

Spirometry in primary health care as a tool for the family and community physician - experience report

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Abstract

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable respiratory pathology, with spirometry being mandatory in the clinical suspicion of COPD, since it assesses the presence of airflow obstruction and bronchodilator response. Objective: To describe the use of spirometry in primary health care in patients with COPD. Methods: This is an experience report whose sample consisted of individuals with COPD who underwent spirometry in primary care by the family doctor. Results: There was a predominance of males (68.42%, n=13). Regarding the age group, the highest prevalence was in those individuals aged 70 to 79 years (36.84%). At spirometry, 42.11% (n=8) had a very severe flow restriction and 36.84% (n=7), severe. Conclusions: It is a pioneering project in the State of Santa Catarina and it is expected that its results will inspire other professionals to be trained in the practice of spirometry or use telemedicine as an option, given the great improvement in the diagnostic and therapeutic criteria for patients with this pathology. In the scenario of this research, there was benefit for these patients, both in cost reduction and in the optimization of their therapy from a clinical diagnosis, but also a complementary one.

Keywords: Spirometry; Lung Diseases; Primary Health Care.

Resumen

Espirometría en atención primaria de salud como herramienta para el médico de familia y comunidad - informe de la experiencia.

Introducción: La enfermedad pulmonar obstructiva crónica (EPOC) es una patología respiratoria prevenible y tratable, siendo la espirometría obligatoria en la sospechosa clínica de EPOC, ya que evalúa la presencia de obstrucción del flujo aéreo y la respuesta al broncodilatador. Objetivo: Describir el uso de la espirometría, en la atención primaria a la salud, en pacientes con EPOC. Métodos: Se trata de un relato de experiencia cuya muestra fue constituida por individuos con EPOC y que realizaron espirometría en la atención primaria, por el médico de familia. Resultados: Hubo predominio del sexo masculino (68,42%, n = 13). En cuanto al grupo de edad, la mayor prevalencia fue en aquellos individuos con edad entre 70 a 79 años (36,84%). A la espirometría, el 42,11% (n = 8) presentaba restricción al flujo muy grave y el 36,84% (n = 7), grave. Conclusiones: Se trata de un proyecto pionero en el Estado de Santa Catarina y se espera que sus resultados inspiren a otros profesionales a capacitarse en la práctica de la espirometría, dado a que mejora en los criterios diagnósticos y terapéuticos para los pacientes con tal patología. En el escenario de esta investigación, hubo beneficio para estos pacientes, tanto en la reducción de costos, como en la optimización de su terapéutica a partir de un diagnóstico no sólo clínico, sino también complementario.

Palabras-clave: Espirometría; Enfermedades Pulmonares; Atención Primaria de Salud.

Espirometria na atenção primária à saúde como uma ferramenta para o médico de família e comunidade - relato de experiência.

Introdução: A Doença Pulmonar Obstrutiva Crônica (DPOC) é uma patologia respiratória prevenível e tratável, sendo a espirometria obrigatória na suspeita clínica de DPOC, uma vez que avalia a presença de obstrução do fluxo aéreo e a resposta ao broncodilatador. Objetivo: Descrever o uso da espirometria, na atenção primária à saúde, em pacientes com DPOC. Métodos: Trata-se de um relato de experiência cuja amostra foi constituída por indivíduos com DPOC e que realizaram espirometria na atenção primária, pelo médico de família. Resultados: Houve predomínio do sexo masculino (68,42%, n=13). Quanto à faixa etária, a maior prevalência foi naqueles indivíduos com idade entre 70 a 79 anos (36,84%). À espirometria, 42,11% (n=8) apresentavam restrição ao fluxo muito grave e 36,84% (n=7), grave. Conclusões: Trata-se de um projeto pioneiro no Estado de Santa Catarina e espera-se que seus resultados inspirem outros profissionais a se capacitarem para a prática da espirometria ou a utilizar a telemedicina como opção, dada a melhora sobremaneira nos critérios diagnósticos e terapêuticos para os pacientes com tal patologia. No cenário desta pesquisa, houve benefício para estes pacientes, tanto na redução de custos, quanto na otimização da sua terapêutica a partir de um diagnóstico não só clínico, mas também complementar.

Palavras-chave: *Espirometria; Doenças Pulmonares; Atenção Primária à Saúde.*

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable respiratory pathology that has as characteristic the persistence of airflow obstruction not totally reversible¹. It usually presents a progressive evolution, associated with the exacerbated inflammatory response of the lungs in the decorence of the inhalation of toxic particles or gases, whose main emphasis is the smoke of the tabaco¹.

COPD is responsible for three million deaths each year, reaching 5% of deaths from all causes and, with an estimate of a progressive increase in mortality from 1990 to 2010, COPD passed from the fourth to the third cause of death¹. The World Health Organization (WHO) considers that 65 million people in the world have moderate to severe COPD; whereas in 2002 the COPD was the fifth cause of world mortality and that in 2020 it will be the third cause of death. In addition, this pathology is one of the main causes of morbidity in the entire world^{2,3}.

In Brazil, COPD is the third cause of death among non-communicable chronic diseases, with an increase of 12% in the number of deaths between 2005 and 2010, which currently represents almost 40,000 deaths per year. The disease was responsible for the cost of R\$ 104 million to the Unified Health System (Sistema Único de Saúde) in 2015, referring to 122,493 hospitalizations. This cost was higher than that of patients with acute myocardial infarction or systemic arterial hypertension and, moreover, was equivalent to the value spent with the admission of Diabetics⁴.

In the past, due to the epidemic of smoking predominating in males, it is observed, nowadays, mortality (due to respiratory diseases) higher among men. However, with the increase in the incidence of smoking in women, it is observed, as a reflex, the increase also in the COPD mortality curve for the female⁵. According to the North-American⁶ Disease Control and Prevention Center, in the United States, mortality in women has surpassed that of men, which is not observed in Brazil. In São Paulo, the prevalence was 15.8%, being 18% in men and 14% in women².

Spirometry is mandatory in the clinical suspicion of COPD, since it evaluates the presence of airflow obstruction and if there is reversibility of it after the use of short acting bronchodilator¹. Moreover, the examination is also of great value for the follow-up of patients. However, despite its importance, spirometry is poorly used in primary care, which results in a higher subdiagnosis of DPOC^{7, 8}.

Thus, with the need for referral to larger centers for the accomplishment of this test, COPD is diagnosed in more advanced stages, which results in more complex and costly treatment to the health system. In view of this scenario, the present study aimed to describe the use of spirometry in patients with COPD in primary health care. The research is justified due to the possibility that, based on the report of the implementation of this type of action, physicians could direct the treatment, improve the quality of life of this group of patients and also, increase the resolutiveness of primary care in health.

Methods

This is a report of experience in which the sample consisted of residents of the city of Agua Doce, Catarina state, whose population, according to the Brazilian Institute of Geography and Statistics, in the year 2012 was 6,961 inhabitants⁹. The city has 100% coverage by Primary Health Care.

We used a population sample consisting of individuals with Chronic Obstructive Pulmonary Disease (COPD) and who underwent spirometry in the Family Health Strategy (FHS) of the city of Água Doce, between august 2014 and may 2015. The examinations were performed by the family physician and community with portable spirometer of the brand Contec®, acquired with own resources. To perform the examination, the patient seated was asked to put in the mouth the spirometer, inhale deeply and expire with as much force as possible, without holding the breath. After three measurements were sprayed four jets in the mouth of the patient of Salbutamol 100mcg spray, which should hold the breath. After fifteen minutes of the first examination three new measurements were made in order to evaluate

the efficacy of the bronchodilator.

From the sample obtained, the following variables were considered: gender (male or female); age in years; education, profession smoking (presence, type and time of use); use of Formoterol 12 mcg isolated or associated with Budesonide 400 mcg, used one to two times a day; The classifications according to the latest guideline of the Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) and; the modified dyspnea scale of the Medical Research Council (MRC). It has five stages, starting at zero (in which the patient refers to lack of air when performing intense exercises), followed by stage I (referring to lack of air when walking faster than usual or when climbing stairs or slopes). Stage II, in which the majority of patients with COPD diagnosis is found, is characterized by the interruption of walking in habitual gait sometimes or walking slower than other people of the same age. In stage III there is a need to make several stops when walking 100 meters or a few minutes of walking in the plane. Finally, in stage IV, the patient does not leave the house due to intense shortness of breath or mentions that he needs help for basic activities of the day-to-day, such as dressing or taking shower^{10,11}. In turn, in the guideline of GOLD¹, the disease is stratified according to spirometry, based on the values of FEV1 (Forced Expiratory Volume in the first second) post-bronchodilator and the relationship between FEV1 as dividend and forced vital capacity (FVC) as divisor. In these terms, the disease has four stages with increasing severity, and in all it is presented the ratio FEV1/FVC, which should be less than 0.70 after the administration of the bronchodilator.

Data analysis was performed using the software EPI INFO v.7.0.9.7. The descriptive statistics were calculated for all continuous variables (described in mean and standard deviation values) and categorical (presented in absolute numbers and percentages). This study strictly followed the precepts contained in Resolution N°466/2012 of the National Commission for Ethics in Research and was initiated after the approval of the Ethics Committee in Research of UNOESC/HUST, being registered under the number of the C.A.A.E 50075715.2.0000.5367.

Results

They were selected for sample, because they underwent spirometry in the FHS during the study period, nineteen patients with COPD. There was a predominance of males (68.42%, n = 13). Regarding age range, the highest prevalence was in those individuals aged 70 to 79 years (36.84%), followed by those with 60 to 69 years and 50 to 59 years, with 26.32% each. In relation to educational level, 63.16% (n =12) of the sample had incomplete elementary education and the most frequent profession was that of farmer, with

47.37% (n = 9). The other results related to the simple profile are described in Table 1.

Table 1. Socio-demographic characteristics of patients with COPD who underwent spirometry in the city Água Doce, Santa Catarina, Brazil, 2016 .

Variable	n (%)
Gender	
Female	6 (31,58)
Male	13 (68,42)
Age Range (years)	
40 - 49	1 (5,26)
50 - 59	5 (26,32)
60 - 69	5 (26,32)
70 - 79	7 (36,84)
80 or more	1 (5,26)
Education	
No education	1 (5,26)
Incomplete Basic Education	12 (63,16)
Completed Basic Education	2 (10,53)
Incomplete High School	-
Completed High School	2 (10,53)
Incomplete College degree	-
Complete College degree	1 (5,26)
Postgraduated, master and/or doctorate	-
Profession	
Technicians and Middle Level Professionals	-
Specialists in the intellectual and scientific professions	-
Administrative and similar staff	3 (15,79)
Senior managers of the public administration, company managers and senior management	-
Service staff and vendors	1 (5,26)
Farmers and skilled workers in agriculture and fisheries	9 (47,37)
Workers, craftsmen and similar workers	1 (5,26)
Plant and machinery workers and assembly workers	-
Unskilled workers	1 (5,26)
Housewife/Househusband	4 (21,05)
Total	19 (100,00)

Regarding smoking habit, 36.84% (n = 7) of the patients reported being smokers, 21.05% (n = 4) non-smokers and 42.11% (n = 8), former smokers. Of these, 75% (n = 6) had stopped smoking for more than 10 years. Among the individuals who claimed to be active smokers (n = 7), all were doing it for more than ten years. Regarding the medication, 68.42% of the patients (n = 13) used Formoterol 12 mcg associated with Budesonide 400 mcg twice a day. Considering the results of spirometry performed with patients, 42.11% (n = 8) of the studied individuals fall into the group with restriction to very severe flow and 36.84% (n = 7) presented severe staging. Regarding the Modified Dyspnea Index of the Research Council (mMRC), 31.58% (n = 6) reported having to stop a few times when they walked in the usual step, or slower than other people of the same age. Still, other 31.58% (n = 6) reported needing to stop often due to lack of air when walking for about a hundred meters, or few minutes of walking on flat ground. The Table 2 summarizes the other findings observed in the study.

Table 2. SClinical and smoking-related characteristics in COPD patients who underwent spirometry in the city of Água Doce, Santa Catarina. Brazil, 2016 .

Variable	n (%)
Smoking	
Yes	7 (36,84)
No	4 (21,05)
Ex-smoking	8 (42,11)
Time of Smoking	
(For those who answered yes to smoking)	
Less than 1 year	-
1 to 5 years	-
6 to 10 years	-
More than 10 years	7 (100)
Type of Smoking	
(For those who answered yes to smoking or ex-smoking)	
Cigarette	15 (100)
Haystack	7 (46,67)
Smoking Pipe	-
Medication in use	
Formoterol 12 mcg single dose	1 (5,26)
Formoterol 12 mcg 12/12h	2 (10,53)
Formoterol 12mcg + Budesonida 400mcg single dose	3 (15,79)
Formoterol 12mcg + Budesonida 400mcg 12/12h	13 (68,42)

Classification GOLD

Mild	1 (5,26)
Moderate	3 (15,79)
Severe	7 (36,84)
Very severe	8 (42,11)

Dyspnea Classification (modified MRC)

Grade I	1 (5,26)
Grade II	4 (21,05)
Grade III	6 (31,58)
Grade IV	6 (31,58)
Grade V	2 (10,53)

Total	19 (100,00)
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Discussion

The Unified Health System (SUS) is conformed to be a decentralized and hierarchized health system. In this context, 85% of resolutiveness occurs in Primary Health Care (APS – Atenção Primária à Saúde)¹². Those cases of high and medium complexity are the responsibility of Tertiary and Secondary Care, respectively. This, mainly due to the high demand, the low supply of professional and technological resources, lack of planning and failures present in the operating system, cannot meet all cases with the necessary efficiency¹³. Despite the high resolution, the FHS also needs qualification and constant improvement of its assistencial process¹⁴, as is the case of the availability of more sophisticated diagnostic methods that could well supply demands and avoid secondary attention overload. Therefore, the proposal to perform spirometry tests in patients with COPD in the FHS corroborates this assertion and justifies the present report.

A previous study conducted in a city in the State of Goiás showed that more than 70% of individuals with risk factors for COPD had underdiagnosis, about 15% had overdiagnosis, and in only 1.5% of the cases spirometry was used as a diagnostic tool¹⁵. Another study, which evidenced the extent of the underdiagnosis of COPD in patients at risk in primary care, concluded that screening in smokers above 40 years old may serve to detect up to 20% of undiagnosed cases of DPOC¹⁶. Also, due to the higher tendency of suspicion of COPD in men, there is a greater underdiagnosis in women, especially in primary care¹⁷. The present study observed, in agreement with the literature, a greater number of men with COPD who underwent the test.

Similarly, in a study conducted in the north and northeast regions of Brazil to assess the prevalence of chronic respiratory pathologies in primary care, it was emphasized that the majority of the general practitioners had training in special-

ized contexts and did not know the prevalence rate of COPD in the population¹⁸. Moreover, it was also observed that high age, male, smoking and the presence of two associated respiratory symptoms are strong predictors of COPD in the initial evaluation of individuals treated in the FHS¹⁸. These findings reinforce that greater knowledge about COPD, through medical training, would avoid both the under and the overdiagnosis, as well as would reduce the prescription of presumption treatments without adequate efficacy.

Spirometry can be used as a diagnostic, staging and monitoring method of chronic respiratory disease¹⁹. However, the implementation of spirometry in the FHS, as an isolated measure, has proved insufficient, being more effective those strategies that combine the implantation of spirometers, establishment of clinical guidelines for its proper use and measures of permanent education¹⁹. Thus, a barrier to the use of spirometry in the FHS is related to the low quality of the interpretation of the exams, when not performed by professionals who have adequate qualification for it²⁰. In the production of this study, the authors emphasize that, for the accomplishment of the exams in the FHS, the medical professional conducted extensive research for their training and practice.

In Rio Grande do Sul, due to the prevalence of chronic respiratory diseases in the state, the “RespiraNet” was launched – the first Brazilian telediagnostic service for respiratory diseases by means of spirometry²⁰. The project is based on a study conducted in a countryside of that state, and demonstrated that the costs of implementing a spirometer in an FHS are lower than the annual costs for patients directed to the referral center to perform the necessary procedures until they are counter-referenced for primary care²¹. Often, the low demand or, even, the non-demand of a certain diagnostic method occurs due to the lack of equipment or technicians trained in its operation in the region in which this occurs²². Thus, the implantation of a decentralized spirometer represents a lower cost, mainly due to the reduction of road displacement and the demand suppressed by this medium complexity examination.

Conclusions

The present study aimed to describe the authors' experience in performing spirometry in the FHS, as a diagnostic method for COPD. It is a pioneering project in the state of Santa Catarina and it is hoped that the dissemination of the results inspire other professionals to qualify for the practice of spirometry, greatly improving diagnostic and therapeutic criteria for the patients with such pathology.

Among the limitations of the study are the small sample size, although the main outcome was the completion of the examination with primary care. Larger studies could evaluate the real benefit of spirometry practice, in a decentralized way by training professionals working in the various Family Health Strategies (FHS) or, mainly, through telemedicine –

an option that demonstrates to be feasible for the Unified Health System (SUS) and extremely valuable to patients with COPD or other respiratory diseases.

Therefore, in the scenario of this research, there was benefit for patients, both in the form of cost reduction and for the optimization of their therapy. This result was mainly achieved by the fact that the diagnosis was established not only based on clinical symptoms, but also on criteria that use spirometry as a fundamental part of the process.

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