the following **inclusion criteria**: primigravida as (primigravida women are more stressed in adapting to new role as a mother), being between the ages of 18 and 35, attending antenatal clinic at 34 weeks gestational age, women can read and write and free from any medical or obstetrics disorders and agree to participate in the research. **Exclusion criteria**: Multiple pregnancy, abnormal presentation or position, does not attend more than one session of Levine's conservation model, being lost to follow-up, withdrawing from the study voluntarily.

2.4 Tools of Data Collection

Three tools were used for data collection:

2.4.1. First tool: - A Structured Interviewing Questionnaire

The researchers created it after reading relevant literature. It was presented as a series of both closed- and open-ended questions and was written in Arabic. It consisted of two main sections:

Part I: included *demographic data* such as (age, educational level, residence, occupation).

Part II: included *women's knowledge questionnaire*: it was adapted from *(24)* and was translated into Arabic language by the researchers. This part was used before and after implementation of Levine's conservation model (pre/ post-test format). The 20- close-ended items consisted of (4) sections. Section (1) general knowledge regarding postpartum period (4 items), section (2) knowledge about proper nutrition during postpartum period (5 items), section (3) knowledge about personal hygiene during postpartum period (4 items), section (4) knowledge about care of baby and breastfeeding (7 items).

Scoring system:

Answer	score	Total knowledge type	Total knowledge score
Yes	**2**	Unsatisfactory	less than 60%
No	**1**	Satisfactory	60% to 100%

2.4.2. Second tool: - The Visual Analogue Scale for Fatigue (VAS-F):

The scale was translated into Turkish and was revised by *(29).* It was used to measure the level of fatigue in women. It contains 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". Woman marks a point on the line corresponding to the severity level of 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.

2.4.3. Third Tool: - Pittsburg Sleep Quality Index (PSQI):

It was adopted from *(19).* PSQI is an effective instrument used to measure the quality and patterns of sleep it consists of 19 self-rated items and seven clinically derived domains of sleep difficulties in the past month (subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction). Each of these domains is weighted equally on a 0-3 scale.

Scoring system

The seven component scores are summed to yield the total global PSQI score, which ranges between 0 and 21 points with the following anchor point descriptors as follow:

Score category	Score grade	Score range	Sleep quality
Minimum	0(better)	Total≤ 5	good sleep quality interpretation
Maximum	21(worse)	Total >5	poor sleep quality

2.5. Method
The research was executed according to the following steps:

2.5.1 Administrative Approval
A written letter was obtained from the Faculty of nursing Dean, then directed to Benha university hospital director. This research was conducted under the approval of the Faculty of Nursing Ethical Committee, Benha University. An official permission was obtained from the directors of the pre-mentioned setting to conduct the research after explaining its purpose. An agreement was taken from every woman in the study at the time of data collection after clear and proper explanation.

2.5.2. Validity
Three nursing specialists in the field of obstetrics and gynecology reviewed the data collecting tools to determine the validity of the content. The tools were modified in accordance with the panel's recommendations about the clarity of the sentences and the relevance of the material.

2.5.3. Reliability
The reliability was done by Cronbach's Alpha coefficient test. The correlation coefficient for knowledge was 0.79; the visual analogue scale for Fatigue was 0.90 and Pittsburg sleep quality index was 0.85

2.5.4. Ethical considerations

The study approval was obtained from Scientific Research Ethical Committee of the Faculty of Nursing at Benha University to the fulfilment of this research. The aim of the research will be explained to each woman before applying the tools to gain confidence and cooperation. A signed consent was obtained from each woman who participated in the research. All tools of data collection will be burned after statistically analysis to promote confidentiality of the research. The research tools were ensured that the research didn't touch participant's dignity, culture, traditional and religious aspects and didn't cause any harm for any participant during data collection. Also didn't include any immoral statements and respect human rights. The women will be free to withdraw from research at any time. After the study was completed, control group would supported with booklet about postpartum care based on Levine's conservation model.

2.5.5. A Pilot Study

The pilot study was carried out on 10% of the total time of data collection (3 weeks) to detect any problem of the statements such as sequence and clarity that might interfere with the process of data collection and to test the clarity and applicability of the research tools as well as estimation of the time needed to fill the questionnaire. No modifications were done. Women involved in the pilot study were included in the sample.

2.5.6. Field Work

The preparatory phase, assessment phase, Levines' conservation model implementation phase, and evaluation phase were adopted to achieve the goal of this research. These phases took place over an eight-month period beginning at the beginning of April 2022 and ending at the end of November 2022. Three days a week from 9:00 am to 12:00 pm, the researchers visited the location mentioned above until the predetermined sample size was reached.

Preparatory Phase

In order to prepare the necessary data collection tools to be distributed to three experts in the field, to test their appropriateness, clarity, and applicability, the researchers read local and international related literatures about the various aspects of the research problem. This helped the researchers understand the magnitude and seriousness of the problem.

Assessment Phase

The researchers start firstly with control group followed by study group to avoid bias.

Control Group

Early in the morning, the researchers went to the outpatient clinic and checked clinical records to identify pregnant women who met the inclusion criteria. Women were greeted and informed of the overall purpose of the research and provided with all information about the research. Then, Women were asked to complete a structured interviewing questionnaire which include demographic data and maternal knowledge questionnaire, the researchers were present to answer any questions. They were informed that data would be

collected in 34weeks gestation to establish a baseline data (pretest), six weeks after delivery during postnatal follow up (posttest). Also, Home address and phone number were obtained from the participants for reminding of the time for collecting post test data.

The researchers telephoned the women periodically to confirm the time of delivery. After six weeks following delivery, the researchers telephoned the women and confirmed the presence in outpatient clinics, the researcher met with the participants individually to answer the post-test questionnaire (maternal knowledge questionnaire, the visual analogue scale for fatigue, Pittsburg sleep quality index).

Lastly, the researchers reviewed the lists of the labor unit and postpartum unit daily to confirm the time of delivery for each woman and also telephoned the participants daily to know if any case delivered outside the study setting. _Study Group_

After the last control group participant give pretest, the researchers initiated recruitment of the study group. The same recruitment, informed consent, and the same pre-test data collection procedures used with control group were used with the study group. In addition, women in the study group were informed that women needed to attend four 30- 45 minute sessions over a four weeks period (the first three sessions were applied in the waiting area of the outpatient clinic of Benha University Hospital and the last session in the postpartum unit in Obstetrics and gynecological department at Benha University Hospital).

The researchers informed women of the time, date, place of sessions and schedule of four sessions. In case women could not attend session on the scheduled day, could attend on a more convenient day and were informed to contact the researcher at any time. Lastly, for collection of post test data, the same procedures used with the control group were used with the study group.

Implementation phase

Pregnant women in the control group received only routine care by hospital staff while in the study group received routine hospital care, in addition to Levine's conservation model application through four sessions each 1 week apart. Each session had (5- 6 women) only to allow for individual attention and participation and followed COVID 19 precautions. Each session lasted 30-45 minutes. Each woman was informed about the time of the next sessions at the end of the session. The subsequent session started by a feedback about the previous session and the objectives of the new session, simple Arabic language was used to suit women' level of understanding. At the end of each session, women' questions were discussed to correct any misunderstanding.

The first session (orientation session) was held at 34 weeks gestational age. It included It included providing _women knowledge_ about postpartum period (meaning, proper nutrition, personal hygiene, breast care and breastfeeding). Then the researcher started application

of the first components of Levine's conservation model (Conservation of energy) by encouraging women to follow healthy eating habits after birth (foods rich in omega-3s, fruits, and vegetables, choose a wide variety of foods from all food groups, stay hydrated all day long, continue prenatal vitamins, minimize caffeine intake) and also this session concerned with taking adequate rest (For the first 6 weeks try to get as much rest as you can. Plan some rest periods during the day. Take a nap or lie down and get off your feet for at least 30 minutes each day. Try to sleep when the baby sleeps, even during the day).

The second session was related to the second components of Levine's conservation model (Structural integrity) and held at 35 weeks gestational age. It was applied by encouraging women to follow adequate exercise following birth (walking which help in healing process, deep breathing exercise, pelvic exercise, and Pilates exercise). Also encouraging women to follow general hygiene rules to help women to heal impaired tissue integrity and to prevent infections and pain.

The third session focused on application of the third component of Levine's conservation model which concerned with (personnel integrity). It was held at 36 weeks gestational age. It involved maintaining or restoring patient's sense of self-worth, self-esteem, human-ness, self-hood and self-determination by encouraging women to keep a diary to record any positive or negative feelings and thoughts which they would avoid sharing with others, enable women to feel better they were given support through phone conversations.

The fourth session was applied one week after delivery in the waiting area of the outpatient clinic in Benha University Hospital. Firstly, the content of first session was reviewed to woman after delivery then researchers applied the last component of Levine's conservation model which concerned with (social integrity) by encouraging women to position in bed to foster social interaction with other women, avoid sensory deprivation, promote women's use of newspaper, magazines, radio, TV, provide support and assistance to family, Women need to redesign the surrounding external environment to adapt to this new situation e.g placing the objects required to give care to the baby at easy-to-access places will facilitate adaptation to the external environment. Finally, women were also encouraged to discuss any problems encountered.

Evaluation phase

The effectiveness of the Levine's conservation model was evaluated six weeks later (posttest) after delivery. Both women in the control group and study group were asked to complete women's knowledge questionnaire, visual analogue scale for fatigue and Pittsburg sleep quality index. After complete collection of the posttest data, the application of Levine's conservation model that was given to the women in the study group was also given to the women in the control group in consideration of the ethical dimension of the research. At almost time the researchers followed women via telephone.

Statistical Design

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 20) was used for that purpose, followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Test of significance (t test, chi-square). A significant level value was considered when p≤0.05. In addition, A highly significant level value was considered when p<0.01.

Results:

Table (1): shows that there was no statistically significance difference between study and control group regarding demographic characteristics.

Table (2): illustrates that there was no statistically significance difference between study and control group regarding mean score of knowledge of postpartum period at pre intervention phase (P= >0.05).Meanwhile there were highly statistically significant difference between study and control group 6 weeks after intervention (P= <0.001).

Table (3): illustrates that there was no statistically significance difference between study and control group regarding mean score of quality and patterns of sleep at pre intervention (P= >0.05) while there were statistically significant difference between study and control group regarding total sleep efficiency, total use of sleep medication and total daytime dysfunction 6 weeks after intervention (P ≤ 0.05). Meanwhile there were highly statistically significant difference between study and control group regarding total subjective sleep quality, total sleep latency, total sleep duration, total sleep disturbance and overall score of quality and patterns of sleep 6 weeks after intervention (P= <0.001).

Table (4): illustrates that there was no statistically significance difference between study and control group regarding mean score of total fatigue and total energy at pre intervention (P= >0.05) while there were highly statistically significant difference between study and control group 6 weeks after intervention (P= <0.001).

Table (5): clarifies that, there was negative statistical significant correlation between total knowledge, total energy and total sleep quality disturbance among studied sample in the both groups at pre and post intervention phase while there was positive statistically significant correlation between total fatigue and total sleep quality disturbance among studied sample in the both groups at pre and post intervention phase.

Figure (1) reveals that, total knowledge score of the studied sample in the study group improved from (28.9%) before intervention to (76.3%) after intervention while there was

minimal improvement in the control group from (34.2%) before intervention to (39.5%) after intervention.

Figure (2): represents that, more than one third (39.5%) of the studied sample in the control group and less than one third in the study group (26.3%) had severe sleep quality disturbance at pre intervention phase. Also, less than one third (31.6%) of the studied sample in the control group had severe sleep quality disturbance after intervention while there was no severe sleep quality disturbance among the studied sample in the study group after intervention of Levine's conservation model.

Table (1): Distribution of the studied sample (control and study groups) according to demographic characteristics (n= 76).

| Demographic characteristics	Control group n= 38		Study group n=38		X2	p-value
	No	%	No	%		
Age (years)						
18<23	21	55.3	17	44.7		
23<29	11	28.9	12	31.6	1.06	0.58 ns
29- 35	6	15.8	9	23.7		
Mean ± SD	23.55±4.64		25.34±4.50		1.70	0.09 ns
Residence						
Rural	28	73.7	24	63.2	0.97	0.32 ns
Urban	10	26.3	14	36.8		
Educational level						
Read and write	2	5.3	1	2.6	0.86	0.83 ns
Basic education	4	10.5	3	7.9		
Secondary education	21	55.3	20	52.7		
University education	11	28.9	14	36.8		
Occupation						
House wife	23	60.5	26	68.4	0.51	0.47 ns
Working	15	39.5	12	31.6		

x2= Chi square   **ns No statistical significant difference (p > 0 .05)**

Table (2): Mean scores of the studied sample' knowledge regarding postpartum period in both groups at pre and post intervention of Levine's conservation model (n=76).

knowledge regarding postpartum period	Possible score	Control group (n=38) Mean ±SD	Study group (n=38) Mean ±SD	t test	P value
Total general knowledge regarding postpartum period					
Before-intervention	4-8	4.94±0.76	4.76±0.78	1.03	0.30 ns
6 weeks after intervention		4.97±0.75	7.60±0.49	18.0	0.000**
Total knowledge about proper nutrition during postpartum period					
Before-intervention	5-10	6.76±0.71	6.57±0.94	0.95	0.34 ns
6 weeks after intervention		6.89±0.68	8.97±0.67	13.2	0.000**
Total knowledge about personal hygiene during postpartum period					
Before-intervention	4-8	5.84±1.21	5.81±1.08	0.09	0.92 ns
6 weeks after intervention		6.07±0.96	7.71±0.45	9.37	0.000**
Total knowledge about care of baby and breastfeeding					
Before-intervention	7-14	9.23±0.94	9.18±0.92	0.24	0.80 ns
6 weeks after intervention		9.52±0.60	12.47±1.26	12.9	0.000**
Overall score					
Before-intervention	20-40	26.78±2.08	26.34±1.36	1.10	0.27 ns
6 weeks after intervention		27.47±1.79	36.76±2.67	17.7	0.000**

t= independent t test   ns No statistical significant difference (p > 0 .05)   ** Highly statistically significant (P ≤ 0.001).
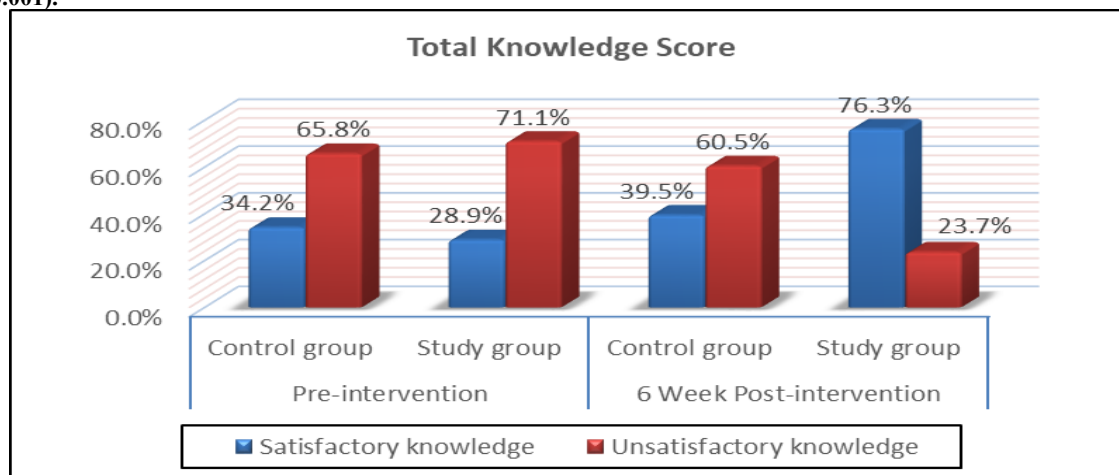
Figure (1): Distribution of the studied sample total knowledge score at pre and post intervention of Levine's conservation model (n=76).
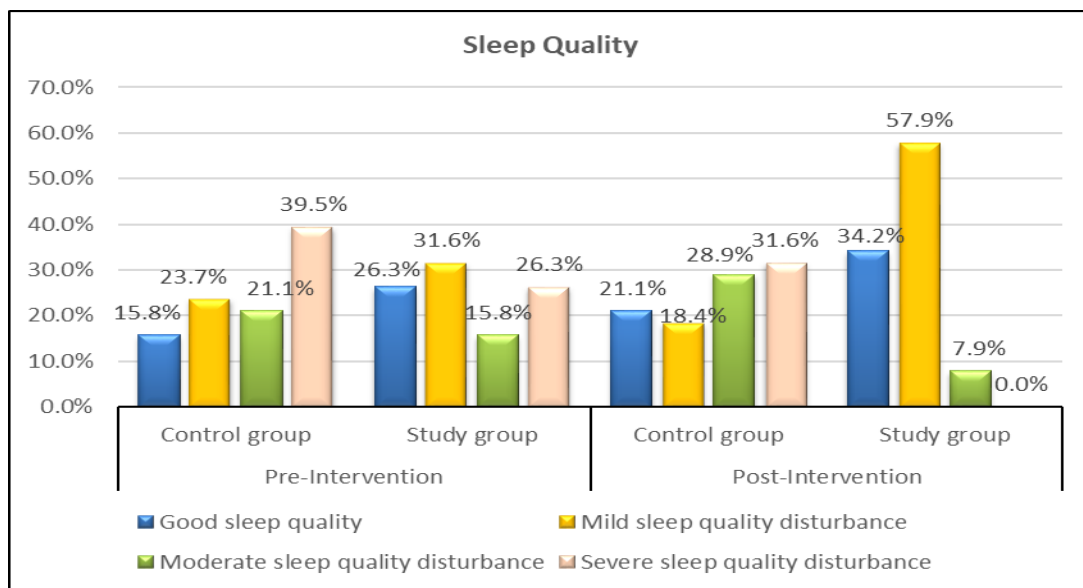
Table (3): Mean scores of the studied sample' quality and patterns of sleep in both groups at pre and post intervention of Levine's conservation model (n=76).

Quality and patterns of sleep	Possible score	Control group (n=38) Mean ±SD	Study group (n=38) Mean ±SD	t test	P value
Total subjective sleep quality					
Before-intervention	0-3	1.94±1.06	1.78±1.11	0.63	0.53 ns
6 weeks after intervention		1.76±0.94	1.02±0.67	3.91	0.000**
Total sleep latency					
Before-intervention	0-3	1.81±1.13	1.71±1.16	0.40	0.69 ns
6 weeks after intervention		1.68±0.98	0.97±0.59	3.79	0.000**
Total sleep duration					
Before-intervention	0-3	1.68±1.04	1.57±1.05	0.43	0.66 ns
6 weeks after intervention		1.55±0.86	0.94±0.65	3.44	0.001**
Total sleep efficiency					
Before-intervention	0-3	1.10±0.72	1.15±0.78	0.30	0.76 ns
6 weeks after intervention		1.05±0.73	0.73±0.50	2.18	0.03*
Total sleep disturbance					
Before-intervention	0-3	1.78±0.96	1.63±0.99	0.70	0.48 ns
3 weeks after intervention		1.55±0.86	0.97±0.59	3.41	0.001**
Total use of sleep medication					
Before-intervention	0-3	0.65±0.58	0.73±0.68	0.54	0.58 ns
6 weeks after intervention		0.55±0.64	0.18±0.39	3.00	0.004*
Total daytime dysfunction					
Before-intervention	0-3	1.10±0.83	1.15±0.91	0.26	0.79 ns
6 weeks after intervention		1.23±0.99	0.81±0.69	2.13	0.03*
Overall score					
Before-intervention	0-21	10.10±5.88	9.76±6.21	0.24	0.80 ns
6 weeks after intervention		9.39±5.47	5.65±3.18	3.64	0.001**

t= independent t test   ns No statistical significant difference (p > 0 .05)
 * statistically significant (P ≤ 0.05).   ** Highly statistically significant (P ≤ 0.001).

Figure (2): Distribution of the studied sample (control and study groups) according to total quality and pattern of sleep at pre and post intervention of Levine's conservation model (n=76).

Table (4): Mean scores of total fatigue and total energy among the studied sample in both groups at pre and post intervention phases at pre and post intervention of Levine's conservation model (n=76).

Total fatigue and total energy	Possible score	Control group (n=38)	Study group (n=38)	t test	P value
		Mean ±SD	Mean ±SD		
Total Fatigue					
Before-intervention	0-130	87.31±14.69	86.23±16.15	0.30	0.76 [ns]
6 weeks after intervention		74.39±17.75	41.60±13.69	9.01	0.000**
Total Energy					
Before-intervention	0-50	21.76±5.85	20.84±5.02	0.73	0.46 [ns]
6 weeks after intervention		23.28±5.02	36.31±2.81	13.01	0.000**

t= independent t test   [ns] No statistical significant difference (p > 0 .05)

** Highly statistically significant (P ≤ 0.001).

Table (5): Correlation between total score of the studied sample' sleep quality and total fatigue as well as total energy score at pre and post intervention of Levine's conservation model (n=76).

Variables	Total sleep quality disturbance							
	Control group n= 38				Study group n= 38			
	Pre-intervention		Post-intervention		Pre-intervention		Post-intervention	
	r	P value	r	P value	r	P value	r	P value
Total knowledge	-.508-	.000**	-.798-	.000**	-.878-	.000**	-.848-	.000**
Total fatigue	.572	.000**	.549	.000**	.696	.000**	.745	.000**
Total Energy	-.880-	.000**	-.882-	.000**	-.870-	.000**	-.821-	.000**

r= person correlation   **A high statistical significant difference (P ≤ 0.001)

Discussion:

The mother and newborn child's health are greatly impacted by the postpartum period. This time of life has a significant physiological, emotional, and social impact not only on the women but also on the family. During this time, women try to deal with the changes in their bodies and the additional responsibilities of motherhood. During the postpartum period, women face significant physical, emotional, and social issues that have an impact on their health and quality of life. Women's adaptation to the postpartum period is negatively impacted by a number of factors. Fatigue and difficulty sleeping are two examples *(17).*

The current   research aimed to evaluate effect of Levin's conservation model application on fatigue and sleep quality among postpartum women.

Concerning the homogeneity of the groups, the independent variables, such as the women's age, residence, education, and occupation, in the study and control groups. The current study found that there were no statistically significant differences in personal

characteristics between the control and study groups. Nearly all of the participants in the control group and the study group, respectively, were between the ages of 18 and 23 years old. These results agreed with *(25)* who said that majority of the study women's age ranged between 18-30 years. This could indicate that the women in the study were of childbearing age, which could be explained by the fact that the majority of them were married at this age, which is considered to be middle reproductive age.

In addition, the current study demonstrated that, respectively, more than two thirds of the control and study groups resided in rural areas. The fact that more than half of both groups had completed secondary school may be due to the fact that the majority of women come from rural areas where, according to cultural norms, girls looked forward to getting married more than they did to finishing school. Furthermore, approximately two thirds of the women in both groups were housewives. The findings of current research came in same line with *(23)* who stated that there was no statistically significant difference between the groups regarding personal characteristics. Also, *(4)* indicated that there was no statistically significant difference between the two groups (P-value = 0.334). On other hand these results disagreed with *(10)* who showed that most of studied women had higher education. Also, in contrast to *(28)* the majority of women, according to the findings, could read and write. These variations could be the result of a different culture or study samples. The current study demonstrated that there was no statistically significant difference in the mean score of the overall knowledge between the two groups prior to the intervention, as measured by Levine's conservation model, for the postpartum period in both groups three and six weeks after the intervention. This result came in same line with *(7)* who presented that women's had insufficient knowledge on postnatal care. This may be explained that around third of studied women were housewives and had secondary education as they did not know about the postpartum period. Also, *(16)* revealed that the housewife mothers had not enough knowledge to deal with the postpartum period. On other hand this result contracted with study done by *(9)* showed that almost all of the participants were well-versed in some aspect of postpartum care. These differences may be attributable to the different study samples. However, the present study found that the study group's mean difference score for overall knowledge mean score was higher than the control group's score after six weeks of intervention. The study group's improved overall knowledge mean score may be contributed to women's active participation in Levine's conservation session, which included teaching women about postpartum nutrition, personal hygiene, breast care, and breastfeeding. These result disagreed with *(4)* who stated that education had no effect on postpartum adaptation and that questionnaire scores at six weeks postpartum were not significantly different between the two groups. This could be because women were less focused on postpartum issues and were more focused on the delivery issue. As a result, postpartum classes in prenatal education shouldn't be stopped because they have no effect on how a mother adapts to life after childbirth.

Levine's conservation model was used to compare the total knowledge score before and after the intervention, and the results showed that there was a significant improvement from less than one third before the intervention to more than three quarters six weeks later. While the control group showed little change. These results were in line with *(22)*, who stated that there was a remarkable improvement in postnatal knowledge and techniques of breastfeeding after receiving the health education program compared to those who received hospital routine care, and that there was a significant improvement in postnatal care, including effective lactation, in the study group compared to the control group. The nursing interventions that aim to maintain the equilibrium between an individual's activity status and current energy level are the foundation of conservation of energy.

The economic use of energy and the avoidance of energy consumption are at the heart of the conservation model. The maintenance of physiological, psychological, and social functions necessitates energy conservation. Planning and carrying out nursing interventions that are specific to patient care and fall under the purview of the conservation model should all have the primary objective of preserving the individual's energy and increasing their energy production Fatigue occurs when energy is lost *(18)*.

The current study found that there was no statistically significant difference between the study group and the control group in terms of the mean score of quality and patterns of sleep at the time of the intervention using Levine's conservation model. On the other hand, there was a statistically significant difference between the study group and the control group in terms of total sleep efficiency, total use of sleep medication, and total daytime dysfunction six weeks after the intervention. Six weeks after the intervention, there were significant differences in total subjective sleep quality, sleep latency, sleep duration, sleep disturbance, and overall score of quality and sleep patterns between the study and control groups. This may be due to positive effect of applying Levine's conservation model session.

These results were in line with those of *(23)*, who stated that there was no statistically significant difference between the mean pretest scores that were obtained by the women in the intervention and control groups from the sleep quality item (t=-0.239, p0.05); However, there was a statistically significant difference between the mean posttest scores (t=-9.135, p0.001). Except for sleep duration, this study did not compare the intervention and control groups because there was no significant difference in the mean pretest and posttest scores for the sleep duration item (t=-1.175, p>0.05). The nursing practices had no effect at all on sleep duration. In the current study, the women in both the intervention and control groups slept for an average of 6 hours. This is probably because the participants had to get up multiple times to care for their babies, which made it hard for them to sleep and made them sleep less.

According to Levine's conservation model, the distribution of the studied sample (control and study groups) in terms of total quality and sleep pattern at pre- and post-intervention

indicated that less than one third of the study sample and more than one third of the control group had severe sleep quality disturbances at pre-intervention. In addition, less than one third of the control group's study sample experienced severe sleep quality issues following the intervention. This could be because the study group's use of Pilate's exercises and the training they received improved their quality of sleep.

These results were in agreement with *(25)* who demonstrated that the study participants had significant insomnia symptoms and sleep disturbances, including poor sleep quality. After Levine's conservation model intervention, the study group's sample did not experience significant sleep quality disturbances. According to the findings of this study, women who received care that adhered to the energy conservation sub-component of Levine's conservation model had better quality sleep. The first hypothesis was confirmed by this result.

Concerning the study sample's mean scores of total fatigue and total energy before and after Levine's conservation model intervention, the current study's findings showed that the mean score of total fatigue and total energy at the beginning of the intervention did not differ significantly between the study group and the control group. Six weeks after the intervention, there were significant differences between the study and control groups that were highly statistically significant. This showed that the women in the intervention group got training on nutrition, Pilates, and better sleep, which also helped them save energy and reduce fatigue. The second hypothesis was supported by *(10)* who stated that fatigue scores did not significantly differ between the two groups prior to the intervention. Also, this result was in line with *(8)* conclusion that Pilate's exercises significantly reduced postpartum fatigue and increased energy in a statistically significant way.

In addition, a study carried out by *(10)* women received face-to-face trainings on energy conservation techniques, which significantly reduced their fatigue levels. Face-to-face training was also found to be effective in reducing the fatigue levels of the women in the intervention group and to improve the efficiency of LCM-based care. Finally, the findings of this study showed that the women in the intervention and control groups experienced significantly different levels of sleep and fatigue. The fact that Levine's conservation model makes it possible to provide women with integrative care during their postpartum period may be the reason why the women in the intervention group experienced less fatigue and significantly improved quality of life. These findings agreed with *(23).*Who presented that there was a significant difference between the women in the control and intervention groups in terms of the variables such as fatigue, sleep, and quality of life.

Concerning the correlation between the total score of the studied sample's sleep quality and total fatigue and energy scores before and after Levine's conservation model intervention. According to the findings of the current study, there was a positive statistically significant correlation between total fatigue and total sleep quality disturbance

among the studied sample in both groups at pre- and post-intervention phases, whereas there was a negative statistically significant correlation between total knowledge, total energy, and total sleep quality disturbance. According to *(13),* there was a statistically significant positive correlation between sleep disturbances and fatigue in the first eight weeks after delivery. This may be because sleep deprivation may make women more tired. Also in line with *(20)* findings, which found that postpartum sleep disturbances were associated with high levels of fatigue.

Conclusion

The current study's findings led the researchers to the conclusion that the conservation model was effective in reducing postpartum women's fatigue and improving their quality of sleep. Six weeks after the intervention, there were statistically significant differences between the study and control groups in terms of total subjective sleep quality, total sleep latency, total sleep duration, total sleep disturbance, and overall score of quality and patterns of sleep($P = <0.001$). In addition, the mean scores of total fatigue and total energy were significantly different between the study group and the control group six weeks after the intervention. Both groups' pre- and post-intervention samples showed a positive, statistically significant correlation between total fatigue and total sleep quality disturbances. As a result, both the study's objective and the supported hypotheses were realized.

Recommendations: based on research findings it was recommended following:

1. All postpartum women should receive printed booklets and brochures containing sufficient information about postnatal periods and the conservation model. These materials should be kept in the postnatal unit.
2. It is suggested that the conservation model be used on all postpartum women to help them sleep better and save energy.
Further researches:
1. Replication of the study on large representative probability sample is highly recommended in different maternity hospitals to achieve more generalization of the results.

Informed Consent: Written informed consent was obtained from the participants.

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الملخص العربى

الخلفية: تعتبر فترة ما بعد الولادة فترة حرجة لكل من النساء وعائلاتهن بسبب التغيرات الفسيولوجية والاجتماعية والنفسية التي تحدث بعد الولادة ،. كل هذه التغييرات لها تأثير على جودة نوم الامهات. **الهدف**: يهدف هذا البحث إلى تقييم تأثير تطبيق نموذج ليفين على التعب وجودة النوم بين النساء بعد الولادة. التصميم: تصميم بحث شبه تجريبي(مجموعتين قبل و بعد التطبيق) . **العينة**: 76 سيدة حامل. الإعداد: البحث الحالي الذي تم إجراؤه في عيادة ما قبل الولادة ووحدة ما بعد الولادة في قسم أمراض النساء والتوليد في مستشفى جامعة بنها ، مصر. **الأدوات**: تم استخدام ثلاث أدوات لجمع البيانات: استبيان المقابلات المنظم الذي يشمل جزأين رئيسيين: البيانات الديموغرافية ، واستبيان معرفة المرأة ، والمقياس التناظري المرئي للإرهاق ، ومؤشر جودة النوم في بيتسبرغ. **النتائج**: توجد فروق ذات دلالة إحصائية عالية بين مجموعة الدراسة والمجموعة الضابطة فيما يتعلق بجودة النوم الذاتية ، عمق النوم ، ومدة النوم الإجمالية ، واضطراب النوم الكلي ، والنتيجة الإجمالية لجودة وأنماط النوم بعد 6 أسابيع من التدخل ($P = <0.001$). أيضا ، كانت هناك فروق ذات دلالة إحصائية عالية بين مجموعة الدراسة والضابطة فيما يتعلق بمتوسط درجة الإجهاد الكلي والطاقة الكلية في 6 أسابيع بعد التدخل. بينما كانت هناك علاقة ارتباط موجبة ذات دلالة إحصائية بين التعب الكلي واضطراب جودة النوم الكلي بين العينة المدروسة في كلا المجموعتين في مرحلة ما قبل التدخل وبعده. **الخلاصة**: تطبيق نموذج ليفين كان فعالاً في تخفيف مستوى التعب وتحسين نوعية النوم لدى النساء بعد الولادة. **التوصيات**. يُنصح جميع النساء بعد الولادة باستخدام نموذج ليفين من أجل الحفاظ على الطاقة وإظهار جودة نوم أعلى