



Research Article

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Assessment of knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with pulmonary diseases

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Abstract

Knowledge of self-care management using exercise to improve pulmonary functions may help to reduce frequent hospitalization and mortality in patients with pulmonary diseases (PmDs). However, there is dearth of information on knowledge, attitude and practice (KAP) of exercise for pulmonary rehabilitation (ExPR) among patients with PmDs. Hence, this study investigated KAP on ExPR in patients with PmDs. This cross-sectional study involved 105 patients with PmDs (male: n=47, female: n=58) who were purposively recruited from Nigerian hospitals. Validated instruments on ExPR and socio-economic status (SES) were used to assess KAP of ExPR and SES among patients with PmDs, respectively. Data were analyzed using descriptive and inferential statistics. Alpha level was set at $p < 0.05$. The mean age of respondents was 54.0 ± 18.7 years with more than half, 56 (53.3%) reported low SES. More than a third, 36 (34.3%) of respondents had asthma. In addition, more than half, 54 (51.4%) scored above average knowledge of ExPR, less than half, 45 (47.4%) reported negative attitude to ExPR. Similarly, more than half, 60 (57.1%) demonstrated poor ExPR practice. However, there was significant associations between knowledge and level of education ($\chi^2 = 13.687$; $P = 0.003$), attitude and age ($\chi^2 = 12.602$; $P = 0.039$) and practice and SES ($\chi^2 = 17.648$; $P = 0.002$). In conclusion, patients with PmDs demonstrated good knowledge, negative attitude and poor practice of ExPR. Knowledge, attitude and practice of ExPR were significantly associated with socio-demographic and economic level among patients with PmDs.

Keywords: Knowledge, Attitude, Practice, Pulmonary disease, Pulmonary Rehabilitation, Exercise.

INTRODUCTION

The Global Burden of Diseases reported that pulmonary diseases are responsible for about 9.5 million deaths worldwide making these diseases one of the major causes of global deaths [1]. It is also now known that the top five pulmonary diseases are among the leading causes of all deaths accounting for 17.4% while 13.3% responsible for all disability – adjusted life years [2]. Pulmonary diseases account for second largest cause of death in Nigeria especially tuberculosis which caused about 4% of cumulative death in Nigeria [3].

Many factors may be responsible for mortality and disability among individuals with pulmonary diseases including but not limited to difficulty in breathing, shortness of breath, respiratory infections, respiratory failure, and respiratory muscle weakness and physical inactivity [4, 5]. Patients with pulmonary diseases may be presented with acute exacerbation of symptoms, reduction in cardiorespiratory functions and persistent easy fatigability which are the hallmark of disability in pulmonary diseases [6]. Similarly, gastro-esophageal reflux, respiratory failure, hypoxia and pulmonary hypertension are potential factors predisposing to early death amidst these patients. Undoubtedly, several studies have shown that regular physical activity and coordinated exercise is capable of preventing complications from pulmonary diseases or disability [7, 8]. Studies have also shown that physical activity, exercise, and physical fitness are central to the promotion of health conditions of these patients [9]. Similarly, Fastenau et al. [10] submitted that cardiopulmonary exercise if well implemented, helps to improve lung functions, expand lung capacity, loosen secretions, manage shortness of breath, prevent further respiratory and vesicular complications

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such as thrombus formation and control breathing pattern. Cardiopulmonary exercise is also capable of building muscle strength and increase endurance capacity as well as improves the health-related quality of life of patients with pulmonary diseases [9, 10]. Hence, self-care management that involves adequate knowledge, positive attitude and regular practice of cardiopulmonary endurance exercise becomes paramount especially in countries with socio-economic challenges such as low and middle income countries in sub - Sahara Africa.

Meanwhile, socio-economic status has been identified as an important determinant of health as well as disease conditions including pulmonary diseases [11]. It is evident that poor access to healthcare facilities and poor environment factors such as use of biomass, air pollution and household living condition such as overcrowding may increase risk of pulmonary diseases [12]. Likewise, reports have shown that patients with knowledge of their disease tend to engage in health-enhancing behaviour and practice towards ameliorating their illness [13]. It is believed that improved knowledge could help to enhance compliance with treatment including pulmonary diseases [14]. Moreover, there is optimum actualization of exercise benefits with robust understanding of its parameters and applications

There abound evidence of the efficacy of exercise for improving cardiorespiratory endurance among patients pulmonary diseases, however, little is known about knowledge, attitude and practice of cardiopulmonary exercise among patients with pulmonary diseases in Nigeria. Investigating knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with pulmonary diseases may help to improve patients' self-care management and prevention of complications. Therefore, this study investigated the level of knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with pulmonary diseases in Nigeria.

MATERIALS AND METHODS

Respondents

Respondents for this cross-sectional study were patients with pulmonary diseases who were receiving treatment in some Nigerian tertiary health facilities. Eligibility for inclusion into the study were individuals with pulmonary diseases who were receiving treatment at selected hospitals namely; Ife Hospital Unit, and Wesley Guild Hospital, Ilesha both under Obafemi Awolowo University Teaching Hospitals Complex, Ile - Ife and Osun State University Teaching Hospital, Osogbo, Nigeria. Also, included in this study were respondents whose ages range between 18 and 65 years old. They were excluded from the study if presented with other chronic diseases such as cardiovascular disease, type-2 diabetes and cognitive disorder that may limit understanding of purpose of the study. They were also excluded if such individuals with pulmonary diseases had undergone chest or abdominal surgery in the last three months. With the use of the sample size formula for cross-sectional study: $n = Z^2(p(1-p))/e^2$, and using 95% confidence interval, 5% precision level and 7.3% estimated proportion of pulmonary diseases in Nigeria [15], we estimated and recruited 105 patients.

Protocol Design

The Health Research and Ethics Committee, Institute of Public Health of the OAU gave approval for this study (IPHOAU/12/920). Administrative approval was also obtained from the consultants in-charge of the chest clinics of the selected hospitals. In addition, written informed consent was obtained from the respondents before the commencement of the study.

Assessment of knowledge, attitude and practice of exercise for pulmonary rehabilitation

The instrument used for this study was a knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with pulmonary diseases. The questionnaire was adopted from a similar study among hypertensive patients [16]. The questionnaire was restructured in such a way that items on knowledge, attitude and practice of exercise related to blood pressure control were consecutively reframed to assess KAP of exercise for pulmonary rehabilitation and pulmonary diseases. This questionnaire had two sections: The first part assessed socio-demographic data of the respondents. Information on related pulmonary diseases such as pulmonary disease type, productive or non-productive persistent cough and difficulty in breathing were recorded. The second part obtained data on knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with respiratory diseases. Items on knowledge consists of four sub-sections which included previous advice on exercise by healthcare professionals, type of cardiopulmonary exercise, combination of exercise with medication(s), the importance of cardiopulmonary exercise for improving pulmonary disease, adverse effects of cardiopulmonary exercise, place of exercise (indoor or outdoor), modes of cardiopulmonary exercises (multiple options).

In the questionnaire were also 3 items on attitude to exercise (confidence, adherence and interference) and 4 items on exercise practice (involvement, frequency, duration and challenges). The answering options were "Yes or No" or "I don't know". A correct answer response was assigned 2 points, incorrect response was given a score of 0 and "I don't know" was assigned 1 point. After summation of the responses, the maximum obtainable score was 38 points (knowledge), 14 points (attitude) and 26 points (practice).

The level of knowledge, attitude and practice of exercise for pulmonary rehabilitation was obtained with the formula: $100 \times (\text{observed score} - \text{minimum possible score}) / (\text{maximum possible score} - \text{minimum possible score})$. The 25th, 50th and 75th percentiles of the scores were classified as below average, average and above average knowledge. However, average and above average knowledge scores were considered as good while below average was labeled as poor knowledge. Furthermore, attitude were classified as negative (below 50th percentile) and positive (greater than 50th percentile), while practice was categorized as poor or good by using similar percentiles as in attitude [13]. The results of the pilot study conducted among the pulmonary patients who were not part of the main study indicated that the questionnaire had adequate internal consistency with Cronbach's alpha value of 0.73.

Assessment of socio-economic status

The socio-economic status (SES) questionnaire was used to evaluate the SES of the respondents. The administration of the questionnaire, and the classification of SES in the Nigeria context including the psychometric properties of the instrument have been explained elsewhere [11]. The questionnaire was culturally adapted into Yoruba language for those who were not literate in English language. However, help was provided by a research assistant for those who could neither read nor write in order to complete the questionnaire.

Statistical analysis

Data was summarized using descriptive statistics of frequency, percentage, mean and standard deviation. Inferential statistics of Chi square test was used to test the association of level of knowledge, attitude and practice of exercise for pulmonary rehabilitation among patients with respiratory diseases. The level of significance was set at $p < 0.05$. Statistical Package for Social Sciences (SPSS version 23 Inc. Chicago, Illinois, USA) was used for data analysis.

RESULTS

Figure 1 shows socio-demographic characteristics of respondents. Female respondents were more than half, 58(55.4%) while a majority, 87(82.9%) were married individuals. Furthermore, less than half, 47(44.8%) had tertiary education and more than half, 56(53.3%) reported low socio-economic status. Figure 2 shows frequency distribution of respondents' pattern of pulmonary diseases with asthma, pneumonia and respiratory tract infection (RTI), and pulmonary tuberculosis were 36(34.3%), 13(12.4%) and 10(9.5%), respectively. Table 1 shows respondents' knowledge and attitude towards cardiopulmonary exercise. A majority, 102(97.1%) agreed that cardiopulmonary exercise is important for improving pulmonary diseases. Almost half, 49(48.0%) of the respondents believed that exercise is very important. In addition, knowledge of type of exercise showed that a majority, 89(84.8%) chose aerobic exercise while 78(74.3%) believed that combination of medications with exercise can help to improve their conditions. Under attitude items; confidence in performing cardiopulmonary exercise showed that a quarter, 24(25.5%) of the respondents were very confident while less than half, 45(47.4%) confirmed their inability to stick to exercise programme. Also, the overall knowledge, attitude and practice scores showed that more than half, 54 (51.4%) had above average knowledge of cardiopulmonary exercise. However, more than two-third, 70(66.7%) had negative attitude to exercise

Practice of exercise shows that more than two-third, 73(68.5%) confirmed that they engaged in regular exercise but only a fifth, 24(22.4%) practiced exercise every day with 20 minutes duration. More than a third, 41(39.0%) of the respondents chose brisk walking as preferred exercise. However, the results showed that more than half, 60(54.7%) reported poor exercise practice (Table 2). Table 3 shows test of associations between respondents' knowledge, attitude and practice of exercise for pulmonary rehabilitation and socio-demographic characteristics. The results show that there was significant association between knowledge and level of education ($\chi^2 = 13.687$; $p = 0.003$). Similarly, there was significant association between attitude and age ($\chi^2 = 12.602$; $p = 0.039$) while significant association was also found between practice and SES ($\chi^2 = 17.648$; $p = 0.002$).

DISCUSSION

The objective of this study was to assess knowledge, attitude and practice of exercise for cardiopulmonary rehabilitation among patients with pulmonary diseases. The study found that a larger number of the respondents had good knowledge of exercise for improving their cardiopulmonary health. This finding may be due to good health education and adequate awareness of the importance of exercise for improving cardiopulmonary indices in patients with respiratory diseases. This level of knowledge among this cohort may also be as a result of rising health education on the pulmonary disease process, and understanding of positive effect of lifestyle changes on the disease morbidity and mortality. This also complements the conclusive evidence of the enormous benefits of exercise in the improvement of cardiopulmonary health. Reports have shown that provision of information from the medical staff to their patients may help patients to adhere with health-enhancing behaviour [17] and it is possible that advice given on the need for regular exercise may influence patients in taking informed decision for improving their cardiopulmonary endurance. In contrast to the results of this study, researchers have reported a low knowledge about pulmonary rehabilitation among patients with chronic obstructive pulmonary diseases (COPD) in China [18] and India [19]. This discrepancy may be as a result of multiplicity of patients with pulmonary diseases recruited in this study as against only patients with COPD employed in the aforementioned studies [18, 19].

Similar to the results of previous studies, this study showed that Nigerian pulmonary patients had a negative attitude to exercise for

pulmonary rehabilitation [18, 19]. Individuals with pulmonary diseases are known to engage in sedentary behaviour which displaces their confidence in engaging in exercise behaviour. Bandura had previously described ability to engage in a specific task as self-efficacy which is also strongly associated with exercise behaviour [20]. Self-efficacy is a known fulcrum for many theoretical models in health and exercise behaviour [20, 21], which if given adequate consideration in exercise prescription may help improving cardiopulmonary health in patients with pulmonary diseases.

Result from this study showed that more than half of the patients with pulmonary diseases showed a poor practice towards pulmonary exercise. The finding is also similar to the reports of Xie et al. [18] while investigating the knowledge, attitude, and practice towards pulmonary rehabilitation among COPD patients in China. The study reported that only 24.69% of patients with COPD had good practice of pulmonary rehabilitation. The low level of good practice of pulmonary rehabilitation among these patients is not surprising as these same set of patients displayed negative attitude to exercise for pulmonary rehabilitation which eventually led to bad practice towards exercise for pulmonary rehabilitation. Previously, researchers had reported close association between negative attitude to pulmonary rehabilitation and bad practice of pulmonary rehabilitation in patients with respiratory diseases [18, 19, 22].

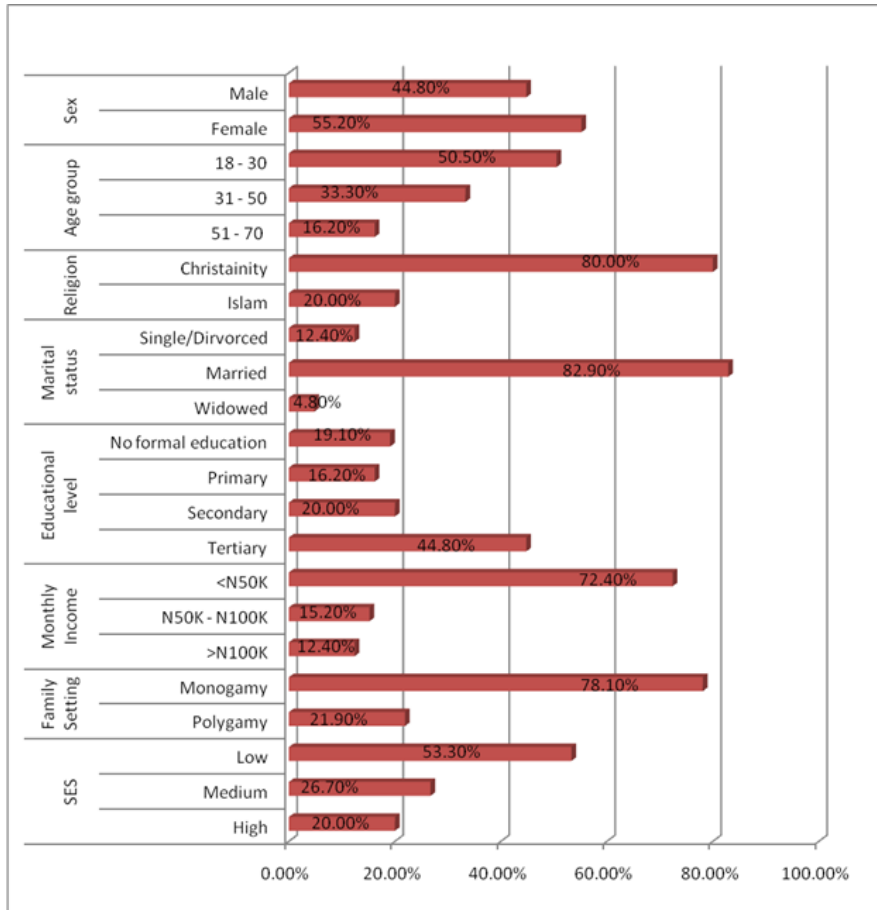
Many factors have been suggested as being responsible for poor practice of pulmonary rehabilitation among patients with respiratory diseases including ignorance, laziness, lack of time and forgetfulness [19]. However, a major and most consistent contributor to poor uptake of pulmonary rehabilitation is low medical referral for exercise for pulmonary rehabilitation [18, 19]. Epidemiological studies suggest exercise has multiple benefits for patients with respiratory diseases thereby reducing the risk of mortality. Unfortunately, most patients with respiratory diseases are placed on pharmacological therapy exclusively. Although some informed physician often advise patients with respiratory diseases to engage in exercise programme, a systematic review of 28 studies revealed that only about 16% of patients with pulmonary diseases were referred for pulmonary rehabilitation [22]. Some of the factors as being responsible for poor referral from physicians for pulmonary rehabilitation are little or no knowledge of pulmonary rehabilitation and its concepts, poor referral system, limited access to pulmonary rehabilitation to their patients, and physicians' poor perception and doubts on the need for changes in exercise behaviour of patients with pulmonary diseases [23]. In addition, reports had indicated low numbers of skilled therapists in exercise prescription and management of high-risk patients such as those with respiratory diseases [24]. Therefore, therapist should avail themselves on the current evidence on the perception of patients with respiratory diseases towards exercise for improving their cardiopulmonary health and also to understand the limiting and facilitators of exercise practice in pulmonary rehabilitation. In addition, professional training and re-training of physicians on pulmonary rehabilitation, and easy access to pulmonary rehabilitation by the patients have been proposed to enhance uptake rates of pulmonary rehabilitation [18].

Similar to the findings of recent studies [18, 19], socio-demographic and socio-economic characteristics of the patients with pulmonary diseases in this study were significantly associated with their knowledge, attitude and practice of exercise for pulmonary rehabilitation. For instance, pulmonary patients with higher socio-economic status may have more resources to access health professionals and information on pulmonary rehabilitation, and educated patients may have more knowledge on the essence of exercise in pulmonary rehabilitation, and be more willing to positive behavioural change to pulmonary rehabilitation. Thus, patients with lower socio-economic status may require more attention from clinicians and policy makers to benefit

from pulmonary rehabilitation and ultimately reduces the morbidity and mortality of pulmonary diseases.

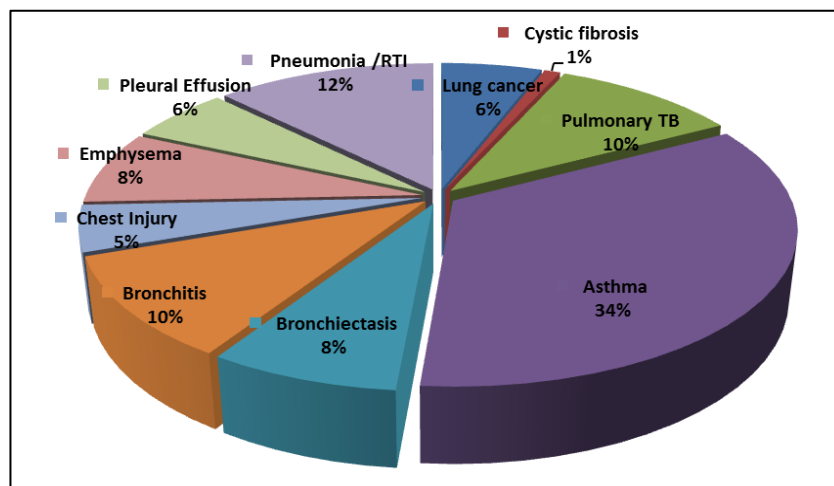
This study has some limitations. The non-availability of a gold standard in the assessment of knowledge, attitude and practice of patients, as common with studies of this nature, may limit the findings and generalizability of this study. However, to counter these problems, we subjected the questionnaire used in this study to psychometric assessment, and we used samples from multiple centres to mitigate

sampling bias. Finally, the associations obtained in this study cannot be said to be cause-effect as this is a cross-sectional study. Nonetheless, the findings of this study had provided novel data on the pulmonary rehabilitation and the associated factors among Nigerian patients with respiratory diseases. This study may also provide basis for future study on the knowledge, attitude and practice of patients with respiratory diseases about cardiopulmonary endurance exercises, and may help to enhance pulmonary rehabilitation uptake among patients with pulmonary diseases.



Key: SES – Socio-economic status

Figure 1: Frequency distribution of respondents' socio-demographics characteristics and socio-economic status



Key: TB – Tuberculosis, RTI: Respiratory tract infection

Figure 2: Frequency distribution of respondents' pattern of pulmonary diseases

Table 1: Frequency distribution of respondents' knowledge and attitude towards cardiopulmonary exercise for respiratory diseases

Item	Frequency	Percentage
Exercise is important in improving cardiopulmonary exercise		
Yes	102	97.1
No	3	2.9
How important is exercise in improving cardiopulmonary exercise		
Important	30	29.4
Somewhat important	11	10.8
Very important	49	48.0
Extremely important	12	11.8
Aerobic exercise can improve cardiopulmonary exercise		
Yes	89	84.8
No	16	15.2
Anaerobic exercise can improve cardiopulmonary exercise		
Yes	63	60.0
No	42	40.0
Exercise with medication can improve cardiopulmonary exercise		
Yes	78	74.3
No	27	25.7
Exercise has some adverse effect on a patient with respiratory disease		
Yes	47	44.8
No	50	55.2
How confident are you during exercise		
Slightly confident	26	27.7
Moderately confident	12	12.8
Very confident	24	25.5
Extremely confident	17	18.1
Not confident at all	15	16.0
Are you unable to stick with exercise		
Yes	45	47.4
No	50	52.6
Knowledge Score		
Poor	51	48.6
Good	54	51.4
Attitude Score		
Negative	70	66.7

Positive	35	33.3
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Table 2: Frequency distribution of respondents' exercise practice cardiopulmonary exercise

Item	Frequency	Percentage
Do you practice exercise for cardiopulmonary exercise		
Yes	73	68.6
No	32	30.5
How often?		
Once weekly	16	15.2
Twice weekly	19	16.1
Thrice weekly	14	13.3
Everyday	24	22.9
Duration of exercise practice per session		
10min	19	16.1
20min	23	21.9
30min	19	16.1
1hour	12	11.4
Do you experience difficulty during exercise practice		
Yes	29	27.6
No	44	41.9
Where do you prefer to exercise		
Indoor	40	38.1
Outdoor	43	40.9
What type of exercise do you engage in		
Brisk walking	41	39.0
Running	7	6.7
Cycling	1	0.9
Strength exercise	10	9.5
Stretching	10	9.5
Jogging	4	3.8
Practice Score		
Good	45	42.9
Poor	60	57.1

Table 3: Association between respondents' knowledge, attitude and practice of cardiopulmonary exercise and socio-demographic characteristics

Variable	Knowledge of exercise		χ ²	p-value	Attitude to exercise		χ ²	p-value	Practice of exercise		χ ²	p-value
	Good	Poor			Negative	Positive			Good	Poor		
Sex	n(%)	n(%)			n(%)	n(%)			n(%)	n(%)		
Male	46(43.8)	1(0.9)	1.302	0.254	23(21.9)	20(19.0)	1.180	0.890	35(33.2)	12(11.4)	1.302	0.254
Female	54(51.4)	4(3.8)			22(20.9)	30(28.6)			38(36.2)	20(19.0)		
Age group (years)												
18 – 30	42(40.0)	11(10.5)	4.882	0.158	8(7.6)	45(42.9)	12.602	0.039*	34(32.4)	19(18.1)	4.836	0.163
31 – 50	28(26.7)	7(6.7)			3(2.9)	32(30.5)			20(19.0)	15(14.3)		
51 – 70	14(13.3)	3(2.9)			5(4.8)	12(11.4)			10(9.5)	7(6.7)		

Monthly income												
<₦50,000	71(67.6)	5(4.8)	2.003	0.367	32(30.5)	34(32.4)	0.125	0.940	52(49.5)	24(22.9)	2.003	0.367
₦50,000 – ₦100,000	16(15.2)	1(0.9)			7(6.7)	9(8.6)			12(11.4)	4(3.8)		
>₦100,000	10(9.5)	2(1.9)			6(6.3)	7(6.7)			9(8.6)	4(3.8)		
Educational level												
Primary	16(15.2)	1(0.9)	13.687	0.003*	7(6.7)	9(8.6)	0.664	0.882	12(11.4)	24(22.9)	4.644	0.200
Secondary	18(17.1)	3(2.9)			10(9.5)	9(8.6)			18(17.1)	3(2.9)		
Tertiary	45(42.9)	2(1.9)			20(19.0)	25(23.8)			3(30.5)	15(14.3)		
No formal education	16(15.2)	4(3.8)			8(7.6)	7(6.7)			11(10.5)	9(8.6)		
Socio-economic status												
Low	30(28.6)	26(24.8)	1.472	0.295	14(13.3)	42(40.0)	1.408	0.366	46(43.8)	10(9.5) 17.648		0.002*
Medium	18(17.1)	10(9.5)			8(7.6)	20(19.0)			24(22.9)	4(3.8)		
High	13(12.4)	8(7.6)			5(4.8)	16(15.2)			19(18.1)	2(1.9)		

*p < 0.05

Key: ₦ – Nigerian currency

CONCLUSION

Patients with pulmonary diseases in Nigeria demonstrated good knowledge, negative attitude and poor practice of exercise for pulmonary rehabilitation. Socio-demographic and socio-economic status of Nigerian patients with pulmonary diseases were associated with their knowledge, attitude and practice of pulmonary rehabilitation.

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Conflict of Interest

We have no conflict of interests to report.

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