



Letter to Editor

Effects of yoga for cardiovascular and respiratory functions: a pilot study



Cardiovascular diseases (CVDs) are the leading cause of death worldwide.¹ Lifestyle modifications are important factors in the treatment, prevention, and rehabilitation of CVDs.² Yoga is an important lifestyle modification consist of specific postures (asanas), regulated breathings (pranayamas) etc.³ Though yoga has shown to improve cardiovascular⁴ and respiratory functions³ in healthy individuals,^{3,4} there is a lack of studies in reporting the difference that exist in cardiovascular and respiratory functions between yoga group (YG) and normal healthy group (NHG).

Thirteen healthy yoga practitioner (over 1 year practice) and 13 age-matched normal healthy individuals were recruited on the volutary basis from a residential university, South India (aged between 18 and 40 years). Subject with the history of any systemic and mental illness, chronic smoking/alcoholism were excluded. Study protocol was approved by the institutional ethics committee and a written informed consent was obtained from each subject.

Breath holding time (BHT) and cardiovascular functions were assessed at one point in time as follows: All the subjects were asked to take a deep inhalation through both nostrils and hold their breath as long as possible, while the nose clipped. BHT was assessed using a stop watch.⁵ Cardiovascular functions were assessed in sitting position using a non-invasive blood pressure monitoring system (Finapres Continuous Non-Invasive Blood Pressure Systems, Netherlands). Statistical analysis was performed using independent samples-*t*-test with the use of SPSS (Ver.16.0).

YG showed a significantly higher BHT ($p < 0.01$), lower systolic blood pressure ($p < 0.01$), pulse pressure ($p < 0.01$), and mean arterial pressure ($p < 0.05$) compared to NHG (Table 1). Yoga may improve the strength of expiratory and inspiratory muscles and regular inspiration and expiration for longer duration may increase

Table 1
Demographic and Cardio-respiratory Outcomes of Yoga and Normal Healthy Groups

Variables	Yoga group (n = 13)	Normal healthy group (n = 13)
Age (years)	23.6 ± 3.6	22.7 ± 4.1
Gender (M/F)	12/1	13/0
Body mass index (kg/m ²)	20.9 ± 2.3	21.3 ± 3.3
Breath holding time (s)	84.1 ± 17.3	41.4 ± 18.4**
Systolic blood pressure (mmHg)	113.7 ± 10.1	129.7 ± 14.7**
Diastolic blood pressure (mmHg)	70.7 ± 7.7	77.0 ± 11.0
Pulse pressure (mmHg)	43.1 ± 6.9	52.7 ± 8.5*
Mean arterial pressure (mmHg)	87.7 ± 8.5	97.2 ± 11.6*
Heart rate (beats/mint)	80.9 ± 7.9	77.4 ± 8.5
Stoke volume (mL)	69.6 ± 14.3	79.7 ± 16.0
Cardiac output (L/mint)	5.6 ± 1.3	6.1 ± 1.0
Pulse Interval (ms)	755.6 ± 83.1	801.3 ± 86.2
Total peripheral resistant (mmHg min/L)	1.0 ± 0.3	1.1 ± 0.4

Note: All values are in mean ± standard deviation.

* $p < 0.05$.

** $p < 0.01$.

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in the voluntary BHT. This results may suggest that the potential usage of yoga to prevent cardiovascular and respiratory diseases. However, the limitations including small sample size and non-randomized study prevent the firm conclusion. More rigorous study should be done to confirm this result.

Conflict of interest

The authors declare no conflict of interest.

Funding

None.

Data availability

Data will be made available on request.

Ethical statement

The study protocol is approved by the institutional ethics committee, S-VYASA a Deemed to be University, Bengaluru (IEC approval no.: RES/IEC-SVYASA/76/2015).

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