GERIA Study – Indoor Air and Respiratory Health in residents of Elderly Care Centers in Lisbon: A Case Study

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Background: The average life expectancy is increasing and Portugal is one of the most aged countries. Also, the elderly population has a high prevalence of chronic diseases and respiratory problems. Previous studies indicate that people of this age group is, on average, 19-20 h/day indoors, being vulnerable to health complications associated with indoor air quality.
Aim: To characterize demographic and health data of the respondent population resident in elderly care centers in Lisbon, and to analyze the indoor air of one of those centers and the general and respiratory health of its residents.
Methods: This is a cross-sectional analysis of a longitudinal study. Through the Social Charter, 33 Lisbon elderly care centers were randomized and their residents, who consented to participate and were able to respond to a questionnaire, were evaluated. To determine indoor air characteristics we monitored ventilation rate and carbon dioxide level in living rooms and in two bedrooms per center. Health information was collected from self-rated health and from respiratory health inquiry and individual processes information. The present study analyses one elderly care center with elevated response rate and respiratory disease rate.
Results: The study took place from September 2012 to March 2013. In a universe of 1441 users, the study sample was of 790 elderly, corresponding to a response rate of 55%, 617 (78%) of them were women. Mean age was 84,1 years (SD=7,2 years), from 65 to 105 years. Self-rated health was unfavorable in 290 (36%), favorable in 212 (27%) and 282 (36%) had no defined opinion. Past or present respiratory disease was assignable to 156 elderly (21%).
The center under this study had 14 residents, all women, able and willing to participate. Mean age was 87,1 years (SD=5,8 years), from 67 to 97 years. Of them, 43% (n=6) had past or present respiratory disease. Air characteristics were evaluated in two bedrooms and in one living room. It had a natural ventilation system, with air renewal from window opening and air permeability. CO_2 monitoring during the night made it possible to estimate an average ventilation rate between $0,3h^{-1}$ e $0,4h^{-1}$. CO_2 maximum values were of 2354 ppm in the double room, 1872 ppm in the triple room and 657 ppm in the living room. Self-rated health was unfavorable in 3 (21%), favorable in 3 (21%), with no defined opinion in 5 (36%), and missing information in 3 (21%). Past or present respiratory disease was assignable to 6 elderly (43%).
Comments: The elevated CO_2 levels found in bedrooms, approximately 3 times higher than those of the living room, reveal a low nocturnal ventilation rate, in accordance with its occupation rate and an insufficient ventilation system, which might compromise individual's respiratory health.
The present study might contribute with information on adequate occupation rate and ventilation system bearing in mind elderly people respiratory health.
Keywords: respiratory health, indoor air, elderly care centers, elderly

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