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RESEARCH ARTICLE

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY LEVEL AND SLEEP QUALITY IN MOTHERS OF INDIVIDUALS WITH SPECIAL NEEDS

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ABSTRACT

Purpose: The study aimed to investigate the relationship between physical activity level and sleep quality in mothers of individuals with special needs.
Material and Methods: Three hundred twenty-one mothers (average age: 41.92±9.53 years) with a disabled child participated in the study from Osmangazi county of Bursa province in Türkiye. Demographic characteristics of the mothers were collected through a personal information form prepared by the researchers. The mothers' physical activity level was determined using the International Physical Activity Questionnaire-short form (IPAQ-SF). The mothers' sleep quality was determined using the Pittsburgh Sleep Quality Index (PSQI). The physical activity level of the disabled individuals was determined based on their mothers' statements.
Results: The mean IPAQ-SF score of the mothers was found to be 1080.58±986.88 MET-min/week, and their mean PSQI score was determined to be 7.46±3.62. The disabled individuals' physical activity level was evaluated as a)15.9% (n=51) of the disabled individuals regularly participated in a sporting activity, b) 32.4% (n=104) did not participate in sports but made efforts to stay active, and c) 51.7% (n=166) were considered inactive. Pearson correlation analysis revealed that a) there was no relationship between IPAQ-SF and PSQI scores (r: -0.056, p=0.313), b) the physical activity level of individuals with special needs did not correlate with PSQI scores of the mothers (r: -0.95, p=0.089), and c) no relationship was determined between the age of individuals with special needs and mothers' sleep quality and physical activity level.
Conclusion: It can be concluded that increasing the physical activity level of mothers cannot be an effective intervention to improve sleep quality in mothers of individuals with special needs. Further research is needed to explore the relationship between physical activity level and sleep quality in mothers of individuals with special needs.

Keywords: individual with special needs, mother, sleep quality, physical activity level

INTRODUCTION

Sleep is an essential biological function with major roles in recovery, energy conservation, and survival (1). Sleep also appears to be important for vital functions such as neural development, learning, memory, emotional regulation, cardiovascular and

metabolic function, and cellular toxin removal (2-5). Sleep disturbances impair cognition, psychomotor function, and mood and lead to lapses in attention and inability to stay focused; reduced motivation; compromised problem solving; confusion, irritability, and memory lapses; impaired communication; slowed or faulty information processing and judgment; diminished reaction times; and indifference and loss of empathy (6-7). Sleep disturbances also affect human life by increasing the risk of heart attacks, stroke, hypertension, obesity, diabetes, depression, and mortality (6,8-10).

Sleep disturbance may occur as a symptom of another physical or mental illness. It can also be seen as a primary disorder (11). Unhealthy sleep patterns and sleep disturbances throughout childhood and adulthood are common across different cultures (12,13). Furthermore, various factors including unhealthy diet, poor emotional and cognitive status, physical or psychological diseases, pain, and fatigue may be associated with sleep disturbances, but the relationships are very complicated and remain unclear (12,13).

One of the predisposing factors of sleep disturbances in a child or an adolescent is having a disability. It is well known that children with a wide range of special health care needs experience poor sleep (14).

Saletovic, Pasalic and Memisevic (15) reported that most common sleep problems in children with intellectual disability (ID) are settling difficulties, night waking, long sleep latencies and early waking. Soytaç, Kahraman and Genç (16) also reported that mothers of children with autism spectrum disorder (ASD) had a higher anxiety level, and lower sleep quality and health-related quality of life.

Anxiety, depression, fatigue, low life quality and burnout are leading health problems in mothers of children with special needs, and these are caused primarily by sleep disturbances (16-18). Higher rates of sleep problems among children with disabilities are likely to have a direct impact on the sleep habits of mothers, and impact maternal subjective health and well-being (19).

Meltzer and Mindell (20) stated that the quality of a child's sleep predicts the quality of the mother's sleep. Several physical activities, including walking, yoga, and aerobic gymnastics, have been suggested for mothers of children with special needs to participate in, in order to improve their sleep quality (21-25). A study by Karakaş and Yaman (24) argued that the quality of life of parents who had disabled individuals and performed regular physical activity was found to be at a higher level than that of those who had disabled individuals but did not perform physical activity. Therefore, this study aimed to investigate the relationship between physical activity level and sleep quality in mothers of individuals with special needs. This study also hypothesized that as physical activity levels increase, sleep quality also increases.

MATERIAL AND METHODS

Three hundred twenty-one mothers (average age: 41.92±9.53 years) with a disabled individual participated in the study from Osmangazi county of Bursa province in Türkiye. The simple random sampling method was used to ensure the consistency of participants in the study. The information obtained from the Bureau of Enquiry of the Presidency of the Republic of Türkiye, Directorate of Communications reveals that there are 3 Special Education and Rehabilitation centers in Osmangazi county of Bursa, serving a total of 834 students with special needs. Based on these 834 students, the study requires a

Table 1. Descriptive characteristics of mothers of individuals with special needs (n=321)

Descriptive Characteristics	n	%
Educational Status		
Literate	4	1.2
Primary school graduate	104	32.4
Secondary school graduate	49	15.3
High school graduate	97	30.2
University graduate	57	17.8
Postgraduate	9	2.8
Working status		
Working	100	31.2
Not working	216	67.3
Part-time job	5	1.6
Income status /Monthly /TL		
0-12.000	115	35.8
12.000-20.000	92	28.6
More than 20.000	114	35.5
Family structure		
Nuclear Family	232	72.3
Traditional family	51	15.9
Single mother	38	11.8

Table 2. Characteristics of mothers of individuals with special needs (n=321)

Descriptive Characteristics	n	%
Where do you live?		
Province	306	95.3
County	11	3.4
Rural area	4	1.2
Who takes care of children/supported by		
Myself	162	51.4
Father	137	42.7
Childminder	22	6.9
Who sleeps with you?		
My child and I sleep in the same room	85	26.5
My child and I sleep in different rooms	236	73.5

Table 3. Descriptive characteristics of individuals with special needs (n=321)

Descriptive Characteristics		
Age	13.49 ±7.81	
	n	%
Gender		
Girl	128	39.9
Boy	193	60.1
Type of Disability		
Intellectual disability	148	46.1
Learning disability	53	16.5
Autism spectrum disorder	100	31.2
Cerebral palsy	12	3.7
Attention deficit hyperactivity disorder	8	2.5
Physical activity level		
Regularly participates in a sporting activity	51	15.9
Does not participate in sports but makes efforts to stay active	104	32.4
Inactive	166	51.7

minimum of 263 mothers according to the formula for proportional sample size used to determine the sample size (26). This will enable the study to provide a 95% confidence interval with a 5% error margin.
Descriptive characteristics of mothers of individuals with special needs are presented in Tables 1-2. Descriptive characteristics of individuals with special needs are given in Table 3.

Data Collection Tools

Personal information form: The demographic characteristics of the mothers were assessed using a form consisting of 11 items that was developed and prepared by the researchers. This form allowed the researchers to gather information about various demographic factors related to the mothers participating in the study. The form consisted of multiple choice questions and open-ended questions including age, educational status, occupation of the mothers, income of the mother/family, current employment status, physical activity level of the child/children, other family members in the home, etc.

Physical activity level of the mothers: Physical activity level of the mothers was determined through the International Physical Activity Questionnaire-short form (IPAQ-SF). The questionnaire was administered to individuals aged 15 to 65 in order to gather information about their physical activity habits and behaviors (27). Tests of Turkish validity and reliability were previously performed by Saglam et al. (28). The IPAQ measurement, which advises engaging in physical activity for at least 10 minutes at a time, was used in the study. The questionnaire

Table 4. Relationship between mothers' PSQI score and physical activity level of individuals with special needs, and relationship between mother's IPAQ-SF score and PSQI score

		PSQI
MET-min/week	Pearson Correlation (*r*)	-0.056
	p	0.313
Physical activity level of individuals with special needs	Pearson Correlation (*r*)	0.095
	p	0.089

Table 5. Relationship between age of individuals with special needs and sleep quality and physical activity level of mothers of individuals with special needs

		PSQI	MET
Age of Individuals with Special needs	Pearson Correlation (*r*)	0.073	-0.98
	p	0.193	0.08

asked individuals about the amount of time they spent participating in vigorous exercise, moderate exercise, walking, and sitting throughout the day. To convert the durations of walking and intense and moderate physical activity into the corresponding metabolic equivalent (MET) units, the following formula was employed: MET value = duration (minutes) × MET level. In this formula, 1 MET is equivalent to 3.5 ml/kg/min. The overall physical activity score (expressed as MET minutes per week) was then calculated by summing the MET values for each activity and multiplying by the corresponding duration. In the calculation of the MET values of the subjects, the study by Maddison et al. (29) was referred to.

Sleep quality of mothers: The Pittsburgh Sleep Quality Index was initially developed by Buysse et al. (30) in 1989 and later adapted to Turkish by Ağargün et al. (31) in 1996. It is designed to evaluate sleep quality and sleep disorders experienced within the past month. The scale consists of a total of 24 questions, with 19 of them being self-report questions and the remaining five questions answered by the spouse or roommate. The scale assesses various aspects of sleep through seven components: Subjective Sleep Quality, Sleep Latency, Sleep Duration, Sleep Efficiency, Sleep Disturbances, Use of Sleeping Pills, and Daytime Dysfunction. Each component is rated on a scale of 0 to 3 points. The scores from the seven components are summed to obtain the total score, which ranges from 0 to 21. A total score greater than 5 is indicative of "poor sleep quality."

Physical activity level of the individual with special needs: One of the questions in the personal information form was, "How would you rate the physical activity level of your child with special needs?" Researchers asked mothers to evaluate their children's physical activity level using the following options: a) He/she participates in a sport regularly, b) He/she does not participate in sports but makes efforts to stay active, c) He/she is inactive.

Data Collection

The data were collected by the researchers using the face-to-face interview technique. The participants were informed about the study and given the necessary explanations, and then, their consent was obtained.

Data Analysis

All statistical analyses were performed using IBM SPSS Statistics version 23.0 (IBM Inc., Armonk, NY, USA). Data were presented as mean and standard deviation. Mothers' physical activity level (IPAQ-SF), physical activity level of individuals with special needs, and sleep quality of mothers (PSQI) were tested for normality using the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test revealed that the data were not normally distributed ($p \leq 0.05$). Since the relationship between all variables was evaluated

using the Pearson correlation coefficient, the level of statistical significance was accepted as $p < 0.05$.

Ethical Aspects of the Study

This study was approved by the Istanbul 29 Mayıs University Scientific Research and Publication Ethics Committee (Approval date: 31.07.2023 Number: 2023/08). Furthermore, the mothers who participated in the study were given a brief description of the study, and consent was received from those who agreed to participate in the study.

RESULTS

The mean physical activity level of mothers was determined to be 1080.58±986.88 MET-min/week, and their mean PSQI score was determined to be 7.46±3.62. The relationship between mothers' physical activity level and sleep quality is presented in Table 4. Additionally, the relationship between physical activity level of individuals with special needs and mothers' sleep quality can also be observed in Table 4. The relationship between the age of individuals with special needs and mothers' sleep quality and physical activity level are presented Table 5.

There was no relationship between IPAQ-SF and PSQI scores in mothers of individuals with special needs (r: -0.056, p=0.313). Also, the physical activity level of individuals with special needs did not correlate with PSQI scores of the mothers (r: -0.95, p=0.089), ($p > 0.05$). (Table 4)

No relationship was determined between age of individuals with special needs and mothers' sleep quality and physical activity level ($p > 0.05$). (Table 5)

DISCUSSION

The main findings of the study are as follows: a) There was no correlation between physical activity level (MET-min/week) and sleep quality (PSQI) in mothers of individuals with special needs. b) The physical activity level of individuals with special needs, as reported by their mothers, did not show any correlation with the sleep quality of the mothers. c) No relationship was determined between age of individuals with special needs and mothers' sleep quality and physical activity level. The study hypothesized that as physical activity levels increase, sleep quality also increases. Based on the findings of the study, we can infer that the hypothesis of the study was not verified.

Several techniques including progressive relaxation training, cognitive behavioral therapy, group coping skills, occupational therapy and mindfulness training have been suggested for mothers of children with mental disabilities (32-34).

Bourke-Taylor et al. (35) reported a strong negative correlation between physical activity level and sleep quality in mothers who had disabled children after the Healthy Mothers Healthy Families workshop intervention in Victoria, Australia. The results of the study revealed that as physical activity level increased, sleep quality also increased. Based on that study, mothers of children with special needs in Turkey may need a guide or motivational program as in the Healthy Mothers Healthy Families workshop intervention in Victoria, Australia to increase their physical activity level and life quality, since it was evaluated that mothers of children with special needs had lower physical activity levels than mothers without disabled children (643.47± 558.78 MET-min/week versus 1151.86±942.62 MET-min/week). In our study, the physical activity level in mothers of a child with special needs was determined as moderately active (1080.58±986.88 MET-min/week) (27). In a study by Skordilis (36), no differences were found between parents with and without children with disabilities in terms of physical activity levels. However, parents with disabled children were found to be less sedentary and more energetic compared to their counterparts. Haegele et al. (37) found mean IPAQ scores in mothers of a child with ASD as 3371 MET-min/week (highly active) and they also found significant correlations between the child's age and mother's physical activity level. They suggested that as parents and children grow older, parents tend to participate in more physical activity. In our study, we found that the mothers' physical activity level was classified as moderately active. This outcome could be attributed to the age of the children (13.49 ± 7.81 years). However, different from the study by Haegele et al. (37), we could not find a relationship between the age of individuals and mothers' sleep quality and physical activity level. It is important to consider this variable in future studies that aim to determine the physical activity level in mothers of children with disabilities.

Yan and Chen (38) reported that practicing aerobic gymnastic exercise at least three times (15 min per section) a week for three months had positive and significant effects on the perceived stress, fatigue and

sleep quality of postpartum women. The postpartum period is characterized by psychosocial problems, including fatigue, depression, stress, tiredness, sleep disturbances and daytime functional problems as in mothers who have children with special needs (39-42).

Ullas et al. (23) concluded that 1.5 hours of integrated yoga practice, consisting of physical postures, breathing techniques, relaxation techniques, and meditation every other day for 1 month, decreased anxiety, depression, and stress, and improved sleep quality in mothers of children with intellectual disabilities.

In a study conducted by Karakaş and Yaman (24), the physical activity levels and life quality of 164 parents with disabled individuals were evaluated. The researchers used the International Physical Activity Questionnaire-Short Form (IPAQ-SF) and the World Health Organization Quality of Life-BREF Form (WHOQOL-BREF) for the assessment. The study in question found that parents who had a disabled individual and engaged in regular exercise had a higher quality of life compared to those who had a disabled individual but did not perform regular exercise.

In the study conducted by Karakaş and Yaman (24), although sleep quality was not directly evaluated, the WHOQOL-BREF questionnaire consisted of five sub-dimensions, including the physical area, psychological area, social area, environmental area, and environmental TR (Transport) area. The sleep quality of 164 parents was indirectly assessed through the physical area sub-dimensions of the WHOQOL-BREF, which included items related to pain and discomfort, energy and fatigue, and sleep and rest.

This study has some limitations. First, the mothers were recruited from only Osmangazi county of Bursa province in Turkey, and as a result, the findings may not be generalizable to all mothers of individuals with special needs. To improve the generalizability of the results, future studies should replicate the research with a larger and more diverse sample by recruiting mothers from different provinces in Turkey.

Second, the study only focused on the physical activity levels of both individuals with special needs and mothers, as well as the age of individuals with special needs, in order to evaluate the mothers' sleep quality. Other independent variables of the mothers, such as work status, education level, monthly income of the family, etc., which could potentially impact sleep quality, were not evaluated. Considering and evaluating these additional factors in future studies could lead to obtaining different and more comprehensive results.

CONCLUSION

Based on the findings of this study, it can be concluded that increasing the physical activity level of mothers cannot be an effective intervention to improve sleep quality in mothers of individuals with special needs. It is well known that the positive impact of physical activity on reducing anxiety, depression, and stress, as well as improving sleep quality, suggests that incorporating regular physical activity routines in the lives of mothers with special needs individuals may have beneficial effects on their overall well-being. Since no relationship was found in the current study between physical activity level and sleep quality in mothers of individuals with special needs, further research is needed to explore the relationship between the physical activity level and sleep quality in mothers of individuals with special needs. A group will be planned with the participation of mothers in a pre-post test design, and the results obtained from experimental studies that test the response of the exercise group to physical activity in comparison to the control group in terms of sleep quality may provide a better understanding of the relationship between physical activity level and sleep quality.

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REFERENCES

1. Mukherjee S, Patel SR, Kales SN, Ayas NT, Strohl KP, Gozal D, et al. An official American Thoracic Society statement: the importance of healthy sleep. Recommendations and future priorities. Am J Respir Crit 2015;191(12): 450-1458.
2. Cincin A, Sari I, Oğuz M, Sert S, Bozbay M, Ataş H, et al. Effect of acute sleep deprivation on heart

rate recovery in healthy young adults. Sleep Breath 2015;19(2):631-636.
3. Davies SK, Ang JE, Revell VL, Holmes B, Mann A, Robertson FP, et al. Effect of sleep deprivation on the human metabolome. Proc Natl Acad Sci 2014;111(29):10761-10766.
4. Frank E, Sidor MM, Gamble KL, Cirelli C, Sharkey KM, Hoyle N, et al. Circadian clocks, brain function, and development. Ann N Y Acad Sci 2013;1306(1):43-67.
5. Xie L, Kang H, Xu Q, Chen MJ, Liao Y, Thiyagarajan M, et al. Sleep drives metabolite clearance from the adult brain. Science 2013;342(6156):373-377.
6. Hillman D, Mitchell S, Streatfeild J, Burns C, Bruck D, Pezzullo L. The economic cost of inadequate sleep. Sleep 2018; 41(8):083.
7. Day A, Haj-Bakri S, Lubchansky S, Mehta S. Sleep, anxiety and fatigue in family members of patients admitted to the intensive care unit: a questionnaire study. Crit Care 2013;17(3):1-7.
8. Zhai L, Zhang H, Zhang D. Sleep duration and depression among adults: A meta-analysis of prospective studies. Depress Anxiety 2015;32(9):664-670.
9. Gangwisch JE. A review of evidence for the link between sleep duration and hypertension. Am. J. Hypertens 2014;27(10):1235-1242.
10. Cappuccio FP, Cooper D, D'Elia L, Strazzullo P, Miller MA. Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. Eur Heart J 2011;32(12): 1484-1492.
11. Keskin N, Tamam L. Uyku bozuklukları: Sınıflama ve tedavi. Arşiv Kaynak Tarama Dergisi 2018; 27(2):241-260.
12. Jeon M, Dimitriou D, Halstead EJ. A systematic review on cross-cultural comparative studies of sleep in young populations: the roles of cultural factors. IJERPH 2021;18(4): 2005.
13. Wang G, Xu G, Liu Z, Lu N, Ma R, Zhang E. Sleep patterns and sleep disturbances among Chinese school-aged children: prevalence and associated factors. Sleep Med 2013;14(1):45-52.
14. Mcbean AL, Schlosnagle L. Sleep, health and memory: Comparing parents of typically developing children and parents of children with special health-care needs. J. Sleep Res. 2016; 25(1):78-87.
15. Saletovic A, Pasalic A, Memisevic H. Sleeping patterns in children with developmental disabilities. J ReAtt Ther Dev Divers 2021;4(1):28-38.
16. Soytaç E, Kahraman T, Genç A. Pain, anxiety, depression, fatigue, sleep quality, and health-related quality of life in the mothers of children with autism spectrum disorder and the mothers of typically developing children: A Case-control study. Cyprus J Med Sci 2022;7(6):774-779
17. Zhou J, Gao S, Sun T, Gao W, Fu W, Ying Z, et al. Sleep quality, anxiety, somatic symptoms, and features of brain structure in parents of children with disabilities. Soc. Behav. Pers. 2022;50(6): 96-109.
18. Ikeda T, Nagai T, Kato-Nishimura K, Mohri I, Taniike M. Sleep problems in physically disabled children and burden on caregivers. Brain Dev 2012;34(3):223-229.
19. Bourke-Taylor H, Pallant JF, Law M, Howie L. Relationships between sleep disruptions, health and care responsibilities among mothers of school-aged children with disabilities. J. Paediatr. Child Health 2013;49(9):775-782.
20. Meltzer LJ, Mindell JA. Relationship between child sleep disturbances and maternal sleep, mood, and parenting stress: a pilot study. J Fam Psychol 2007;21(1):67.
21. Gözgen H, Belgen Kaygısız B. Analysis of physical activity level and body awareness of mothers of children with special needs. Health Care Women Int 2022;43(6):583-595.
22. Ku B, Sung MC. Physical activity among parents of children with disabilities: A systematic review. J. Fam. Issues 2022;43(8):2134-2158.
23. Ullas K, Maharana S, Metri KG, Gupta A, Nagendra HR. Impact of Yoga on mental health and sleep quality among mothers of children with intellectual disability Altern Ther Health Med 2021;27:128-132.
24. Karakaş G, Yaman Ç. Examination of the quality of life according to the physical activity status of parents who have disabled individual. J Hum Sci 2017;14(1):724-737.
25. Yang CL, Chen CH. Effectiveness of aerobic gymnastic exercise on stress, fatigue, and sleep quality during postpartum: A pilot randomized controlled trial. Int J Nurs Stud 2018;77:1-7.
26. Newbold P. Statistics for Business and Economics. 4th ed. New Jersey: Prentice-Hall, 1995.

27. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. MSSE 2003;35:1381-1395.
28. Saglam M, Arikan H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, et al. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills 2010;111(1):278-284.
29. Maddison R, Ni Mhurchu C, Jiang Y, Vander Hoorn S, Rodgers A, Lawes CM, et al. International physical activity questionnaire (IPAQ) and New Zealand physical activity questionnaire (NZPAQ): a doubly labelled water validation. Int J Behav Nutr Phys Act.2007;4(1): 1-9.
30. Buysse DJ, Reynolds III CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res 1989;28(2):193-213.
31. Ağargün MY, Kara H, Anlar O. Pittsburg Uyku Kalite İndeksi'nin geçerliliği ve güvenilirliği. Turk Psikiyatri Derg 1996;7:107-111.
32. Javanmard GH, Garegozlo RM. The effectiveness of relaxation training on anxiety of disordered children's mothers. Procedia Soc Behav Sci 2013;84:341-345.
33. Hosseinkhanzadeh AA, Yeganeh T, Rashidi N, Zareimanesh G, Fayeghi N. Effects of stress management training by using Cognitive-Behavioral method on reducing anxiety and depression among parents of children with mental retardation. Sociology Mind 2013;3(01): 62.
34. Helitzer DL, Cunningham-Sabo LD, VanLeit B, Crowe TK. Perceived changes in self-image and coping strategies of mothers of children with disabilities. OTJR 2002; 22(1); 25-33.
35. Bourke-Taylor HM, Jane F, Peat J. Healthy mothers healthy families workshop intervention: A preliminary investigation of healthy lifestyle changes for mothers of a child with a disability. J Autism Dev Disord 2019;49(3):935-949.
36. Skordilis EK. Quality of life, depression and involvement in physical activity of parents with disabled children in Greece. RETOS 2015;27:193-196.
37. Haegele JA, Lee J, Chang SH. Physical activity of parents of children with autism spectrum disorder. Int J Disabil Dev Educ 2017;64(4):368-377.
38. Yang CL, Yu CH, Chen CH. Development and validation of the postpartum sleep quality scale. J Nurs Res 2013;21(2):148-154.
39. Bell AF. Carter CS, Davis JM, Golding J, Adejumo O, Pyra M, et al. Childbirth and symptoms of postpartum depression and anxiety: a prospective birth cohort study. Arch. Women's Ment. Health 2016;19: 219-227.
40. Yang CL, Chen CH. Effectiveness of aerobic gymnastic exercise on stress, fatigue, and sleep quality during postpartum: A pilot randomized controlled trial. Int J Nurs Study 2018;77: 1-7.
41. Kung YY, Yang CC, Chiu JH, Kuo TB. The relationship of subjective sleep quality and cardiac autonomic nervous system in postmenopausal women with insomnia under auricular acupressure. Menopause 2011;18(6): 638-645.
42. Ko YL, Yang CL, Chiang LC. Effects of postpartum exercise program on fatigue and depression during "doing-the-month" period. J Nurs Res 2008;16(3): 177-186.