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Effect of Swedish massage on vitals and plasma glucose levels in college students

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Abstract

Background: Swedish massage is the systematic application of manual pressure and the movement of soft tissue, with rhythmical pressure and stroking to obtain or maintain health. Several studies have shown that massage has positive effects on muscle soreness, anxiety, high blood pressure and blood glucose levels. The purpose of the study was to assess cardiovascular parameters and blood glucose levels in healthy young Students.

Methods: 50 healthy students of both genders with the age group of 18 to 25 years were prospectively added to this single group pre-post study. Baseline assessments included systolic blood pressure, diastolic blood pressure, pulse rate, oxygen saturation, surface body temperature and random blood glucose level. Swedish full-body massage was given to the participants. Assessments were repeated after the end of the intervention.

Results: Post-assessments revealed no noticeable change in Systolic blood pressure, pulse rate and oxygen saturation after massage. However, there is a significant reduction in diastolic blood pressure ($p<0.001$), random blood glucose level ($p<0.001$) and surface body temperature ($p<0.001$) showed a significant increase.

Conclusions: We have demonstrated a positive impact of Swedish full-body massage on cardiovascular parameters. However, given the design of the present study, future case-control studies should confirm our results.

Keywords: Swedish full-body massage, vitals, plasma glucose levels

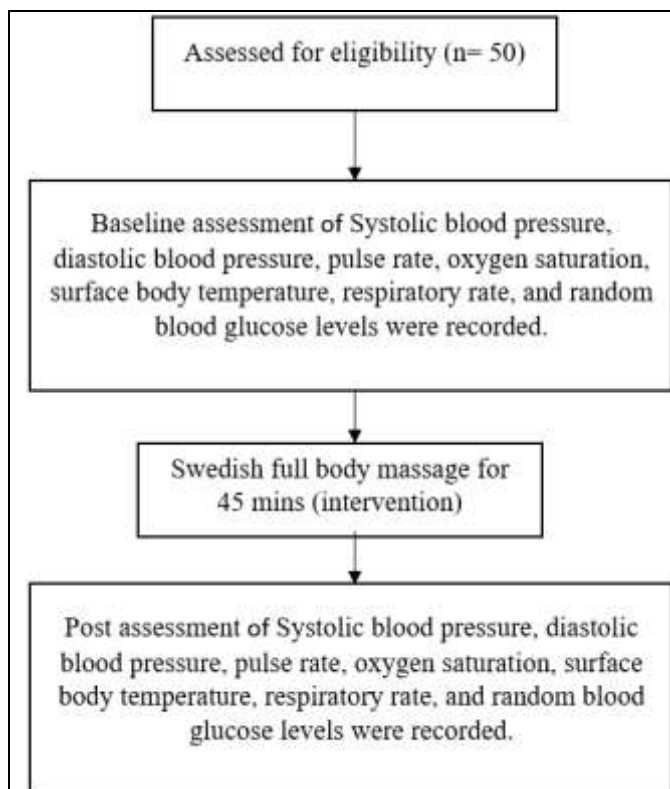
Introduction

Massage Therapy is a scientific and systematic manipulation of the body's soft tissues to normalize them ^[1]. Swedish massage, a form of massage, involves the application of manual pressure and the movement of soft tissue with rhythmic pressure and stroking to achieve or maintain health ^[2]. Almost all cultures have developed therapeutic massage systems. In traditional Chinese and Indian medical care, massage techniques play an essential role. In the early 19th century, Per Henrik Ling systematized European massage, which is now known as Swedish massage. To date, most clinical trials of massage have examined its psychological outcomes. Randomized controlled trials indicate that massage can reduce anxiety scores in various settings, such as intensive care, psychiatric institutions, hospices, and occupational health. A Double-Blind Randomized Clinical Trial conducted in The Trauma ICU in Taiwan suggests that full-body massage can be recommended as a routine method in clinical practice to alleviate pain intensity, anxiety, and physiological relaxation in patients with metastatic bone pain ^[3]. Studies suggest that massage can be beneficial in conditions such as muscle soreness, pain reduction, and anxiety ^[4], and even the improvement of weight in preterm infants ^[5]. Recently, research on massage therapy has focused mostly on its psychological aspects rather than physiological data. For instance, studies have examined the effects of Swedish massage on blood pressure in healthy males ^[6], blood pressure, heart rate, and inflammatory markers in hypertensive women ^[7], and many other studies relating to Swedish massage and blood pressure. This study aims to investigate the effect of Swedish massage on vitals and plasma glucose levels in college students, contributing to the growing body of knowledge on the physiological impact of massage therapy.

Materials and Methods

This study was conducted between January and February 2023 at the Research Department of Government Yoga and Naturopathy Medical College and Hospital. Ethical approval clearance for the study was obtained from the Institutional Ethical Committee (IEC) clearance at the Government Yoga and Naturopathy Medical College and Hospital. Before enrolling participants, a written permission letter was obtained from The Principal of the college. Each participant provided written informed consent before the intervention. The participants were informed that they could withdraw from the study at any time during the intervention. This study was designed as an experimental study investigation, with the primary objective of measuring systolic blood pressure, diastolic blood pressure, pulse rate, oxygen saturation, surface body temperature, respiratory rate, and random blood glucose levels. The study population comprised 50 of (n=50) healthy individuals, with an age range of 18 to 25 years, and both male and female participants were included. Each subject received a full-body Swedish massage for approximately 45 minutes, with the massage covering most parts of the body. Systolic blood pressure, diastolic blood pressure, pulse rate, oxygen saturation, surface body temperature, respiratory rate, and random blood glucose levels were assessed at baseline and after the intervention. Only healthy individuals who underwent a systemic examination were eligible for inclusion in the study.

Study design



Intervention

The participants were fully informed about the study and the intervention they would receive, and they provided their consent after being assessed. They were also informed about the procedure that would be followed during the study. The participants' vital signs, including systolic and diastolic blood pressure, pulse rate, oxygen saturation, respiratory rate, surface body temperature, and random blood glucose levels,

were measured both before and after the intervention. Before the data collection began, the participants were instructed to lie comfortably on the massage table in the supine position for 2 minutes. Then, they received a 45-minute Swedish full-body massage, and their vital signs were measured again immediately after the massage. The duration of the session was lasted approximately 1.25 hours for each participant.

Results

Following a 45-minute Swedish full-body massage, participants' vital signs were measured both before and immediately after the massage. The results revealed significant changes in several parameters (Table. 2). The pre-assessment mean systolic blood pressure was 109.60±9.68 mmHg, which decreased to 106.15±11.03 mmHg post-assessment, though this change was not statistically significant (p = 0.145). Conversely, there was a significant decrease in diastolic blood pressure from a pre-assessment mean of 75.80±8.23 mmHg to a post-assessment mean of 68.65±7.65 mmHg (p<0.001*). Similarly, significant reductions were observed in respiratory rate (pre-assessment mean: 22.00±3.67 cpm, post-assessment mean: 19.40±3.27 cpm, p<0.001*), surface body temperature (pre-assessment mean: 97.10±0.84°F, post-assessment mean: 97.76±0.73°F, p<0.001*), and random blood glucose levels (pre-assessment mean: 101.90±15.62 mg/DL, post-assessment mean: 93.55±12.66 mg/DL, p<0.001*). However, changes in pulse rate (pre-assessment mean: 83.45±14.18 bpm, post-assessment mean: 80.20±9.83 bpm, p = 0.095) and oxygen saturation (pre-assessment mean: 97.10±5.27%, post-assessment mean: 99.00±0.00%, p = 0.123) were not statistically significant. These findings suggest that Swedish full-body massage may have a beneficial effect on certain physiological markers, potentially contributing to relaxation and overall well-being. Further research is warranted to explore the mechanisms underlying these observed changes and to investigate the long-term effects of massage therapy on various health outcomes.

Table 1: Demographic details

Demographic Details	Mean ±Standard Deviation
Age	24.72 ± 5.48
Height	1.60 ± 0.07
Weight	60.62 ±10.18
BMI	23.68 ±3.11

Table 2: Pre and Post outcome variables among the participants

Variables	Pre-assessment	Post-assessment	P Value
Systolic blood Pressure (mmHg)	109.60±9.68	106.15±11.03	0.145
Diastolic blood Pressure (mmHg)	75.80±8.23	68.65±7.65	<0.001*
Pulse rate (Bpm)	83.45±14.18	80.20±9.83	<0.095
Oxygen saturation (pO ₂)	97.10±5.27	99.00±0.00	0.123
Respiratory rate (cpm)	22.00±3.67	19.40±3.27	<0.001*
Surface body Temperature (Fahrenheit)	97.10±0.84	97.76±0.73	<0.001*
Random Blood Glucose Level (mg/DL)	101.90±15.62	93.55±12.66	<0.001*

* denotes significant.

Discussion

Massage is a commonly used alternative therapy for the management of various health conditions. The current study aimed to assess the effects of Swedish full-body massage on

vital signs and random blood glucose levels. After 45 mins of Swedish full-body massage, we observed a significant reduction in vitals and random blood glucose levels. The results indicated that the mean systolic and diastolic BP in the massage group were significantly lower than those in the control group. Stimulation of baroreceptors and mechanoreceptors present in the skin increases the activity of the vagus nerve and parasympathetic system. This results in decreased blood pressure and cortisol levels. There was a significant reduction in respiratory rate and random blood glucose levels in the study group compared to those in the control group. The reduction in respiratory rate is due to increased parasympathetic activity as a result of relaxation and reduced muscle tension. Massage improves blood circulation, which causes a more efficient uptake utilisation of insulin and glucose by cells. This results in reduced blood glucose levels. The results showed that there was a significant reduction in the surface body temperature. During massage, the friction created between the fingers and skin increases the blood flow by increasing the heart rate, which results in

increased surface body temperature. However systolic blood pressure, pulse rate and oxygen saturation in the study group were not statistically significant. Evaluation of the durability of the massage effects on BP also indicated that, 72 hr hours after finishing the study, there was still a significant difference between the systolic and diastolic BP of the test study and control groups^[8].

Different types of massage techniques were shown to produce different effects, in which Swedish massage was well-known for its therapeutic effects^[9-12]. The main rationale for choosing Swedish massage as our mode of intervention was its backup articles relating to therapeutic efficiency. A study conducted to assess the effects of massage therapy in diabetic individuals showed that abdominal massage improved glycated haemoglobin levels in the study group compared with the control group^[13, 14]. The findings of the study indicated that massage therapy was a safe, effective, applicable and cost-effective intervention in controlling BP of pre-hypertension women^[7]

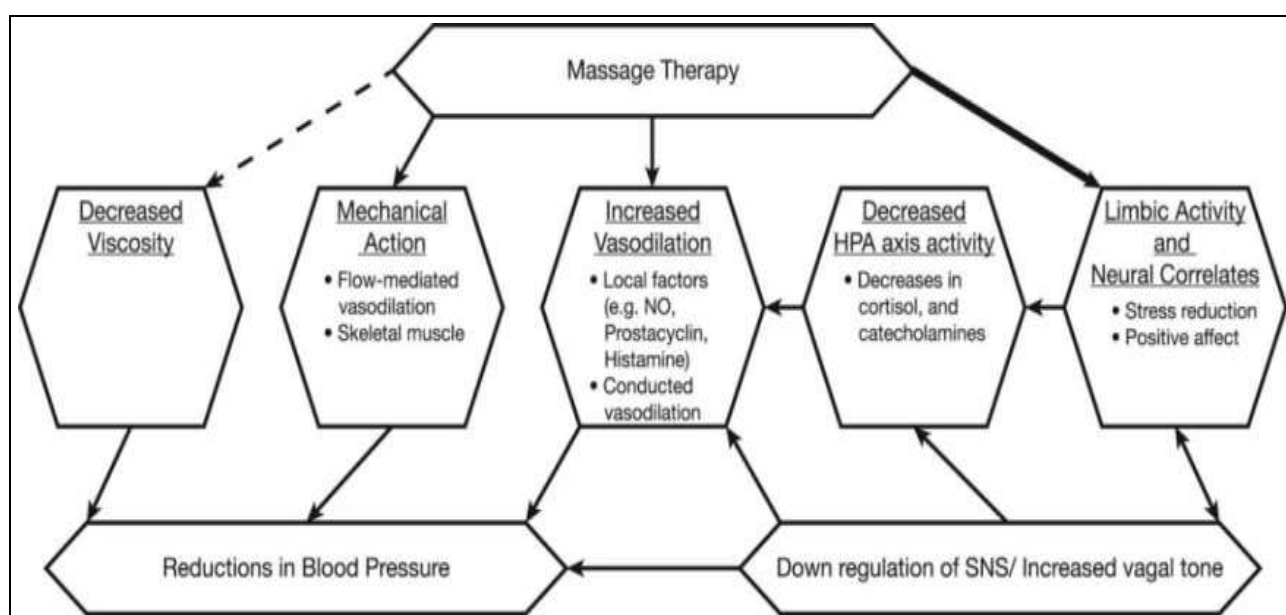


Fig 1: Possible mechanisms of massage therapy in reducing blood pressure

The above picture (fig.1) depicts the possible mechanisms of massage therapy on Blood pressure. Massage therapy reduces blood pressure by decreasing blood viscosity. Flow-mediated vasodilatation of skeletal muscle due to secretion of local factors such as nitric oxide, prostacyclin, and histamine helps to reduce blood pressure. Reduced cortisol and catecholamines deprive the sympathetic nervous system and increase vagal tone via the HPA axis, which decreases blood pressure^[15].

A study conducted in preterm infants with respiratory distress showed that massage therapy improved oxygen saturation, respiratory rate, and respiratory distress scores^[16]. Another experimental study conducted in preterm infants to assess the mean body temperature during and after massage therapy showed an increase in mean surface body temperature^[17].

Limitations of study

This experimental study assessed the immediate effects of Swedish full-body massage on cardiorespiratory parameters such as systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate, surface body temperature, oxygen saturation, and random blood glucose levels. The results

would have been more exemplary for this subject. This limitation adds to the small sample size of this study. Further research is required to support this finding.

Conclusion

In summary, Swedish full-body massage yielded significant reductions in systolic and diastolic blood pressure, respiratory rate, and random blood glucose levels. These effects suggest improved relaxation, enhanced parasympathetic activity, and better blood circulation. Although other vital signs showed non-significant changes, the sustained impact on blood pressure up to 72 hours post-massage underscores its lasting benefits. These findings support Swedish massage as a safe, effective intervention for managing health conditions, warranting further investigation into its long-term effects and broader clinical applications.

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