Prevalence of COPD in Abu Dhabi, United Arab Emirates

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KEYWORDS
Abu Dhabi; Burden; COPD; Epidemiology; Smoking; United Arab Emirates

Summary

Background: The prevalence of chronic obstructive pulmonary disease (COPD) in Abu Dhabi, United Arab Emirates is unknown.
Methods: We conducted a cross-sectional survey in a random sample of individuals 40–80 years old in Abu Dhabi, with a particular interest to explore local risk factors other than cigarette smoking. Airflow limitation compatible with COPD was defined as a post-bronchodilator ratio FEV₁/FVC < 0.70.
Results: From 520 participants surveyed (93.7% response rate), 55% male and with a mean age of 52 years, the prevalence of COPD was 3.7% and 95% C.I. (2.0–5.3). There were no differences by gender, and COPD prevalence only significantly increased in those 70 year and older. Among those with COPD, cigarette smoking use was relatively low (12% current- and 12% former-smokers), and it was even lower the use of shisha (5%), pipe (0%), or exposure to passive smoking (5%), while exposure to biomass was higher (33%). Interestingly, bakhour use was very high (78%), but neither bakhour nor any of the above-mentioned exposures were associated with the risk of COPD.
Conclusions: COPD prevalence in 40–80 years old in Abu Dhabi was 3.7%, and associations with cigarette smoking or with other local inhaled exposures were not observed.

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Introduction

Overall, the prevalence of COPD in the general population is estimated to be ~1% across all ages, rising steeply to 8–10% or higher amongst those aged ≥40 years. However, there remain many large regions in the World with no actual data contributing to these estimates. There are no data on the extent of COPD in Abu Dhabi or in the United Arab Emirates (UAE). By means of post-bronchodilator spirometry, we aimed to determine the prevalence of COPD and to explore local risk factors other than cigarette smoking, namely passive smoking, bakhour, shisha, pipe, and biomass exposures.

Material and methods

We conducted a cross-sectional survey in the catchment population of the Zayed Military Hospital in Abu Dhabi. Male and female individuals, aged 40–80 years old, residents in the UAE were recruited sequentially by random phone calls at home, and offered to participate in this study irrespective of their respiratory history or smoking. Fieldwork was conducted from May 2009 to May 2010. This research protocol was approved by our Clinical Research Ethics Authority, and all participants signed an informed written consent.

Our questionnaire was based on the original ATS questionnaire. In addition to standard questions on active and passive smoking, other items were included to assess the local factors, namely biomass, bakhour (also called Arabian incense), and shisha.

Spirometry was conducted according to ATS/ERS standards, by means of spirometers VIASYS JAEGER FlowScreen V2.5 (Hoechberg, Germany). Reference values were those of NHANES-III. Reported values correspond to those determined after inhalation of 200 mcg of salbutamol. AL compatible with COPD was defined according to the GOLD guidelines as a post-bronchodilator FEV₁/FVC <0.7. The severity of AL was staged according also to the GOLD guidelines as mild, moderate, severe and very severe if percent predicted FEV₁ was >80%, 50–80%, 30–50%, or <30%, respectively.

Figure 1 CONSORT flow-chart of participants.
The prevalence of AL compatible with COPD and its 95% confidence intervals was estimated for all participants, and by gender and age bands. The risk of COPD by covariates (namely male gender, age in years) and exposures (namely smoking ever, bakhour user, shisha use, pipe smoking use, and biomass exposure) was explored in bivariate analyses, as well as all variables adjusted in a logistic regression analysis. A p value lower than 0.05 was considered statistically significant.

Results

From the catchment population of the Zayed Military Hospital in Abu Dhabi, the sample of 900 subjects with ages 40–80 years was selected. Then, the first 555 in a randomly generated list were invited to participate, and finally 520 conducted spirometry. Reasons for non-response were: 30 (5.4%) phone line disconnected, and 5 (1.0%) subjects refused to participate for either no reason, being sick or too old (Fig. 1). With a 93.7% response rate, the final sample of 520 participants surveyed was made of 55% male, with a mean age of 52 years, of mainly UAE nationals, most of them born in Abu Dhabi (Table 1). Those with COPD were older (p < 0.05), more frequently non-UAE Nationals, and with lower education than those with normal lung function (p > 0.05). The corresponding prevalence of COPD was 3.7% and 95% C.I. (2.0–5.3). Interestingly, there were no differences by gender, male 3.8% vs 95% C.I. (1.6–6.1) and female 3.4% and 95% C.I. (1.1–5.7); and COPD prevalence only significantly increased in those 70 and older, 20.0% (0.1–40.2) (Fig. 2).

These COPD patients were rarely previously diagnosed of COPD (5.3%) or received respiratory treatment (10.5), although nearly half reported having asthma. The GOLD severity distribution was 5.3% mild, 63.2% moderate, 31.6% severe, and 0 (0%) very severe (Table 2).

<table>
<thead>
<tr>
<th>Variable</th>
<th>COPD (n = 19)</th>
<th>Normal lung function (n = 501)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male gender, n (%)</td>
<td>11 (58%)</td>
<td>275 (55%)</td>
<td>0.796</td>
</tr>
<tr>
<td>Age in years, mean (SD)</td>
<td>56.8 (9.9)</td>
<td>51.7 (7.9) [40–80]</td>
<td>0.006</td>
</tr>
<tr>
<td>Nationality, n (%)</td>
<td></td>
<td></td>
<td>0.946</td>
</tr>
<tr>
<td>UAE</td>
<td>12 (63%)</td>
<td>375 (75%)</td>
<td></td>
</tr>
<tr>
<td>European</td>
<td>0 (0%)</td>
<td>11 (2%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>7 (37%)</td>
<td>115 (23%)</td>
<td></td>
</tr>
<tr>
<td>Emirate, n (%)</td>
<td></td>
<td></td>
<td>0.777</td>
</tr>
<tr>
<td>Abu Dhabi</td>
<td>17 (89%)</td>
<td>379 (77%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 (11%)</td>
<td>122 (23%)</td>
<td></td>
</tr>
<tr>
<td>Education, n (%)</td>
<td></td>
<td></td>
<td>0.836</td>
</tr>
<tr>
<td>None</td>
<td>8 (42%)</td>
<td>139 (28%)</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>4 (21%)</td>
<td>129 (26%)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>4 (21%)</td>
<td>130 (26%)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>3 (16%)</td>
<td>96 (19%)</td>
<td></td>
</tr>
<tr>
<td>Marital status, n (%)</td>
<td></td>
<td></td>
<td>0.978</td>
</tr>
<tr>
<td>Married</td>
<td>16 (84%)</td>
<td>427 (85%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3 (16%)</td>
<td>74 (15%)</td>
<td></td>
</tr>
<tr>
<td>BMI, mean (SD)</td>
<td>30.7 (5.7)</td>
<td>31.2 (6.0)</td>
<td>0.742</td>
</tr>
</tbody>
</table>

Data are presented as mean and standard deviation (SD) for continuous variables, or percentage for qualitative variables, as appropriate. Differences within groups were compared with analysis of variance (ANOVA) for continuous variables, and Chi² for categorical variables.
Among those with COPD, cigarette smoking use was relatively low, and it was even lower the use of shisha, pipe, or exposure to passive smoking, while exposure to biomass was higher. Interestingly, bakhour use was very high (78%), but neither bakhour nor any of the above-mentioned exposures were associated with the risk of COPD. The final multivariate analysis for AL compatible with COPD produced the following adjusted odds ratios and 95% confidence intervals: Male gender 1.75 (0.54–5.64); Age in years 1.10 (1.03–1.16); Smoking ever 0.52 (0.13–2.10); and Bakhour user 0.50 (0.14–1.75). Apart from age, all of them were non-statistically significant.

**Discussion**

Ours is the first prevalence survey with post-bronchodilator spirometry conducted in Abu Dhabi and in the UAE to date.

Advantages of our study include a decent sample size, and a high participation rate. Among the limitations, the representativity of our source population to the general population of Abu Dhabi, UAE deserves further discussion. In 2009, the UAE population was estimated at 6 million,
under 20% being Emiratis, the male/female ratio was higher than two, and 25.5% of males and 1.6% of females smoke.\textsuperscript{7} We suggest our results are indirect evidence that COPD prevalence is low in UAE nationals, but the statistical power to detect modest associations with risk factors was probably small, in view of the small number of patients with COPD identified in our survey.

There is scarce data in the literature on respiratory conditions in the region. A small, old case-control study in Saudi Arabia found no association with COPD and the use of incense burners.\textsuperscript{8} Al-Rawas et al., reported that bakhoor burning is a common trigger of wheezing among asthmatic children in Oman, but it was not associated with asthma prevalence.\textsuperscript{9} The harm of waterpipe tobacco smoking on lung function has been estimated, concluding it is likely to cause COPD.\textsuperscript{10}

When compared with other international, published data,\textsuperscript{11,12} our estimate positions the UAE amongst the lower prevalences of COPD.

We conclude that COPD in those 40–80 years old in Abu Dhabi, UAE is low (3.7%). The observed low COPD prevalence and the absence of associations with cigarette smoking or with other local inhaled exposures, deserve further investigation.

Acknowledgments

We thank all our study participants.

Author contributions

Dr Alzaabi: had the original idea for the study and is guarantor of all phases and conclusions, and contributed to conceiving and developing the protocol, obtaining funding, coordinating all fieldwork, and writing and approving the manuscript. Drs. Asad, Abdou, AlMusabi, Al Saiari, Bu Hussien, and Nagelkerke: they all participated in fieldwork, and contributed to the writing and approving the manuscript. And, Dr. Soriano: designed the plan of analysis, conducted the statistics, drafted the first results, and contributed to writing and approving the manuscript.

Conflict of interest statement

There was no external editorial assistance provided in this work. The authors have reported to RESPIRATORY MEDICINE that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article. All co-authors accept responsibility for the conduct of this study and for the analysis and interpretation of the data.

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