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**COMBINE EFFECT OF CHEST PROPRIOCEPTIVE NEUROMUSCULAR
FACILITATION AND QIGONG EXERCISE ON PULMONARY FUNCTION
TEST AMONG GERIATRIC POPULATION: AN EXPERIMENTAL STUDY**

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ABSTRACT

Background: Aging is associated with a progressive decline in numerous physiological processes, leading to an increased risk of health complications and such diseases like respiratory systems with diminished ventilator responses. Qigong exercise involves movement of the extremities and breathing control. It is used to promote a healthy lifestyle and to treat various chronic diseases. There is no evidence Qigong exercise has an impact on pulmonary function in geriatric populations. Therefore, the purpose of this study is to enhance pulmonary function in geriatric patients to improve quality of life.

Methodology: 80 Geriatrics were recruited based on the inclusion and exclusion criteria. In this present experimental study, the subjects were randomly assigned into group A (conventional + PNF), group B (conventional + Qigong), group C (conventional + Qigong PNF) group D (conventional alone). Pre and post pulmonary parameters were taken as an outcome measure and analysis were performed by use of Microsoft Excel and SPSS version 29.

Results: The study showed within group analysis that different outcome measures in group A, group B, group C, group D were statistically significant ($p < 0.05$). Furthermore, between group analysis for

different outcome measures in group A, B, C and D were also suggested statistically significant ($p < 0.05$).

Conclusion: In conclusion, the combination of Respiratory PNF and Qigong exercise demonstrated positive effects on examined PIFR, FEV1, FVC, and FEV1/FVC Pulmonary Function Test parameters, indicating an improvement in pulmonary function among the geriatric population.

Keywords: Respiratory PNF, Qigong exercise, Geriatrics, Pulmonary function test

INTRODUCTION:

As the average human lifetime rises, the proportion of persons reaching the 65 and older age group is rapidly increasing and will do so for the next 20 years [1]. As we become older, several physiological processes gradually weaken, increasing the likelihood of illnesses and other health issues [1]. Ageing is commonly thought to be the accumulation of several detrimental alterations that take place in cells and tissues with age, raising the risk of illness and death. The main theories of ageing each concentrate on a different aspect of ageing and provide important and useful insights into understanding physiological changes associated with ageing [1].

A growing body of research indicates that eating well correlates with healthy ageing [2, 4, 6, 7]. Therefore, modifying one's diet to promote healthy ageing can be an important strategy for preserving mental and physical function as well as preventing age-related illnesses. throughout the time of demographic transition [8].

The inevitable ageing process introduces notable changes in lung function, attributed to factors such as diminished alveolar gas

exchange surface area, weakening of respiratory muscles, and the decline of lung elasticity [12]. These age-related alterations underscore the importance of assessing pulmonary function, as ageing individuals may experience physiological shifts in their respiratory systems. The evaluation of respiratory system functionality is often accomplished through Pulmonary Function Tests (PFTs).

Pulmonary Function Tests (PFTs) play a crucial role in assessing the efficiency of the respiratory system. However, there is a notable gap in the literature regarding baseline pulmonary function in the ageing population, particularly in Indian cohorts. A thorough literature search has revealed an absence of research focusing on pulmonary function among the elderly in our region [16].

When utilising a respiratory Proprioceptive Neuromuscular Facilitation (PNF) method, a notable outcome is observed wherein there is an augmented epigastric abdominal excursion occurring over the thoracic vertebrae, consequently leading to increased vertebral pressure. Specifically, the

movement of the apical thorax over the T9–T11 vertebrae plays a pivotal role in eliciting this heightened respiratory response. This observed increase in respiratory movement is attributed to the activation of the dorsal root-mediated intersegmental reflex [21].

Qigong, deeply rooted in Chinese tradition, represents an exercise regimen harmonising the movement of extremities, meditation practices, and controlled breathing. Esteemed for its holistic benefits, Qigong serves as a versatile tool in promoting a healthy lifestyle and addressing various chronic diseases [23]. Notably, it distinguishes itself as an affordable and risk-free form of exercise [16]. Characterized by low-impact, gentle, and contemplative movements, Qigong stands out as a universally accessible practice suitable for individuals of all ages.

Pursed lip breathing, characterised by its continuous nature, serves as a multifaceted exercise contributing to various aspects of respiratory well-being. Not only does it effectively lower heart rate and anxiety levels, but it also empowers patients to exert control over the depth and pace of their breathing. Lip constriction plays a crucial role in generating a diverse expiratory resistance, a fundamental element utilised in the practice of the Pursed-Lip Breathing (PBE) technique. In the implementation of this technique, participants were given

explicit instructions to select a comfortable seating position, initiate a gentle inhalation through their nostrils, and subsequently engage in a slow and gentle exhalation through pursed lips. The prescribed regimen involved the completion of three sets, each consisting of ten repetitions, adhering to a specific 1:3 ratio of inhalation to exhalation intervals.

MATERIAL AND METHODOLOGY:

An experimental study with 80 geriatric population were taken from Sainath hospital (Ahmedabad) and this study was carried out 4 days per week for 4 weeks.

INCLUSION CRITERIA:

- Age between 60 to 75 years.
- Subject willing to participate.
- Both male and female gender.
- Able to communicate.

EXCLUSION CRITERIA:

- Subjects who suffered from severe physical illness or disability.
- Showed any psychotic or neurogenic disorders. (Dementia)
- Any symptomatic disease. (chronic kidney disease)
- Any respiratory or cardiovascular condition, whether inherited or acquired.
- Any chest abnormality.

PROCEDURE:

- After approval from the Institutional Ethical Committee, the study was conducted at Sainath Hospital.
- According to the inclusion criteria, individuals aged between 60 to 75 were selected.
- They provided written consent after receiving an explanation of the study procedure.
- The selection of participants was done using convenient sampling techniques.
- They were divided into a total of four groups, comprising a total of 80 geriatric populations.
- Pulmonary function tests (PFT) were conducted with participants in a seated position.

Group A: 20 participants Conventional + Chest PNF

Group B: 20 participants Conventional + Qigong exercise

Group C: 20 participants Conventional + Qigong exercise + Chest PNF

Group D: 20 participants Conventional exercise alone

STATISTICAL ANALYSIS:

- With a 95% confidence interval and a predefined level of statistical

significance set at $\alpha = 0.05$, the data analysis was carried out using SPSS version 29. Using the Kolmogorov-Smirnov Test, the data's normal distribution was evaluated. Since the data satisfied the normalcy assumption, the means of the two independent groups were compared using the parametric-t test.

- Key respiratory measures, such as FEV1, FVC, PEFr, PIFr, and FEV1/FVC, were evaluated both before and after the intervention. ANOVA, or analysis of variance, was used to compare groups both inside and between. The statistical significance of the observed changes in the respiratory parameters before and after the intervention was assessed using the ANOVA test.

LEVEL OF SIGNIFICANCE:

The fact that the researchers set the significance level (alpha) at 5% means that they regarded a p-value of less than 0.05 as statistically significant.

RESULT:

Table 1: Shows Gender Distribution

GENDER	GROUP A	GROUP B	GROUP C	GROUP D
MALE	10	15	13	15
FEMALE	10	5	7	5

Table 2: Shows Age Distribution in 4 Groups

AGE	MEAN	SD
GROUP A CONVENTIONAL + PNF	66.200020	6.66965
GROUP B CONVENTIONAL +QIGONG	66.750020	4.05067
GROUP C CONVENTIONAL+PNF+ QIGONG	64.450020	4.70694
GROUP D CONVEMNTIONAL ALONE	67.350020	4.43995

Table 3: Between Group A, B, C and D Comparison of PEFR, PIFR, FEV1, FVC AND FEV1/FVC

VARIABLES		PEFR	PIFR	FEV1	FVC	FEV1/FVC
GROUP -A	MEAN	2.9925	1.7700	1.1075	1.7875	82.2700
	SD	0.83703	0.57885	0.82383	0.88081	8.65140
GROUP -B	MEAN	3.4633	2.0133	1.5867	1.9533	86.5933
	SD	0.44072	0.47721	0.29280	0.60335	0.83050
GROUP -C	MEAN	3.0420	1.1080	1.9400	2.4700	77.5540
	SD	0.86326	0.72617	0.74873	0.84711	8.94040
GROUP -D	MEAN	1.8967	0.7600	1.5100	1.5633	73.3633
	SD	1.16629	0.67179	0.33061	0.11504	7.67030
F VALUE		1.456	0.691	1.471	0.814	0.900
P VALUE		0.0292	0.014	0.028	0.026	0.056

DISCUSSION

The previous studies have repeatedly demonstrated that a variety of respiratory muscle strengthening activities can improve lung functioning in a range of groups. In a similar vein, our research confirms that breathing workouts including Proprioceptive Neuromuscular Facilitation (PNF) repeatedly improve lung elasticity, chest expansion, oxygen intake, and mobility of the chest wall.

The therapist's direct resistance during inspiration, which raised intra-abdominal and intra-thoracic pressure, is responsible for the improvement that was seen. As a result, the diaphragm and other supporting inspiratory muscles became more active. In addition to improving ventilation in under

ventilated lungs, the helping push given at the end of expiration also had a good effect on chest wall movement [17].

The contact between the lungs and the chest cavity is one significant factor influencing the lungs' ability to exchange gases during inspiration and expiration. Moreover, the capacity of the thorax—which is necessary for the expansion and contraction of the lungs—is influenced by the strength of the respiratory muscles, the suppleness of the surrounding soft tissues, and the mobility of the skeletal muscles [18].

One kind of mild aerobic exercise that promotes self-healing is pulmonary-based Qigong exercise. This exercise regimen includes deep diaphragmatic breathing, muscle stretching, relaxation, and isometric

contraction. The main goal is to increase total body strength. It is commonly known that practising belly breathing can improve respiratory system performance and induce deep relaxation. It has been discovered that this breathing method has a significant effect on the vagus nerve, which regulates breathing patterns and promotes calm. In essence, the act of concentrating on the breath serves as a gateway to a state of tranquillity and balance, offering a sanctuary from the stresses and demands of everyday life. As individuals delve deeper into the practice of abdominal breathing, they may discover an invaluable tool for promoting both physical vitality and emotional wellbeing. Roswiyani, Kwakkenbos, *et al* . discovered that the intervention of Qigong exercise did not yield greater benefits for well-being compared to the individual interventions.

As evidenced by the findings, the incorporation of proprioceptive stimulation technique alongside pulmonary-based Qigong exercise led to enhanced pulmonary function among geriatric individuals, suggesting a promising avenue for improving respiratory health in this demographic.

CONCLUSION:

In conclusion, the combination of Respiratory PNF and Qigong exercise demonstrated positive effects on examined

PIFR, FEV1, FVC, and FEV1/FVC Pulmonary Function Test parameters, indicating an improvement in pulmonary function among the geriatric population. None of the groups exhibited any effect on PEFR, and when either chest PNF or Qigong exercise was applied alone, no beneficial effect on pulmonary outcomes was observed.

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