



Effectiveness of aerobic gymnastic exercise on stress, fatigue, and sleep quality during postpartum: A pilot randomized controlled trial[☆]



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ABSTRACT

Background: Gymnastics is a preferable safe exercise for postnatal women performing regularly.

Objective: The aim of this pilot randomized controlled trial was to determine whether the aerobic gymnastic exercise improves stress, fatigue, sleep quality and depression in postpartum women.

Design: Single-blinded, randomized controlled trial held from December 2014 until September 2015. Setting: Postnatal clinic of a medical center in southern Taiwan.

Participants: 140 eligible postnatal women were systematically assigned, with a random start to experimental (n = 70) or a control (n = 70) group.

Interventions: Engage in aerobic gymnastic exercise at least three times (15 min per section) a week for three months using compact disc in the home.

Outcome measures: Perceived Stress Scale, Postpartum Fatigue Scale, Postpartum Sleep Quality Scale, and Edinburgh Postnatal Depression Scale.

Results: In a two-way ANOVA with repeated measures, the aerobic gymnastic exercise group showed significant decrease in fatigue after practicing exercise 4 weeks and the positive effects extended to the 12-week posttests. Paired *t*-tests revealed that aerobic gymnastic exercise participants had improved significantly in perceived stress and fatigue after 4 weeks gymnastic exercise; these positive effects extended to the 12-week posttests. In addition, the changes in physical symptoms-related sleep inefficiency after 12 weeks gymnastic exercise were significantly decreased in the experimental group compared with the control group.

Relevance to clinical practice: The findings can be used to encourage postnatal women to perform moderate-intensity gymnastic exercise in their daily life to reduce their stress, fatigue and improve sleep quality.

What is already known about the topic?

- Many postpartum women confront major psychosocial problems including fatigue, poor sleep quality, depression and stress and are at high risk for physical inactivity and not aware they can engage in postpartum exercise.
- Learning aerobic gymnastic exercise through multimedia communication suitable for postpartum women performing exercise in the home should be explored in order to maximize new mothers' mental and physical health.

What this paper adds

- Postnatal women performing 4 weeks moderate-intensity aerobic gymnastic exercise can significantly improve their perceived stress

and fatigue; these positive effects extended to 12 weeks practice.

- Practicing aerobic gymnastic exercise at least three times (15 min per section) a week for three months has significant effects on the physical symptoms-related sleep inefficiency of postnatal women.
- Clinical healthcare professionals can incorporate aerobic exercise into postpartum health promotion protocols to assist postnatal women to cope with early postpartum stress, fatigue, and sleep quality.

1. Introduction

1.1. Stress, fatigue, depression and sleep quality during postpartum period

The postpartum period is a critical stage for women. It not only influences significantly the mental and physical health of new mothers,

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but also can be one of the most exhausting times in a woman's life (Bane, 2015; Zourladani et al., 2015). Several major psychosocial problems, including fatigue, depression, and stress occurring during the postpartum period were reported in the literature (Bell et al., 2016; Ko et al., 2008; Troy, 2003). In the United States, researchers found that 44–95% of postpartum mothers undergo postpartum fatigue (Milligan et al., 1997) and 10–15% suffer from postpartum depression (Guille et al., 2013). Postpartum fatigue and depression also manifest common problems in Taiwan (Chen et al., 2006; Ko et al., 2008). Persistent postpartum fatigue has been associated with postpartum depression (Troy, 2003), which is known to interfere with the development of the mother-child relationship and can also result in child maltreatment (Lai et al., 2015). As a result postpartum psychological problems can interfere with a new mother's ability to care for her infant and may adversely affect her quality of life (Lovell et al., 2015; Werner et al., 2016).

Also, during the postpartum period, most women experienced significant disturbance in their sleep patterns, due to hormonal changes and newborn care responsibilities (Ashrafinia et al., 2014; Heh et al., 2008). Sleep disorders can cause tiredness, fatigue, daytime functional problems, and depression (Ko et al., 2010; Kung et al., 2011; Mungui-Azquierdo and Legaz-Arrese, 2012; Yang et al., 2013). Sleep deprivation significantly influences concentration, judgment and daily activities of these mothers (Hosseinabadi et al., 2010). The disturbance of sleep cycle during postpartum period might last for several weeks or months. If it persists or worsens, it may negatively influence breastfeeding and reduce mother-infant bonding (Gunderson et al., 2008). Consequently, poor sleep quality, stress, mood sway, and depression may also occur in the mothers and their family members (Ashrafinia et al., 2014; Posmontier, 2008). Therefore, postpartum sleep quality is a critical health index and lack of sleep is a major source of stress for postpartum women (Hunter et al., 2009; Li et al., 2011; Yang et al., 2013). Another factor affecting maternal sleep and health is postpartum stress. Postpartum women have also perceived stress from maternal role attainment, body changes, lack of support (Huang et al., 2011), baby caretaking, baby crying, sleep disturbances, physical function, and dissatisfaction with partner support (Insana et al., 2011; Medina et al., 2009).

1.2. Effectiveness of aerobic gymnastic exercise

Postpartum health promotion has been emphasized by health care providers (Adeniyi et al., 2013; Daley et al., 2007; Davenport et al., 2011; Walker and Wilging, 2000; Zourladani et al., 2015). According to American College of Obstetricians and Gynecologists (ACOG) (2015), the postpartum period is an opportune time for obstetrician-gynecologists and other obstetric care providers to initiate, recommend, and reinforce a healthy behavior lifestyle. Exercise is a simple and inexpensive intervention that can play a significant role in maximizing health and wellness during the postpartum period. It is reported that exercise can improve postpartum women's physical and psychological health, including reduced bodyweight, increased lactation, less severe levels of depression, and enhanced mothering abilities and capacity to implement regular physical activity regimens for herself and her child (Adeniyi et al., 2013; Bane, 2015; Daley et al., 2007, 2009; Larson-Meyer, 2002; Sichel and Driscoll, 2002). However, those researches only evaluated the short-term effects and none has studied the long-term impact of any interventions on sleep quality improvement. Owing to the nature of persisting sleep deprivation after childbirth, a regular home-based intervention program is necessary in order to improve sleep quality of the mothers.

Exercise is defined as any movement that is planned and done with the purpose of maintaining or improving physical fitness (Bane, 2015). Exercise is positively correlated with overall fitness and can range from light, moderate, to vigorous. Examples of exercise include walking, running, yoga, cycling, and resistance training. Many of the vast

physiological and psychological benefits of exercise and physical activity are reported (ACSM, 2010; Landers, 2009). According to ACOG (2015), an exercise program that leads to an eventual goal of moderate-intensity exercise for at least 20–30 min per day on most or all days of the week should be developed with the patient and adjusted as medically indicated. Aerobic exercise was found to significantly reduce anxiety and depression following pregnancy (Koltyn and Schultes, 1997) and chronic fatigue syndrome (Edmonds et al., 2004).

1.3. Health education and multimedia technology

In hospital, traditional nursing instruction is carried out by verbal, health education manual, and videotape individually or by group (Ko et al., 2008; Yu, 2014). But these passive participation learning may not raise the learning interest of postpartum women; therefore, there is a need to be supplemented by other teaching strategies to compensate the insufficiency of traditional nursing instruction. In recent decades, due to the progress and development of information technology, the use of multimedia teaching in a variety of academic discipline has quite common; however, it is still insufficient for nursing instruction of clinic practice (Wofford et al., 2005). Using health education disc developed by multimedia technology opens a new opportunity for health instruction. Because its content photos are vivid, show motions, permit safe viewing, the disc combining image and sound may attract the interest of learner and increases the memory of instruction content.

1.4. 'Doing the month'—Taiwanese culture

Traditional Taiwanese culture places great emphasis on "postpartum preservation" as critical to the overall wellness of women who have given birth. This traditional Taiwanese custom mandates that postpartum women should eat high-caloric high-protein food, rest and be confined to the home during the first month after childbirth, in addition to taking care of the infant. This restrictive regimen is referred to as "Tso-Yueh-Tzu," which has been translated into English as "doing-the-month" (Callister, 2006; Chien et al., 2006; Leung et al., 2005). Under this situation, the mother may reduce or stop exercising, and this can affect subsequent exercise habits (Ko and Chen 2010).

"Doing-the-month" is widespread cultural practice in Taiwan, women largely are inactive and confined during their postpartum periods. A growing body of evidence suggests that exercise is important contributor to maternal health and thus is beneficial to infants. Gymnastics is a preferable safe exercise for postnatal women performing regularly. The present study developed aerobic exercise digital versatile disc (DVD) which is suitable for postpartum women performing exercise in the home. The purpose of this study was to pilot test the effects of aerobic exercise DVD on perceived stress, fatigue, sleep quality, and depression in Taiwanese postpartum women.

2. Method

This pilot study was a single-blinded, randomized controlled trial with a prospective pretest-posttest experimental design.

2.1. Participants

Participants for this study were recruited from the postnatal clinic of a medical center in southern Taiwan. The inclusion criteria were (a) vaginal delivery, (b) no postnatal complications, and (c) informed consent to participate. The sample size of 63 per group was considered sufficient to estimate a medium effect 0.50 with α value of 0.05 and power of 0.08 (Polit and Beck, 2011). Finally, 140 postnatal women were enrolled in this study to increase the power for detecting beneficial outcomes with a comfortable margin for attrition.

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