

The Changes in the Neck Meridian Test Scores Induced by Self-Administered Acupressure: A Secondary Analysis of Data from a Randomized Controlled Trial of Self-Administered Acupressure

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Abstract

In the neck meridian test, the examinee stretches his or her neck in four directions and rates the intensity of pain and/or symptoms on a four point Likert scale. The four responses are summed to calculate the test score. This study conducted secondary analyses of data from a randomized controlled trial of self-administered acupressure. The study aimed to examine the change of the neck meridian test score induced by self-administered acupressure. The data of 54 (male, n = 34; female, n = 20) students, who were randomly assigned to an intervention group (IG) and a control group (CG), were subjected to secondary analyses. The IG participants were asked to complete a self-administered acupressure intervention for two weeks; the CG participants were not. In the IG, the perceived stress decreased significantly over time, while the neck meridian test score decreased significantly; in contrast, this score increased in the CG. A significant positive correlation was found between the changes in the perceived stress and neck meridian test scores. These results supported validity of the neck meridian test as a tool for assessing perceived stress.

Keywords

Neck Meridian Test, Perceived Stress, Qi Imbalance, Acupressure, Meridian Theory

1. Introduction

The development of a reliable and valid tool for assessing perceived stress in the fields of acupuncture and moxibustion medicine would provide a potentially useful assessment tool for both researchers and practitioners to apply when using these methods to manage stress [1]. One fifth of users of these methods in Japan undergo treatment to manage stress [2]. It is common, however, for researchers and practitioners to use psychological (e.g., questionnaires) and physiological measures (e.g., heart rate variability) to assess their results [1], due to the lack of such a tool.

Honda, Tsuda, & Horiuchi [1] [3] proposed the neck meridian test as a tool that can be applied in the assessment of perceived stress. This test is a simplified version of the meridian test [4]. Mukaino [4] assumed that pain and/or the symptoms associated with the body's movements reflect Qi imbalance, and developed the meridian test. In the neck meridian test, the examinee is asked to stretch his or her neck in four directions and to rate the intensity of pain and symptoms that he or she feels during the stretch on a four-point Likert scale.

It was previously suggested that the neck meridian test could be used to assess perceived stress in research and in the clinical setting by acupuncture and moxibustion practitioners. Honda *et al.* [3] found that the test score was positively correlated with perceived stress. Honda *et al.* [1] reported that the neck meridian test scores of individuals who were exposed to a stressful situation (a small 1-min examination that included a performance in front of a judge) increased, while there was no change in the scores of those who were not exposed to a stressful situation.

However, no studies have examined the changes in the neck meridian test results during acupuncture and moxibustion treatments. These treatments can reduce perceived stress, and it is hypothesized that the neck meridian test score decreases as these treatments reduce the perceived level of stress. Testing this hypothesis is important for proving the validity of the neck meridian test as a tool for assessing perceived stress.

The purpose of this study was to examine the changes in neck meridian test scores induced by self-administered acupressure. This study represents a secondary data analysis of the data set of Horiuchi *et al.* [5]. In the original publication, 54 students were randomly assigned to an intervention group (IG, $n = 28$) and a control group (CG, $n = 26$). The IG participants completed five acupressure sessions three times a day (morning, noon, and night), while the CG participants went about their usual routine. It was found that the self-administered acupressure effectively reduced the negative moods of the subjects in the IG. In contrast, this secondary study focused on the changes in the neck meridian test scores of both groups and the associations between the changes in test scores and perceived stress. The following hypotheses were established and tested: 1) the score of the neck meridian test would significantly decrease in the IG, while it would not change in the CG; and 2) a positive and significant correlation would be found between the changes in the scores of the neck meridian test and

perceived stress.

2. Method

2.1. Participants

Thirty-four male students and 20 female students, who were majoring in acupuncture and moxibustion medicine at a private college in Fukuoka, Japan, participated in this study. One of the authors (Y. H.) was an instructor of the participants. They had no history of current or previous psychiatric illnesses. Due to the lack of evidence, a priori power analysis was not conducted to determine the appropriate sample size.

2.2. Measures

The subjective levels of stress and activation were investigated in each of the sessions using an adaptation of the Japanese UWIST mood adjective checklist (JUMACL) [6]. The JUMACL, which is based on the UWIST mood adjective checklist [7], consists of 12 items that assess a subject's energetic arousal and tension arousal (TA). The responses to each of the questions, which are rated on a 4-point scale, are summed. The values reflect the degree of energetic arousal and TA. The internal reliability and discriminant validity of this checklist was confirmed in Japanese college students [6]. Only the TA subscale was used in the present study.

The neck meridian test was developed by Honda *et al.* [1] [3]. The participants were each instructed to stretch their neck in four directions (neck extension, neck right rotation, neck left rotation, and neck flexion). The four movements in the neck meridian test are shown elsewhere [3]. The subject was then asked to rate the intensity of pain and/or symptoms that he or she felt in association with each of the four movements on a 4-point scale (0 indicated that the subject felt no pain at all, while 3 indicated that the subject felt very strong pain). The scores were summed to calculate the total score. The reliability, which was evaluated based on internal consistency using Cronbach's alpha coefficient, was acceptable ($\alpha = 0.77$) [1]. The validity of the neck meridian test was initially examined against the stress score (measured with the tense arousal subscale of JUMACL) and was found to be significantly and positively related to the stress score ($r = 0.40$) [1].

2.3. Procedure

The study protocol was approved by the Institutional Review Board of Kurume University. The present study was conducted at a college located in Fukuoka prefecture, Japan, over a 2-week period in July, 2012. After receiving a thorough explanation of the study aims and procedure, each of the participants gave their oral informed consent to participate in the present study. Written consent was not obtained from all of the participants. Since one of the authors was a teacher of the participants, it is possible that some of the participants would have hesi-

tated in withholding their consent to participate in the study if they had been asked to complete a written consent form. Efforts were made to protect the right of each participant to refuse to participate in this study.

The participants were randomly assigned into an intervention group (IG; $n = 28$) and a control group (CG; $n = 26$). The participants and the authors were aware of the groups to which they had been allocated. Following the completion of the classes, the baseline TA levels were assessed using the JUMACL. The participants in the IG were told to perform the self-administered acupressure intervention [8], and to perform five acupressure sessions on waking, after lunch, and before going to bed each day (three times a day). In each session, the participants were instructed to apply pressure with their thumbs to each of the six acupuncture points (*i.e.*, GB12, SI17, and LI18 [9]) for 5 s, until they felt a sensation of comfort. The six acupuncture points are located in the neck [8]. The intensity of pressure at each of the acupuncture points was determined by the participant. Once a week, one of the authors encouraged each of the participants in the IG to effectively perform acupressure. The patients in the CG received no specific intervention. The participants in the IG were not required to report whether they had performed the acupressure procedure. After 2 weeks, the TA levels were evaluated. The participants were followed up using numbers (e.g., 890), words (e.g., lucky), or nicknames (e.g., apple) that they had determined at baseline.

3. Results

3.1. Descriptive Statistics

Table 1 shows the TA and neck meridian test scores of the patients. The results are shown as the mean and standard deviation, as well as the correlation coefficient.

3.2. The Changes in the TA Scores of the Subjects in the IG and CG

An analysis of variance, in which group (IG vs. CG) and period were considered to be independent variables and the TA score was a dependent variable revealed a significant group by period interaction ($F(1, 52) = 19.91, p < 0.01$). Subsequent analyses of the interaction effect indicated that the TA score decreased significantly over time in the IG (12.0 ± 4.35 to 9.3 ± 3.21) while it did not change in the CG (11.7 ± 3.89 to 12.7 ± 4.38). It was significantly higher at 2 weeks ($p < 0.01$) (**Figure 1**).

3.3. The Changes in the Neck Meridian Test Scores in the IG and CG

Analysis of covariance in which group (IG vs. CG) and period were considered to be independent variables, the baseline test score considered to be a covariate, and the neck meridian test score was considered to be a dependent variable revealed a significant group by period interaction ($F(1, 52) = 13.54, p < 0.01$). Subsequent analyses indicated that the neck meridian score decreased significantly over time in the IG (3.5 ± 2.24 to $2.89 \pm 1.60, p < 0.01$) and in contrast in-

Table 1. Descriptive statistics.

Variables	Mean (SD)	1	2	3
1) Perceived stress at baseline	11.9 (4.10)			
2) Perceived stress after 2 weeks	10.9 (4.15)	0.65**		
3) Neck meridian test at baseline	4.4 (3.00)	0.29*	0.24	
4) Neck meridian test at 2 weeks	4.4 (3.27)	0.17	0.39**	0.82**

* $p < 0.05$; ** $p < 0.01$.

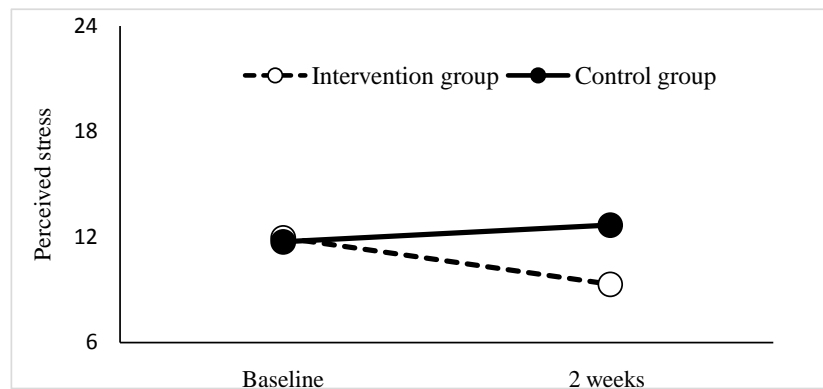


Figure 1. The changes in the perceived stress levels in the intervention and control groups.

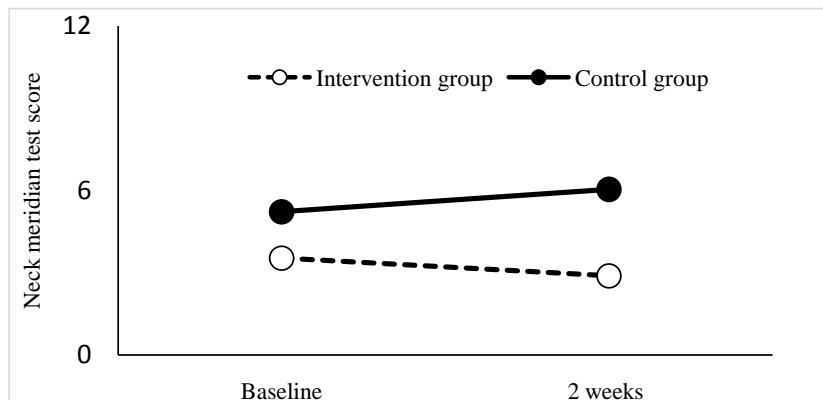


Figure 2. The changes in the perceived stress levels in the intervention and control groups.

creased in the CG (5.2 ± 3.4 to 6.04 ± 3.82 , $p < 0.01$). The score was significantly higher at 2 weeks ($p < 0.01$) (Figure 2).

3.4. The Associations between the Changes in the TA and Neck Meridian Test Scores

A correlation analysis indicated there was a significant and positive correlation between the changes in the TA score and the neck meridian test score ($r = 0.55$, $p < 0.01$). The significant and positive correlation remained after controlling for the baseline scores of the TA and the neck meridian test score ($r = 0.55$, $p < 0.01$) (Figure 3).

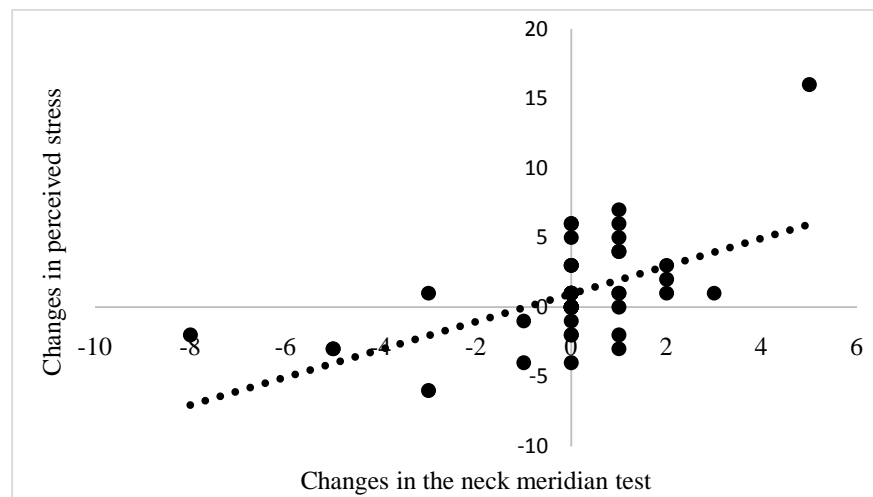


Figure 3. The correlation between the perceived stress and the neck meridian test scores.

4. Discussion

The first hypothesis that the score of the neck meridian test would significantly decrease in the IG while it would not change in CG was supported. The second hypothesis that a positive and significant correlation would be found between the changes in the scores of the neck meridian test and the level of perceived stress was also supported. These results were consistent with those of Honda *et al.* [3] who showed that the neck meridian test scores increased in individuals who were exposed to a 1-min examination. Furthermore, the present findings enhanced our understanding on the validity of the neck meridian test as tool for assessing perceived stress in that the score corresponded to a self-acupressure intervention, which reduced perceived stress. Furthermore, the changes in the subjects' test scores were correlated with their levels of perceived stress. These results are encouraging, since they offer researchers and practitioners a new option for predicting intervention-induced reductions of perceived stress using a neck meridian test, which reflects Qi imbalance. These results further supported the validity of the neck meridian test.

It is important to note that the strength of correlation between the change in the test score and perceived stress was moderate, with the correlation coefficient of 0.55. This moderate coefficient indicated that factors other than perceived stress would affect the neck meridian test score. According to the meridian theory, Qi imbalance is mainly induced by internal causes (e.g., emotional disturbance such as anxiety), external causes (environmental stressors such as a cold environment), and other causes (e.g., disturbances in lifestyle, unhealthy sex). Perceived stress seems to correspond to an internal cause. Theoretically, the neck meridian test score might also be influenced by external and other causes. Consistent with this hypothesis, Honda *et al.* [1] found that the test score was affected by excessive alcohol consumption and the failure to eat a balanced diet. Unfortunately, there is no data on the influence of external causes on the neck meridian test score. Since other factors affect the test score, caution should be

taken when using the test results as an indicator of perceived stress. To further clarify how tightly the neck meridian test is related to perceived stress, it will be necessary to examine external and other causes, as well as perceived stress.

The present study further supported the validity of the neck meridian test as a tool for assessing perceived stress. However, this study is associated with some limitations. First, perceived stress was only measured using one scale. The JUMACL assesses mood in relation to stress. It is necessary to assess perceived stress with other questionnaires such as the Perceived Stress Scale [10] and the Rhode Island Stress and Coping Inventory [11]. It is also necessary to obtain information of more objective measures, such as cortisol levels. Third, the self-administered acupressure used in this study focuses on not treating stress-related disorders or diseases, but on promoting health by pressing the identical acupuncture points in the same way while the particular variables of each individual participant were not taken into consideration. It is therefore important to elucidate whether the findings in this study can be replicated in the clinical setting of Chinese medicine.

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