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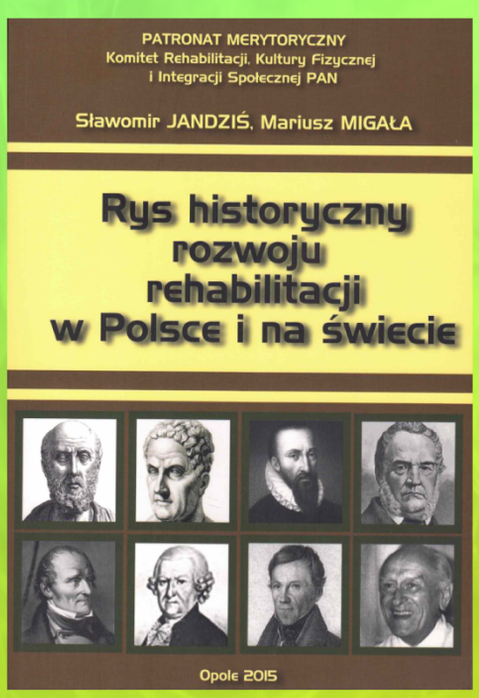

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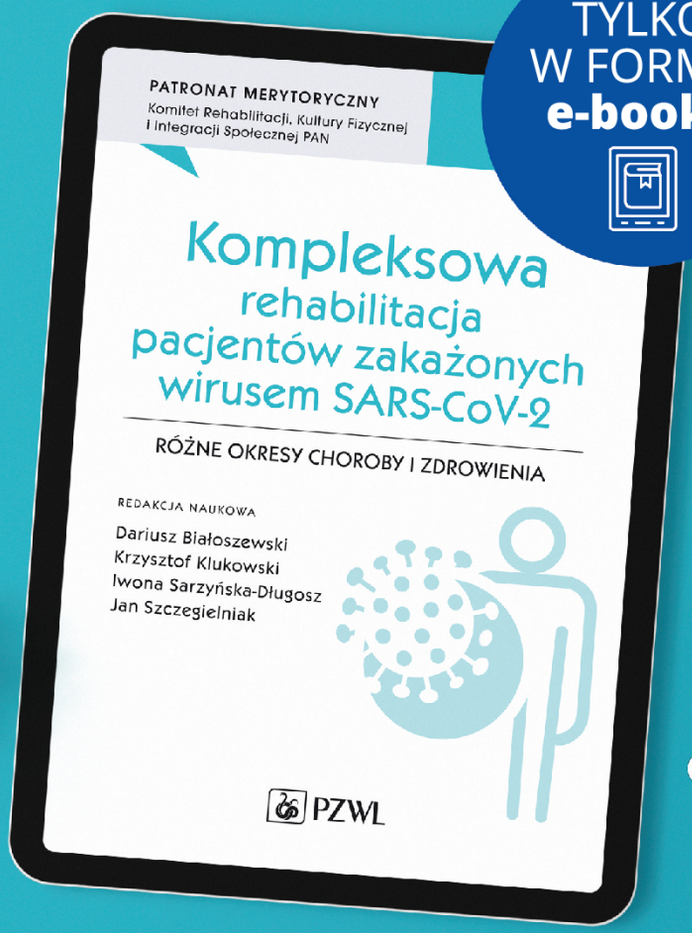

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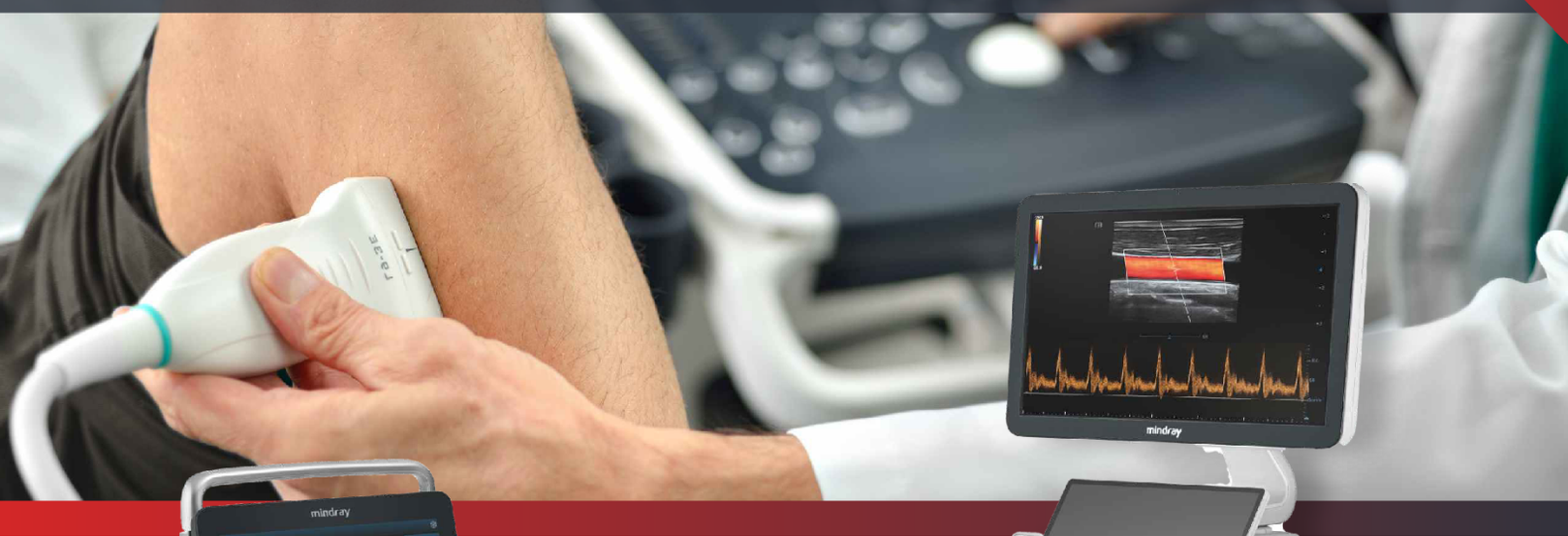

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Rehabilitacja kardiologiczna i fizjologia wysiłku – zapraszamy do rejestracji na wyjątkową konferencję w Wiśle

W dniach 11–13 maja w Hotelu Stok Wiśle odbędzie się wyjątkowe i interdyscyplinarne spotkanie specjalistów z całej Polski – 26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego. Serdecznie zapraszamy do rejestracji.

26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego to coroczne spotkanie specjalistów, zajmujących się rehabilitacją kardiologiczną, prewencją chorób układu krążenia i innymi formami aktywności fizycznej, która ma prowadzić do poprawy stanu naszego zdrowia.

Ta trzydniowa konferencja przeznaczona jest dla lekarzy kardiologów, specjalistów rehabilitacji medycznej oraz innych specjalności, którzy w swojej codziennej praktyce zajmują się rehabilitacją i fizjologią wysiłku, ale także dla fizjoterapeutów, pielęgniarek, techników i przedstawicieli innych zawodów medycznych, zainteresowanych tematyką spotkania, oraz studentów.

Jakie tematy zostaną poruszone podczas konferencji?

26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku to konferencja, na którą zaproszeni zostali wybitni specjaliści z dziedziny kardiologii i nie tylko. Podczas wydarzenia wygłoszonych zostanie prawie 100 wykładów merytorycznych w ciągu aż 20 sesji. Uczestnicy będą mieli również szansę na udział w sesjach przypadków klinicznych, intensywnych warsztatach, a także panelach dyskusyjnych. To wydarzenie cechujące się dużą interdyscyplinarnością, dlatego z pewnością każdy znajdzie coś dla siebie.

Podczas wydarzenia kompleksowo pochylimy się nad dziedziną rehabilitacji kardiologicznej i fizjologii wysiłku. Wśród tematów wiodących znajdują się:

- rehabilitacja w dobie pandemii i po pandemii COVID-19;
- telerehebilitacja i rehabilitacja hybrydowa;
- rehabilitacja kardiologiczna w specyficznych grupach pacjentów;
- programy KOS-zawał i KONS;
- nowe standardy ESC, PTK i SRKiFW;
- Testy wysiłkowe i testy spiroergometryczne
- monitorowanie wysiłku fizycznego;
- prewencja pierwotna i wtórna chorób sercowo-naczyniowych;
- farmakoterapia pacjentów rehabilitowanych kardiologicznie i nie tylko;
- sport i aktywność sportowa w kardiologii;
- czynniki ryzyka chorób układu krążenia.

Program merytoryczny wydarzenia jest niezwykle bogaty i angażujący. Warto podkreślić także, iż na konferencji pojawią się specjalne sesje wykładów prowadzone przez zaproszone sekcje i asocjacje Polskiego Towarzystwa Kardiologicznego, m.in. Sekcję Kardiologii Sportowej, Asocjację Niewydolności Serca, Asocjację Elektrokardiologii Nieinwazyjnej i Telemedycyny, Sekcję Pielęgniarstwa Kardiologicznego i Pokrewnych Zawodów Medycznych, „Klub 30”, Sekcję Farmakoterapii Sercowo-Naczyniowej, Sekcję Prewencji i Epidemiologii, a także Polskie Towarzystwo Medycyny Sportowej.

„Pandemia wymusiła na nas zmianę paradygmatu rehabilitacji kardiologicznej”

Organizatorami wydarzenia są wydawnictwo naukowe Evereth Publishing oraz Sekcja Rehabilitacji Kardiologicznej i Fizjologii Wysiłku Polskiego Towarzystwa Kardiologicznego (SRKiFW). Przewodniczącą Komitetu Naukowego jest prof. dr hab. n. med. Małgorzata Kurpesa, Wiceprzewodniczącymi – prof. dr hab. n. med. Anna Jagier, dr hab. n. med. Dominika Szalewska, a Komitetu Organizacyjnego – dr n. med. Bartosz Szafran.

Dr n. med. Agnieszka Mawlichanów, Przewodnicząca SRKiFW, podkreśla, iż ostatnie Sympozjum miało miejsce w 2019 r. w Wiśle. W tym czasie udało się zorganizować wydarzenie w formule online, jednak zdaniem Przewodniczącej obecnie „wszyscy spragnieni jesteśmy spotkania osobistego, wymiany doświadczeń i bezpośrednich rozmów, nie tylko na sali wykładowej, ale i w kuluarach”.

– Cztery lata w sporcie to pełna olimpiada, a w naszej dziedzinie kardiologii można powiedzieć – cała wieczność. Pandemia wymusiła na nas zmianę paradygmatu rehabilitacji kardiologicznej, między innymi stworzyła pole dla rozwoju modelu hybrydowego i monitorowanego telemedycznie. W tym czasie ukazało się wiele ważnych dokumentów, stworzonych przez polskie i europejskie towarzystwa kardiologiczne, dotyczące rehabilitacji, prewencji i aktywności fizycznej. Dynamicznie w naszym kraju rozwija się też program KOS-zawał, przynoszący liczne korzyści, ale też budzący kontrowersje. O tym wszystkim i jeszcze wielu innych sprawach pragniemy podyskutować w czasie naszego majowego spotkania – zapowiedziała dr Mawlichanów.

Rejestracja na 26. Sympozjum Sekcji Rehabilitacji Kardiologicznej i Fizjologii Wysiłku możliwa jest na stronie internetowej konferencji rehabilitacja-2023ptk.pl/rejestracja/. Informacje na temat opłaty zjazdowej i wydarzeń towarzyszących znajdują się tutaj: rehabilitacja2023ptk.pl/oplata-konferencyjna/.

Informujemy jednocześnie, iż liczba miejsc na konferencji jest ograniczona, dlatego warto zarejestrować się już dzisiaj.

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Effects of suryanamaskar on peak expiratory flow rate and quality of life in patients with Chronic Obstructive Pulmonary Disease (COPD)

Wpływ Surjanamaskaru na szczytowy przepływ wydechowy i jakość życia pacjentów z przewlekłą obturacyjną chorobą płuc (POChP)

Aayushi Palor[A,B,C,D,E,F], D. Anandhi[A,B,C,D,E,F]

SRM College of Physiotherapy, Faculty of Medical and Health Sciences, SRM Institute of Science and Technology, SRM Nagar, Kattankulathur, Kanchipuram, Chennai, Tamil Nadu, India

Abstract

Background. Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. Surya Namaskar is an ancient yogic method to worship the sun. This specific postural and breathing protocols were developed in Indian Subcontinent in the 17th century by Saint Samarth Ramdass. Aim. To find out the effects of Suryanamaskar on peak expiratory flow rate and quality of life in patients with Chronic Obstructive Pulmonary Disease (COPD). Methods. Experimental design, pre and post type. 14 COPD patients, aged 35–50 years, both men and women, grade I and II in GOLD classification was randomly allotted into two groups. The patients had to clear the flexibility tests – Sit and reach test and back scratch test. For the Experimental group (n = 7), Suryanamaskar, with conventional chest physiotherapy intervention, was given for 5 days per week for 6 weeks. For the control group (n = 7), conventional chest physiotherapy intervention was given for the same duration. Outcome measures: Peak expiratory flow rate (l/min), SF–36 questionnaire. Results: The study showed that the peak expiratory flow rate and SF–36 questionnaire showed non-significant result for both the groups as $p > 0.05$, though there was a clinically significant improvement. Conclusion: This study concluded that there is no statistically significant improvement in PEFR and QOL in COPD patients who performed Suryanamaskar along with chest physiotherapy.

Keywords

COPD, Peak expiratory flow rate, QOL, SF–36, Suryanamaskar

Streszczenie

Informacje wprowadzające. Przewlekła obturacyjna choroba płuc (POChP) jest powszechną chorobą, której można zapobiegać i którą można leczyć, charakteryzującą się utrzymującymi się objawami ze strony układu oddechowego i ograniczeniem przepływu powietrza przez drogi oddechowe, które jest spowodowane nieprawidłowościami w drogach oddechowych i/lub pęcherzykami płucnymi, zwykle wywołanymi znaczną ekspozycją na szkodliwe cząsteczki lub gazy. Surjanamaskar to starożytna jogiczna metoda oddawania czci słońcu. Te specyficzne protokoły posturalne i oddechowe zostały opracowane na subkontynencie indyjskim w XVII wieku przez świętego Samartha Ramdassa. Cel. Zbadanie wpływu Surjanamaskaru na szczytowy przepływ wydechowy i jakość życia pacjentów z przewlekłą obturacyjną chorobą płuc (POChP). Projekt badania. Projekt eksperymentalny, badania wykonane przez i po interwencji. 14 chorych na POChP w wieku 35–50 lat, zarówno mężczyzn, jak i kobiet, I i II stopnia w klasyfikacji GOLD, podzielono losowo na dwie grupy. Pacjenci musieli przejść testy elastyczności – test „Siąść i dosięgnąć" oraz test drapania się po plecach. Grupie eksperymentalna (n = 7) realizowała protokół Surjanamaskar wraz z konwencjonalną fizjoterapią klatki piersiowej przez 5 dni w tygodniu przez 6 tygodni. W grupie kontrolnej (n = 7) zastosowano konwencjonalną fizjoterapię klatki piersiowej przez taki sam czas. Mierniki. Szczytowy przepływ wydechowy (l/min), kwestionariusz SF-36. Wyniki. Badanie wykazało, że szczytowy przepływ wydechowy i kwestionariusz SF-36 dały wynik nieistotny dla obu grup jako $p > 0,05$, chociaż nastąpiła klinicznie istotna poprawa. Wniosek. W badaniu tym stwierdzono, że nie ma statystycznie istotnej poprawy w zakresie szczytowego przepływu wydechowego i jakości życia pacjentów z POChP, którzy realizowali protokół Surjanamaskar wraz z fizjoterapią klatki piersiowej.

Słowa kluczowe

POChP, Szczytowy przepływ wydechowy, jakość życia, SF–36, Surjanamaskar

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is one of the leading causes of mortality and disability around the world. It is expected to become the third leading cause of death and the fifth leading cause of disability-adjusted life years in 2020 [1].

COPD is a common, treatable, yet preventable disease characterised by persistent respiratory symptoms and airflow limitation that is because of the airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases. COPD is a major global public health issue because of its high prevalence, morbidity, and mortality [2, 3]. This exposure can be quite variable, with smoking being the main risk factor in developed countries and indoor cooking and occupational exposures representing important risk factors in developing countries. Genetic predisposition is an important risk factor for COPD next to toxic exposure. COPD represents a group of complex diseases in which genetic abnormalities, in combination with the type and duration of toxic exposures, determine the clinical phenotype. The definition and staging by GOLD (Table 1) are rather uniform, as defined by lung function, symptoms, and exacerbation history, despite COPD is a heterogeneous disease in its pathological manifestations in patients [3].

Table 1. Gold classification of airflow limitation severity in COPD

Stage 1	Mild	Predicted $FEV_1 \geq 80\%$
Stage 2	Moderate	Predicted $50\% \leq FEV_1 < 80\%$
Stage 3	Severe	Predicted $30\% \leq FEV_1 < 50\%$
Stage 4	Very Severe	Predicted $FEV_1 < 30\%$

India is a large country comprising people with different sociodemographic profiles, cultural practices and ethnicities. Hence the risk factors for COPD are also likely to be varying across Indian states and regions. According to a report in 2001 – 2003, COPD, asthma, and other respiratory diseases are the second (10.2%) leading cause of death in the population aged between 25– 69 years in India, and they account for 3% of disability adjusted life-years (DALYs) lost. Of the Chronic Respiratory Diseases (CRD), COPD accounts for about 500 000 deaths in India, which is four times more than the number of people who dies due to COPD in the USA and Europe. A recently completed questionnaire-based study estimated the prevalence of COPD at 3.49% in India (ranging from 1.1% in Mumbai to 10% in Thiruvananthapuram). The spirometry test was not done for the diagnosis of COPD in this study, and it is, therefore, possible that the reported COPD burden could be underestimated. Recently, the BOLD study conducted in Pune, Mumbai, and Srinagar reported overall COPD prevalence estimation is 6.25%, 6.8%, and 16.05%, respectively. Though the study adopted standardised procedures, it did not have adequate power to generate dependable prevalence estimates apart from the wide variations of the prevalence [4].

Peak Expiratory Flow Rate (PEFR) is one of the important and widely used pulmonary function test as it is very easy to perform and reliable. PEFR is defined as the maximum velocity of flow with which air is forced out of the lungs and is measured in L/min. The value of PEFR is affected by many factors, such as age, sex, anthropometry, and race. PEFR also depends on respiratory muscles power. It is going to determine the functioning of large airways during the initial 100–200 ms of forced expiration. PEFR is a very accurate and sensitive index of airway obstruction and the strength of respiratory muscles. The normal range for males and females is 450–550 L/min and 320–470 L/min, respectively [5].

A 36-item short-form (SF–36) was designed to conduct a survey for health status in Medical Outcomes Study. The SF–36 was constructed for use in clinical practice and research, general population surveys, and health policy evaluations. The SF–36 questionnaire is a multi-item quality of life scale that assesses eight health domains: 1) limitations in physical activities; 2) limitations in social activities due to physical and emotional problems; 3) limitations in daily role activities because of physical problems; 4) bodily pain; 5) general mental health (well-being or psychological distress); 6) limitations in daily role activities because of emotional problems; 7) energy and fatigue; 8) general health perceptions. The survey was formed for self-administration by persons above 14 years of age and for administration by a trained interviewer in person or by telephone [6].

"Surya Namaskar (Sun Salutation): A path to good health" in the International Journal of Pharmacological Research says Surya Namaskar is an ancient yogic method to worship the sun. In Sanskrit literature, "Surya" means "sun" and the word "Namaskar" means "salutation". Combined, the meaning of "Surya Namaskar" means "Salutation to the Sun". This specific postural and breathing protocols were developed in Indian Subcontinent in the 17th century by Saint Samarth Ramdass. It has been advised to practice certain postural movements with proper breathing rhythm in front of the sun. It was believed that doing this everyday would bring good physical and mental health, illumination, and stability in life. Suryanamaskar revitalized each and every cell of the body, which gives physical strength, flexibility, and mental calmness.

A study by M. V. Bhutkar et al. indicated that Suryanamaskar has the potential to improve muscle strength, general body endurance, and body composition to the optimum level in healthy individuals. Nevertheless, there is a lack of research in the field of Suryanamaskar, and it is also not used frequently as a therapeutic exercise [7].

Methods

It was an Experimental design, pre and post-test type study. 14 COPD patients, aged 35 – 50 years, both men and women, with grade I and II in GOLD classification of COPD, who had cleared the flexibility test – Back Scratch Test and Sit and Reach Test were randomly allotted into two groups by lottery me-

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thod. The study was conducted for 6 weeks in 2 settings – Department of Pulmonary Medicine, SRM Medical College Hospital and Research Centre, Kattankulathur, Tamil Nadu and Pulmonary Medicine Department, Geetanjali Medical College and Hospital, Udaipur, Rajasthan, India. Patients suffering from severe and very severe stage of COPD according to GOLD classification, neurological, musculoskeletal condition, malignancy, uncontrolled diabetes mellitus and hypertension and patients unwilling to participate were excluded from the study. Materials used in the study are measuring tape, scale, Peak Expiratory Flow meter by Cipla company and SF-36 Questionnaire.

Ethical committee approval (IEC No. 2109/IEC/2020 dated 28.02.2020) was taken before starting the work on this study. Consent was taken from all the patients to participate voluntarily in this study after screening with inclusion and exclusion criteria. After detailed explanation, 18 patients were screened for the study, and there were 4 dropouts (2 patients because of a family emergency and 2 patients were absent for final measurement) and 14 patients (8 women, 6 men) included in the study. Every patient had to perform two flexibility tests – The back scratch test and sit and reach test. After passing the flexibility tests, they were given the Peak Expiratory Flow Meter and explained the procedure of holding and using the meter. The measuring unit is litre/min. They need to carry the meter from the middle in order not to obstruct the pointer on the device. It needs to be placed on zero to start calculation from the same. Now, they need to take a seat comfortably and breathe in normally. The patient needs to take a breath in for 3 seconds and expire single, fast, and forcefully in meters through the mouthpiece. The observer was taking the reading of the meter. The patient was asked to do it 2 times more in order to take the best of three readings. Then the patient was asked to fill SF – 36 questionnaire to understand their quality of life of them. The results were calculated in percentage according to the scoring values of the questions and put as a baseline measurement.

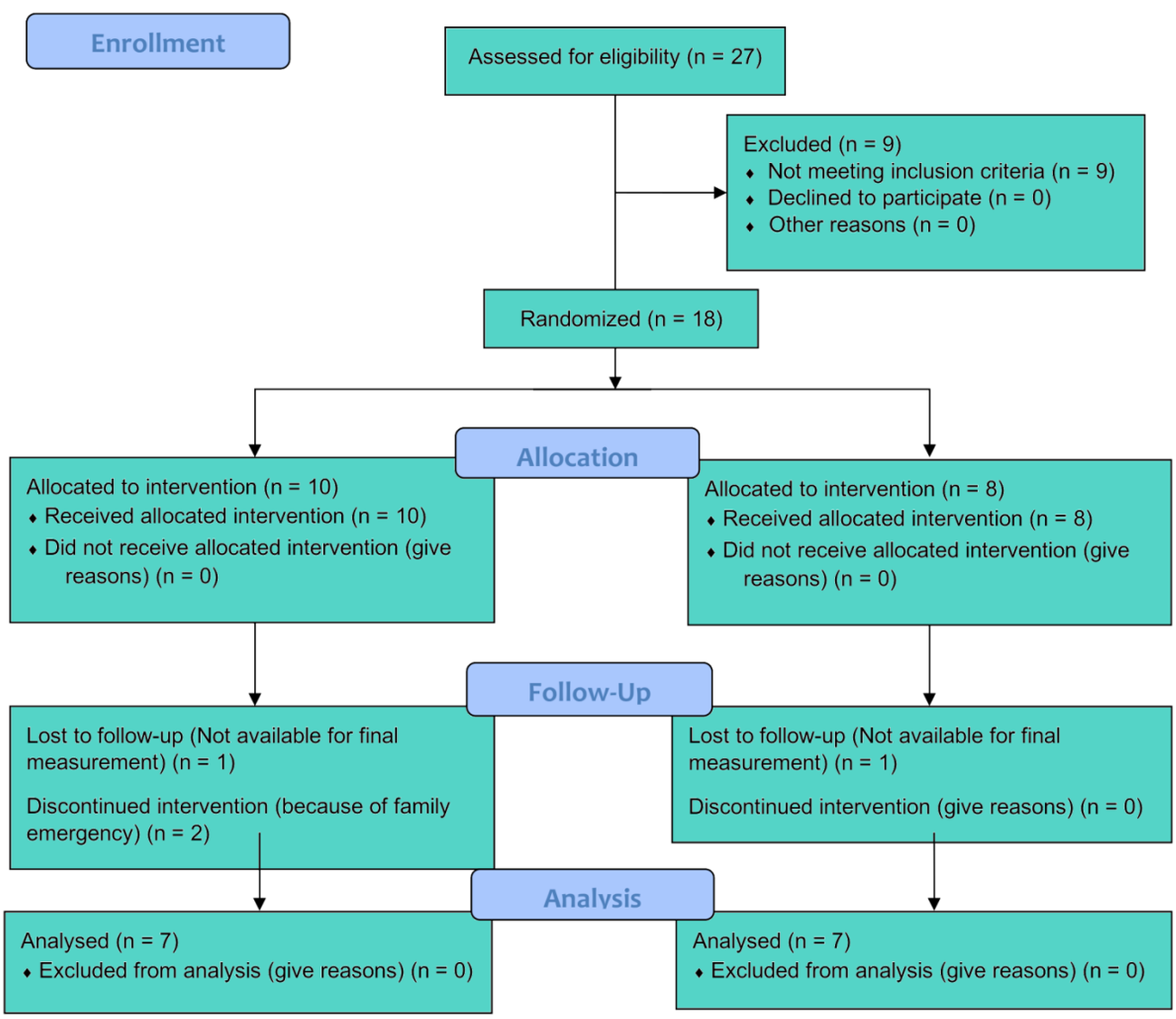

Fig. 1. Consort diagram

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All the patients were divided into two groups, with the random allocation as the experimental group and the control group. The experimental group had to perform Suryanamaskar with other chest physiotherapy exercises like breathing exercises, forced expiratory technique, and chest expansion exercises for 6 weeks. The Control group had to perform chest physiotherapy exercises except for Suryanamaskar for 6 weeks.

Suryanamaskar

Posture 1 – Inhale and maintain the standing posture with hands joined together near the chest, feet together, and all the toes touching each other on the ground.

Posture 2 – Exhale and bend forward from the waist until both palms touch the ground in line with the toes. Do not bend your knees while performing this posture.

Posture 3 – Inhale and take the left leg back with left toes on the floor, press the waist downwards and raise the neck straight and bend back, stretch the chest forward and push shoulders backward. Keep the right leg and both hands in the same posture on the ground. Keep the right leg folded.

Posture 4 – Hold your breath and raise the left knee. Take the right leg back to the left leg and keep both feet close. Straighten both legs and both hands. Keep the neck straight and sight fixed. Keep both toes erect. The neck, spine, thighs, and feet should be in a straight line.

Posture 5 – With an exhalation, bend both hands and elbows and touch the forehead on the ground, touch both the knee on the ground and keep both palms close to the chest. The forehead, chest, palms, both knees, and all the toes should touch the ground. The rest of the body should not touch the floor. Since only eight parts rest on the ground, it is called the 'Ashtanga namaskar' position.

Posture 6 – Inhale and straighten both elbows, stretch both shoulders upwards, and press the waist downwards but do not bend the arms. Keep both the knees and all the toes on the floor. Push the neck backward and sight upwards towards the roof.

Posture 7 – Hold your breath and bend the neck downwards towards the floor, press your chin to the throat, push the whole body backward and upwards, raise the waist upwards and touch both heels on the ground. Do not move both palms from the floor.

Posture 8 – Hold the breath as in posture 7, bring the right leg to the front and place it in between the hands and place the left leg at the back with the left knee and toes on the ground.

Posture 9 – Exhale and bring the left leg forwards as in posture 3 and place it in between both arms.

Posture 10 – Inhalation starts with getting up and attaining the posture as in posture 2.

Postures 11 and 12 – Same as posture 2 and posture 1.

During these 6 weeks, one more measurement is taken after three weeks to track their performance. So, it is done for every patient after 3 weeks. This is taken as a_midline measurement. Both peak expiratory flow rates are calculated again from the best of 3 readings, and SF–36 questionnaire was taken. After six weeks of completion of the study, the peak expiratory flow rate and SF–36 questionnaire were taken again as the final measurement.

Outcome measures

1. Peak expiratory flow rate (l/min) - Peak expiratory flow measurement (peak flow) is a_simple measure of the maximal flow rate that can be achieved during forceful expiration following full inspiration. The most commonly used peak flow meter is a simple hand-held device that patients can reuse many times.

2. SF–36 Questionnaire – It is a 36-Item Short Form Survey (SF–36) which is an often used, well-researched, self-reported measure of health. It includes 36 questions that cover 8 domains: physical activity, social activities, usual role, body pain, mental health, emotional problems, energy, and fatigue. It was originally designed as a generic health measure. Motamed N et al. found that the reliability and validity of the SF – 36 questionnaire is very high, which is 0.87. With this, a questionnaire can be used for the assessment of the health status of a population due to its speed and simplicity [22].

Data analysis

The collected data were tabulated and analysed using the statistical package for social science (SPSS) version 26 for Windows. Descriptive statistics were done for demographic data, and inferential statistics were done for other variables. The collected data were assessed for normal distribution using Kolmogorov – Smirnov test and found to be normally distributed with a significance of $p < 0.05$. So, paired 't-test was used for the analysis of pre-test and post-test means within the groups, whereas the independent 't-test was used for the analysis of the comparison between the 2 groups. Pre-test and post-test values are analysed on the basis of p-value, which has to be ($p < 0.05$) for the significance of the result.

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Results

Table 2 shows the mean age of 8 women patients and 6 men patients is 47.92 ± 4.60 years, and BMI (Body Mass Index) is 24.34 ± 1.36.

Table 3 shows that the mean pre-test value of PEFR is 230 ± 42.43 l/min, which improved to mean post-test values of 278.57 ± 39.34 l/min, and it is statistically significant ($p < 0.05$). The mean pre-test value of SF–36 is 41.59 ± 8.22% which improved to mean post-test values of 65.22 ± 7.92%, and it is statistically significant ($p < 0.05$).

Table 2. Demographic data on age and gender of patients with COPD

Demographic variables		n	Mean ± SD
Age (In years)			47.92 ± 4.60534
BMI			24.34 ± 1.36
Gender	Female	8	57.14
	Male	6	42.85

Table 3. Comparison of mean values of PEFR and SF–36 among COPD patients who underwent Suryanamaskar, Group A

S. No	Parameter		Mean ± SD	Mean Diff	t-value	p-value
1	PEFR (l/min)	Pre-test	230 ± 42.43	48.57	7.25	0.0004
		Post-test	278.57 ± 39.34			
2	SF–36 (%)	Pre-test	41.59 ± 8.22	23.62	16.09	0.0001
		Post-test	65.22 ± 7.92			

($p < 0.05$)

Table 4 shows that the mean pre-test value of PEFR is 201.43 ± 34.85 l/min, which improved to mean post-test values of 254.29 ± 32.07 l/min, and it is statistically significant ($p < 0.05$). The mean pre-test value of SF-36 is 38.41 ± 7.12% which improved to mean post-test values of 57.96 ± 4.54%, and it is statistically significant ($p < 0.05$).

Table 4. Comparison of mean values of PEFR and SF–36 among COPD patients who underwent Chest Physiotherapy, Group B

S. No	Parameter		Mean ± SD	Mean Diff	t-value	p-value
1	PEFR (l/min)	Pre-test	201.43 ± 34.85	34.29	9.29	0.0001
		Post-test	254.29 ± 32.07			
2	SF–36 (%)	Pre-test	38.41 ± 7.12	19.54	11.84	0.0001
		Post-test	57.96 ± 4.54			

($p < 0.05$)

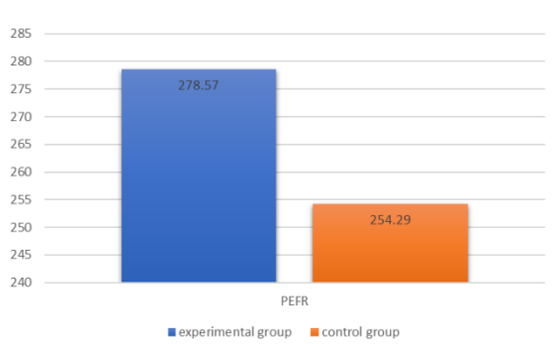

Figure 2. Comparison of post-test mean values of PEFR between Group A & Group B

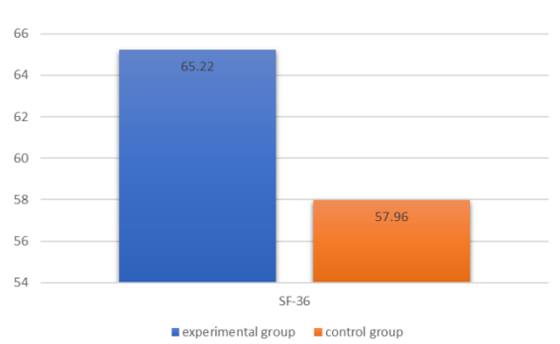

Figure 3. Comparison of post-test mean values of SF-36 between Group A & Group B

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Discussion

The study was done to find out the effects of Suryanamaskar on Peak Expiratory Flow Rate and quality of life in patients with Chronic Obstructive Pulmonary Disease (COPD). The results found a significant effect in the group of COPD patients who underwent Suryanamaskar.

The collection of data for a study was done, and there were 18 patients who agreed to take part in the study. They were divided into both experimental and control groups according to random sampling. Patients in the experimental group were taught about the Suryanamaskar and the 12 steps to perform it with asanas and proper inhalation and exhalation with them. They were also taught about breathing exercises and forced expiratory techniques. Patients from the control group were taught about chest physiotherapy that is breathing exercises, and forced expiratory technique. During the course of the study duration, 2 patients chose to opt out because of a family emergency, and 2 more patients were not present for the final measurement. So, in the end, we concluded the study with 14 patients.

According to V. Tiwari et al., the PEFR value for COPD patients will be around 102.03 l/min by using a peak flow meter [23]. According to D. Ray et al., the peak flow is ranged from 150 to 680 l/min in males and 150 to 500 l/min in females in the age group of 10 to 59 years [24]. Even the mean PEFR of this study is 278.57 l/min for the experimental group and 254.29 l/min for the control group, which is under the normal range according to the above study.

The result shows that the post-test mean values of PEFR and SF–36 have significantly improved from that of pre-test mean values in the experimental group. This suggests that Suryanamaskar has effects on pulmonary function and quality of life in COPD patients.

A study by Amit Vaibhav et al. suggested that while doing Suryanamaskar, the lungs inhale and exhale in a specific periodic manner, resulting in the improved contractility of the respiratory tree and increased vital capacity which leads to the more stable, revitalized, oxygenated lungs and whole body [11].

Bhavanani AB et al. study supported that there was a significant improvement in FVC, FEV1, and PEFR in school children following yoga training. This is attributed to the increase in the strength of the major respiratory muscles following Suryanamaskar practice [21].

In support of our study, Rajashree Ranjitha et al. conducted a study that showed promising results, reducing dyspnoea and fatigue and improving functional exercise capacity in COPD patients, indicating the value of using yoga in programs of pulmonary rehabilitation as an adjunct to conventional care [12].

The result is that the post-test mean values of PEFR and SF – 36 have significantly improved from that of pre-test mean values in the control group. This suggests that chest physiotherapy has effects on pulmonary function and quality of life in COPD patients.

A similar study done by Jean–Louis Corhay et al. found that tailored pulmonary rehabilitation provides beneficial effects on dyspnoea, improvement in muscle strength and endurance, improvement of psychological status, reduction of hospital admissions, and improvement of QOL in COPD patients [25].

A study conducted by Cees P van der Schans proved that conventional chest physiotherapy (CPT) improves mucous transport by the most effective and important part of it – directed cough. Alternative airway clearance modalities (for example – high-frequency chest wall compression, vibratory positive expiratory pressure, and exercise are not proven to be more effective than conventional CPT and usually add little benefit to conventional CPT [26].

Though both the groups showed significant improvement within the group, the results showed statistically no significance in the PEFR and QOL between the two groups. A review by Ross et al. suggested that yoga can be equally effective or better than exercise at improving a variety of health-related outcome measures like blood lipids, blood glucose, and oxidative stress [16].

Our study, supported by Anupama Gupta et al., concluded that pranayama can improve the subjective experience of health, disease severity, and functional status for COPD patients without much improvement in FEV1 actually occurring and with airflow limitation not fully reversible but usually progressive [27].

Moreover, there are numerous health benefits of Suryanamaskar for a different systems of the body especially musculoskeletal, cardiovascular, gastrointestinal, nervous system, respiratory and endocrinal. The heart, liver, intestine, stomach, chest, throat, legs, and backbone are the main benefited organs. Regular practice of Suryanamaskar improves blood circulation throughout the body, maintains health, and makes the body disease-free. Suryanamaskar training significantly increases maximum inspiratory pressure and maximum expiratory pressure. This suggested that its training improves the strength of both expiratory and inspiratory muscles. It also improved the strength of the intercostal muscles, ultimately leading to an increase in the vital capacity and contractility of the lungs. It is also found that by regular Suryanamaskar training, there is a significant change noted in forced vital capacity (FVC), FEV_1, PEFR, and Vital capacity (VC) [11].

A study done by Biswajit Sinha et al. showed the effect of yogic training on various cardiorespiratory responses during the practice of Suryanamaskar were observed in 9 healthy male volunteers after 3 months (1st phase), 6 months (2nd phase), and 11 months (3rd phase) months of training. The physiological parameters such as $\dot{V}O_2$, HR, VCO_2, $\dot{V}E$, and VT showed a significant fall in the 3rd phase as compared to the previous phases [18].

On contrary to our study, Mallikarjun Gunjiganvi et al. concluded that PFT shows significant improvement in both the Yoga therapy and chest physiotherapy group with an increase in forced vital capacity and forced expiratory volume at 4 weeks. Yoga therapy shows improvement in the physical component of quality of life and respiratory muscle endurance in blunt chest trauma patients [28].

A study done by Nagarathna Raghuram et al. on post-CABG patients concluded that the Yoga group shows better improvement in cardiac parameters such as LVEF than the control group. This yoga group shows a better reduction in body mass index and blood glucose. There is a significant decrease in perceived stress, anxiety, and depression in the Yoga group, while there is a reduction in only anxiety in the control group [29].

Possible reasons for the non-significant result of our study are – a small sample size for the study, a shorter duration for follow-up, and no personal supervision of the patients because of

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a pandemic. Probably if the above limitations were addressed, then the result could have shown a significant improvement in the group performing Suryanamaskar. However, this study shows that there is no significant improvement in PEFR and QOL in COPD patients undergone Suryanamaskar.

Conclusion

This study concluded that there is no statistically significant improvement in PEFR and QOL in COPD patients who per-

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