DOI: 10.7860/JCDR/2026/84482.22413

Original Article

Physiotherapy Section

Impact of OM Chanting versus Diaphragmatic Breathing on Cardiorespiratory Endurance Level in Young Adults: A Prospective Interventional Study

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ABSTRACT

Introduction: Adulthood is a critical period during which modifiable behaviours influence long-term health outcomes. Physical inactivity contributes to poor cardiorespiratory endurance and increased risk of mental health disorders. OM chanting and diaphragmatic breathing have demonstrated several physiological benefits; however, their comparative effects on cardiorespiratory endurance remain underexplored.

Aim: To evaluate and compare the effects of OM chanting and diaphragmatic breathing on cardiorespiratory endurance in young adults.

Materials and Methods: This prospective interventional study was conducted at College of Physiotherapy, Sumandeep Vidyapeeth Deemed to be University, Piparia, Vadodara, Gujarat, India. The study included 24 healthy young adults aged 20-35 years, who were randomly assigned to either the OM Chanting Group or the Diaphragmatic Breathing Group. Both groups practiced their respective interventions twice daily (5 minutes per session, 60 breathing cycles per day) for 30 consecutive days. Cardiorespiratory endurance was assessed using the 6-Minute Walk Test (6MWT) before and after the intervention. Participants were further stratified according to their Body Mass Index (BMI) based on the World Health Organisation (WHO) classification for subgroup analysis. Paired t-tests were applied for intragroup (pre-post) comparisons, while independent t-tests were used for intergroup analysis. A p-value<0.05 was considered statistically significant.

Results: In the Diaphragmatic Breathing Group, participants with normal BMI demonstrated a significant increase in 6-Minute Walk Test Distance (6MWTD) from 540.50±42.46 m to 576.00±37.81 m (p-value=0.001). Those in the Obese I subgroup improved from 527.00±52.33 m to 559.50±53.03 m (p-value=0.009). In the OM Chanting Group, participants with normal BMI showed an increase in 6MWTD from 444.29±152.63 m to 476.29±133.73 m (p-value=0.005), while Obese I participants improved from 350.00±45.83 m to 390.00±50.00 m (p-value=0.020). Between-group comparison revealed that the Diaphragmatic Breathing Group had a significantly lower postintervention pulse rate compared to the OM Chanting Group among normal BMI participants (p-value=0.002). In the Obese I subgroup, the Diaphragmatic Breathing Group demonstrated a higher postintervention 6MWTD (p-value=0.030) and lower pulse rate (p-value=0.010) than the OM Chanting Group.

Conclusion: Both diaphragmatic breathing and OM chanting improved cardiorespiratory endurance in young adults. However, diaphragmatic breathing showed superior benefits in enhancing exercise capacity and respiratory endurance. These accessible techniques can be integrated into preventive and rehabilitative health programs for young adults.

Keywords: Breathing exercises, Physical endurance, Respiratory function tests, Body mass index

INTRODUCTION

Adulthood is generally considered a healthy phase of life; however, many non communicable diseases that occur later are linked to modifiable risk behaviours—such as unhealthy dietary habits and physical inactivity—established during this period [1]. Globally, nearly 80% of youth are insufficiently active, and recent trends indicate rising physical inactivity and increasing prevalence of mental health disorders, including anxiety and depression, which often begin during adolescence [2]. Cardiorespiratory endurance, also known as cardiorespiratory fitness, is a key component of health-related physical fitness [3]. It refers to the capacity of the cardiac and pulmonary systems to supply adequate oxygen to tissues and skeletal muscles for energy production during physical activity [4]. Cardiorespiratory endurance is a strong predictor of cardiovascular disease and mortality in adults and serves as an important indicator of both physical and mental health [4,5]. Mental health is defined as a state of wellbeing in which individuals realise their abilities, manage everyday stresses, and contribute effectively to their communities [6].

OM (pronounced "AUM") consists of three components—A, U, and M. It is a form of meditation practiced mentally or through vocal repetition. Each cycle of OM chanting lasts 10 seconds, consisting of 4 seconds of inhalation followed by 2 seconds each of "AA," "UU," and "MM" during exhalation. OM chanting primarily emphasises the expiratory phase of breathing and has been shown to improve awareness, sensory perception, concentration, stress levels, and blood pressure [7,8]. In contrast, diaphragmatic breathing emphasises the inspiratory phase. Individuals inhale slowly and deeply through the nose using the diaphragm, with minimal chest movement, and exhale through the mouth. Diaphragmatic breathing enhances respiratory function and respiratory muscle strength, and may also help manage eating disorders, chronic functional constipation, hypertension, migraine, and anxiety [9].

Poor cardiorespiratory endurance and high stress levels adversely affect adult health and wellbeing. Although cardiorespiratory fitness and mental health are interrelated, limited scientific evidence exists on how OM chanting and diaphragmatic breathing influence cardiorespiratory endurance. Therefore, the purpose of this study was to assess the effects of OM chanting and diaphragmatic breathing on cardiorespiratory endurance in young adults. This study is part of a larger project assessing two primary outcomes:

cardiorespiratory endurance and stress levels. The present article focuses solely on cardiorespiratory endurance; results pertaining to stress levels will be reported separately.

MATERIALS AND METHODS

This prospective interventional study with two parallel groups was conducted at the College of Physiotherapy, Sumandeep Vidyapeeth Deemed to be University, Vadodara, Gujarat, India, over a six-month period (December 2024 to May 2025). Ethical approval was obtained from the Institutional Ethics Committee (SVIEC/ON/Phys/PhD/June/24/46).

Inclusion criteria: Young adults aged 20-35 years [10] who were willing to participate were included in the study.

Exclusion criteria: Adults with systemic, metabolic, musculoskeletal, or neurological disorders; pregnancy; and any surgery within the past 6 months were excluded from the study.

Sample size: A total of 24 participants were recruited through convenience sampling. All participants received a participant information sheet and provided written informed consent.

Study Procedure

Baseline data—including demographic information, vitals (heart rate, respiratory rate), rate of perceived exertion using the Borg Scale, and BMI—were recorded. Cardiorespiratory endurance was assessed using the 6MWT according to American Thoracic Society guidelines [11]. Participants were randomly assigned to either the Diaphragmatic Breathing Group (odd numbers) or the OM Chanting Group (even numbers) using simple random sampling. They were further categorised by BMI based on WHO classification [12].

Interventions

OM chanting group: Each cycle lasted 10 seconds, comprising 4 seconds of inhalation followed by 2 seconds each of "AA," "UU," and "MM" [7-13].

Diaphragmatic breathing group: Participants performed slow, deep nasal inhalation using the diaphragm with minimal chest movement in a supine position. One hand was placed on the chest and the other on the abdomen to ensure proper technique. Inhalation and exhalation phases were 6 seconds each [9-14].

Both groups performed their assigned practice twice daily for 5 minutes per session (60 cycles/day) for 30 consecutive days. The initial session included demonstration and supervised practice; the first five sessions were supervised, and subsequent sessions were performed independently with periodic follow-up to ensure adherence.

Postintervention assessment: Following the 30-day intervention period, all participants were reassessed using the 6MWT.

STATISTICAL ANALYSIS

Data were analysed using Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM Corp., USA). Paired t-tests were used for within-group comparisons, and independent t-tests for between-group comparisons. A p-value<0.05 was considered statistically significant.

RESULTS

A total of 24 young adults (5 males and 19 females) were recruited as per the inclusion criteria, with 12 participants in each group. The baseline demographic and clinical data are presented in [Table/Fig-1]. To evaluate the effects of diaphragmatic breathing and OM chanting on cardiorespiratory endurance, results were analysed by categorising each participant's Body Mass Index (BMI) according to the World Health Organisation (WHO) classification, as shown in [Table/Fig-2]. The p-values were calculated using Fisher's exact test. As there was only a single participant in the Overweight and Obese II categories, no analysis was performed for these subgroups.

Parameters	Diaphragmatic breathing group (Mean±SD)	OM chanting group (Mean±SD)	p-value
Age (years)	24.25±0.87	23.08±1.08	0.007
Height (metre)	1.59±0.08	1.60±0.09	0.77
Weight (kg)	58.33±9.55	59.33±6.92	0.77
BMI (kg/m^2)	23.09±4.10	23.11±3.20	0.98

[Table/Fig-1]: Baseline data.

WHO classification	Diaphragmatic breathing group N (%)	OM chanting group N (%)	p-value
Underweight	0	0	0.99
Normal	8 (66.7)	7 (58.3)	
Over weight	1 (8.3)	1 (8.3%)	
Obese I	2 (16.7)	3 (25.0)	
Obese II	1 (8.3)	1 (8.3)	

[Table/Fig-2]: Body Mass Index (BMI) of participants in each group as per WHO classification.

A significant increase in 6MWTD was observed after diaphragmatic breathing in the normal BMI group (p-value=0.001) [Table/Fig-3]. A significant improvement in 6MWTD was also noted postintervention in the OM Chanting Group (p-value=0.005) [Table/Fig-4]. Both groups demonstrated significant improvement in 6MWTD among Obese I participants (p-value=0.009 and 0.02, respectively) [Table/Fig-5,6].

Outcome	Pre mean±SD	Post mean±SD	t-value	p-value
Pulse rate (beats per minute)	76±5.66	74.75±3.99	1.66	0.13
Respiratory rate (breaths per minute)	13.25±1.04	12.75±1.49	1.00	0.35
BORG scale	6.13±0.35	6.00±0.33	1.00	0.35
6MWTD (m)	540.50±42.46	576.00±37.81	5.43	0.001

[Table/Fig-3]: Intragroup comparison of parameters among normal in diaphragmatic breathing group.

Outcome	Pre mean±SD	Post mean±SD	t-value	p-value
Pulse rate (beats per minute)	89.00±9.61	87.86±9.03	1.92	0.10
Respiratory rate (breaths per minute)	14.86±1.57	14.14±1.77	1.98	0.09
BORG scale	6.0±0.31	6.10±0.31	1.01	0.34
6MWTD (m)	444.29±152.63	476.29±133.73	4.26	0.005

[Table/Fig-4]: Intragroup comparison of parameters among normal in OM chanting group.

Outcome	Pre mean±SD	Post mean±SD	t-value	p-value
Pulse rate (beats per minute)	73.00±4.24	73.00±1.41	0.00	1.00
Respiratory rate (breaths per minute)	14.25±1.04	14.75±1.49	1.20	0.38
BORG scale	6.23±0.45	6.00±0.53	1.09	0.36
6MWTD (m)	527±52.33	559.50±53.03	65.00	0.009

[Table/Fig-5]: Intragroup comparison of parameters among obese I in diaphragmatic breathing group.

As shown in [Table/Fig-7], among individuals with normal BMI, pulse rate and respiratory rate differed significantly between groups before the intervention (p-value<0.05). According to [Table/Fig-8], a statistically significant lower pulse rate was observed in the Diaphragmatic Breathing Group compared to the OM Chanting Group after the intervention (p-value=0.002). No significant differences were noted for other parameters.

As per [Table/Fig-9], among individuals with Obesity Class I, preintervention pulse rate and 6MWTD showed highly significant differences between groups. Respiratory rate demonstrated a

Outcome	Pre mean±SD	Post mean±SD	t-value	p-value
Pulse rate (beats per minute)	95.00±4.58	94.33±5.69	1.00	0.42
Respiratory rate (breaths per minute)	15.00±0.11	15.67±0.58	2.00	0.18
BORG scale	6.02±0.31	6.00±0.31	1.00	0.33
6MWTD (m)	350.00±45.83	390±50.00	6.92	0.02

[Table/Fig-6]: Intragroup comparison of parameters among obese I in OM chanting group.

Outcome	Pre mean±SD diaphragmatic breathing	Pre mean±SD om chanting	t-value	p-value
Pulse rate (beats per minute)	76±5.66	89.00±9.61	4.03	0.0006
Respiratory rate (breaths per minute)	13.25±1.04	14.86±1.57	2.96	0.007
BORG scale	6.13±0.35	6.0±0.31	0.86	0.39
6MWTD (m)	540.50±42.46	444.29±152.63	1.80	0.09

[Table/Fig-7]: Comparison of preprocedure parameters among normal in the diaphragmatic and OM chanting group.

Parameters	Diaphragmatic breathing Mean±SD	OM chanting Mean±SD	t-value	p-value
Pulse rate (beats per minute)	75.75±3.99	87.86±9.03	3.75	0.002
Respiratory rate (breaths per minute)	12.75±1.49	14.14±1.77	1.65	0.12
BORG scale	6.35±0.41	6.20±0.53	1.12	0.37
6MWTD (m)	576.00±37.81	476.0.0±133.73	2.03	0.06

[Table/Fig-8]: Comparison of postprocedure parameters among normal in the diaphragmatic and OM chanting group.

Outcome	Pre mean±SD diaphragmatic breathing group	Pre mean±SD OM chanting group	t-value	p-value
Pulse rate (beats per minute)	73.00±4.24	95.00±4.58	12.2106	0.0001
Respiratory rate (breaths per minute)	14.25±1.04	15.00±0.11	2.30	0.031
BORG scale	6.23±0.45	6.02±0.31	1.38	0.18
6MWTD (m)	527±52.33	350.00±45.83	8.84	0.0001

[Table/Fig-9]: Comparison of preprocedure parameters among obese I in the diaphragmatic and OM chanting group.

moderately significant difference. The Borg scale values were comparable between groups, with no significant difference. In the Obese I category, there was a significant difference in postintervention 6MWTD and pulse rate between groups, with the Diaphragmatic Breathing Group showing superior cardiorespiratory endurance, as indicated by a higher 6MWTD (p=0.03) and lower pulse rate (p=0.01) as shown in [Table/Fig-10].

Parameters	Diaphragmatic breathing Mean±SD	OM chanting Mean±SD	t-value	p-value
Pulse rate (beats per minute)	75.33±5.03	94.33±5.69	4.33	0.01
Respiratory rate (breaths per minute)	14.20±0.12	14.58±0.58	1.88	0.19
BORG scale	6.02±0.31	6.10±0.38	1.02	0.35
6MWTD (m)	559.50±53.03	390.00±50.00	3.63	0.03

[Table/Fig-10]: Comparison of postprocedure parameters among obese I in the Diaphragmatic and OM chanting group.

These results highlight the favourable effects of diaphragmatic breathing compared to OM chanting on improving cardiorespiratory endurance, particularly among young adults with normal and Obese I BMI classifications. Both interventions significantly improved 6MWTD in the respective BMI subgroups; however, diaphragmatic breathing was associated with lower pulse rates and greater post-intervention endurance gains.

According to [Table/Fig-11], when comparing the two groups among individuals with normal BMI, there were no statistically significant differences in the amount of improvement for any of the measured outcomes. This suggests that both interventions were equally effective in enhancing functional exercise capacity without producing differential effects on heart rate, breathing, or perceived exertion.

Parameters	Diaphragmatic breathing Mean Δ±SD	Om chanting Mean Δ±SD	Mean Diff (G1-G2)	t-value	p-value
Pulse rate (beats per minute)	-1.25±2.13	-1.14±1.57	-0.11	0.12	0.91
Respiratory rate (breaths per minute)	-0.50±1.41	-0.72±0.96	+0.22	0.37	0.72
BORG scale	-0.13±0.37	+0.10±0.26	-0.23	1.41	0.18
6MWTD (m)	+35.50±18.5	+32.00±19.9	+3.50	0.35	0.73

[Table/Fig-11]: Comparison of mean difference values between the groups among normal.

As shown in [Table/Fig-12], the between-group comparison revealed no statistically significant differences in any outcomes among participants with Obesity Class I, indicating that both interventions were similarly effective in improving walking endurance, with minimal effects on heart rate, breathing, and perceived exertion.

Parameters	Diaphragmatic breathing Mean Δ±SD	OM chanting Mean Δ±SD	Mean Diff (G1-G2)	t-value	p-value
Pulse rate (beats per minute)	0.00±0.00	-0.67±1.16	+0.67	0.84	0.46
Respiratory rate (breaths per minute)	+0.50±0.59	+0.67±0.58	-0.17	0.36	0.74
BORG scale	-0.23±0.30	-0.02±0.03	-0.21	1.33	0.27
6MWTD (m)	+32.50±0.71	+40.00±10.01	-7.50	1.27	0.29

[Table/Fig-12]: Comparison of mean difference values between the groups among Obese I.

DISCUSSION

The present experimental study investigated the effects of diaphragmatic breathing and OM chanting on cardiorespiratory endurance in young adults across different BMI categories. The findings demonstrated significant improvements in 6MWTD in participants with normal and Obese I BMI following both interventions, with diaphragmatic breathing showing comparatively greater (although not statistically significant) benefits, particularly in reducing pulse rate and enhancing endurance capacity. The significant increase in 6MWTD following diaphragmatic breathing aligns with results from previous studies. For instance, Lehrer PM et al., and Pal GK et al., reported that diaphragmatic breathing enhances respiratory muscle endurance, improves ventilatory efficiency, and reduces the work of breathing—all of which support better oxygen exchange during physical activity [15,16]. Regular diaphragmatic breathing increases lung volume utilisation and strengthens diaphragm function, leading to improved aerobic capacity and reduced cardiovascular strain.

The observed reduction in pulse rate postintervention is also consistent with literature indicating that diaphragmatic breathing activates the parasympathetic nervous system, decreases sympathetic activity, and improves autonomic balance [17,18].

OM chanting also produced statistically significant improvements in 6MWTD and demonstrated favourable trends in respiratory rate and Borg scale scores. These findings align with those of Mooventhan A and Khode V, who reported that OM chanting—a resonant and

mindful vocalisation practice—enhances parasympathetic tone, promotes relaxation, and favourably modulates autonomic function [19]. The vibratory sensations generated during chanting stimulate vagal nerve centers, improving heart rate variability and promoting "rest-and-digest" responses. However, the comparatively smaller effect on pulse rate and exercise endurance suggests that OM chanting primarily exerts neuro-modulatory and psychological effects rather than directly enhancing pulmonary mechanics.

The 6MWT is a well-established and validated tool for assessing functional cardiorespiratory fitness, integrating cardiac, pulmonary, and musculoskeletal responses under submaximal exertion [20]. The improvements observed in 6MWT following both interventions highlight their potential utility in health promotion programs aimed at improving aerobic capacity and cardiovascular function.

Limitation(s)

The present study was limited by a small sample size, a short intervention duration, and limited representation across different BMI categories.

CONCLUSION(S)

Diaphragmatic breathing appears to be a feasible and cost-effective intervention with potential benefits for improving cardiorespiratory endurance in young adults. OM chanting also demonstrated modest improvements in cardiopulmonary function. Both interventions were similarly effective in improving walking endurance, with minimal effects on heart rate, breathing, and perceived exertion. These findings are preliminary and should be interpreted with caution. Further research with larger and more diverse cohorts is needed to validate and generalise these results before recommending widespread implementation in preventive or rehabilitative programs.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]

- Plagiarism X-checker: Sep 30, 2025
- Manual Googling: Oct 24, 2025
- iThenticate Software: Nov 17, 2025 (7%)

ETYMOLOGY: Author Origin

EMENDATIONS: 8

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Sep 20, 2025**
Date of Peer Review: **Oct 15, 2025**
Date of Acceptance: **Nov 20, 2025**
Date of Publishing: **Feb 01, 2026**