

Spiritual emotional freedom technique (SEFT) improved autonomic nervous activity in primipara



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ABSTRACT

Introduction: Anxiety is one of prevalent mental disorders in pregnant women and causes alteration in autonomic nervous system (ANS) function and cardiovascular system adaptation. It could potentially lead to increased risk of maternal complications and morbidity. SEFT had been known to lower anxiety level and autonomic nervous system activity but its application in pregnant women is still debated. Therefore, this study aimed to assess the effectiveness of SEFT in primipara women.

Method: a quasi-experimental, non-equivalent control group study was conducted in Bantul District, Yogyakarta, Indonesia involving primipara who fulfilled the research criteria. SEFT was performed at the 9th month of pregnancy and 1 week before the estimated date of delivery. LF/HF ratio was assessed and compared in the two groups as representation of HRV and autonomic nervous activity.

Results: 62 primiparous women were enrolled in this study and divided equally to the intervention and control group. This study showed that the LF/HF ratio was already different between the two groups at the beginning of the study. However, while the mean of LF/HF ratio was decreasing in the intervention group, an increasing trend was observed in the control group. Finally, the comparison of the mean difference between the two groups revealed that SEFT significantly lowered the ratio of LF/HF in primipara, thus improving the HRV.

Conclusion: SEFT effectively lowered LF/HF ratio in primipara women which might indicate a better balance between sympathetic and parasympathetic nerve responses. However, further study should be conducted to validate the application of SEFT in pregnant women with anxiety.

Keywords: Anxiety, Primiparous, LF/HF ratio, HRV, SEFT.

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INTRODUCTION

Maternal Mortality Rate (MMR) is an indicator of health development. MMR in Indonesia is 305 per 100.000 live births.¹ Other data from the World Bank, MMR in Indonesia amounted to 177 per 100.000 live births in 2017. When compared with the MDG's target in 2015 of 102 per 100.000 live births, and the SDG's 2030 target is under 70 per 100.000 live births², hence the development of maternal health in Indonesia is still relatively weak.

The causes of MMR include both direct and indirect causes. Indirect causes of MMR are not directly related to pregnancy and childbirth, such as pre-existing diseases, or diseases that occur during pregnancy. Mental health is one of the causes of MMR and one of them is anxiety which will aggravate the adaptation process of the cardiovascular system and can lead to

failure of cardiovascular adaptation.^{3,4} It is estimated that anxiety occurred in 33.93% of pregnant women in Indonesia.⁵ Failure of cardiovascular adaptation during pregnancy can lead to complications such as hypertension, preeclampsia, preterm birth, chronic hypertension maternal and infant morbidity.^{6,7} Anxiety in pregnancy often progresses to postpartum anxiety.⁸

In pregnancy, mothers experienced hemodynamic changes, including increased stroke volume, decreased systemic vascular resistance, and increased total blood volume.⁹ Parasympathetic nerve influence to cardiovascular system is decreased during pregnancy and at the final stage of pregnancy, the sensitivity of the baroreceptor is lowered.¹⁰ This interrelation between autonomic nervous system (ANS) and cardiovascular system is often measured through heart rate variability (HRV) which tend to be

decreased in but stable in pregnancy but steadily increase as the pregnancy progressed.¹¹ All of these changes are harmless for normal pregnant women but could be problematic in women with depression or anxiety due to the decreased parasympathetic control and increased sympathetic influence to HRV.¹² This pattern is consistently observed in acute or chronic stress.¹³

One of the management of anxiety for pregnant women is the psychotherapy approach. While Cognitive Behavior Therapy (CBT) is the gold standard in psychotherapy, Emotional Freedom Technique (EFT) is deemed more popular due to its efficacy and comfort.¹⁴ One study¹⁵ showed that Mindfulness Efficiency Based on Islamic-Spiritual Scheme was more effective in reducing anxiety and depression in pregnant women compared to CBT.

Table 1. The baseline characteristics of the research subjects

Characteristics	Interven-tion	Control	P-value
Age (years old)	25.1 ± 2.5	24.8 ± 3.2	>0.05
Education			>0.05
Elementary-Junior	1 (3.2%)	1 (3.2%)	
Senior	3 (9.7%)	3 (9.7%)	
Diploma	19 (61.3%)	22 (71%)	
Bachelor	8 (25.8%)	5 (16.1%)	
Income			>0.05
Low (<1.5 million IDR)	7 (22.6%)	8 (25.8%)	
Moderate (1.5 - 4 million IDR)	20 (64.5%)	20 (64.5%)	
High (> 4 million IDR)	4 (12.9%)	3 (9.7%)	
Working Status			>0.05
Working	21 (67.7%)	17 (54.8%)	
Jobless	10 (32.3%)	14 (45.2%)	
Social support satisfaction			>0.05
Quite satisfied	3 (9.7%)	4 (12.9%)	
Satisfied	18 (58.1%)	14 (45.2%)	
Very satisfied	10 (32.3%)	13 (41.9%)	

Table 2. The baseline characteristics in the LF/HF ratio value of HRV in between control and intervention group

Group	Mean	SD	p ⁺
HRV Pre			
Control	1.811	1.893	0.002
Intervention	3.603	3.727	

⁺ Mann Whitney

Table 3. The pre-post difference in LF/HF ratio value of HRV in the intervention group and the control group

Ex	Pre Mean-SD	Post Mean-SD	p ⁺
Intervene	3.6 ± 3.7	1.8 ± 1.3	0.003
Control	1.8 ± 1.9	3.3 ± 2.7	0.000

⁺ Wilcoxon

Table 4. The intragroup LF/HF ratio difference comparison between the intervention and control groups

Variable	Intervention Mean-SD	Control Mean-SD	P
HRV ⁺	-1.8 ± 3.2	1.5 ± 1.4	0.00

⁺ Mann Whitney

Spiritual emotional freedom psychological energy such as principles technique (SEFT) is a technique that combines spirituality, including prayer, sincerity, submission, and gratitude with and techniques for utilizing the body's energy system to improve the state of mind and emotions through three simple

techniques, namely: set-up, tune-in, and tapping. SEFT uses stimulation in the form of light taps or tapping at acupoints while focusing on words or sentences containing a prayer, sincerity, pleasure, resignation, resignation, gratitude which is repeated repeatedly with a regular rhythm according to patient beliefs.¹⁶

However, the application of SEFT is still limited and there are only few studies that focus on this technique. Meanwhile, its potential benefit could potentially reduce the number of anxiety related morbidity in pregnant women. Therefore, this study aimed to evaluate the efficacy and applicability of SEFT in reducing the LF/HF ratio value of HRV in third trimester primiparous mothers in the Bantul district pregnant women in Bantul, Yogyakarta.

METHOD

Study Design and Subject Recruitment

This research used a quasi-experimental non-equivalent control group design with a pre-post test. This study was conducted for 3 months starting from March to May 2020. The population criteria in this study were third-trimester primiparous mothers, age between 20-30 years, currently living in Bantul District, registered and control their pregnancy in the local health center, have a generally health condition, have healthy baby with no abnormal position, no history of smoking and did not smoke during pregnancy, have good support from husband and family, married and live with her husband, and willing to be respondent until the completion of the study. The exclusion criteria were pregnancies with a history or current complications (miscarriage, termination of pregnancy, stillbirth). Based on the sample calculation, 62 subjects were needed for this study which were evenly distributed to the control group and intervention group.

Heart Rate Variability (HRV) Measurement

The HRV was measured using Polar H10 Heart Rate Monitoring which then classified as High Frequency and Low Frequency. High frequency reflects the parasympathetic vagal tone and the fluctuations caused by spontaneous respiration known as Respiratory Sinus Arrhythmia (RSA). Low Frequency

reflects the sympathetic and partly parasympathetic activity of the ANS.

HRV measurement was carried out at the same sitting position for the same duration for each respondent. Respondents have to remove the bracelet or watch to start the SEFT. Before the measurement, the respondent did relaxation by taking a deep breath. The time needed is between 5-10 minutes. HRV is a measure of the short-term record and has the same physiological significance as the 24-hour record¹⁷.

The LF per HF ratio indicates a balance between the sympathetic and parasympathetic systems. Higher scores reflect the dominance of the sympathetic system while lower scores indicate the dominance of the parasympathetic system. The stress state is considered good when LF per HF ratio is less than 2.

Statistical Analysis

The pre- and post-difference test for LF/HF ratio value of HRV in the intervention and control groups were analyzed descriptively and comparatively using the Wilcoxon test. On the other hand, the difference between LF/HF ratio value changes of HRV between the two groups was analyzed using Mann-Whitney test. All tests were performed using SPSS 21 for Windows and P-value <0.05 was considered as significant.

RESULT

Characteristics of Research Subjects

62 eligible primiparous women were enrolled in this study and evenly distributed to control and intervention groups. The baseline characteristics of research subjects including educational level, occupation, age, income, and social support are shown in Table 1.

All of the baseline characteristics were compared to ensure the comparability of the subjects in the two groups. Despite slight differences, the statistical analysis showed that the differences in all characteristics were not statistically significant (p-value > 0.05). Therefore, the two groups were comparable to each other and can be considered homogenous.

The baseline characteristics of the LF/HF ratio of HRV

To analyze the subject's comparability, the initial LF/HF ratio of HRV was also recorded and compared Table 2. The results showed that the intervention group had a higher mean of LF/HF ratio at 3.603(±3.727) while the control group had 1.811(±1.893). Mann-Whitney test showed that the difference was statistically significant. This result also indicates that both groups were not comparable in terms of LF/HF ratio and intra-group pre- post-SEFT LF/HF ratio should be used to assess the efficacy of SEFT.

The comparison of pre- and post-SEFT LF/HF ratio value between control and intervention group

Based on pre-SEFT measurement, the pre- and post-SEFT LF/HF ratio was measured and analyzed in each group. Surprisingly, each group showed a very different trend during the course of the study. The LF/HF ratio in the intervention group was dropped significantly to almost half the pre-SEFT value while it was significantly increased in the control group (Table 3). Both groups experience significant changes in LF/HF ratio based on the Wilcoxon test.

Finally, the pre- and post-SEFT difference was compared between the two groups. As depicted in Table 4, the control group has a positive difference value due to improvement in post-SEFT LF/HF ratio, while the intervention group has a negative difference value. Consistent with the intragroup analysis, the differences were significant between the two groups, with SEFT was associated with a significant reduction in LF/HF ratio in pregnant women.

DISCUSSION

This study is one of few studies that reported the effectiveness of SEFT in lowering sympathetic nerve tone and increased parasympathetic response. Here we used the LF/HF ratio. Although the control and intervention groups had already differed from the beginning of the study, there was still a significant difference when the difference of pre- and post-interventional LF/HF ratio was compared between those groups. This

finding is nonetheless supporting the efficacy of SEFT in decreasing sympathetic nerve tone and increased parasympathetic response among primipara women.

We used LF/HF ratio because previous studies showed convincing data which link it with stress and sympathetic nerve activity. Klinkenberg et al showed that *Trier Social Stress Test* (TSST) increased stress among pregnant women as observed by increased LF/HF ratio among study's sample.¹⁰ The second parameter, HRV, was also used according to previous study conducted by Bach et al. who found that stress decreased HRV.¹⁸ Specifically, we used the LF/HF ratio which represents the balance of sympathetic and parasympathetic nerves. LF represents parasympathetic vagal tone which causes respiratory sinus arrhythmia (RSA) that corresponds to spontaneous respiration. Meanwhile, HF is influenced mainly by sympathetic and partial parasympathetic from ANS. Decreased in LF/HF ratio indicates an increase in parasympathetic or decrease in sympathetic tone. In stress condition, LF/HF ratio < 2 is favorable.¹⁹

In physiological processes, healthy activity is characterized by more complex variability of HRV value, which reflects the ongoing interaction of various processes. Meanwhile, the pathological state is characterized by high predictability and reduced flexibility. Healthy individuals exhibit high HRV levels, reflecting the ability to adapt quickly to the physical or psychological demands. Conversely, a reduction in HRV is hypothesized to reflect a maladaptive response to environmental stress or indicate explicit myocardial damage.²⁰

The cardiovascular system in pregnant women undergoes several major changes to accommodate increased metabolic needs and to supply the developing fetus. Cardiovascular adaptation in pregnant women is marked by an increased stroke volume (SV) and heart rate which result in a higher cardiac output to compensate the decrease in total peripheral resistance in early pregnancy.⁹ As cardiac output continues to increase until the end of pregnancy and systemic vascular resistance continues to recover, blood pressure returns to pre-pregnancy levels. On the other hand, there is a decrease in

LF strength early in pregnancy which will continue for the rest of the gestational period. On the contrary, the mean HR increases as gestational age increases. However, these changes do not cause major problems for healthy pregnant women.¹¹

Depression and anxiety are quite prevalent among pregnant women especially those who experienced the first pregnancy. These two conditions can adversely affect the Autonomic Nervous System (ANS) activity and function during pregnancy which may result in serious consequences for both the mother and the developing foetus.²¹ These variables can be assessed by HRV from electrocardiogram (EKG).²²

On the other hand, spirituality has been positively correlated with parasympathetic cardiac control ($r(222) = 0.151, p = 0.02$). It is also related to a specific pattern of cardiac autonomic regulation, characterized by a high level of cardiac autonomic control and this autonomic control pattern may affect a patient's health.²³ Spirituality also plays a role in the development of cognitive schemas to manage stressors. Each type of emotional reaction relies on a specific cognitive assessment process. Cognitive judgment is an evaluative process that determines why and to what extent the series of transactions between people and the environment is stressful. Spirituality is a state that is obtained through religious obedience, piety, and devotion. Religious people use religious beliefs and values when responding to conflicts, challenges, and interpersonal problems.²³

SEFT intervention is a technique that combines spirituality in the form of prayer, pleasure, and gratitude with psychological energy in the form of a set of principles and techniques for utilizing the body's energy system to improve the state of mind and emotions through three simple techniques, namely set-up, tune-in, and tapping.²⁴

SEFT contains three basic steps. First is the set-up stage in which the subject is affirming the acceptance phrase (affirmation of self-acceptance even if there is a problem). The affirmation causes a reversal of emotions from negative to positive, which calms the

subject and activates the parasympathetic nerves. The second one is the stage of expressing emotions through prayer and building good responses which would neutralize the psychological reversal and psychological resistance through sincerity, submission, and gratitude. Finally, deep breathing is carried out which stimulates the hypothalamus and, then, reticular formation and spinal cord. This activity is known to stimulate parasympathetic tone, which also contributed in improving HRV by lowering LF/HF ratio.²⁵

Lehrer and Gervitz (2014)²⁵, stated that breathing longer and slower increased the amplitude of RSA. A breath rate of approximately 0.1 Hz (6 breaths per minute) provided the highest amplitude of RSA and the most efficient gas exchange. This method of breathing is also known to improve athletic performance after HRV biofeedback training.

SEFT contains tapping and focusing on prayer, sincerity or pleasure, resignation, gratitude which are repeated in regular rhythm by deep and long breath. This condition decreases Hypothalamus-Pituitary Axis activation and reduces the production of cortisol²⁶, activates vagus brakes, improves parasympathetic response, inhibits limbic system control over the central nervous system. All of these effects will culminate in increasing relaxation capability and emotional tension improvement.²⁷

The main limitation of this study is the lack of control toward factors that influence HRV and LF/HF ratio such as basal metabolic index, sleep/wake cycle, drug consumption, physical and mental activity, and response to stress, although the HRV was considered to be stable when there is no clinical intervention.²⁸ Another limitation is no long-term HRV measurement was conducted, although it has been stated that short-term HRV measurement has similar value to 24-hour heart rate recording. However, short-term recording has limited ANS representation which should be considered in the interpretation of our findings.

CONCLUSION

In summary, SEFT has been shown to reduce LF/ HF ratio of HRV in third trimester primiparous mothers which will

benefit the cardiovascular adaptability of the mother and potentially reduce maternal morbidity and mortality. However, a larger study is needed to confirm this finding and validate it in different populations and different religions.

DISCLOSURE

Conflict of Interest

Authors declared that there is no conflict of interest regarding the publication of this article

Ethic Approval

This study has been approved ethically by Medical and Health Research Ethics Committee, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada (KE/FK/0017/EC/2019)

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Author contribution

All of the authors contributed equally in the research and writing process of this article

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