Original Article

Prevalence of chronic obstructive pulmonary disease (COPD) among rural population: A national survey in Bangladesh

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ABSTRACT

Background: In Bangladesh, there is a scarcity of nationally representative data on the burden of chronic obstructive pulmonary disease (COPD). **Methods:** To estimate the COPD prevalence in rural settings, this cross-sectional, population-based study was conducted in all eight administrative divisions of Bangladesh, and involved adults aged 40 years and above. By using multi-stage random sampling, 2,458 individuals were enrolled. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines were used to diagnose COPD based on post-bronchodilator lung function, while additional participant data was gathered through computer-assisted personal interviews. **Results:** A 2% COPD prevalence (95% CI: 1.45, 2.55) was found in the study sample with a statistically significant difference between males (2.7%; 95% CI: 1.8, 3.6) and females (1.2%; 95% CI: 0.59, 1.81). Increasing age significantly inflated the odds of having COPD irrespective of sex (OR: 1.03; 95% CI: 1.00, 1.05; *P* value < 0.05). Furthermore, prevalence of COPD was higher among manual workers, cigarette smokers, and those that used the indoor kitchen and did not have a primary education. Sex-based analysis showed that smokeless tobacco consumption was significantly associated with COPD occurrence among males (OR: 2.14; 95% CI: 1.05, 4.37; *P* value < 0.05), but not females. Further, using an indoor kitchen increased the odds of developing COPD by 400% among female participants (OR: 4.39; 95% CI: 1.37, 14.10; *P* value < 0.05). **Conclusion:** This study provides a comprehensive sex-based estimation of COPD prevalence among rural population and imparts significant contribution to the growing database on COPD prevalence in Bangladesh.

KEY WORDS: Bangladesh, COPD, GOLD criteria, prevalence, rural population

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) manifests as a progressive obstruction of the airways, which is largely preventable.[1] It is a prevalent condition affecting almost 5% of global population, while being more prevalent in low- and middle-income countries.[2] At present, COPD is the third leading cause of death

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worldwide and is expected to become the leading cause of death within 15 years.[3] However, COPD remains mostly underdiagnosed in many territories of the world.[3] As a result, to design appropriate and timely prevention strategies for COPD, an emphasis is now being placed on country-specific prevalence estimation and risk factor identification.

The Global Initiative for Obstructive Lung Disease (GOLD) defines COPD as chronic airflow limitation which is not fully reversible and is usually associated with significant concomitant comorbidities resulting in increasing mortality.[4] For diagnosing COPD, GOLD (2019) recommends a spirometry airflow reversibility test before and after inhaling a bronchodilator agent. As COPD is related to the interaction between genetic and environmental factors, its prevalence varies from country to country.[5] The most common genetic factor for developing COPD is alpha-1 antitrypsin deficiency, while tobacco smoking, indoor air pollution from biomass fuel combustion,[6] occupational allergen exposure, history of pulmonary tuberculosis, chronic asthma and low socio-economic status are some of the recognised environmental risk factors.

In Bangladesh, there is a scarcity of nationally representative data on the COPD burden. According to a recent systematic review, however, a pooled prevalence of 12.5% was noted in the Bangladeshi population.[7] Guided by these findings, the aim of the present study was to estimate COPD prevalence in rural Bangladeshi communities by examining data pertaining to adults aged 40 years and older.

MATERIALS AND METHODS

Study design and setting

This cross-sectional household survey was conducted among a representative rural population of the country. Bangladesh is divided into eight administrative divisions, and study participants were drawn from each division using a multi-stage sampling method. As the primary sampling unit, one Upazila (sub-district) from each division was chosen at random. Then, one village from each primary sampling unit was selected at random as the secondary sampling unit. Secondary sampling units were considered data enumeration areas, and each enumeration area was mapped and a list of households was generated. The Bangladesh Bureau of Statistics defined households as "a dwelling in which persons either related or unrelated were living together and taking food from the same kitchen".[8]

The ultimate sampling unit was the household, selected by systematic random sampling from the data enumeration areas. During pre-interview screening, all eligible participants within a selected household were identified and placed into the appropriate sex-based group, subsequently sorted by age. Next, one individual aged 40 years or above from each household was selected randomly using Kish selection grid method.[9] The participants, who were undergoing treatment for pulmonary tuberculosis or heart failure, pregnant, unwilling to participate or unfit for spirometry according to American Thoracic Society (ATS) guidelines[10] (those with diagnosed stroke, recent myocardial infarction, eye surgery, thoracic/abdominal surgery, haemoptysis, known thoracic, aortic, or cerebral aneurysm or uncontrolled hypertension) were excluded. Proxy interviews were not allowed.

Sample size

The required sample size for this study was calculated using the formula $n = Z^{2}_{1-\frac{\alpha}{2}}(1-P)P/\varepsilon^{2}$.[11] Assuming 13.5% COPD prevalence,[12] precision rate of 2.5%, and a design effect of 1.5, the sample size was approximately $1184 \approx 1200$ considering 90% response rate. The final sample size was calculated as $1200 \times 2 = 2400 \approx 2500$ after considering male and female sex as separate strata.

Data collection

Ten field research assistants and five field supervisors were recruited and were provided two-week training program on data collection using an electronic device. They were also trained on handling spirometer at the Department of Respiratory Medicine, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. Field research assistants were sent to collect data after proving their efficacy in conducting spirometry assessments.

Face-to-face interviews were conducted in an isolated place of the participant's residence, and data were recorded in REDCap (Research Electronic Data Capture) software through Computer-Assisted Personal Interviewing interface.

Data on different sociodemographic characteristics were obtained, such as age, sex, educational attainment, marital status, occupation and smoking status. Smoking history was recorded as a non-smoker (never smoked tobacco products), former smoker (had not smoked tobacco products in the past 12 months) and current smoker (smoking tobacco products on a daily or less than daily basis). Smoking status was then categorised as non-smoker and ever-smoker (former and current smoker) for analysis.

When collecting data on smokeless tobacco consumption, chewing tobacco and inhaling tobacco were considered separately. Types of chewing tobacco included Zarda (tobacco, lime, spices, vegetable dye, areca nut), Sada pata (sun-dried or cured raw tobacco leaf), Gul (tobacco powder, molasses), Khoinee (tobacco, slaked lime, menthol, flavourings and areca nut), etc.,[13] while Nassi (dried and ground or pulverised tobacco leaves) was included as inhaled smokeless tobacco.

The Wealth Index was developed based on participants' household assets such as tables, chairs, watches/jewellery, computer equipment, electricity supply, television, radio, mobile phone, refrigerator, bicycle and air conditioner. Data on building materials used in the house construction was used to categorise house types into kutcha, pucca and semi-pucca. Kutcha houses are made up of mud, straw, wood and dry leaves, while pucca and semi-pucca dwellings are designed to be solid and permanent, and are built of durable materials such as iron sheets, stone, brick, cement, concrete, metal, etc. Data on the primary fuel source used for household cooking was also collected and was dichotomised into biomass fuel (wood products, dried vegetation, crop residues, aquatic plants and animal waste) and clean fuel (liquefied petroleum gas and kerosene). Kitchen was considered the primary location for household cooking and was categorised into indoor and outdoor kitchen.

Spirometry

To test their lung function, spirometry was performed on all participants using a hand-held, portable and diagnostic spirometer (Helios 401, India, 2018). The spirometer had a digital turbine that was detachable and easy to disinfect, allowing its repeated use in the field. The spirometer was calibrated daily as specified by the manufacturer. Participants were instructed to abstain from smoking, vigorous physical activity or any bronchodilator drug for at least one hour before starting the spirometry. Prior to the test, the field research assistants demonstrated the spirometry procedure to the participants, including taking a deep breath in, holding a breath for a few seconds, and then exhaling as hard as they can into the mouthpiece of the spirometer. After a successful demonstration, participants were asked to sit on a chair, and their nostrils were closed using nose clips. Then, the participants were asked to perform the previously demonstrated manoeuvre at least three times, and the highest value was recorded if those three values were similar. If the first three test values varied considerably, the participants were asked to perform up to five further manoeuvres. If a participant failed to produce a steady result after eight manoeuvres, another session was attempted after 10 minutes of rest followed by a repeat demonstration of the procedure. If the second session failed to yield a stable result, the spirometry test was rescheduled for another day. As a part of the spirometry procedure, Forced Expiratory Volume in 1 second (FEV1) and Forced Vital Capacity (FVC) were recorded in spirogram. For participants with FEV1/FVC <0.7, a bronchodilator was administered, and spirometry was repeated after 20 minutes. After inhaling the bronchodilator, FEV1/FVC score of <0.7 was recorded as COPD, in accordance with the GOLD criteria.[4]

Field supervisors examined all the spirometry reports (spirograms) on a daily basis and sent them to the operation centre at BSMMU. Each spirogram was reviewed by research physicians following ATS criteria,[10] and if found unacceptable, the entire procedure was repeated for that participant. Thus, a 100% spirometry response of adequate quality was ensured.

Data analysis

For COPD prevalence, results were presented as a percentage with a corresponding 95% confidence interval (CI). For categorical variables, frequencies and percentages were calculated as summary measures, while arithmetic mean and standard deviation (SD) were used to describe continuous variables. In addition, principal component analysis (PCA) was performed to construct a wealth index using household assets data.[14] Socio-economic status was considered the first factor in the PCA, as it exhibited the greatest variance. Multivariate logistic regression was conducted to identify potential independent risk factors, with COPD as the dependent variable. Two further logistic regression models were constructed separately for the male and female sub-samples. Odds ratios were presented with corresponding 95% CIs, and $P < 0.05$ was considered statistically significant. Data were analysed using the Statistical Package for Social Sciences, version 21.

Ethical considerations

Ethical clearance for this study was obtained from the Institutional Review Board of BSMMU (Memo no. 2018/4382). Informed written consent was obtained from each participant after explaining the study objectives and the spirometry procedure.

RESULTS

Given that 2,500 was the target sample size and 2,458 participants were interviewed, about 98% response rate was achieved. While females comprised around 49% of the sample, about 25% of the participants were aged 60 years or above, almost 67% did not complete primary education and about 37% worked as manual labourers. According to the tobacco consumption history, tobacco smokers comprised 35% of the sample, and 36% were smokeless tobacco users. Moreover, about 86% of the participants reported using biomass fuel as the main source of energy.

Spiro-metric airflow limitation (FEV1/FVC <0.7) was recorded for 2.6% of the participants, whereby COPD prevalence (post-bronchodilator FEV1/FVC <0.7) was found to be 2% (95% CI: 1.45, 2.55). The mean (SD) age for the sub-sample comprising of individuals with COPD diagnosis was found to be 56.23 (11.11) years. However, COPD prevalence among people aged 60+ years was twice as high as that among those aged <60 years. A significantly lower COPD rate was noted among females compared to males (p-value < 0.05). COPD was also significantly more prevalent among manual labourers and less educated participants ($p < 0.05$). The prevalence of COPD among tobacco smokers was 3%. COPD diagnosis rate was higher among participants living in kutcha houses compared to those living in pucca and semi-pucca houses. COPD rate in biomass fuel users was also higher than in fossil fuel users,

Table 1: COPD prevalence and spirometric airflow limitation among survey population with different descriptive characteristics (n=2,458)

Variables	N	Spirometric airflow limitation[a] (%)	COPD prevalence, % (95% CI)	*P*-value
Overall	2,458	2.6	2.0 (1.45, 2.55)	
Age				
Below 60 years	1,848	1.9	1.6 (1.00, 2.20)	0.016*
60 years and above	610	4.6	3.1 (1.70, 4.50)	
Sex				
Male	1,246	3.6	2.7 (1.80, 3.60)	0.003*
Female	1,212	1.5	1.2 (0.59, 1.81)	
Education				
Less than primary	1,653	2.8	2.3 (1.58, 3.02)	0.049*
Primary and above	805	2.0	1.2 (0.45, 1.95)	
Marital status				
Married	2,175	2.5	1.9 (1.32, 2.47)	0.312
Single/widowed	283	2.8	2.5 (0.68, 4.32)	
Occupation				
Manual labourers	897	3.9	2.9 (1.80, 3.99)	0.009*
Others	1,561	1.8	1.4 (0.82, 1.98)	
Wealth index				
Low	933	2.6	1.9 (1.02, 2.78)	0.428
Middle	1,073	2.3	1.9 (1.08, 2.72)	
High	452	3.1	2.2 (0.85, 3.55)	
Tobacco smoking				
Ever-smoker	858	4.1	3.0 (1.86, 4.14)	0.004*
Non-smoker	1,600	1.8	1.4 (0.82, 1.97)	
Smokeless tobacco consumption				
Yes	878	3.1	2.2 (1.23, 3.17)	0.336
No	1,580	2.3	1.8 (1.14, 2.46)	
Passive smoking				
Yes	511	3.5	2.7 (1.29, 4.10)	0.106
No	1,947	2.3	1.7 (1.13, 2.27)	
Fuel type				
Biomass fuel	2,113	2.7	2.0 (1.4, 2.59)	0.315
Clean fuel	345	1.4	1.4 (0.16, 2.64)	
Kitchen type				
Indoor	298	3.7	3.4 (1.34, 5.46)	0.057
Outdoor	2,160	2.4	1.8 (1.24, 2.36)	
Light source				
Electricity	2,252	2.4	1.9 (1.34, 2.46)	0.376
Solar/battery/kerosene	206	3.9	2.4 (0.31, 4.49)	
House type				
Kutcha	1,395	3.4	2.4 (1.59, 3.2)	0.059
Pucca/semi-pucca	1,063	1.5	1.4 (0.69, 2.10)	

[a]spirometric airflow limitation refers to FEV1/FVC < 0.7

* *P*-value is significant at 5% level

even though the difference was not statistically significant. The highest COPD prevalence (3.4%) was observed among participants using an indoor kitchen [Table 1]. Moreover, when analyses focussed solely on the participants using biomass fuel as the primary source of cooking, COPD prevalence was significantly greater among indoor kitchen users compared to those using outdoor kitchen (p-value < 0.05) [Figure 1].

The sex-specific analysis showed that COPD was significantly more prevalent among male passive smokers than their female counterparts [Table 2].

Regression analysis revealed that age was a significant predictor of COPD occurrence among the study participants (OR: 1.03; 95% CI: 1.00, 1.05; *P* value < 0.05). The odds of having COPD were also 200% higher among male smokeless tobacco users than non-users (OR: 2.14; 95% CI: 1.05, 4.37; *P* value < 0.05). Among female participants, using an indoor kitchen increased the odds of COPD four times compared to those using an outdoor kitchen (OR: 4.39; 95% CI: 1.37, 14.10; *P* value < 0.05), as shown in Table 3.

DISCUSSION

According to the findings obtained in the present study, 2% of the rural Bangladeshi population aged 40 years or above are suffering from COPD. A robust diagnostic approach with standardised spirometry before and after bronchodilation was used in this study to identify COPD cases. The results reported here can thus reasonably be extrapolated to the entire rural population across the country and are expected

Table 2: Sex-specific prevalence of COPD among study population

Variables	COPD prevalence (%)		*P*-value
	Male	Female	
Age			
Below 60 years	2.2	1.0	0.022*
60 years and above	4.1	1.7	0.049*
Education			
Less than primary	3.1	1.5	0.019*
Primary and above	2.0	0.5	0.059
Marital status			
Married	2.7	0.7	<0.001*
Single/widowed	0.0	2.5	0.881
Occupation			
Manual labourers	2.9	0.0	0.889
Others	2.3	1.2	0.060
Wealthi			
Low	3.3	0.6	0.001*
Middle	2.1	1.6	0.329
High	3.1	1.3	0.176
Tobacco smoking			
Ever-smoker	3.0	0.0	0.884
Non-smoker	2.0	1.2	0.146
Smokeless tobacco consumption			
Yes	5.0	0.7	<0.001*
No	2.0	1.6	0.331
Passive smoking			
Yes	4.2	0.0	0.003*
No	2.2	1.4	0.105
Fuel type			
Biomass fuel	2.8	1.2	0.007*
Clean fuel	2.3	0.9	0.287
Kitchen type			
Indoor	5.0	2.5	0.214
Outdoor	2.5	0.9	0.003*
Light source			
Electricity	2.6	1.2	0.008*
Solar/battery/kerosene	3.9	1.0	0.184
House type			
Kutcha	3.2	1.6	0.035*
Pucca/semi-pucca	2.2	0.6	0.025*

** P-value is significant*

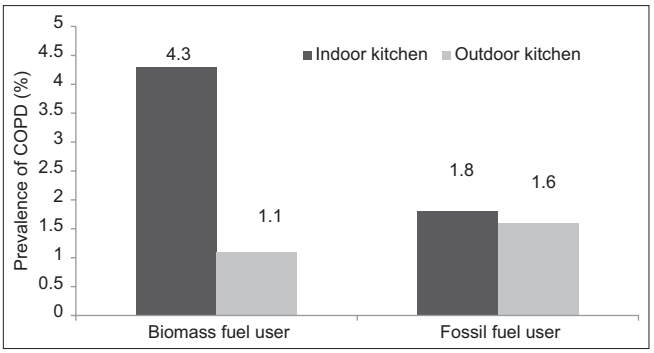

Figure 1: COPD prevalence of among participants by kitchen location and type of fuel used in cooking

to impart significant contribution to the growing database on COPD prevalence in Bangladesh.

However, the prevalence estimate obtained in this study is much lower than that reported by other authors that conducted similar studies in this region.[7] This difference can be attributed to the variation in methodology, study population, sample size, or diagnostic criteria.[15] In their study based on GOLD criteria, Alam *et al*.[12] found 17% and 9.9% COPD prevalence in a rural area and an urban area of Bangladesh, respectively. On the other hand, Islam *et al*.[16] reported 11.4% COPD prevalence among a hospital-based sub-population in urban Dhaka, Bangladesh. Furthermore, Grigsby *et al*.[17] estimated 10% and 15.5% COPD prevalence in selected urban and rural areas of Bangladesh, respectively. However, as none of these studies covered all eight divisions of Bangladesh, their findings are not nationally representative. This issue is addressed in the present study by including a nationally representative sample from all administrative divisions, and the findings yielded may thus reflect the COPD disease burden among rural population in Bangladesh.

Further, there is significant variation in COPD prevalence among different regions across the world. Applying the same methodological approaches, the authors of the Burden of Obstructive Lung Disease (BOLD) study that was conducted across 12 geographic locations found COPD prevalence among women to range from 3.7% to 16.7%, increasing to 8.5−22.2% among men.[18] A recent meta-analysis shows that, in 2010, COPD prevalence was the lowest in Southeast Asia (9.7%).[19] Johnson *et al*.[20] reported 2.44% COPD prevalence among rural women of Tamil Nadu, while Aggarwal[21] reported 8% prevalence among rural population of Haryana, India. However, in different countries of the world, COPD prevalence and associated symptoms have been decreasing over the last few decades.[22]

In this study, COPD was found to be more prevalent among older participants. Ageing is usually considered one of the most important risk factors for developing COPD, like other non-communicable diseases (NCDs).[23] Over the past few years, life expectancy at birth has increased substantially in Bangladesh irrespective of sex. In 2017, male and female life expectancy was 70.6 and 73.5 years, respectively, while 7.5% of the total population is now older than 60 years.[24] As a result of aging population, the country has experienced a substantial increase in the overall NCD burden, and thus to additional health expenditure. As Bangladesh is a resource-poor country and age is a non-modifiable factor, elderly population should be given particular attention in the initiatives aimed at reducing other established modifiable risk factors of COPD. We found that COPD is more prevalent among older male participants. Around 4% of males aged 60 years or above suffer from COPD, which is almost double the prevalence seen among males aged <60 years.

Compared to female participants, COPD prevalence was more than two times higher in male participants. Similar sex distribution in COPD prevalence was also noted in other studies conducted in Bangladesh[12] and around the world.[25] The relationship between COPD and sex is

Table 3: Logistic regression results predicting the likelihood of presenting with COPD for male and female participants

Variables	Male[a]	Female[b]	Both[c]
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age	1.03 (1.00, 1.06)*	0.99 (0.94, 1.05)	1.03 (1.00, 1.05)*
Sex			
Female	-	-	1
Male	-	-	2.39 (0.81, 7.03)
Education			
Less than primary	1	1	1
Primary and above	0.74 (0.31, 1.75)	0.32 (0.07, 1.58)	0.65 (0.31, 1.38)
Occupation			
Other	1	1	1
Manual labourer	0.97 (0.41, 2.32)	0.00	0.89 (0.38, 2.07)
Tobacco smoking			
Non-smoker	1	1	1
Ever-smoker	1.29 (0.57, 2.95)	0.00	1.24 (0.55, 2.79)
Smokeless tobacco use			
No	1	1	1
Yes	2.14 (1.05, 4.37)*	0.34 (0.10,1.11)	1.28 (0.68, 2.38)
Kitchen type			
Outdoor	1	1	1
Indoor	1.91 (0.71, 5.14)	4.39 (1.37, 14.10)*	2.37 (1.15, 4.88)*
House type			
Pucca/semi-pucca	1	1	1
Kutcha	0.82 (0.39, 1.74)	0.27 (0.07, 1.07)	0.65 (0.34, 1.23)

[a]Cox & Snell R^2=0.012 and Nagelkerke R^2=0.054

[b]Cox & Snell R^2=0.011 and Nagelkerke R^2=0.094

[c]Cox & Snell R^2=0.009 and Nagelkerke R^2=0.053

**P*-value is significant

complex and is influenced by different factors, including tobacco consumption, susceptibility to tobacco-induced health issues, biomass fuel usage, anatomic and hormonal differences, and behavioural differences.[26] Authors of several extant studies reported a relationship between smoking among women and the overall COPD burden. Over the last few decades, the number of female smokers in high-income countries has increased, which has resulted in higher COPD prevalence.[27] In our study, only 0.3% of female participants were smokers, compared to around 69% men. This disparity might explain the higher prevalence of COPD among the male population.

Tobacco smoking is considered one of the most important risk factors for developing COPD.[28] Smoking causes airway inflammation and structural damage, which subsequently causes COPD.[29] In this study, COPD was more prevalent among ever-smokers (3%) than non-smokers (1.4%). Furthermore, smokeless tobacco use was significantly associated with COPD occurrence among men, even after controlling for the effect of smoking. In general, smokeless tobacco use is perceived as less harmful than smoking, especially for lung health.[30] Thus far, there is no evidence of direct association between smokeless tobacco consumption and the COPD pathogenesis. However, in 2020, Roy reported that smokeless tobacco consumption was independently associated with COPD-related deaths among Indians.[31] Further exploration is thus needed to ascertain if there is an association between smokeless tobacco use and the development of COPD.

In our study, participants having indoor cooking facilities were more likely to develop COPD than those using an outdoor kitchen. In a separate regression model, we found that females using indoor kitchen were four times more likely to develop COPD than females using outdoor kitchen. In 2011, Johnson *et al*.[20] also found that rural women of Tamil Nadu that cooked inside the household were more prone to develop COPD. In this study, most participants reported using biomass fuel as the primary source of energy for cooking. Combustion of biomass fuel in the indoor kitchen might increase the chance of developing COPD among the participants.

A higher prevalence of COPD among biomass fuel users was noted compared to clean fuel users in our study, even though the difference was not statistically significant. This finding is congruent with the results yielded by the meta-analysis conducted by Hu *et al*.,[6] who recognised using biomass fuel as a potential risk factor for developing COPD. Unfortunately, as biomass fuel usage is still relatively high in the middle- and lower-income areas, people living in these areas are at a high risk of developing COPD.[17,32] Besides, we found that manual labourers had a double the prevalence of COPD than other workers. This phenomenon may be related to their living conditions, work environment, or lifestyle factors, none of which were examined in this study. However, after controlling for age, sex, and smoking status, no association was found between COPD prevalence and manual works.

The analyses aimed at identifying the COPD risk factors failed to produce statistically significant results related to

some established risk factors like tobacco smoking. This lack of statistical significance can be explained by the fact that this study was not adequately powered to examine the association between COPD and its risk factors. The sample size for this study was calculated with the aim of generating COPD prevalence, and the study design and the sampling framework were selected accordingly. Therefore, although the association of the selected risk factors (such as smoking and biomass fuel use) was in the direction noted by other authors,[17] it lacked statistical significance.

Another limitation of this study stems from the reliance on the fixed FEV1/FVC ratio (<0.7) when assessing the COPD prevalence as per GOLD criteria.

Moreover, as the GOLD criteria ignores the population norms for spirometry in the subjects tested, an appropriate lower limit of normal would be preferable. Since this sampling was random, a lower 2.5th centile value would be the best for determining the presence of airflow obstruction, thus ensuring that the false positive rate is known (2.5%). However, FEV1/FVC <0.7 does not allow the false positive rate to be established for a given population. Finally, the prevalence of airflow obstruction in those aged 60+ was double that of younger subjects, which is what is expected for using 0.7 as this ignores the normal reduction in FEV1/FVC with age.

CONCLUSION

Our study indicates that 2% of rural adult Bangladeshi population aged 40 years and above suffers from COPD. COPD is more common in the elderly, men, the less educated, manual labourers, smokers, smokeless tobacco users and indoor kitchen users. The majority of these factors are potentially preventable with timely and appropriate measures, which may contribute to the national COPD prevention and control effort.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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