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Impact of Face Masks on the Six Minute Walking Distance in Pulmonary Hypertension Patients During the COVID-19 Pandemic: A Prospective, Randomized Cross-over Study

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Abstract

In patients with pulmonary hypertension (PH) or with other pulmonary or cardiac diseases, the 6-minute walking test – accompanied by the Borg dyspnea score – is frequently utilized as a semi-quantitative measure of exercise capacity . The 6-minute walking distance (6MWD) also serves as primary or key secondary endpoint in numerous clinical trials assessing the efficacy of pharmacotherapies in various forms of PH . Furthermore, the 6MWD is among the key non-invasive measures of multi-modal risk assessment in pulmonary arterial hypertension (PAH) . In this context, cut-off values of 440 m and 165 m have been validated to indicate low, intermediate and high mortality risk, respectively, in the 3-strata model proposed by the current ESC/ERS guidelines, with an additional cut-off of 320 m to discriminate between intermediate-high and intermediate-low risk in the recently introduced 4-strata approach. During the COVID-19 pandemic, representing an unprecedented challenge worldwide, most (if not all) hospitals required the constant use of face masks for staff members and patients, following the recommendations for protective measures by the World Health Organization (WHO) , and local regulations. During the course of the pandemic, it became clear that FFP2 masks provide greater protection against aerosol-mediated SarsCoV-2 infections than surgical masks , Protective measures including face masks have remained in place in health care institutions in many countries. Objectives: While clinically relevant, the potential impact of face masks on the 6MWD and associated measures has not been systematically evaluated in patients with PH. Methodology: We performed a prospective, randomized cross-over study to evaluate the impact of face masks on the 6MWD, Borg dyspnea score, and O2 saturation pre- versus post-exercise. The 6-minute walk test was performed according to ATS standards. Patients were randomized to perform the test with versus without face mask first, and then crossed over to the respective other condition to repeat the test within the same day (minimal recovery time 60 minutes). Results: In the randomized cross-over design, 62 patients (50.8%) performed the first walking test with mask, and 60 patients (49.2%) without mask. The mean recovery period between the two tests was 144 ± 75 minutes. As shown in the Table, the mean 6MWD was significantly lower when wearing a mask as compared to no mask ($p<0.0001$), and this difference was more pronounced for FFP2 than for SM. The mean intra-individual difference in 6MWD with versus without mask was -11.3 ± 2.8 m in all patients ($p<0.0001$), -6.9 ± 4.5 m in patients wearing a SM ($p=0.127$), and -15.4 ± 3.3 m in those wearing an FFP2 mask ($p<0.0001$) (Table). Similar differences were obtained in patients who performed the test without or with mask first (-12.1 ± 4.1 vs. -10.5 ± 3.7 m for all patients). In addition to differences in 6MWD, patients with masks were more symptomatic during exercise, as indicated by a higher Borg dyspnea score in all patients and in both subgroups (Table). Policy Implications/ Conclusions: Indeed, our study – the first addressing the impact of face masks in patients with PH – found a marked decline in 6MWD of approximately 15 m for FFP2 masks, along with limited physical comfort, according to the Borg score. The differences tended to be larger in patients in WHO-FC III versus those in WHO-FC II (not shown). These findings may impact PH risk assessment: When considering the 3- or 4-strata approaches and the respective cut-off values for 6MWD in our cohort, the lower values associated with wearing a mask led to a change in risk categorization in 8 (6.6%) and 12 (10.0%) patients, respectively, albeit the risk associated with lower 6MWD is continuous.

Impact of COVID-19 on Lung Function in COPD Patients: EspirCOVID Cohort Study

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Abstract

Background/Problem: In 2019, a novel coronavirus (SARS-COV2) was detected in Wuhan, China as a cause of acute respiratory distress syndrome (COVID-19). Other previous coronaviruses have caused respiratory sequelae (pulmonary fibrosis) demonstrable by tomography and lung function tests. These alterations have begun to be detected in patients who have survived COVID-19.The hypotheses of the authors is that SARS-COV2 infection accelerates the deterioration of lung function in patients with Chronic Obstructive Pulmonary Disease (COPD). Objectives: To analyze the evolution of lung function in COPD patients diagnosed with COVID-19, while comparing it with COPD patients without the disease. Methodology: Cohort study in patients diagnosed with COPD. Authors distinguish 2 subgroups of participants: COVID group: Patients with COPD diagnosed with COVID-19 before recruitment or during the study period. Non-Covid group: Patients with COPD who have not suffered from COVID-19 either before or during the study. Scope: Primary Care; 20 primary care centers managed by the Catalan Health Institute in Camp de Tarragona. Study period: March 2023 to December 2024.Participants:Inclusion criteria:Patients over 18 years of age with a diagnosis of COPD (register code J44.9 according to the 10th edition of the International Classification of Diseases, ICD-10). Fulfilling COPD spirometric diagnostic criteria prior to January 1, 2020.Last valid spirometry after January 1, 2017. Availability and acceptance of the follow-up proposed in the study . Exclusion criteria: Severe or critical COVID-19 (according with the NICE classification) Any chronic or terminal condition that may make it difficult to carry out the necessary tests during the study period. Criteria for leaving the study (losses during the follow-up period): Inability to perform spirometry with quality criteria. Two or more confirmed SARS-COV2 infections during the follow-up year. Severe or critical COVID-19 during the follow-up period. Transfer of the participant outside the study area. Inability to make follow-up visits. Participant's decision. Main variables: Diagnosis of COVID-19 (study factor) Response variable: change in the forced expiratory volume in the first second (FEV1) measured at the start of the study and after 1 year, compared to the basal FEV1 (before January 2020). Other variables: socio-demographic, clinical, functional and treatment. Policy Implications: In the case of demonstrating an accelerated deterioration of lung function in COPD patients who have suffered covid-19, secondary prevention measures could be established: intensification of follow-up and rehabilitation. Conclusions: The proactive detection of functional sequelae will allow early treatment, with the aim of improving the quality of life of these patients.

Keywords: COVID-19, spirometry, COPD, pulmonary function, Primary Care

Dust Exposure and Respiratory Health among Selected Factories in Ethiopia: Existing Evidence, Current Gaps and Future Directions

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Abstract

Background: Workers who are working in dusty environments might be associated with respiratory health problems. In Ethiopia, factories processing wood, textile, coffee, flour, cement and other materials are associated with dust emission. Furthermore, despite the adoption of the International Labour Organization (ILO) convention, the available constitution and labour proclamation, there are a lot of gaps in terms of occupational health and safety measures in Ethiopia. The current review aims to examine the existing evidence, current challenges and future direction regarding dust exposure and respiratory health in selected Ethiopian factories. Methodology: Searches of peer-reviewed articles with full-length papers were made in online databases such as PubMed, Web of Science, MEDLINE, EMBASE and Google Scholar with a key words "Dust exposure", "Respiratory health", "Respiratory symptom", "Ethiopia" and "Factory workers" from January 2000 to March 2023. Results: The review found that excessive dust exposure is associated with a high prevalence of respiratory health problems. Lack of personal protective equipment and absence of safety and health training were the main occupational health deficits identified in most factories. Policy implication/ conclusions: Actions that focus on these deficiencies are commendable. Interventions focused on safety and health trainings, and the provision of adequate personal protective equipment of the required quality is recommended. In addition, administrative solutions and longitudinal studies on dust exposure and respiratory health are suggested.

Key words: dust; exposure; Ethiopia; factory; health; respiratory

MSC-treatment of SARS-CoV2-induced severe ARDS- A phase I dose-escalating prospective trial

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Abstract

Background/Problem: The main cause of death in Covid 19 is respiratory failure due to ARDS, where treatment options are currently limited. Mortality and morbidity are high despite improvements in ICU treatment regimens. In addition, survivors of SARS-CoV-2-induced ARDS will also experience similar neuromuscular, neuropsychological and respiratory problems as described for other survivors of ARDS. New treatment strategies of viral induced ARDS are urgently needed. Objectives: Based on preclinical and clinical experience, we hypothesize that adoptive transfer of mesenchymal stromal cells (MSCs) can act immune modulatory and promote endogenous repair of the injured lung and prevent organ failure. Methodology: The ARDS-MSC-205 is a single center, phase 1, first-in-human, dose-escalating, trial, where a single dose of allogeneic, minimally expanded bone marrow-derived-MSCs (BM-MSCs) is administered intravenously to patients with SARS-CoV-2-induced severe ARDS on mechanical ventilation. All patients must be positive for SARS-CoV-2, and have severe ARDS as defined by the acute onset, bilateral infiltrates consistent with pulmonary oedema on frontal chest radiograph or CT scan and in need of positive pressure ventilation by a tracheal tube, PaO2/FiO2 less than 100 mm Hg with at least 8 cm H2O positive end-expiratory airway pressure (PEEP). Patients are screened prior to intubation but enrolled after 24h on mechanical ventilation. A total number of seven patients has been included. The first three patients received the lower dose of 1 million cells/kg body weight and the following 4 patients received the higher dose of 2 million cells/kg body weight. All documents have been approved by the Swedish MPA (Läkemedelsverket, Dnr 5.1-2020-25502) and the ethical review board (D.nr: 2020-02238). This study, ARDS-MSC-205, is sponsored by the Uppsala University Hospital (ClinicalTrials.gov Identifier: NCT04447833). Results: The seven treated patients experienced no prespecified infusion-associated events or treatment-related adverse events. A serious adverse event was only noted in one patient but was not thought to be treatment related. No patient died within the first 60-day period, but one patient died after the initial 60-day period due to a unrelated event. Efficacy of the treatment was investigated by using high resolution computerized tomography with dual energy (DECT), six minutes walk test, spirometry, SF-36 to evaluate mental and physical outcomes. Plasma as well as peripheral blood mononuclear cells (PBMC) were collected during the follow-up period of 1 year. By using PCR as well as flow cytometry both the MSCs´ effect on the virus as well as the effect on the innate immune response was analyzed. Policy Implications/Conclusions: Based on the study results we demonstrated that a single dose of allogeneic, minimally expanded BM-MSCs was safe to administrate in all seven patients with SARS-CoV2-induced ARDS on mechanical ventilation. Data from the study also indicates long-term effects that needs to be corroborated in larger placebo-controlled studies.

Keywords: MCS, Covid 19, ARDS, Cell Therapy, SARS

Extended endoscopic approaches to the non-malignant maxillary sinus lesions comparative study

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Abstract

A wide range of surgical ways to reach maxillary sinus. Historically, maxillary sinus was entered by external approaches such as lateral rhinotomy in benign or malignant diseases. but now, endoscopic approaches have recently replaced external approaches as the standard of treatment of maxillary sinus diseases due to reduced morbidity, improved visualisation and low recurrence rates of benign tumors. Studies found that middle meatal antrostomy provided access to about 24–34 percent of the total sinus volume only and rarely offer access to the anterior wall and sinus floor, regardless of the angled instruments used. Endoscopic maxillary mega-antrostomy is typically used as a revision procedure in patients with maxillary sinusitis refractory to surgery. The resulting antrostomy is greatly enlarged and allows the sinus to drain more easily by gravity, as well as admitting topical therapy more readily. Radical endoscopic medial maxillectomy is indicated for the resection of benign and malignant sinonasal neoplasms when wide surgical access and tumor clearance is required. However, resection of the inferior turbinate head may contributes to nasal crusting, dryness and empty nose syndrome ,so modified endoscopic medial maxillectomy gives better access to the maxillary sinus, with preserving the head of the inferior turbinate. Pre-lacrimal recess approach allows for direct access to the sinus with 0-degree endoscopes and straight instruments, and thus improves visualisation of its contents especially anterior sinus wall, better handling of tools with preservation of inferior turbinate and nasolacrimal duct. It is difficult to select suitable approach to maxillary sinus to ensure proper intraoperative visualization and better access to disease with fewer complications that is why we do this study. This study will be carried out in Otorhinolarynology Department Tanta University hospital from November 2021 to November 2023. A written informed consent will be obtained from all patients of the study . Demographic data including age, weight, gender, previous medical history and indication for operation will be obtained on all patients using medical record which is private to each patient in the study. All patients who indicated to undergo extended endoscopic approach by preoperative endoscopic examination and routine preoperative CT scan and MRI scan if needed will be included in this study. Any patient with suspected tumor of maxillary sinus should be excluded by biopsy pre-operatively. The results of this work will be discussed and analyzed after completion of the study.

Acute Severe Heart Failure in Paediatric Inflammatory Multisystem Syndrome Temporally Associated with SARS-CoV-2: A Case Report

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Abstract

Background: Clusters of children presenting with paediatric inflammatory multisystem syndrome temporally associated with COVID-19 (PIMS-TS) emerged during the first wave of the global pandemic. COVID-19 cases are still prevalent with emerging variants in 2023. The presentation of PIMS-TS is multisystemic and may overlap with other well-known acute inflammatory syndromes such as Kawasaki disease and toxic shock syndrome. Cardiovascular involvement causes significant disease burden in PIMS-TS. The most commonly observed complications are cardiogenic shock, cardiac arrhythmias, pericardial effusion, and coronary artery dilatation. Though PIMS-TS primarily affects older children and adolescents, multisystem inflammatory syndrome in adults (MIS-A) is a similar condition that affects the adult population. Objectives: This case highlights the importance of diagnostic awareness of PIMS-TS and its spectrum of disease, and recognition of the potential for rapid deterioration in these patients. Prompt resuscitation and early escalation to the intensive therapy unit (ITU) in the context of haemodynamic instability are essential. Methodology: Written consent was obtained from the patient for the presentation of this case. Clinical progress and investigation results were obtained from the patient's clinical notes and electronic investigation reporting systems during his admission in ITU and the coronary care unit, and subsequently at the tertiary cardiac centre and outpatient clinic. Results: We describe a case of a 17-year-old patient who presented as a diagnostic challenge due to multisystemic features with mucocutaneous, neuropsychiatric, gastrointestinal and cardiovascular involvement. He developed cardiogenic shock due to severe myocardial dysfunction concomitant with myocarditis, associated with PIMS-TS. The patient required inotrope and vasopressor support in ITU and specialist management of heart failure in the coronary care unit. Initial admission echocardiogram demonstrated severe left ventricular systolic dysfunction with estimated left ventricular ejection fraction (LVEF) of 27%. Following treatment with immunoglobulins and corticosteroids, there was substantial improvement in LVEF to >55% four days later. The patient subsequently had complete resolution of symptoms and full restoration of functional status by four months. Conclusion: Though PIMS-TS remains a rare COVID-19-associated syndrome, it can cause life-threatening cardiovascular complications if a timely diagnosis is not made. Due clinical diligence is required in identifying the degree of cardiovascular involvement with clinical findings, ECG, laboratory cardiac indices and echocardiography. Early multidisciplinary team involvement will facilitate diagnosis and improve patient outcome. Despite its critical nature, the prognosis of PIMS-TS is excellent if it is treated promptly with immunoglobulins and corticosteroids.

Keywords: cardiogenic shock, heart failure, intensive therapy unit, covid-19, paediatric multisystem inflammatory disease

The Effect of Fan Airflow to the Face on Dyspnea and Physical Activity Level

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Abstract

Background: Dyspnea has been noted to be reduced by blowing air into the face with a fan as a non-pharmacologic treatment. Patients who were advised to blow air with a fan in addition to exercise advice versus those who were not advised to blow air reported that 85% had improved shortness of breath and 54% were more active. (Barnes-Harris, 2019) Since dyspnea can have psychological as well as physical causes, we decided to observe differences in dyspnea and physical activity by providing all subjects with a fan and dividing them into two groups: frequent and infrequent users. Here I present a study published in the journal Respiratory care. Methods: Subjects were outpatients with dyspnea of mMRC scale 2 or higher due to chronic respiratory failure. Patients with chronic dyspnea, chronic heart failure, and cancer were recruited, and their average breathlessness (Visual analog scale: VAS) and physical activity scale for the past week (Physical activity scale for elderly: PASE) were investigated with a questionnaire. All patients were provided with a small rechargeable electric fan and told that the airflow was expected to reduce dyspnea. Patients in the intervention group were instructed to blow air toward their faces after each exercise session or whenever they felt breathless, and patients in the control group were instructed to blow air twice a day, immediately after waking up and just before going to bed. Three weeks later, the same questionnaires were mailed regarding dyspnea and physical activity level. The amount of change in dyspnea and physical activity before and after the intervention in both groups was tested by analysis of covariance with the pre-intervention values as covariates. RESULTS: There were 36 subjects randomized and 34 subjects in the final analysis. The mean age was 75.4 years, 50% had COPD, 20% had interstitial pneumonia, etc. The least-squares mean change in dyspnea VAS score before and after intervention was 5.8 lower in the intervention group than in the control group, and the least-squares mean change in physical activity PASE before and after intervention was 14.3 higher in the intervention group than in the control group, but none of the differences were significant. Conclusions: Patients who had a higher number of daily air blasts showed an increase in physical activity in the summary statistics, but the sample size could not be collected as planned due to COVID-19 pandemic, so evidence could not be presented. Further studies are needed to clarify the effect of this casual non-pharmacological treatment, based on objective measure and matching the demographics of the subjects.

Biography

Hideko Nagumo, PhD, RN, RRT is the Vice President, Japan Respiratory Care Network, a non-profit organization She is Graduated from The School of Nursing Faculty of Medicine The University of Tokyo, Japan, with Diploma, and started working as a nurse at the University's hospital. After returning to Japan, worked as a respiratory therapy nurse and nursing manager. Since 2017 she is working as Assistant Professor, Department of Nursing, Faculty of Health Sciences, University of Tokyo Health Sciences.

Vestigial Immune System! Is it a hypothetical scenario or a possible future?

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Abstract

Every animal or living thing on Earth has a defense mechanism in place to keep it safe from both external and internal threats in order to achieve its survival needs. Humans assert that they are at the top of the biological food chain and have the most sophisticated immune systems, which are demonstrated by their ability to successfully survive and evolve despite all the grave dangers they have faced throughout evolution. Studies on evolutionary immunology show the progression from prokaryotic cells' basic natural defense to the eukaryotic cells' establishment of antigen-specific immune responses. Evolutions of most complex and highly specific immune responses is directly proportional to the magnitude of the threat encountered i.e. severe the offence, stronger the defense and vice-versa. With the emergence of medical system in human history, human immune system gets a crutch; stronger the crutch, weaker the immune system and is evident with the increasing incidences of auto-immune diseases. The issue is that if this crutch is not removed right away, the immune system of humans will be rudimentary because of non-functionality. Additionally, according to the rules of nature, anything that is not in use becomes vestigial. We are currently on the verge of this unpleasant future reality, and even if we don't comprehend the importance of enhancing the body's natural defenses and employing its immunological responses to combat diseases, we do at least have a vestigial immune system. The talk will cover the effectiveness of our natural defense mechanisms, such as sneezing, coughing, vomiting, purgation and thoughts (neuro-hormonal axis) in practice with the clinical evidences to treat respiratory diseases like URTIs, LRTIs and latent diseases. The lecture will also discuss the SOPs of Nasa-prakshalana, Pradhamana Nasya, Sadhya Vamana, and Dhumpana in the context of respiratory diseases. It will also discuss the relation of latent respiratory disease and heart diseases and the clinical evidences of the Ayurvedic therapies for its management.

Key words: Pradhamana Nasya, Sadhya Vamana, Nasaprakshalana, Clinical evidences.

Effectiveness of Compassion-Focused Therapy (CFT) on Emotional self- Regulation and Cancer Fatigue in Patients with Breast Cancer neoplasms

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Abstract

Background: High intraoperative PEEP with recruitment manoeuvres may improve perioperative outcomes. We re-examined this question by conducting a patient-level meta-analysis of three clinical trials in adult patients at increased risk for postoperative pulmonary complications who underwent non-cardiothoracic and non-neurological surgery. Methods: The three trials enrolled patients at 128 hospitals in 24 countries from February 2011 to February 2018. All patients received volume-controlled ventilation with low tidal volume. Analyses were performed using one-stage, two-level, mixed modelling (site as a random effect; trial as a fixed effect). The primary outcome was a composite of postoperative pulmonary complications within the first week, analysed using mixed-effect logistic regression. Pre-specified subgroup analyses of nine patient characteristics and seven procedure and care-delivery characteristics were also performed. Results: Complete datasets were available for 1913 participants ventilated with high PEEP and recruitment manoeuvres, compared with 1924 participants who received low PEEP. The primary outcome occurred in 562/1913 (29.4%) participants randomised to high PEEP, compared with 620/1924 (32.2%) participants randomised to low PEEP (unadjusted odds ratio [OR]=0.87; 95% confidence interval [95% CI], 0.75–1.01; P=0.06). Higher PEEP resulted in 87/1913 (4.5%) participants requiring interventions for desaturation, compared with 216/1924 (11.2%) participants randomised to low PEEP (OR=0.34; 95% CI, 0.26–0.45). Intraoperative hypotension was associated more frequently (784/1913 [41.0%]) with high PEEP, compared with low PEEP (579/1924 [30.1%]; OR=1.87; 95% CI, 1.60–2.17). Conclusions: High PEEP combined with recruitment manoeuvres during low tidal volume ventilation in patients undergoing major surgery did not reduce postoperative pulmonary complications.

“Pros, Cons, and Progress: Organ-on-Chip Modelling of Pulmonary Arterial Hypertension”

Beata Wojciak-Stothard

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Abstract

Pulmonary arterial hypertension (PAH) is a severe and currently incurable disease, characterised by progressive thickening of intrapulmonary arteries, which restricts oxygen supply to blood and leads to right heart failure. The lack of models of human disease is a key obstacle to drug development. We designed a biomimetic model of pulmonary arterial endothelial-smooth muscle cell interactions in PAH, combining natural and induced bone morphogenetic protein receptor 2 (BMPR2) dysfunction with hypoxia to induce smooth muscle activation and proliferation, which is responsive to drug treatment. The model captures key transcriptomic and functional changes in the pulmonary endothelial cells that are essential for the induction of SMC remodelling. The lecture will discuss pros and cons of using organ-on-a-chip technologies in disease modelling.

Biography

Dr. Beata Wojciak-Stothard is working as a Professor in Vascular Biology, Imperial College London. She is the members of European Vascular Biology Organization (EVBO), Pulmonary Vascular Research Institute (PVRI) Fellow, member of Pre-Clinical Task Force, American Thoracic Society , European Organ-On-A-Chip Society, Organ-On-A-Chip Technologies UK etc. Her current administrive responsibilities are Deputy Section Head of Vascular Sciences, NHLI Athena Swan Co-Lead, Higher Degree Research Committee (HDRC) Section representative, Imperial College London, Senior Tutor with responsibility for Pastoral Care, etc. She has been PI of a number of funding awards to support my research, attracting resources to a total value of £ 3 050 958. Her current research team consists of 3 PhD students and 2 post-doctoral fellows.

High Prevalence of Respiratory Symptoms among Particleboard Workers in Ethiopia: A Cross-Sectional Study

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Abstract

Background: Work in the wood industry might be associated with respiratory health problems. The production of particleboard used for furniture making and construction is increasing in many countries, and cause dust, endotoxin and formaldehyde exposure of the workers. The aim of the study was to assess the prevalence of respiratory symptoms and to measure lung function among Ethiopian particleboard workers using Eucalyptus trees as the raw material. Methodology and results: In total 147 workers, 74 from particleboard production and 73 controls, participated in the study. Mean wood dust in the particleboard factories was measured to be above recommended limit values. Particleboard workers had a mean age of 28 years and the controls were 25 years. They had been working for 4 and 2 years, respectively. Lung function test was done using spirometry following American Thoracic Society (ATS) recommendations. Respiratory symptoms were collected using a standard questionnaire of ATS. Particleboard workers had higher prevalence of wheezing, cough, cough with sputum production, phlegm, and shortness of breath compared to controls. Lung function status was similar in the two groups. The symptoms might be related to the work in the factories. Policy implication/ conclusions: Longitudinal studies are recommended to explore the chronic impact of work in particleboard factories on respiratory health.

Key words: Ethiopia; lung function; particleboard factory workers; respiratory symptoms

We welcome to the European Conference on Respiratory Medicine (ECRM 2023) will be held in Milan, Italy, from September 14–15, 2023. .

All accepted abstracts for European Conference on Respiratory Medicine (ECRM-2023) will be published in European Journal of Respiratory Medicine (Online ISSN-2633-7452) with a permanent DOI number. European Journal of Respiratory Medicine- EJRM is an international journal publishing articles on all aspects of respiratory medicine and critical care. The journal adheres to a blind review process in which the reviewer's name is routinely withheld from the author.

A new special issue has been created and titled "Challenges and Advances in Diseases of the Respiratory System". Respiratory diseases can cause significant health challenges for people who suffer from them. General practitioners get a lot of cases of respiratory diseases in their day to day practice. Respiratory research has developed and evolved over the past 30 years and it has been applied to clinical medicine. Significant progress has been achieved in identifying, treating, and preventing respiratory diseases. However, there were concerns regarding the transmission of infections asglobal exchanges between countries gradually increased.

For any inquiries related to a Special Issue, please contact the Editorial Office.

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