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Chronic obstructive pulmonary disease in women exposed to wood stove smoke☆

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ABSTRACT

Objective: To identify respiratory symptoms and COPD (forced vital capacity and forced expiratory volume in one second ratio < 0.70 and below the lower limit of normal) in non-smoking women with history of exposure to wood smoke of at least 80 hours-year.
Methods: One hundred sixty nonsmoking women were included. Demographic data and information about symptoms and other environmental exposures were collected. All women underwent spirometry and those with COPD also had their lung volumes measured.
Results: The COPD group had greater exposure in years to wood smoke (p = 0.043), greater length of rural residence (p = 0.042) and the same length of passive smoking (p = 0.297) and farm work (p = 0.985). Cough (69.8%), expectoration (55.8%) and wheezing (67.4%) predominated in the COPD group (p < 0.001) compared to those without COPD (40.2%, 27.4%, 33, 3%, respectively). The COPD patients had mild to moderate obstructive disturbance and normal lung volumes, except for the residual volume and total lung capacity ratio (RV/TLC) > 0.40 in 45%, which correlated negatively with forced expiratory volume in one second (FEV1) and FEV1/vital forced capacity ratio (FEV1/FVC).
Conclusion: Women with prolonged exposure to wood smoke had predominantly mild to moderate COPD. Those without COPD had a high prevalence of chronic respiratory symptoms, justifying clinical and spirometric monitoring.

☆ Study conducted at Hospital das Clínicas, Faculdade de Medicina, Universidade Federal de Goiás, Goiânia, GO, Brazil.

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Doença pulmonar obstrutiva crônica em mulheres expostas à fumaça de fogão à lenha

Palavras-chave:
Doença pulmonar obstrutiva crônica
Biomassa
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RESUMO

Objetivo: Identificar sintomas respiratórios e DPOC (relação entre volume expiratório forçado no primeiro segundo e capacidade vital forçada < 0,70 e abaixo do limite inferior da normalidade) em mulheres não fumantes, com história de exposição à fumaça da combustão de lenha de ao menos 80 horas-ano.
Métodos: Foram incluídas 160 mulheres não tabagistas. Coletaram-se dados demográficos, sintomas e informações sobre outras exposições ambientais. Todas as mulheres realizaram espirometria e aquelas com DPOC também medidas de volumes pulmonares.
Resultados: O grupo com DPOC apresentava maior duração de exposição, em anos, à fumaça de lenha (p = 0,043), maior tempo de domicílio rural (p = 0,042), duração similar de tabagismo passivo (p = 0,297) e de trabalho na lavoura (p = 0,985). Tosse (69,8%), expectoração (55,8%) e chiado (67,4%) predominaram no grupo com DPOC (p < 0,001) quando comparado ao grupo sem DPOC (40,2%, 27,4%, 33,3%, respectivamente). As pacientes com DPOC apresentavam distúrbio obstrutivo leve a moderado e volumes pulmonares normais, exceto a relação entre o volume residual e a capacidade pulmonar total (VR/CPT) > 0,40 em 45%, que apresentou correlação negativa com o VEF1 e VEF1/CVF.
Conclusão: Mulheres com exposição prolongada à fumaça de lenha apresentaram DPOC predominantemente leve a moderado. Aquelas sem DPOC tiveram alta prevalência de sintomas respiratórios crônicos, justificando monitoramento clínico e espirométrico.

Introduction

In developing countries, biomass fuels (wood, charcoal, animal dung and crop residues) are used for space heating and for cooking food in rustic stoves. In Brazil, the Brazilian Institute of Geography and Statistics[1] has estimated at 40.9% the proportion of rural residents and 2.6% the proportion of urban dwellers who use wood stoves.

Approximately 1.5-2 million deaths per year worldwide are attributed to diseases related to pollution from biomass combustion.[2] Reviews and meta-analyses have demonstrated that exposure to biomass smoke is an important risk factor for chronic obstructive pulmonary disease[2-4] (COPD). Approximately 3 billion people worldwide are exposed to biomass smoke, whereas the number of smokers is much lower, 1.1 billion, thus making exposure to biomass smoke a major risk factor for COPD, globally.[5] However, the findings of studies from other countries may not be fully applicable to Brazil, as the vegetation used as fuel here is different, the use of biomass is mostly restricted to cooking food and there is limited use of other types of biomass.

This study aims to identify respiratory symptoms and COPD in non-smoking women with a history of exposure to wood stove smoke for at least 80 hours-year.

Methods

The participants were recruited from outpatient clinics of a university hospital and two Basic Health Units.

Inclusion criteria were age ≥ 40 years, never having been a smoker, exposure to wood smoke while cooking for ≥ 80 hours/year and a minimum of 10 years[6]; signing the free and informed consent form. Exclusion criteria were: presence of clinical evaluation by pulmonologists performed during the study or contained in medical records, suggesting bronchial asthma and/or allergic rhinitis; extrapulmonary disease that could interfere with lung function; change in forced expiratory volume in one second (FEV_1) after bronchodilators (bd) ≥ 10% in relation to the predicted value.[7]

The adapted version of the questionnaire used in the PLATINUM study in Brazil was used.[8] Data were obtained regarding demographics, respiratory symptoms (cough, phlegm, wheezing and dyspnea); previous medical diagnosis of COPD, exposure to smoke resulting from wood combustion (intensity, presence of stove chimney, location in the house) and other types of exposure (passive smoking, agricultural activity).

Exposure to wood stove smoke was expressed in hours, years and hours-year (product of time in years cooking with wood stove, multiplied by the mean number of hours spent in this activity).[6] Passive exposure to tobacco was expressed in years of living in a home with smokers.

All women interviewed underwent spirometry pre- and post-bd use. The following parameters were measured: forced vital capacity (FVC), FEV_1; ratio between FEV_1 and FVC. Women who were diagnosed with COPD also underwent residual volume (RV) and total lung capacity (TLC) assessment. Pulse oximetry (SpO_2) at rest was measured in women with FEV_1 < 50% of the predicted value.[9]

The diagnostic criteria for COPD were: history of dyspnea and/ or chronic cough; absolute value of FEV_1/FVC