Effects of a Single Session of Yogic Relaxation on Cardiovascular Parameters in a Transgender Population

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ABSTRACT

Aim and objective: This pilot study was done to determine effects of a single session of yogic relaxation on cardiovascular parameters in a transgender population.

Methods: Heart rate (HR) and blood pressure (BP) measurements were recorded in 106 transgender participants (mean age of 23.86 ± 7.87 y) attending a yogic relaxation program at CYTER, MGMCR. Participants practised a series of techniques consisting of quiet sitting, om chanting, mukha bhastrika, nadi shuddhi, brahma mudra, pranava pranayama in sitting posture and savitri pranayama in shavasana. HR, systolic (SP) and diastolic pressure (DP) were recorded before and after the 60 minute session using non-invasive blood pressure (NIBP) apparatus. Pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (DoP) indices were derived from recorded parameters. Student’s paired t test was used to compare data that passed normality testing and Wilcoxon matched-pairs signed-ranks test for others. P values less than 0.05 were accepted as indicating significant differences for pre-post comparisons.

Results: All recorded cardiovascular parameters witnessed a reduction following the session. This was statistically more significant (p < 0.0001) in HR, MP, RPP and DoP and significant (p = 0.002) in SP.

Conclusion: There is a healthy reduction in HR, BP and derived cardiovascular indices following a single yogic relaxation session in a transgender population. These changes may be attributed to enhanced harmony of cardiac autonomic function as a result of mind-body relaxation program. It is suggested that an open and non-hostile environment is conducive for obtaining such a state of psychosomatic relaxation and that such opportunities for transgender participants should be created in all healthcare facilities.

Keywords: Yoga, cardiovascular, relaxation, transgender.

INTRODUCTION

The art and science of yoga has a lot to offer all sections of society as it enables a wholesome flowering of human potential across all human-made barriers such as class, creed, religion, language, nationality; and even across the natural divisions of gender and age. It is hence surprising that a MEDLINE search conducted with the terms “yoga and transgender” didn’t come up with even a single publication in this population. This statistic is quite a mind-opener as this population is under great stress and at an increased risk of suicide, eating disorders and substance misuse. (1)
It has been suggested that health care practitioners need to improve awareness and take steps to create an open, non-hostile environment to overcome the suboptimal provision of health care for transgender individuals.\(^1\) Sri Balaji Vidyapeeth (SBVU), a deemed to be university in Pondicherry, India has taken innovative steps in creating such an open and non-hostile environment through its community outreach, education and research activities facilitated through a special Transgender Clinic functioning in Mahatma Gandhi Medical College and Research Institute (MGMCRI). A half dozen transgender individuals have been given administrative postings as well as responsible duties thus enhancing their status in society and also providing opportunities for self growth and development. The Centre for Yoga Therapy, Education and Research (CYTER) has been actively involved in providing yoga therapy for many transgender individuals for the past four years. The authors have received positive and appreciative feedback on numerous occasions from these participants who expressed their satisfaction with physical and mental benefits they obtained through yoga.

Though the multifaceted physiological and psychological health benefits of both short and long term yoga training are quite well established,\(^2\) very few studies have reported on the immediate effects of a single session. We have earlier published reports on the significant reductions in cardiovascular parameters following a single yoga session in a retrospective study of 1896 patients from CYTER\(^5\) and also found the same to be true in a geriatric population.\(^6\) The magnitude of reductions in heart rate (HR) and blood pressure (BP) differed in different groups of patients depending on pre-existing medical conditions as well as the specific yoga therapy protocol adopted for them. Keeping all the above in mind, this pilot study was done to assess the effects of a single 60-min session of yogic relaxation on cardiovascular parameters in transgender individuals.

**MATERIALS & METHOD**

The present study was conducted at CYTER functioning at MGMCRI under auspices of the SBVU, Puducherry, India. As it is part of the desertion project of the fourth author who is completing his Masters (MSc) degree in nursing at Kasturba Gandhi Nursing College of SBVU, ethical clearance was obtained from its IHEC. All the study participants were from the SCOHD Society of Pondicherry. Informed consent was obtained from participants and the yogic relaxation sessions carried out in CYTER Yoga hall between 11am and 12 noon in a quiet environment, with comfortable temperature and subdued lighting. The participants had been advised to finish breakfast at least 2 hours earlier and come after emptying bowel and bladder.

HR and BP measurements were recorded from 106 participants (mean age of 23.86 ± 7.87 y), who were attending this yogic relaxation program. Participants were taught and practised under supervision a protocol especially designed for them keeping in mind their health status and requirements. Each session started with three minutes of quiet contemplative sitting and was followed by three rounds of om chanting. The participants were then led through nine rounds each of mukha bhastraika (bellows breath) and nadi shuddhi (alternate nostril breathing). They then practised nine rounds of brahma mudra turning the head away from a neutral position in four directions (right, left, up and down) on inspiration, followed by the movement of the head brought back to the centre while producing audible sounds of aaa, ooo, eee, mmm respectively on expiration. This was followed by pranava pranayama (sectional breathing with audible sounds of aaa, uuu and mmm on exhalation) in the sitting posture and finally savitri pranayama in shavasana (slow, deep, rhythmic breathing in a 2:1:2:1 pattern of inspiration: held-in: expiration: held-out). Each session ended with another three rounds of om chanting and a quiet sitting period of three minutes.

Non-invasive blood pressure (NIBP) apparatus was used to record HR, systolic pressure (SP) and diastolic pressure (DP) readings before and after the 60 minute session. To ensure objectivity, all recordings were performed using non-invasive automatic BP monitor (Omron HEM 7203, Kyoto, Japan) that uses oscillometric method with an instrumental accuracy of ± 5% for HR and ± 3 mm Hg for BP. The pre-session recordings were taken after 5 min of quiet comfortable sitting while post-session recordings were taken at the end of the session. Pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (DoP) indices were derived from the recorded parameters.
Data were assessed for normality using GraphPad InStat version 3.06 for Windows 95, (GraphPad Software, San Diego California USA, www.graphpad.com). Student’s paired t test was used to compare data that passed normality testing by Kolmogorov-Smirnov Test (HR, MP and DoP) and Wilcoxon matched-pairs signed-ranks test for those that didn’t (SP, DP, PP and RPP). P values less than 0.05 were accepted as indicating significant differences for pre-post comparisons.

RESULTS

All recorded cardiovascular parameters and derived indices witnessed a reduction following the single session of yogic relaxation and the results are given in Table 1. This was statistically more significant (p < 0.0001) in HR, MP, RPP and DoP and significant (p = 0.002) in SP. It was however not statistically significant in DP (p<0.0820) and PP (p< 0.1009).

DISCUSSION

It has been suggested that the modulation of stress response systems through yoga occurs by a reduction of perceived stress and anxiety that in turn decreases physiological arousal resulting in lowered HR, BP and respiration. (7) Our present study confirms this postulate as all participants reported a sense of being at ease, or at peace with themselves after the interactive session. This sense of inner peace (sukham) is vital for the relaxation response to ‘kick in’ and produce the psychophysiological changes witnessed in our study. Even a single session of yogic relaxation has significant cardiovascular effects in a transgender population. This reflects a healthier autonomic regulation of the heart due to either an overall increase of vagal parasympathetic tone and/or a reduction in adrenergic sympathetic tone.

RPP and DoP are indirect indicators of myocardial O$_2$ consumption and thus reflects overall load on the heart. Hence, reductions in both of them signify a healthy lowering of the strain on the heart. (8,9) Sympathetic activation is known to increase HR and RPP and decrease overall heart rate variability (HRV). The RPP can also provide a simple measure of HRV and is considered a surrogate marker in situations where HRV analysis is not available. (10) It is worth noting that both SDNN and total power of HRV have been reported to be inversely correlated with mean HR and RPP. Hence decreases witnessed in our participants can be taken to imply a healthier HRV that may possibly prevent heart diseases in transgender population who are already under immense psycho-physiological stress. (8)

An earlier study at SVYASA, Bangalore compared O$_2$ consumption and respiration following four yoga postures interspersed with relaxation and supine relaxation alone, and concluded that the combination of stimulating and relaxing techniques reduced physiological arousal better than the mere practice of relaxation techniques alone. (11) Even though the practical performance of various yoga techniques may seem to be stimulatory in nature, they suggested that the ultimate physiological effect of such techniques is in fact more relaxatory. This hypothesis is also corroborated by another study from JIPMER, Pondicherry reporting that relaxation in shavasana is enhanced by the addition of savitri pranayama thus resulting in a 26% reduction of O$_2$ consumption. (12)

As our yogic relaxation session consisted primarily of pranayama, we hypothesize that this is producing a healthier cardiac autonomic balance in our subjects irrespective of their initial condition. We also noticed that reductions were greater in those who had abnormal readings in the initial testing as opposed to those in whom the initial readings were within normal range. The yoga tradition extols yoga as a state of harmonious balance (samatvam yoga uchyate - Bhagavad Gita) and this restoration of physical, mental, emotional and spiritual balance may be a prime factor behind the positive changes seen in our participants.

Transgender individuals are often in turmoil with internal conflicts about gender identity or discomfort in an assigned gender role, especially when they desire transition. Such people who experience discord between their gender and the expectations of others or whose gender identity conflicts with their body, may benefit by talking through their feelings in depth. This can alleviate suffering and restore functionality. (13) The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association refers to the topic as gender dysphoria and this may manifest clinically as either depression or the inability to work and to form healthy relationships with others. (14) We suggest
that a yogic relaxation programme can be offered on a regular basis in all health care facilities to enable such individuals to get a sense of positive inner relaxation. This will help them live a happier and healthier life with a positive sense of self esteem.

Our present study is limited by the fact that we have only taken into consideration the cardiovascular effects of a single session of yogic relaxation. We plan further comprehensive short and long term studies to shed light on potential psycho-physiological health benefits of yoga for transgender population as these may help understand inherent mechanisms of action better.

**CONCLUSION**

There is a healthy reduction in HR, BP and derived cardiovascular indices following a single session of yogic relaxation in a transgender population. These changes may be attributed to enhanced harmony of cardiac autonomic function as a result of mind-body relaxation due to the specific program. It is imperative that an open and non-hostile environment is created where such individuals can feel safe and at ease with themselves. The authors commend Sri Balaji Vidyapeeth for having initiated such an innovative program in its university premises thus fulfilling this felt need. We recommend that such an integrated yoga program should be part of the health care facilities for transgender population as it can enhance their quality of life and improve their overall health status.

Table 1. Heart rate (HR), systolic pressure (SP), diastolic pressure (DP), Pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (DoP) before (B) and after (A) a single session of yogic relaxation in transgender population.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>B</th>
<th>A</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR (bpm)</td>
<td>77.11 ± 9.03</td>
<td>73.14 ± 9.29</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SP (mmHg)</td>
<td>119.33 ± 11.49</td>
<td>115.53 ± 9.60</td>
<td>0.0020</td>
</tr>
<tr>
<td>DP (mmHg)</td>
<td>71.39 ± 8.99</td>
<td>69.69 ± 8.61</td>
<td>0.0820</td>
</tr>
<tr>
<td>PP (mmHg)</td>
<td>47.94 ± 11.21</td>
<td>45.84 ± 9.86</td>
<td>0.1009</td>
</tr>
</tbody>
</table>

Student’s paired t test was used to compare data that passed normality testing by Kolmogorov-Smirnov Test (HR, MP and DoP) and Wilcoxon matched-pairs signed-ranks test for those that didn’t (SP, DP, PP and RPP). P values less than 0.05 were accepted as indicating significant differences for pre-post comparisons.

**Conflict of Interest:** None

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**Ethical Clearance:** IHEC of KGNC approved the research study.

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**REFERENCES**


