The Immediate Effect of Thai Herbal Steam on Heart Rate Variability and Stress

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Abstract

The study evaluated the Immediate Effect of Thai Herbal Steam on Heart Rate Variability and Stress. The research was a Quasi-Experimental Research conducted on patients with stress. The volunteers were evaluated to have level 3 of stress or over. After the diagnosis, 30 participated in the study. The treatment group underwent a herbal steam therapy three times a week for four weeks. Each session lasted 30 minutes comprised of two 15-minute sessions separated by a 5-minute break. Before and following the experiment, the stress levels of the participants in both groups were assessed using an HRV measurement device. The level of statistical significance was set at $P<0.05$.

Comparisons of the HRV values before and following the experiment showed significant improvements in the values for the treatment group ($P<0.05$). In addition, comparisons of the HRV values between the Pretest and Posttest following the experiment revealed statistically greater improvements in the SDNN, RMS-SD, and LF values for the Pretest and Posttest ($P<0.05$).

The findings demonstrate that herbal steam is likely to be effective in reducing stress in patients, possibly because of its role in increasing the function of the parasympathetic nervous system.

Keywords: The Immediate, Effect, Thai Herbal Steam, Heart Rate Variability, Stress

1. Introduction

Diabetes is a prevalent public health issue both worldwide and in Thailand. As reported by the World Health Organization (WHO) in 2016, the number of adults diagnosed with diabetes surged from 108 million in 1980 to 422 million in 2014, marking a fourfold increase. This corresponds to a rise in age-standardized prevalence rates from 4.7% to 8.5% in just three decades. Alongside this significant increase, mortality rates linked to diabetes and its associated risk factors, such as overweight and obesity, are alarmingly high. For instance, in 2012, diabetes was responsible for 1.5 million fatalities, while complications from excessive blood glucose levels accounted for an additional 2.2 million deaths. Furthermore, both the prevalence and mortality rates related to diabetes are more pronounced in low- and middle-

income nations compared to their high-income counterparts. A similar trend has been observed in Thailand, where the Ministry of Public Health reported a slight increase in diabetes prevalence among females, from 7.3% to 7.7%, while rates among males decreased marginally from 6.4% to 6.0% (Ministry of Public Health, 2015).

One way to address stress-related issues, including those faced by individuals with diabetes, is through the WHO's Guidelines for Managing Stress-Related Conditions (World Health Organisation, 2013). These guidelines outline standards of care for stressed patients that cover both traditional treatments, like medication, and complementary therapies, such as herbal steam, natural remedies, aromatherapy, and massage. Notably, herbal steam promotes relaxation due to the combination of heat, herbs, and essential oils involved in the treatment (P. T, P. N, W. W., 2018), in addition to its positive effects on the respiratory system (Lertlop W., 2015).

Consequently, it is valuable to investigate how effective herbal steam is for alleviating stress in type 2 diabetic patients who are being treated at a health center in the Phakdi-chumphon area of Chaiyaphum province, to enhance the guidelines for utilizing alternative treatments, particularly herbal steam, for this patient demographic.

1.1 Research Objective

The study evaluated the Immediate Effect of Thai Herbal Steam on Heart Rate Variability and Stress.

2. Material and methods

2.1 Design

The research was a Quasi-Experimental Research conducted on patients with stress. The research was approved by the Human Research Ethics Committee of Sirindhorn College of Public Health Khon Kaen (81/2018, HE610662).

2.2 Study Sample

The participants were 30 patients aged 35-85 having been diagnosed with level 3 of stress or over on the Suan-prung Stress Test 20 (SPST-20) (Mahatnirunkul S, et al., 1998). The treatment group received herbal steam therapy, while. Both before and following the experiment, the participants' stress levels were determined using a heart rate variability (HRV) measurement device.

In this study, the inclusion criteria were male or female patients aged 35-85 having been diagnosed to have level 3 of stress or over on SPST-20. The exclusion criteria were a fever of higher than 38C due to the likelihood of infection; the presentation of any malignant infectious disease; and a history of allergy to herbs.

2.3 Intervention

The treatment group received of herbal steam therapy Each session lasted 30 minutes comprised of two 15-minute sessions separated by a 5-minute break.

2.4 Measurement instruments

The study employed SPST-20, a psychological test developed by Suan-prung Hospital in Chiang Mai province, as the instrument for measuring stress levels. The SPST-20 was

interpreted as a five-level of point rating scale, as follows; Level 1: a point of 0 to 5 rating was less stressful than a normal level; Level 2: a point of 6 to17 rating was stress at a normal level; Level 3: a point of 18 to 25 rating was a moderate level of stress; level 4: a point of 26 to 29 rating of a high level of stress and; Level 5: more than 30 rating was suggested severe stress, respectively.

2.5 Procedures

An announcement was made to recruit volunteers for the study. After the recruited volunteers were provided details of the study, they were diagnosed by physicians to determine whether they were experiencing any stress. Those whose diagnosis was positive were asked to complete questionnaires enquiring about their personal data and stress levels. At this stage, 30 participants remained.

The participants had to express their intent to participate in the study by signing a consent form. Before the experiment, the stress levels and the HRV of the treatment group were assessed using SPST-20 and the Heart Rhythm Scanner PE, respectively. During the experimental period, was given a herbal steam therapy. After the experimental period, the stress levels and the HRV were assessed again.

2.6 Statistical analysis

The participants' demographic characteristics were analyzed using descriptive statistics (mean and S.D.). The within-group stress levels and HRV values were analyzed using the paired t-test. The level of significance was set at $P<0.05$.

3. Results

With regards to the demographic characteristics, the majority of the participants were female (24 for the treatment group or 80.00%). Over half were 49-61 years old (16 for the treatment group or 53.30% Mean ±SD was 60.73 ±1.05) weighing 52-69 kg (19 for the treatment group or 63.30%).

As for the within-group HRV values pre- and post-treatment, both SDNN and RMS-SD, under the time domain, and both LF and HF, under the frequency domain, increased significantly for the treatment group ($P<0.05$), as shown in Table 1.

Table 1. Compare outcome measures within the group between before and after the treatment.

Outcome	Baseline (Mean± SD)	Effect (Immediate) (Mean± SD)	*P*-value
Heart rate variability (HRV) - SDNN (Ms)	22.71±14.89	36.43±22.20	< 0.05*
- RMS-SD (Ms)	17.92±15.02	26.37±13.02	< 0.05*
- LF (ms^2)	27.16±21.12	37.97±21.22	< 0.05*
- HF (ms^2)	22.11±20.59	28.67±20.15	< 0.05*
- LF/ HF (ms^2)	1.59±0.68	1.77±0.61	< 0.05*

Note.* $P < 0.05$ is statistically significant differences as compare between before and after the treatment from baseline.

4. Discussion

The findings reported here lend support to the existing literature on the relationships between the application of alternative medicine, including naturotherapy, and parasympathetic nervous system function and stress, such as with the study of Boonjang N. and Fakkham S. (Boonjang N, 2019), R.K. Goit et al (Goit RK, et al., 2014), (Goit RK, et al., 2017), and Damapong et al (Damapong P et al., 2015), (Damapong P et al., 2016). R.K. Goit et al. studied how mild to moderate exercise improved cardiac autonomic drive in 20 type 2 diabetic patients (Goit RK, et al., 2014)They found that after six months of supervised aerobic exercise done three times a week, all the HRV values under investigation, namely RMS-SD, pNN50, LF, HF, and LF/HF values, improved significantly for the treatment group ($P<0.05$). In their subsequent study, R.K. Goit et al. investigated the effects of mild to moderate exercise on the HRV of 41 obese type 2 diabetic patients (Goit RK, et al., 2017). They again discovered that six months of supervised aerobic exercise done three times a week could lead to significant improvements in the RMS-SD, pNN50, LF, HF, and LF/HF values for the treatment group ($P<0.05$). In another study, P. Damapong et al. evaluated the short-term effects of court-type traditional Thai massage (CTTM) on pressure pain threshold (PPT) and pain intensity in 60 patients with chronic tension-type headache (CTTH) (Damapong P et al., 2016).

5. Conclusions

The study evaluated the Immediate Effect of Thai Herbal Steam on Heart Rate Variability and Stress. The research was a Quasi-Experimental Research conducted on patients with stress. It was found that after herbal steam therapy was administered three times a week, the SDNN, RMS-SD, LF, and HF values went up significantly ($P<0.05$). Moreover, the results revealed significantly better improvements in the SDNN, RMS-SD, and LF values for the treatment group ($P<0.05$).

6. Acknowledgment

The researchers sincerely appreciate all participants for sharing essential information. We would also like to express our gratitude to the Public Health Chief Officer, Public Health Officers, Nurses, and others in the Phakdi-chumphon district, Chaiyaphum province for their valuable guidance, support, and collaboration. This study received funding from the Research Institution of Suan Sunandha Rajabhat University and the National Science, Research, and Innovation Fund (NSRF) in Thailand.

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