

# Comparing the effects of two Swedish massage techniques on the vital signs and anxiety of healthy women

Farzaneh Gholami-Motlagh<sup>1</sup>, Mina Jouzi<sup>2</sup>, Bahram Soleymani<sup>3</sup>

## ABSTRACT

**Background:** Anxiety is an inseparable part of our lives and a serious threat to health. Therefore, it is necessary to use certain strategies to prevent disorders caused by anxiety and adjust the vital signs of people. Swedish massage is one of the most recognized techniques for reducing anxiety. This study aims to compare the effects of two massage techniques on the vital signs and anxiety of healthy women.

**Materials and Methods:** This quasi-experimental study with a two-group, crossover design was conducted on 20 healthy women who were selected by simple sampling method and were randomly assigned to BNC (Back, Neck, and Chest) or LAF (Leg, Arm, and Face) groups. Massage therapy was carried out for a 14-week period (two 4-week massage therapy sessions and 6 weeks washout stage). Gathered data were analyzed using paired *t*-test with a significance level of  $P < 0.05$ .

**Results:** Both BNC and LAF methods caused a significant decrease in systolic BP in the first stage ( $P = 0.02, 0.00$ ); however, diastolic BP showed significant decrease only in BNC group ( $P = 0.01$ ). The mean average of body temperature of LAF group showed a significant decrease in the first stage ( $P = 0.03$ ), and pulse and respiratory rate showed significant decrease in both groups during the second stage ( $P = 0.00$ ). In addition, anxiety scores showed no significant difference before and after massage therapy ( $P < 0.05$ ).

**Conclusions:** Massage therapy caused a decrease in systolic BP, pulse, and respiratory rate. It can be concluded that massage therapy was useful for decreasing the vital signs associated with anxiety in healthy women.

**Key words:** Anxiety, blood pressure, CAM, healthy women, massage, massage therapy, Swedish massage, vital signs

## INTRODUCTION

Complementary medicine is described as a metaphysical science in ancient Islamic and Arabic civilizations and consists of methods that have been

<sup>1</sup>Department of Operating Room, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran, <sup>2</sup>Department of Nursing, Najafabad Branch, Islamic Azad University, Najafabad, Isfahan, Iran, <sup>3</sup>Department of Medicine, Najafabad Branch, Islamic Azad University, Najafabad, Isfahan, Iran

**Address for correspondence:** Dr. Mina Jouzi, Department of Nursing, Najafabad Branch, Islamic Azad University, Najafabad, Isfahan, Iran.  
E-mail: minajouzi@pnu.iaun.ac.ir, minajouzi@gmail.com

Submitted: 03-Nov-13; Accepted: 31-Oct-15

Access this article online	
Quick Response Code:	Website: www.ijnmrjournal.net
	DOI: 10.4103/1735-9066.185584

immensely popular among the populace in the past. Despite great technological and scientific advances in various fields, especially medicine, many still believe complementary medicine to be safer and cheaper compared to other forms of conventional medicine.<sup>[1]</sup> The scope of complementary medicine is vast and covers more than 1800 different methods.<sup>[2]</sup>

One of the most popular complementary therapies around the world is massage therapy. Touching is one of the basic behavioral needs of humans, and massage therapy as a form of touch not only causes body and mind relaxation and transfers feelings of love to the recipient, but also helps the care provider to relax and enjoy this practice.<sup>[3]</sup>

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**How to cite:** Gholami-Motlagh F, Jouzi M, Soleymani B. Comparing the effects of two Swedish massage techniques on the vital signs and anxiety of healthy women. Iranian J Nursing Midwifery Res 2016;21:402-9.

Massage therapy is an ancient treatment method which is used in most medical traditions.<sup>[4]</sup> The word massage is derived from Arabic, Greece, Indian, and French roots meaning touching or washing. In both Bible and Quran, massage is described as rubbing oil on the skin.<sup>[5]</sup> The most special aspect of massage therapy is non-verbal communication, which is valuable in itself. Massage therapy induces respect, trust, and empathy without use of words and only through physical touch.<sup>[6]</sup> Almost everyone can enjoy massage therapy, whether as a treatment method or as a daily habit.<sup>[7]</sup>

Today, massage therapy is considered to be a major treatment method in the west and millions of individuals use massages to decrease pain and pressure, and obtain the general feeling of well-being.<sup>[8]</sup> The start of modern massage therapy in the west is credited to the Swedish doctor Pehr Henrik Ling who introduced remedial Swedish massage techniques.<sup>[9]</sup>

Recent trends for use of massage therapy as a complementary medical method along with medical treatments have resulted in several clinical studies that show massage therapy can have positive effects on pain, anxiety, and muscular tension.<sup>[4]</sup>

There are two main approaches to massage therapy, including recreational and medical massages. Recreational massage is a general massage which is used for health maintenance and disease prevention. General massage therapy is designed to return the general energy balance to the body and covers the physical, social, and psychological aspects of a patient.<sup>[10]</sup>

There are more than 150 massage techniques and even professional practitioners do not agree about the situations each massage technique can be useful in. Some of these techniques include neuromuscular massage, Swedish massage, deep massage, sports massage, Rolfing, salon massage, and Trager approach. Swedish massage is a set of simple massage therapy techniques which are designed to relax the muscle tissue by applying pressure in the opposite direction of the muscles and bones and massaging in order to return the blood to the heart.<sup>[11]</sup> Swedish massage is one of the standard treatment methods used in many countries.<sup>[2]</sup>

The Swedish massage techniques include effleurage (long, gliding strokes), petrissage (lifting and kneading the muscles), friction (firm, deep, circular rubbing movements), tapotement (brisk tapping or percussive movements), and vibration (rapidly shaking or vibrating specific muscles).<sup>[12]</sup>

Almost all massage therapists in the United States use Swedish massage techniques for relaxation.<sup>[13]</sup>

The feelings reported by patients undergoing massage therapy in a study by Andersson *et al.* (2008) include increased energy, sense of delight, fatigue reduction, improved sleep patterns, decreased pain, increased mobility, and improvement in general and physical health.<sup>[14]</sup> Complementary therapies such as massage therapy have great potential in reducing stress and anxiety and have positive effects on the general welfare and health of individuals.<sup>[2]</sup>

Massage therapy is considered as an intervention method for nurses around the world. Massage therapy enables nurses to carry out health care from a unique perspective. Many patients require pain relief or help for reducing stress and anxiety, and massage therapy allows them to experience nursing in an actual form. Working as a massage therapist nurse can make clear the relation between body and mind. By mixing nursing and massage therapy science, technique and art are used together. Independent actions in massage therapy allow nurses to provide patients with unique care, which is one of the most valuable goals of any nursing team.<sup>[15]</sup>

Anxiety is a complex phenomenon, but its clinical description is a psychosocial condition which mixes worry and fear with physical symptoms.<sup>[16]</sup> Mental anxiety causes muscular tension and this tension can be reduced using massage therapy which sends signals to the brain, relaxing the muscles. Therefore, massage of any part of the body can increase general relaxation and energy of the recipients and enables them to confront various situations.<sup>[7]</sup> The main goal of massage therapy is stress reduction and relaxation.<sup>[9]</sup> Psychological effects of massage include mental relaxation, reducing depression, anger, or fear and, most importantly, making the recipients feel that someone cares about them enough to spend time massaging and touching them.<sup>[3]</sup> A review study by Benney and Gibbs (2013) showed the effectiveness of Swedish massage techniques in reducing the anxiety of oncology patients.<sup>[17]</sup>

The first physiological effect of massage therapy is blood circulation improvement.<sup>[18]</sup> Furthermore, the repeated sensory stimulation caused by massage can change neurological cycles and thus induce changes in autonomic nervous systems, such as the blood pressure control system.<sup>[19]</sup> Based on the report of Moyer *et al.*, massage therapy can reduce cortisol levels.<sup>[20]</sup> Systemic changes in blood pressure level can occur through neurological or endocrine methods. Results shows that compared to other

hypertension treatments, even one session of massage therapy can be effective in reducing blood pressure.<sup>[21]</sup> Therefore, reduction of heart rate and blood pressure caused by reduction of muscular tension are among other possible effects of massage therapy which are investigated in various studies.<sup>[22]</sup>

Although massage therapy is unable to cure serious medical conditions, it is effective reducing symptoms of anxiety, stress, and depression, such as headaches, and back, muscular, and other chronic pains.<sup>[11]</sup> Studies conducted by Miami School of Medicine's Touch Research Institute show that massage therapy can strengthen the body's immune system. Massage therapy can increase the number of natural killer cells (body's first line of defense) and, therefore, can be effective in treating diseases such as common cold, AIDS, breast cancer, asthma, and diabetes.<sup>[23]</sup>

Most studies to date concentrate on massage therapy as a complementary medicine for various diseases and very few studies investigate the effects of massage therapy on healthy individuals. Regardless of the technique used or the intentions of the therapist, massage therapy can create physiological and psychological improvements in healthy individuals.<sup>[10]</sup>

According to Wilkinson *et al.*, use of complementary treatment methods such as massage therapy is still a controversial area in healthcare providing service. These doubts among public and medical society are the main challenge for introducing these interventions to nursing practices,<sup>[24]</sup> and therefore, it is necessary to strengthen the scientific evidence about the effectiveness of these methods in order to include them in practical guidelines to help nurses provide high-quality care for the patients based on scientific evidence.

By considering the role of massage therapy as a complementary medicine technique in most pathological situations and the increased public attention to complementary medicine in recent years and the fact that use of these methods could increase the nursing independence in patients' care, nurses can use these methods to manage the conditions of patients with various diseases. So, nurses need to be ready to use these complementary methods or, at least, be aware of such therapies.<sup>[3]</sup> Since no sufficient scientific studies on massage therapy have been conducted in Iran, this study aimed to prove the effect of massage therapy on healthy individuals and introduce its useful effects on the society, especially the female populace. The authors believe that if it is proven that massage therapy can reduce anxiety and blood pressure in healthy individuals, it can be used in order to reduce the blood pressure of normal people or those

with hypertension and help people with stress and anxiety. Therefore, applying this simple and cheap technique can help patients without the need for various expensive and complex methods and medications.

## MATERIALS AND METHODS

This quasi-experimental study used two-group, two-stage, crossover design and was carried out in one of the clinics of Najafabad on 20 healthy housewives. The ethical aspects of the study were investigated and confirmed by the Province Health Deputy, and the necessary permissions were obtained. After choosing 20 individuals who met the inclusion criteria (having a medical record in the clinic, full speech and consciousness, lack of psychological problems, motivation and interest in participating in the study, and lack of underlying medical conditions such as hypertension, cardiovascular diseases, respiratory problems, asthma, febrile disease, pregnancy, acute burns, phlebitis, thrombosis, inflammation, and other skin and musculoskeletal problems in massage locations), the participants were divided into two groups. Initial sampling used simple method and group allocation was carried out randomly using the list of individuals' names and odd and even numbers. Exclusion criteria included any skin and musculoskeletal problem such as injuries, infections, burns, fractures, unidentified lumps, severe pain, and new physiological problems that conflict with massage therapy, lack of interest in continuing the therapy during the study, and severe stress.

Written and oral permission was obtained from the participants before the study. Demographic characteristics of the participants were recorded prior to the study, and the anxiety level was determined before the start and after each massage therapy stage using Cattle anxiety scale. This scale is used in several studies and has high reliability and validity. The study period for each person was a period of 14 weeks divided into two 4-week massage therapy stages and a 6-week washout period between the two massage therapy stages.

Participants were randomly placed in one of the two LAF (Leg, Arm, and Face) and BNC (Back, Neck, and Chest) massage groups. The group that received LAF massage in the first stage was labeled LAF group and the one receiving BNC massage in the first stage was labeled BNC group. In the BNC group, each session included 15 min of back massage, and 12 min and 3 min of chest and neck massage, respectively. For the LAF group, each therapy session included 15 min of leg massage, 10 min of arm and hand massage, and 5 min of face massage. In other words, each massage therapy session lasted for 30 min.

The second stage was the washout period, which lasted for 6 weeks for both groups. During this stage, the participants were asked not to receive similar treatments and continue with their daily lives. During the second therapy stage (second 4-week period), the massage therapy was reversed for both groups, which means those in LAF group received BNC massages and vice versa. Overall, all participants received three massage therapy sessions per week for 4 weeks. A place with suitable lighting, ventilation, and temperature was used for the massage therapy. Also, in order to improve relaxation and prevent sudden movements by the participants, the location was quite, pleasant, and offered suitable privacy. Participants were instructed not to consume hot or cold drinks before the sessions and to attend the sessions on an empty stomach if possible. Odorless bitter almond oil was used in order to reduce friction. Other principles observed during the sessions included: Lack of heavy pressure on nerve clusters, blood, or lymphatic vessels, extra care for pressuring joints or pulse locations, and lack of localized pressure. Massage therapy sessions were carried out using trained therapists with necessary information and ability regarding Swedish massage techniques.

Someone other than the therapist recorded the vital signs before and after each session. In order to improve the precision of the measurements and control the factors affecting vital signs, all measurements were carried out using the same method and by the same individual. In addition, in order to achieve lowest possible fluctuation in vital signs, before each measurement, the participant rested on the massage bed for at least 5 min without any movements. Blood pressure was measured using non-invasive cuff method with a stethoscope and pressure analog sphygmomanometer attached to the left arm leveled with the heart. In order to calibrate the sphygmomanometer, a new mercury barometer with guaranteed accuracy was used and the accuracy of sphygmomanometer was controlled using other similar devices. Pulse was counted on the radial artery of the left arm when the arm was leveled with the heart for 1 min, and respiratory rate was measured during 1 min with the participant's hand resting on her chest. Body temperature was measured through the mouth using a mercury thermometer for 3–5 min. Data were analyzed by using descriptive (average, standard deviation, frequency, and percentage) and analytical (paired *t*-test) statistics with SPSS 17.0 software (SPSS Inc., Chicago IL, USA).

## RESULTS

A total of 20 individuals participated in this study and were divided into two groups with each group containing 10 individuals. During the study, three participants left the

study (one due to long-term travel, another due to lack of interest in continuing the therapy, and the other one due to family problems) and were then replaced with other people. The age of participants in BNC group was between 20 and 51 years and in LAF group was between 28 and 45 years. Also, the average age of BNC group was 37.1 years and the average age of LAF group was 39 years. All participants were married homemakers, 35% of the participants had high school diploma, and the least frequent education was elementary school (15%).

Results of paired *t*-test showed that the mean average of systolic blood pressure of both LAF and BNC groups had decreased significantly after the first massage therapy stage compared to the start of the study, but BNC group showed no significant difference in systolic blood pressure after the second massage therapy stage [Tables 1 and 2].

There was no significant difference in the mean average of diastolic blood pressure of LAF group before and after massage therapy stages [Table 1], but diastolic blood pressure of BNC group showed a significant decrease after the second massage therapy stage [Table 2].

The mean average of body temperature of LAF group showed a significant difference after the first massage therapy stage, but BNC group showed no significant changes in body temperature [Tables 1 and 2].

There were significant changes in pulse and respiratory rate of both groups after the second massage therapy stage [Table 1]; however, LAF group showed no significant changes in these parameters after the first massage therapy stage [Table 2].

The results of paired *t*-test showed that there was no significant difference between the mean average of anxiety scores of participants before and after massage therapy in either groups [Tables 1 and 2]. Also, there was no significant difference between the mean average of vital signs of the two groups before and after intervention [Table 3].

## DISCUSSION

Results showed that any Swedish massage technique (LAF or BNC) can reduce systolic blood pressure in healthy individuals. In addition, massage therapy was unable to create changes in diastolic blood pressure except for one stage. The results of a study by Aourell *et al.* entitled "Effects of Swedish massage on blood pressure" also showed that massage therapy was useful in decreasing systolic blood pressure but produced no significant changes in diastolic blood pressure.<sup>[25]</sup>

**Table 1: Comparison of mean values of systolic blood pressure, diastolic blood pressure, temperature, pulse, respiration, and anxiety obtained before and after receiving a massage in LAF group**

Steps Indicators	Mean±SD				P	
	Step 1		Step 2		Step 1	Step 2
	Before	After	Before	After		
Systolic blood pressure	106.20±6.76	100.80±7.76	111.00±6.41	105.20±6.78	0.02	0.00
Diastolic blood pressure	73.60±6.54	67.80±3.34	71.40±3.95	70.80±4.07	0.08	0.47
Temperature	36.90±0.07	36.78±0.11	36.86±0.14	36.86±0.16	0.03	1.00
Pulse	76.60±7.23	72.40±5.13	75.60±6.70	72.75±5.43	0.27	0.01
Respiration	21.40±2.88	19.80±1.48	21.60±2.41	19.10±4.04	0.09	0.04
Anxiety	44.60±1.13	42.00±9.51	41.16±1.16	42.00±9.25	0.58	0.81

SD: Standard deviation, LAF: Leg, Arm, and Faces

**Table 2: Comparison of mean values of systolic blood pressure, diastolic blood pressure, temperature, pulse, respiration, and anxiety scores obtained before and after receiving a massage in the BNC group**

Steps Indicators	Mean±SD				P	
	Step 1		Step 2		Step 1	Step 2
	Before	After	Before	After		
Systolic blood pressure	110.06±8.29	104.37±6.01	106.00±6.22	102.40±4.27	0.00	0.07
Diastolic blood pressure	72.37±4.94	68.94±10.10	72.10±5.21	68.10±1.73	0.19	0.01
Temperature	36.87±0.12	36.86±0.12	36.92±0.14	36.85±0.12	0.83	0.23
Pulse	74.00±3.26	71.18±3.62	72.50±2.55	69.50±2.79	0.00	0.00
Respiration	20.75±1.44	19.75±1.81	21.00±1.05	19.00±0.94	0.00	0.00
Anxiety	39.92±6.33	38.14±8.26	43.40±1.14	36.40±6.29	0.69	0.06

SD: Standard deviation, BNC: Back, Neck, and Chest

**Table 3: Comparison of mean changes in systolic blood pressure, diastolic blood pressure, temperature, pulse, respiration, and anxiety before and after receiving a massage in the two groups**

Group Indicators	Mean (SD)		P
	BNC	LAF	
Systolic blood pressure	1.50 (12.65)	0.40 (4.67)	0.75
Diastolic blood pressure	0.00 (9.45)	3.60 (5.32)	0.45
Temperature	0.08 (0.17)	0.10 (0.16)	0.83
Pulse	0.20 (2.78)	1.40 (8.73)	0.78
Respiration	1.00 (1.69)	2.20 (4.71)	0.21
Anxiety	7.33 (15.24)	4.00 (10.72)	0.67

SD: Standard deviation, LAF: Leg, Arm, and Faces, BNC: Back, Neck, and Chest

The results of the study by Sahbaei *et al.* entitled “Effects of Swedish massage on blood pressure” showed that Swedish massage caused no significant changes in systolic or diastolic blood pressure in patients with hypertension.<sup>[26]</sup> Although the applied techniques in Sahbaei’s study were the same as in the present study, given the limited massage therapy time in his study (30 min per week), the results were in agreement with the current study. Another reason for lack of significant changes in blood pressure in Sahbaei’s study can be due to the use of patients with hypertension; therefore, given the effects of Swedish massage therapy on blood pressure of healthy individuals seen in the study,

one can recognize the effects of massage therapy on blood pressure.

Cambron *et al.* reported in their study that Swedish massage for two 20-min sessions each week could lower systolic and diastolic blood pressure.<sup>[27]</sup> Also, the results of another study by Jouzi *et al.* on brain stroke patients showed that full body massage could significantly lower systolic and diastolic blood pressure.<sup>[28]</sup> In general, the results regarding the effect of massage therapy on blood pressure were in conflict with some studies that showed the effects on both systolic and diastolic blood pressure, while others only showed an effect on systolic blood pressure and claimed that changes in diastolic blood pressure require long-term massage therapy. In addition, other studies showed no significant changes in blood pressure due to massage therapy and some others believed that the effects were dependent on the massage technique and massaged area. In a single-blind clinical study by Moeini *et al.*, 50 women with the risk of hypertension were divided into intervention and control groups and the intervention group received 10 Swedish massage therapy sessions with each session lasting 10–15 min. The results showed the significantly lower systolic and diastolic blood pressure mean averages compared to the control group. Therefore, they considered massage therapy to be a safe, effective, practical, and reasonable method for controlling

blood pressure and recommended its use in healthcare centers and home.<sup>[29]</sup>

The mean average of body temperatures showed that there was no significant change in body temperature except one instant and that generally both methods had no effects on the average of body temperature. A clinical trial was conducted by Imani *et al.* to determine the effect of massage therapy on the physiological parameters of female brain stroke patients admitted in ICU. The results showed that after 5 min of foot massage, there were significant decreases in pulse, respiratory rate, and mean arterial pressure and a arterial blood oxygen saturation. Regarding the body temperature, although there was a significant decrease in the patients' body temperature, the changes were small enough that the body temperature could effectively be constant.<sup>[30]</sup> These results were similar to this study that showed the changes in body temperature which were not significant.

The results of paired *t*-test on pulse and respiratory rate of the participants showed that massage therapy successfully decreases pulse and respiratory rate. In a study by Mok and Woo on brain stroke patients, results showed that gentle back massage could decrease systolic and diastolic blood pressure and pulse of the patients, which were somewhat similar to the results of the present study.<sup>[31]</sup>

Various other studies showed different effects of massage therapy on heart rate and blood pressure ranging from stimulatory effect to no effect or calming effects, which could be due to the importance of massage technique used on patients.<sup>[25,29,31-33]</sup> Swedish massage techniques used in this study were mostly calming techniques, and therefore, they could naturally reduce the heart rate and blood pressure.<sup>[34]</sup>

Hosseini *et al.*, in their study on the effects of massage therapy on coma patients admitted to ICU, observed that three 20-min massage therapy sessions in three consecutive days could significantly decrease vital signs, which could be due to reduced stress and increased calm in the patients.<sup>[35]</sup> It is possible that the same calming effects of massage techniques were responsible for reduction of pulse and respiratory rate in the current study.

The results showed that Swedish massage techniques were successful in reducing the anxiety of the participants, but this reduction was not significant. Several studies showed that massage therapy could reduce anxiety<sup>[36-38]</sup> and used various theories to explain these changes.<sup>[10]</sup> Emotional response during massage therapy regulated by limbic systems<sup>[39]</sup> is closely related to the autonomic nervous system and reduced the activity of sympathetic system.<sup>[40]</sup> Reduced activity in the sympathetic system could reduce

the stress hormones and, therefore, reduced anxiety in the patient. Also, other than emotional effects, massage therapy could greatly affect psychological mechanisms.<sup>[41]</sup> It seems that one of the reasons for the lack of significant change in the participants' anxiety level was due to the tool that was used for measuring anxiety, i.e. Cattle anxiety scale. Other studies used tests such as Spielberger test that measured immediate anxiety in patients. In contrast, Cattle anxiety scale required more time in order to show changes in anxiety scores. Therefore, there is need for longer intervention time. It is possible that the use of other tests will show larger changes in anxiety scores. Other anxiety factors such as worrying about family members during massage therapy sessions or insufficient number of therapy sessions might also be the reason behind the lack of significant changes in anxiety scores. Comparing all vital signs and anxiety of participants showed no difference between the two groups before and after intervention. Therefore, it is possible to conclude that order of the two massage techniques has no effect on the mean average of vital signs or anxiety of the participants.

### Suggestions

As the positive effects of massage therapy on reducing the vital signs and anxiety of healthy women were observed in this study, it is suggested that similar studies be conducted on male individuals or with a larger number of participants in order to compare the results. Also, investigating the effects of other massage techniques with various lengths, number of sessions, and pressures on vital signs and anxiety of healthy or sick individuals should be done. Also, due to the important role of nurses on disease prevention and since prevention is preferable to treatment, it is suggested that Swedish massage techniques be taught to people at risk of various diseases such as anxiety and hypertension.

### CONCLUSION

In this study, massage therapy using both methods was successful in significantly reducing pulse, respiratory rate, and systolic blood pressure, but had no effect on other vital signs or anxiety of the participants. These results can clearly highlight the desirable effects of these two massage therapy techniques in reducing the vital signs and anxiety of healthy individuals.

There were some cultural, social, and economical differences between the families of the participants, which might have affected the results. In addition, some results might change with the gender of the participants and their hormone levels. Participants had different physiological situations and personalities, and therefore, the attitude of the patient toward therapist and wariness of the patient may

be one of the limiting factors that could not be controlled in the study.

### Acknowledgments

This study results are of a research proposal approved by Deputy of Research and Technology of Islamic Azad University-Najafabad branch, code no. 51501870631003. The researchers wish to thank all the authorities of the aforementioned university, Deputy of Health of Isfahan University of Medical Sciences, the head of the clinic in which the study was conducted, and all others who helped them in this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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