

# Effect of Nature Sound Therapy on the Level of Cortisol in Postpartum Primipara

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ORIGINAL RESEARCH

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## EFFECT OF NATURE SOUND THERAPY ON THE LEVEL OF CORTISOL IN POSTPARTUM PRIMIPARA

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### Abstract

**Background:** Majority of primiparous mothers experience a wide range of postpartum blues, which leads to stress and an increase in cortisol. Therefore, efforts to reduce cortisol level is needed. Nature sound music therapy is believed to make the mothers feel relaxed and comfortable.

**Objective:** To determine the effect of the nature music therapy on cortisol levels in postpartum primipara.

**Methods:** This was a true experimental study with pretest-posttest control group design. The study was conducted in the postpartum ward in the General Hospital of Semarang Indonesia from November 2016 to January 2017. There were 39 postpartum primipara selected in this study using simple random sampling divided into three groups: 1) the experiment group who received the nature music therapy for 15 minutes, 2) the experiment group who received the nature music therapy for 30 minutes, and 3) the control group. One-way ANOVA test was performed for data analysis.

**Results:** There was a statistically significant effect of the nature sound therapy on the cortisol level in the postpartum primipara, with  $p$ -value = 0.010 ( $<0.05$ ).

**Conclusion:** There was a significant effect of the nature music therapy on the cortisol levels in postpartum primipara. Thus, the application of nature music therapy can be an alternative therapy especially for postpartum primipara who experience emotional stress, physical, anxiety, and fatigue.

**Keywords:** nature sound therapy; cortisol levels; postpartum; primipara

### INTRODUCTION

Postpartum period can be a difficult time for many women and they may experience a wide range of postpartum problems. One of the common problems is postpartum stress (Marshall, 2004). The incidence of postpartum stress in Indonesia is 50-70% from several studies that have been done in several places in Jakarta, Yogyakarta and

Surabaya (Miyansaski, 2014). Most of them are primipara with moderate stress 66.7% (Jayasima, Deliana, & Mabruri, 2014). Based on previous research, primiparous postpartum mothers have high stress and cortisol compared with multiparas (Grajeda & Pérez-Escamilla, 2002).

Stressful body condition however may trigger the hypothalamus (anterior pituitary pituitary) in increasing cortisol and the secretion of adrenocorticotropin hormone (ACTH). Cortisol is released into the bloodstream through the activation of the pituitary-pituitary-adrenal (HPA) system. Stress conditions and cortisol levels have a strong association so that cortisol is assumed as a stress biomarker, representing HPA system activity (Greenstein & Wood, 2010).

Under normal circumstances, stress hormones are released in small amounts throughout the day, but when faced with stress, hormone levels are increased. Any type of body response in the form of stress, both physical stress and psychic stress can increase ACTH secretion which in turn can increase cortisol levels. In anxiety and depression condition, cortisol secretion increases (Gunawan, 2007). ACTH stimulates glucocorticoid release. When the body is under stress for a long time, fatigue will occur and is characterized by muscle wasting, immune system atrophy, gastric ulcers, and vascular damage. Thus, an effort is needed to decrease the level of cortisol (Greenstein & Wood, 2010).

Listening to music is considered effective to decrease stress hormone. Music causes changes in brain wave status and also affects the cardiovascular system, and respiration (Halim, 2002; Stiller, 2007). A nature sound music is music that has a slow tempo, with low tones and no lyrics that can cause feelings relaxed and comfortable (Jayasima et al., 2014). Listening to the music can increase the frequency in the alpha rhythm section and the larger (coherent) equations between different regions of the cerebral cortex, most commonly in the frontal lobes. The activation of right frontal lobe then causes decreased cortisol and ACTH hormone until the normal range (Stiller, 2007).

Therefore, with the benefits of natural sound therapy, this study aimed to examine the effect of nature sound therapy on the level of cortisol in postpartum primipara.

## METHODS

### *Study design*

This was a true experimental study with pretest-posttest control group design. This research was conducted in the postpartum ward in the General Hospital of Semarang from November 2016 to January 2017.

### *Population and sample*

There were 39 postpartum primipara recruited in this study using simple random sampling divided into three groups: 1) the experiment group who received the nature music therapy for 15 minutes, 2) the experiment group who received the nature music therapy for 30 minutes, and 3) the control group. The random assignment was done by giving a close envelope to each participant. The envelop contained the code number indicating the group. The inclusion criteria of the sample included: 1) postpartum primipara (the 3<sup>rd</sup> day after delivery) with the reason to consider the stability of maternal health and adaptability to their new role as mother and in the phase of taking hold, 2) normal delivery, 3) mother and baby were in healthy condition, 4) not taking any medications that can lower blood pressure and anti-analgesic drugs and drugs containing gluco-steroids, and 5) willing to be a respondent and could communicate actively. While the exclusion criteria included mothers who were suffering from serious illness (diabetes mellitus, cancer).

### *Intervention*

The nature music therapy used in this study was the music created by Kevin McLeod entitled "3 hours relaxing music with water sounds meditation", with volume 50 at sound pressure of 52 dB. The intervention was given for 15 minutes for experiment group I and 30 minutes for experiment group II. The intervention was administered on the 3<sup>rd</sup> day of postpartum period once daily for 2 days and also received standard nursing care services for normal postpartum. The intervention was given by the researcher. While control group only received standard nursing care services.

**Instrument**

Laboratory test was performed to measure cortisol levels using saliva specimens for 2 days on the 3<sup>rd</sup> and 4<sup>th</sup> days of the postpartum period. Data on specimen yields of cortisol content obtained from the laboratory of each respondent were noted on the observation sheet and collected for tabulation. Normal value of cortisol 1.2 – 14.7 ng/mL (Greenstein & Wood, 2010). Saliva is an appropriate medium for measuring steroids because it is a natural ultra-filtrate of blood, and the steroids were not bound by the carrier proteins in free blood diffuse into the saliva.

**Ethical consideration**

The study has obtained an ethical approval from Health Research Ethics Committee (K.E.P.K) with the code number: 213 / KEPK / Poltekkes-SMG / EC / 2016. The researchers have confirmed that each respondent has obtained an appropriate informed consent.

**Data analysis**

Data were analyzed using One-way ANOVA.

**RESULTS**

Table 1 shows that the average of cortisol level before the intervention in the group I was 7.46 ng/mL, and after given intervention cortisol decreased to 5.32 ng/mL (2.14 ng/mL difference between pretest-posttest). While the average of cortisol level before the intervention in the group II was 8.79 ng/mL, and after given intervention cortisol level was 6.31 ng/mL, with mean difference of 2.48 ng/mL. In the control group, the mean of cortisol level before intervention was 4.63 ng/mL and after intervention was 6.22 ng/mL. There was a mean difference of 1.59 ng/mL.

Paired t-test showed p-value 0.007 in the group I, and p-value 0.006 (<0.05) in the group II. It is indicated that there was a statistically significant difference of cortisol level before and after given intervention. While there was no significant difference of cortisol level in the control group before and after given intervention with p-value 0.578 (>0.05).

**Table 1** Cortisol level before and after given intervention in postpartum primipara

Group	Cortisol level (ng/mL)		p-value
	Mean ± SD	Min- Max	
Group I - 15 min (Pretest)	7.46 ± 2.14	3.99-13.02	0.126*
Group I - 15 min (Posttest)	5.32 ± 1.76	2.98-7.92	0.195*
Group II - 30 min (Pretest)	8.79 ± 3.50	4.64- 16.13	0.067*
Group II - 30 min (Posttest)	6.31 ± 2.53	3.25- 12.36	0.257*
Control group (Pretest)	4.63 ± 1.93	2.75- 10.14	0.843*
Control group (Posttest)	6.22 ± 2.04	3.40- 10.26	0.490*

Note: \* = Test of Normality with Shapiro – Wilk, \*\* = Paired t-test

**Table 2** Effect of nature music therapy on cortisol level in postpartum primipara

Group	Mean±SD	Min-Max	Mean Square	F	p-value
Group I	2.14 ± 2.36	-2.20- 5.10			
Group II	2.48 ± 2.44	-2.85- 6.07	32.788	0.903*	0.010**
Control	-2.04 ± 2.68	-4.29- 3.88			

Note: \* = Levene Test, \*\* = One Way ANOVA

Table 2 shows that the Levene test was 0.903 (>0.05) indicated that data were homogenous. While one-way ANOVA test showed p-value 0.010 (<0.05), which indicated that there was a statistically significant effect of the nature sound therapy on the cortisol level in the postpartum primipara.

**DISCUSSION**

Findings of this study revealed that there was a significant influence of the nature sound therapy and the cortisol level. In addition, there was also a significant difference of cortisol level between the 15 min and 30 min

interventions. This study is consistent with Khalfa's study indicated that there was a significant decrease of salivary cortisol and stress compared with control group (Khalfa, Bella, Roy, Peretz, & Lupien, 2003). Supported by Linnemann revealed that there was a decrease of cortisol levels and stress in daily day after listening to relaxation music (Linnemann, Ditzen, Strahler, Doerr, & Nater, 2015).

Music therapy can provide physiological or biological effects on a person by stimulation of some rhythm. The music can decrease the cortisol (stress hormone), which can contribute to blood pressure, and can improve the function of the inner lining of blood vessels that cause vasodilating blood vessels by 30% (Bobak, Lowdermilk, & Jensen, 2005). The natural sound music therapy was received by the ear and captured by the tympanic membrane. In interconnected hearing bones (meleus, incus and stepes) produce vibrations of mechanical impulses and then transformed into electrical impulses and sent to the branches of nerve VII (Cochlearia vestibule) to be transmitted to the brainstem thalamus, so that the mother becomes relaxed by giving positive results of heart rate and breathing rate is more stable and reduce stress levels (Campbell, 2001).

Nature music therapy is one of the distractions to give a good effect for a short period of time, which can reduce physiological pain, anxiety and stress. Music therapy is a therapeutic technique that is easy to implement and affordable. In addition, music causes changes in the brain wave status and stress hormone patients (Halim, 2002; Potter & Perry, 2005).

#### Limitations

Matching had not been done in each group that might be the limitation of the study.

#### CONCLUSION

There was a significant effect of the nature music therapy on the cortisol levels in

postpartum primipara. Thus, the application of nature music therapy can be an alternative therapy especially for postpartum primipara who experience emotional stress, physical, anxiety, and fatigue.

#### Declaration of Conflicting Interest

None declared.

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#### Author Contribution

All authors contributed equally in this study.

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