HEALTH AND INDOOR ENVIRONMENT IN ELDERLY CARE CENTERS

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INTRODUCTION

Aged population is growing in most affluent societies of the western world [1], increasing in absolute and relative terms. This is projected to have a major impact on the delivery of health care, particularly acute and emergency services [2]. The older people require significantly more emergency care resources compared to younger adults [2] due to a decline in immune defences and respiratory function, resulting in a higher predisposition to respiratory infections [3]. Such conditions are highly prevalent, multifactorial, and associated with multiple comorbidities and poor outcomes, such as increased disability and decreased quality of life [4].

OBJECTIVES

This article focus on respiratory symptoms of older people living in elderly care centers (ECC). The present results have been produced by measuring and characterizing indoor air quality, thermal comfort and respiratory health in 21 ECC in Porto, Portugal, with a sampling universe of 685 residents. The aim of this study was to evaluate 1) the influence of indoor environmental parameters on older people respiratory health symptoms; 2) the reliability of self-perceived symptoms questionnaires when applied to indoor environmental variables, and 3) develop innovative strategies which, with relatively simple measures, could provide health benefits to ECC residents.

MATERIALS AND METHODS

All ECC located within the Porto urban area and included in the ‘Portuguese Social Charter’ were invited to participate in our study. Out of a total of 58 ECC, 36% (n = 21) accepted to participate in the two stages of this study: (1) Environmental data collected for each ECC in two seasons (i.e. summer and winter) starting from November 2011 till August 2013; (2) A respiratory health questionnaire performed from September 2012 to April 2013, along the winter season environmental sampling campaign correspondent to each ECC. The Portuguese version [5] of BOLD (Burden of Obstructive Lung Disease) [6, 7] was administered by a trained interviewer to the older people who gave their informed consent and were able to participate (n = 143). All the participants should had ≥ 65 years old, live in the ECC for more than 2 weeks and possess cognitive and interpretative skills in order to receive the questionnaire.
RESULTS

Our sample was characterized mainly by women (85%), with most people in the age group above 85 years old (48%). Participants presented a reasonable rate of dementia (40%) and they were mostly (61%) physically impaired. Cough (23%) and sputum (12%) were the major respiratory symptoms, and allergic rhinitis (18%) the main self-reported illness. Heart troubles were reported by 37% of the residents. Overall PM$_{2.5}$ median concentration was above reference levels both in winter and summer season. Also, peak values of PM$_{10}$, total volatile organic compounds, CO$_2$, bacteria and fungi exceeded the reference levels, compromising indoor air comfort and worsening the already existent respiratory chronic diseases. The winter predicted mean vote (PMV) index was below references, between the ‘slightly cool’ (-1) and ‘cool’ (-2) points in the thermal sensation scale, which may potentiate respiratory tract infections. Predicted percentage dissatisfied and PMV indices also showed significant differences by room and by season ($p < 0.01$). Older people exposed to PM$_{10}$ above and temperature below the reference levels presented a higher odds of allergic rhinitis (OR = 2.9, 95% CI: 1.1 – 7.2) and (OR = 0.8, 95%:0.6 – 1.0) respectively.

CONCLUSIONS

Indoor environment have a potential influence in chronic respiratory symptoms on older people living in ECC due to their health susceptibility and decline in immune defences and respiratory function. Self-perceived symptoms questionnaires have some limitations when applied to older people with physical and cognitive impairments. These results need to be confirmed in future studies. Adequate measures, such as, local exhaust ventilation systems near cooking and gas burning devices, as well as, daily slightly moist cleaning of the rooms surfaces would reduce particle accumulation and re-suspension. Low indoor temperatures and discomfort, especially on winter season, could be prevented by simple measures such as insulating ceilings, walls and windows, maintaining natural and passive ventilation.

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REFERENCES