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Prevalence of physical therapy treatment in older adults with chronic obstructive pulmonary disease: results from ELSI-Brazil

Prevalência do tratamento fisioterapêutico em adultos mais velhos com doença pulmonar obstrutiva crônica: resultados do ELSI-Brasil

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Abstract

Background: Although physiotherapeutic treatment is recommended in the management of people with Chronic Obstructive Pulmonary Disease (COPD), referrals to this service remain insufficient. Aim: To assess the prevalence of physiotherapeutic treatment among older adults with COPD in Brazil and its associated factors. Methods: Cross-sectional study using data from the second wave of the Brazilian Longitudinal Study of Aging (ELSI-Brazil, 2019–2021). The outcome was the self-reported use of physiotherapeutic treatment by individuals with COPD. Sociodemographic and health-related variables were considered as exposures. Poisson regression was performed to estimate crude and adjusted prevalence ratios (PR) with 95% confidence intervals (CI). Results: Data from 333 individuals were analyzed, most of whom were women (59.0%) and aged 50 to 59 years (49.0%). Only 11.6% (95%CI: 7.9–16.7) reported undergoing physiotherapeutic treatment. Higher prevalence rates were observed among men, older individuals, those with higher educational levels, former smokers, users of oxygen therapy, and those hospitalized in the past 12 months. In the adjusted analysis, male (PR: 2.18; 95%CI: 1.13–4.19) and recent hospitalization (PR: 2.19; 95%CI: 1.01–4.77) remained significantly associated with the outcome. Moreover, individuals with no formal education (PR: 0.26; 95%CI: 0.08–0.86) or with 1 to 4 years of education (PR: 0.44; 95%CI: 0.20–0.92) showed a lower prevalence of physiotherapeutic treatment. Conclusion: The low prevalence of physiotherapeutic treatment among older adults with COPD—particularly among those with lower education—highlights existing inequalities in access. These findings underscore the need for strategies to expand service availability and referral pathways, especially for the most vulnerable populations.

Keywords: Chronic Obstructive Pulmonary Diseases; Physical Therapy; Prevalence.

Resumo

Introdução: Embora o tratamento fisioterapêutico seja recomendado no manejo de pessoas com Doença Pulmonar Obstrutiva Crônica (DPOC), o encaminhamento para esse serviço ainda é insuficiente. Objetivo: Verificar a prevalência do tratamento fisioterapêutico em indivíduos mais velhos com DPOC no Brasil e os fatores associados. Métodos: Estudo transversal com dados da segunda onda do Estudo Longitudinal de Saúde dos Idosos Brasileiros (2019-2021). O desfecho foi a realização de tratamento fisioterapêutico autorreferida por indivíduos com DPOC. Variáveis sociodemográficas e de saúde foram consideradas exposições. Utilizou-se regressão de Poisson para estimar razões de prevalência (RP) brutas e ajustadas, com intervalos de confiança (IC) de 95%. Resultados: Foram analisados dados de 333 indivíduos, a maioria mulheres (59,0%), com idade entre 50 e 59 anos (49,0%). Apenas 11,6% (IC95% 7,9-16,7) dos indivíduos relataram realizar tratamento fisioterapêutico. Maiores taxas de prevalência foram observadas entre homens, com idade mais avançada, com maior escolaridade, ex-tabagistas, em uso de oxigenioterapia e com internação nos últimos 12 meses. Na análise ajustada, o sexo masculino (RP: 2,18; IC95%: 1,13-4,19) e a internação hospitalar mantiveram-se associados ao desfecho (RP: 2,19; IC95%: 1,01-4,77). Além disso, indivíduos que nunca estudaram (RP: 0,26; IC95%: 0,08-0,86) ou que estudaram de 1 a 4 anos (RP: 0,44; IC95%: 0,20-0,92) apresentaram menor prevalência do tratamento. Conclusão: A baixa prevalência do tratamento fisioterapêutico entre os adultos mais velhos com DPOC, especialmente entre os menos escolarizados, evidencia desigualdades no acesso. Esses achados sugerem a necessidade de estratégias que ampliem a oferta e o encaminhamento a este tratamento, especialmente para os grupos mais vulneráveis.

Palavras-chave: Doença Pulmonar Obstrutiva Crônica; Serviços de Fisioterapia; Prevalência.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a preventable and treatable respiratory disease[1] that represents the third most common cause of death globally[2]. In Brazil, it ranks fifth among the leading causes of death, with an annual mortality rate of 51.5 per 100,000 inhabitants between 2010 and 2018[3]. The prevalence of COPD in Brazil is estimated to be 19.0% among adults aged 40 years and older[4], highlighting the importance of management and prevention strategies to reduce the global burden of the disease[5].

The disease is characterized by airflow obstruction and impaired pulmonary gas exchange[6]. However, it is associated with systemic impairment, involving cardiovascular, nutritional, psychological, and neuromusculoskeletal changes[7]. In addition, COPD exacerbations can accelerate the progression of the disease[8,9], increase the risk of hospitalization and death, as well as impair functional capacity[10] and quality of life[8].

Given the consequences of COPD, physiotherapeutic care is a key element in the treatment of these patients. It includes physical training, education, and behavior change, designed to improve physical condition and promote long-term adherence to health-enhancing behaviors[11]. This approach increases exercise capacity, reduces symptoms, and improves psychological well-being and quality of life, lowering the rate of exacerbations and the demand for health services[12].

Given the high prevalence of COPD e in Brazil, generating a significant demand on health services, and that physiotherapy treatment can benefit both patients and the public system, this study aims to verify the prevalence of physiotherapy treatment among older adults with COPD in Brazil, as well as to identify the sociodemographic and clinical characteristics associated to the use of physiotherapy services. By identifying patterns of prevalence and patient profiles related to physiotherapy use it is hoped not only to better understand the current scenario but also to contribute to the development of more targeted health policies.

METHODS

Study design

This is a cross-sectional study using data from the second wave of the Brazilian Longitudinal Study of Aging (ELSI-Brazil), which was designed following the recommendations of the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE).

Ethics

The ELSI-Brazil project was submitted and then approved by the Research Ethics Committee of the René Rachou Research Center/Oswaldo Cruz Foundation, Brazil, under CAAE number 34649814.3.000.5091. All participants provided written informed consent.

Study context

ELSI-Brazil was based on a nationally representative sample of adults aged 50 and over living in the community, aimed at investigating the dynamics of the ageing of the Brazilian population and its determinants. The second wave of ELSI-Brazil was carried out between 2019 and 2021 and included 9949 participants[13,14]. The interviews were conducted by trained researchers using a structured questionnaire designed for the study.

To ensure that the sample represented the urban and rural areas of small, medium, and large municipalities, the ELSI-Brazil used a multi-stage sampling design, combining the stratification of primary sampling units (municipalities), census tracts, and households. Municipalities were allocated into four strata depending on population size: first stratum (≤ 26,700 inhabitants from 4,420 municipalities); second stratum (26,701 - 135,000 inhabitants from 951 municipalities); third stratum (135,001-750,000 inhabitants from 171 municipalities); and fourth stratum (> 750,000 inhabitants from 23 municipalities). All residents of the selected households aged 50 or over were eligible for interview. A reverse sampling design was employed to mitigate non-response bias without increasing the sample size. The final sample consisted of participants from 70 municipalities in the main Brazilian regions. Sample weights were derived to weigh the differential probability of selection and differential non-response. Further details on methodological aspects can be found in Lima-Costa et al.[13,14].

Participants

Participants from ELSI-Brazil study was if they answered yes to the question: "Has a doctor ever told you that you have emphysema, chronic bronchitis, or chronic obstructive pulmonary disease (COPD)?". Participants with incomplete data on the exposure variables detailed below were excluded.

Variables

Physiotherapy treatment, the outcome variable in this study, was assessed by the g question : "Do you undergo physiotherapy for lung disease (asthma, emphysema, chronic bronchitis, or chronic obstructive pulmonary disease (COPD))?", providing the following answer options: "No", "Yes".

The exposure variables comprised the following sociodemographic and health factors: use of oxygen (O_2); hospitalization in the last 12 months (yes, no); smoking (never, former smoker, current smoker); age group (50-59, 60-69, 70-79, 80 years and over), sex (female, male), schooling in years of study (no formal schooling, 1-4

years, 5-8 years, 9, or more), and private health insurance (yes, no). These variables were also used as adjustment parameters in the regression models.

Statistical analysis

The statistical analysis was carried out on the Stata software, version 16.0, accounting for the sample weights given by the study design and complex sampling. Initially, a descriptive analysis was carried out, presenting absolute and relative frequencies, along with the respective 95% confidence intervals (95%CI) for the qualitative variables, and measures of central tendency and dispersion for the quantitative variables. The chi-square test was used in the bivariate analysis between the exposure variables and the outcome. Next, crude and adjusted Poisson regression analyses were carried out to estimate the prevalence ratios and their respective 95%CI. Regression models were drawn up for each exposure variable, with adjustments for the other study variables. The marginal effects of interactions between gender and age group, as well as between gender and schooling, were also assessed using the margins command. Results with a p-value < 0.05 were considered statistically significant. As this is a secondary analysis of a database, the analyses were not pre-specified in the original study protocol, and no sample calculation was carried out for the outcome of interest.

RESULTS

Among the 9,949 ELSI-Brazil participants, 342 (3.61%, 95%CI: 2.99-4.37) older adults reported having been diagnosed with COPD by a doctor. Out of these, 333 held complete information and were included in the analyses, as shown in Figure 1. Table 1 shows the sample description and analysis of physiotherapy treatment. The mean age was 67.2 years (SD=10.5) and the median was 66 years (IQR=58-75). Most of the sample comprised women (59.0%), aged between 50 and 59 years (49.0%), 39.0% reported one to four years of schooling, and 55.0% had never smoked, while 27.0% were former smokers. The use of O_2 was reported by 22.0%, 17.0% had been hospitalized in the last year, and 21.0% had health insurance. Figure 2 shows the distribution of participants included in the study by according to Brazilian region.

Physiotherapy treatment was reported by 11.6% of participants (95%CI: 7.9-16.7), being more prevalent among men, with 18.0% (p = 0.008). The prevalence of treatment increased with advancing age (p = 0.031), with 22.0% of

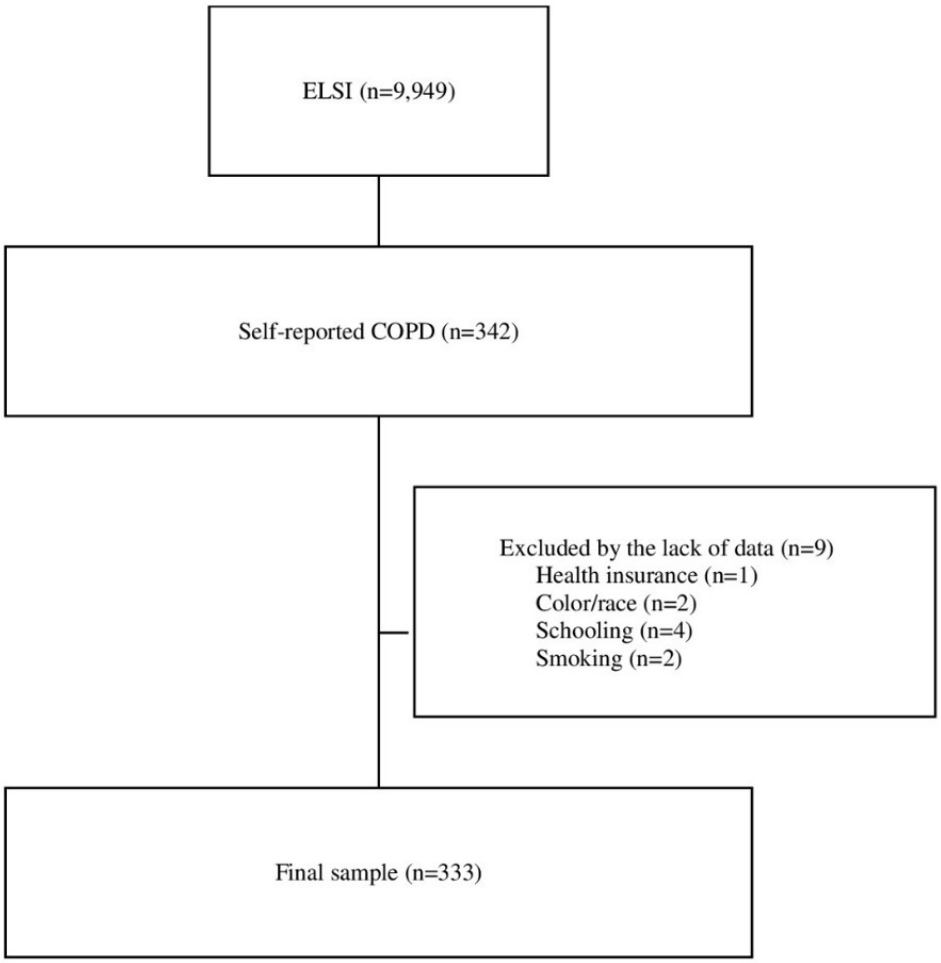

Figure 1. Sample selection flowchart based on the inclusion criteria, ELSI-Brazil, 2019-2021.

Table 1. Descriptive and bivariate analysis of factors associated with physiotherapy treatment ELSI-Brazil, 2019-2021.

Variables	Description		Physiotherapy treatment		P value
	n	% (95% CI)	*Yes*	*No*	
			% (95% CI)	% (95% CI)	
Age (years)					0.031
50-59	99	49.0 (41.0-57.0)	9,0 (4.0-18.0)	91.0 (82.0-96.0)	
60-69	112	27.0 (22.0-33.0)	7.0 (4.0-13.0)	93.0 (87.0-96.0)	
70-79	71	14.0 (10.0-19.0)	22.0 (13.0-33.0)	78.0 (67.0-87.0)	
80 or more	51	10.0 (6.0-15.0)	22.0 (10.0-41.0)	78.0 (59.0-90.0)	
Sex					0.008
Female	208	59.0 (50.0-67.0)	7.0 (4.0-12.0)	93.0 (88.0-96.0)	
Male	125	41.0 (33.0-50.0)	18.0 (11.0-28.0)	82.0 (72.0-90.0)	
Schooling (years)					0,355
9 or more	77	25.0 (19.0-32.0)	17.0 (10.0-28.0)	83.0 (72.0-90.0)	
5 to 8	78	21.0 (15.0-29.0)	8.0 (4.0-16.0)	92.0 (84.0-96.0)	
1 to 4	121	39.0 (31.0-47.0)	11.0 (5.0-22.0)	89.0 (78.0-95.0)	
Never studied	57	15.0 (9.0-25.0)	8.0 (3.0-21.0)	92.0 (79.0-97.0)	
Smoking					0.030
Never smoked	163	55.0 (45.0-64.0)	9.0 (5.0-17.0)	91.0 (83.0-95.0)	
Former smoker	110	27.0 (31.0-35.0)	19.0 (12.0-30.0)	81.0 (70.0-88.0)	
Active smoker	60	18.0 (12.0-25.0)	7.0 (3.0-15.0)	93.0 (85.0-98.0)	
O_2 use					0.009
No	264	78.0 (70.0-84.0)	9.0 (5.0-14.0)	91.0 (86.0-95.0)	
Yes	69	22.0 (18.0-30.0)	22.0 (13.0-37.0)	78.0 (63.0-87.0)	
Heath insurance					0.955
No	270	79.0 (72.0-85.0)	12.0 (7.0-17.0)	88.0 (83.0-93.0)	
Yes	63	21.0 (15.0-23.0)	12.0 (6.0-23.0)	88.0 (77.0-94.0)	
Hospitalization in the last 12 months					0.004
No	276	83.0 (75.9-88.8)	8.0 (5,0-13,0)	92.0 (87.0-95.0)	
Yes	57	17.0 (11.0-24.0)	27.0 (13.0-48.0)	73.0 (52.0-87.0)	

Legend: O_2: Oxygen. The data shown in brackets correspond to the 95% confidence intervals (95% CI) of the prevalence rates.

individuals aged between 70 and 79 and 22.0% of those over 80 having undergone treatment. Among former smokers, 19.0% underwent physiotherapy, compared to only 7.0% of active smokers (p = 0.030). In addition, 22.0% of those who used oxygen (p = 0.009) and 27.0% of those who had been hospitalized (p = 0.004) received physiotherapy treatment. No significant associations were found with schooling or having health insurance (Table 1).

Table 2 shows the results of the crude and adjusted prevalence ratios derived by Poisson regression. In the crude analysis, the prevalence of physiotherapy treatment was higher among males (PR: 2.48; 95%CI: 1.25-4.91), former smokers (PR: 2.09; 95%CI: 1.01-5.34), those using oxygen therapy (PR: 2.63; 95%CI: 1.28-5.44), and being admitted to hospital in the last 12 months (PR: 3.27; 95%CI: 1.50-7.10).

Figure 2. Percentage distribution of participants included in the study according to Brazilian region, ELSI-Brazil, 2019-2021.
Legend: Values presented in percentages.

The adjusted analysis pointed to sex , schooling, and hospitalization as the factors associated with physiotherapy treatment . The prevalence of treatment was significantly higher among males (PR: 2.18; 95%CI: 1.13-4.19) and those who had been hospitalized in the last 12 months (PR: 2.19; 95%CI: 1.01-4.77). Conversely, individuals with lower levels of schooling (PR: 0.44; 95%CI: 0.20-0.92 for 1 to four years of schooling and PR: 0.26; 95%CI: 0.08-0.86 for those who had never studied) had a lower prevalence of treatment.

The interaction between sex and schooling was investigated, given the shift in the significance of the association between schooling and physiotherapy treatment in the adjusted models. Figure 3 shows the adjusted predictive means of the probability of undergoing treatment as a function of the interaction between sex and schooling. Women are significantly less likely to undergo treatment than men (7.6% vs. 16.6%; p<0.001). As to schooling, there was a downward trend in the likelihood of undergoing physiotherapy treatment as schooling decreased, with a significant difference between the groups (p<0.05), except for those who had never studied (p=0.058). The combination of sex and schooling boosts these effects. In all education strata, men had higher predicted averages than women, with a more pronounced difference in the group with greater schooling. Being male with nine years or more of schooling significantly (p<0.001) increased the likelihood of treatment compared to any other group.

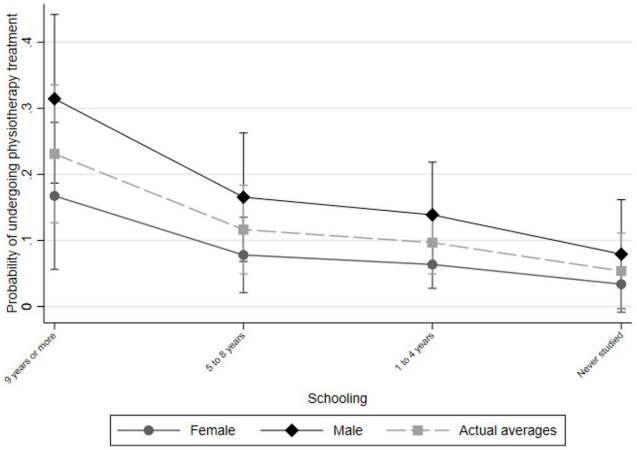

Figure 3. Adjusted predictive means of the probability of physiotherapy treatment as a function of schooling, ELSI-Brazil, 2019-2021.
Legend: The variation bars represent the 95% confidence intervals of the probabilities.

Table 2. Crude and adjusted prevalence ratios (PR) of factors associated with physiotherapy treatment, ELSI-Brazil, 2019-2021.

Variables	Crude PR bruta	Adjusted PR
	95 CI%	95 CI%
Age (years)		
50-59	1	1
60-69	0.81 (0.30-2.20)	0.92 (0.42-2.10)
70-79	2.42 (0.99-5.92)	2.22 (0.92-5.40)
80 or more	2.45 (0.89-6.74)	2.29 (0.81-16.46)
Sex		
Female	1	1
Male	**2.48 (1.25-4.91)**	**2.18 (1.13-4.19)**
Schooling (years)		
9 or more	1	1
5 to 8	0.46 (0.20-1.06)	0.51 (0.22-1.18)
1 to 4	0.65 (0.26-1.62)	**0.44 (0.20-0.92)**
Never studied	0.48 (0.16-1.45)	**0.26 (0.08-0.86)**
Smoking		
Never smoked	1	1
Former smoker	**2.09 (1.01-5.34)**	1.17 (0.52-2.68)
Active smoker	0.70 (0.25-1.96)	0.71 (0.28-1.86)
Use of supplementary O_2		
No	1	1
Yes	**2.63 (1.28-5.44)**	2.16 (0.99-1.74)
Health plan		
No	1	1
Yes	1.02 (0.46-2.27)	0.84 (0.41-1.74)
Hospitalization in the last 12 months		
No	1	1
Yes	**3.27 (1.50-7.10)**	**2.19 (1.01-4.77)**

Legend: O_2: Oxygen. In the adjusted analysis, for each exposure variable, the other variables shown in the table were considered for the adjustment. Statistically significant PR values have been highlighted in bold.

DISCUSSION

Our findings point to a low prevalence of physiotherapy treatment among older people with COPD in Brazil. Only 11.6% reported having undergone this type of treatment, with the highest prevalence rates found among males, older people, former smokers, those using oxygen therapy, and those who had been hospitalized in the last 12 months. The adjusted analysis showed significantly higher prevalence ratios for treatment among men and among those who reported hospitalization in the last year, and lower among individuals with lower levels of education.

The low prevalence of physiotherapy treatment identified in this study may be related to insufficient referral to this service[15-17]. The main barriers include the limited training of professionals to identify and manage patients with COPD[18], the lack of knowledge about the benefits and effectiveness of physiotherapy by professionals and the population, the difficulty of access, and the lack of specialized services[17,18], in addition to the lack of coverage by health insurance plans[16].

According to the Clinical Protocol and Therapeutic Guidelines for Chronic Obstructive Pulmonary Disease (COPD)[19], pulmonary rehabilitation and physiotherapy treatment are essential interventions for improving the quality of life and physical reconditioning of patients. However, resulting from limitations linked to the implementation and availability of these services in the public health system[20], the protocol recommends home-based physical exercise as an alternative. This strategy aims to provide the benefits of physical exercise, even outside the clinical environment[19]. However, it can be unfeasible and unsafe in more severe cases, reinforcing the need for public policies and initiatives to expand access to these services.

In terms of the factors associated with treatment, although age was associated with physiotherapy use in the bivariate analyses, this association was not observed in the adjusted analyses. Studies have revealed that the benefits of treatment do not depend on age and that age should not be considered a barrier to referral or completion of rehabilitation programs[21,22].

Regarding sex, there was a higher prevalence of physiotherapy treatment among men, both in the crude and adjusted analyses. Sex is widely recognized as a determinant of health[23,24], influencing the diagnosis, pathophysiology, and clinical presentation of COPD. Studies indicate that women are less likely to be diagnosed with COPD[25] and are less likely to undergo spirometry[26]. These factors may contribute to men's greater propensity to seek and undergo physiotherapeutic treatment.

In addition, it is worth mentioning the interaction between sex and education found in this study, with a higher prevalence of physiotherapy treatment among men with higher levels of education. This could suggest that barriers to treatment may be even more pronounced among women with lower levels of education. Lower levels of education have been associated with a higher risk of developing COPD and lower values for the ratio between lung volume in the first second and forced vital capacity[27], which may reflect limited access to information on prevention, early diagnosis, and the effectiveness of therapeutic interventions. In addition, low schooling is often linked to lower adherence to treatment, caused by limited understanding of the benefits of therapies, barriers to accessing health services, and financial restrictions[28].

The bivariate analyses revealed a higher prevalence of physiotherapy treatment among individuals using supplementary O_2. However, this association did not remain in the adjusted analysis, despite the borderline confidence interval. Individuals with severe COPD may develop hypoxemia as the disease progresses, making the use of supplemental oxygen essential for improving survival and quality of life[29,30]. Thus, the severity of the condition associated with the use of O_2 could be one of the factors explaining the search for treatment. However, it is worth noting that individuals with COPD who use supplementary O_2 in the long-term benefit from physiotherapy treatment to the same extent as those who do not[30].

This study also found that hospitalization was significantly associated with physiotherapy treatment, even in the adjusted analyses, highlighting the importance of this intervention in the management of COPD. A history of hospital admissions is often associated with greater severity of the disease, and patients hospitalized for severe exacerbations can benefit significantly from physiotherapy, which enhances respiratory function and reduces the recurrence of new admissions[31]. In this context, the study by Seymour et al.[31] revealed that pulmonary rehabilitation initiated after acute exacerbations can reduce the incidence of new exacerbations and hospitalizations in the following three months, reinforcing the key role of this therapeutic approach.

This study involves some limitations. Although the ELSI-Brazil features a representative sample of the population aged 50 and over, the number of individuals who reported having COPD was small, resulting in a limited sample for this analysis. Moreover, no sample calculation was carried out, which could increase the occurrence of a Type II error.

The sample consists of older adults living in the community, probably with less severe forms of the disease, which limits the generalization of the findings to hospitalized, institutionalized individuals or those with COPD in more advanced stages. Moreover, the variables were self-reported, which may affect the accuracy of the data and the number of patients included. However, this form of measurement is used in epidemiological studies[32,33]. The absence of spirometry for diagnostic confirmation may also have compromised the accuracy of the assessments.

Another relevant aspect is that the study did not assess the previous history of physiotherapy treatment or its duration, which prevents a more in-depth analysis of the continuity and effectiveness of the intervention. These limitations should be weighed when interpreting the results and outlining upcoming research that could address these methodological gaps.

CONCLUSION

This study showed a low prevalence of physiotherapy treatment among older adults with a self-reported diagnosis of COPD in Brazil, despite clinical recommendations highlighting the importance of this intervention. Factors such as male gender, higher educational level, and recent history of hospitalization were associated with a greater likelihood of receiving treatment, suggestion potential inequalities in access to care. These findings reinforce the need for public policies that promote appropriate referrals, increase the availability of physiotherapy services, and reduce barriers to access, especially for the most vulnerable groups.

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CONFLICT OF INTEREST

Nothing to declare.

ACKNOWLEDGEMENTS

Nothing to declare.

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