Characterizing a population of smokers: An observational, transversal, non-randomized pilot study based on smoking history and spirometry changes

Dear Editor,

Smoking is a major cause of morbidity and mortality. This fact is well known by the whole medical community and the population in general. Respiratory diseases, which can be diagnosed by changes in lung function tests, are among the various consequences. The sooner disease is identified, the sooner the monitoring of symptoms and intervention can start, smoking cessation in particular.[1–7] In fact, smoking cessation is of the upmost importance even before the existence of any symptoms or presence of any disease.

With this in mind, we investigated a population of smokers and characterized it based on smoking history, symptoms (dyspnea – characterized by the *modified Medical Research Council*) and spirometry changes.

The study, approved by the scientific ethical committee (reference number 203/03-2014, Supplementary material I), took place at a healthcare facility in the district of Coimbra, USF BRIOSA, which belongs to the ACES Baixo Mondego.

The population consisted of patients who were diagnosed with ''Tobacco Abuse'' (ICPC-2 P17). From them, a convenient sample of 76 patients aged between 40 and 75 years old were selected to be part of the study. Another criterion was that no participant was diagnosed with acute respiratory illness, dementia or was bedridden.

The patients were invited to participate by their family physician. An interview was scheduled when they accepted in order to provide them with the explanation of the study and its goal. After this description, patients were invited to give their formal written consent (Supplementary material II) and asked to answer a questionnaire (mMRC questionnaire, Supplementary material III). This was followed by a pre-bronchodilator and a post-bronchodilator spirometry performed by a cardiopneumology technician. The spirometry results[8] were described using the criteria implemented by the American Thoracic Society/European Respiratory Society. These were then analyzed by OpenEpi® with descriptive and inferential statistics (*U* Mann–Whitney and Kruskal–Wallis tests) and, in this study, differences were considered as being statistically significant whenever the correspondent *p*-value was lower than 0.05.

We invited 76 patients: 67 people attended and 7 users were excluded and so the sample was composed of 60 patients, more than half of which were women (53.3% females). The average age of participants was 55.9 years and 38.3% of them were asymptomatic.

Looking at the spirometry results ($n = 60$) we observed that 58.3% of the population was normal [95% CI 45.7–69.9%], and 18.3% had non-reversible obstruction [95% CI 10.6–29.9]. On the other hand, 15.1% of the individuals had obstruction of the small airways [95% CI 8.1–26.1] and 8.3% had reversible obstruction [95% CI 3.6–18.1]. These changes were not influenced either by the pack-year units (p-value = 0.478) or dyspnea (p-value = 0.384).

One-quarter of the participants mentioned were aware of their pulmonary disease, prior to the study. In particular, four patients, in whom a non-reversible obstruction was observed, stated that they had been diagnosed with bronchopneumonia, asthma, tuberculosis and emphysema. Tuberculosis was also reported by a patient with small airway obstruction and by one individual with a reversible obstruction. Also in the group of patients with small airway obstruction, two mentioned that they suffered from bronchitis. Lastly, patients without spirometry alterations reported six diseases: bronchopneumonia, bronchitis, chronic obstructive pulmonary disease, pulmonary infection, pulmonary lesion and tuberculosis. This segmentation of patients was based on the information provided by them, given in their own words and without any codification. We are aware that this kind of information can lead to mistakes in diagnosis, although these descriptions reflect the knowledge that patients had about their illness. For that reason, we believe that it is important to keep to the patient's words which is why we cannot provide more specific descriptions.

In relation to the distribution of patients with non-reversible obstruction in spirometry, three groups were defined in accordance with GOLD criteria. Group A represents 72.7% of the sample, group B is associated with 9.1% and lastly, 18.2% belongs to group C. Note that the diagnosed patient, previously to the study, was part of group A. Group C was surprisingly large, which could be related to inaccurate answers to the mMRC questionnaire; individuals might have reported themselves as asymptomatic because, in real life, they do not perceive the symptoms and limitations of their disease.

To sum up, let us consider a sample of 100 individuals older than 40 years with a history of smoking. In accordance with the above described results, 41 of them will report some alteration in the spirometry: 18 patients will be diagnosed with a non-reversible obstruction, 8 people with reversible obstruction and 15 participants will have alterations in the small airway.

We also compared these results with the records available in our healthcare facility. We observed a difference of 14.6% between both values: the above study reported 18.0% chronic obstructive pulmonary disease while our records only show 3.4%. This significant difference can be partly explained by (a) the absence of relationship between the pack-year units and dyspnea with the presence of alterations in spirometry, as found in this study; (b) as mentioned by some physicians, the lack of accessibility to a spirometry; (c) the lack of evidence of cost-effective benefit in this screening and (d) the probability of a false positive result in healthy individuals.

This study has some limitations, namely, the use of a non-randomized sample (the patients were invited to participate by their family physician), the small size of the sample and the fact that other causes for non-reversible obstruction were not excluded.

However, the prevalence of chronic obstructive pulmonary disease follows the results reported by other studies (21–34.8%) with a similar design.[2,4,6,7]

Similar studies,[9,10] reporting results for other countries, have found a significant relationship between the PYU and dyspnea in the presence of alterations in the spirometry. Therefore, based only on our study, we cannot state the significance of these particular findings. In a scenario that these represent the truth, could be this the reason for the under-diagnosis of this disease? If patients do not feel ill or if the doctor does not understand the importance of the low and mild smoker's risk factor, there is no further investigation and consequently, no disease. On the other hand, the low *p*-value observed may be due to the small sample size. Might other studies, for which a significant difference was observed, have compelled their *p*-value by the large sample used and then differences were found where there were none?

What are the consequences of these results? Is this evidence enough to recommend an early screening in asymptomatic smokers? Or should we perform a ''case-finding'' approach, with questionnaires? Are the available resources in the national healthcare system enough to carry out this early detection? What are the reasons of this apparent under-diagnosis?

This study was the first of its kind in our healthcare facility. The results obtained raise issues regarding the screening of this pathology and reinforce the need for investment in this area. As a matter of fact, in 2014, the results here described led to the extension of this project to other geographical areas served by the ACES Baixo Mongedo, involving a significant number of healthcare units. In addition, the study also highlighted the need to improve coordination between primary and secondary healthcare in the management of this disease.

Funding

This study was sponsored (spirometry and a cardiopneumology technician) by Novartis®, Portugal.

Conflicts of interest

This study was sponsored (spirometry and a cardiopneumology technician) by Novartis®, Portugal.

Acknowledgments

We thank USF BRIOSA, and all their healthcare professionals, for receiving us and for the commitment during this study.

We thank Marisa Figueiredo for reviewing this manuscript.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.rppnen.2015.02.004.

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http://dx.doi.org/10.1016/j.rppnen.2015.02.004