12-month prevalence of known chronic obstructive pulmonary disease (COPD) in Germany

Abstract
Chronic obstructive pulmonary disease (COPD) is associated with a high disease burden and is one of the leading causes of death worldwide. Smoking is the key modifiable risk factor for COPD in Germany. GEDA 2014/2015-EHIS surveyed the 12-month prevalence of known COPD using the European indicator on self-reported chronic bronchitis, chronic obstructive pulmonary disease, emphysema. Among adults aged 18 years or older with complete information on the indicator (n=22,702), the 12-month prevalence of known COPD is 5.8% (5.8% for women and 5.7% for men). In both genders, the prevalence increases strongly with age. Overall, the presence of COPD was more often reported by women and men with a low educational level than by those with a higher one. In a comparison of federal states, the 12-month prevalence of known COPD varies between 3.6% and 7.5% for women and 4.3% and 11.2% for men.

Introduction
Chronic obstructive pulmonary disease (COPD) is associated with a high disease burden and is one of the leading causes of death in Germany and globally [1-3]. COPD is a prevalent chronic disease of middle and older age [1, 4-7]. It is marked by chronic inflammation and progressive obstruction (narrowing) of the airways and destruction of lung tissue (parenchyma) [1, 8]. Chronic cough and phlegm production (chronic bronchitis) as well as a permanent over-inflation of the air sacks (emphysema) are common among COPD patients and often occur together [1, 8]. Moreover, shortness of breath under physical strain is a typical symptom. At more progressed stages of the disease, patients may also suffer from shortness of breath even at rest [1, 8].

Smoking is the most important modifiable risk factor for COPD in Germany [1, 7-9]. The risk of developing COPD is thereby related to the total amount of cigarette smoking over time (pack years) [7, 9]. Moreover, specific occupational exposures (e.g., coal dust) are important COPD risk factors [1, 7, 9, 10]. COPD is therefore considered a potentially preventable disease [1, 8]. However, impaired growth and functional development of the lungs also affect a person’s COPD risk [1, 9, 11]. Besides genetic factors and prenatal influences (e.g., maternal smoking during pregnancy), repeated respiratory infections in early childhood, exposure to airborne pollutants, or childhood asthma potentially contribute to developing COPD in later life [1, 7, 9, 12, 13].
December 2014) with regard to gender, age, district type and education. The district type reflects the degree of urbanisation and corresponds to the regional distribution in Germany. The International Standard Classification of Education (ISCED) was used to classify the responses provided on educational level [19]. Lange et al. [20] set out the details of the methodology applied in GEDA 2014/15-EHIS including a description of the method used to calculate the weighting factor and an assessment of the response rate. Background information on GEDA 2014/15-EHIS are also provided in the article German Health Update: New data for Germany and Europe, which was published in Issue 1/2017 of the Journal of Health Monitoring.

Results and discussion

In GEDA 2014/2015-EHIS, 5.8% of adults aged 18 years or older reported the presence of COPD during the past 12 months. The 12-month prevalence of known COPD for women (5.8%) is comparable to the prevalence for men (5.7%). In both genders, the 12-month prevalence increases strongly with age (Table 1). Overall, the presence of COPD was more often reported by women and men with a low educational level than by those with a medium or high one (8.1% vs. 5.7% and 4.0%). Stratified by age and sex, these differences with regard to educational level are particularly evident for women under 65 years of age and for men aged 45 to 64 years (Table 1). The prevalence of known COPD varies considerably between federal states, ranging from 3.6% in Saxony-Anhalt to 7.5% in Bremen for women and from 4.3% in Hesse to 11.2% in Saarland for men (Figure 1).

Adults with COPD frequently suffer from other chronic conditions such as cardiovascular diseases [1, 7, 9]. These concurrent conditions considerably impact the quality of life of COPD patients and contribute to the high COPD-related costs of illness [14-17]. COPD-related costs of illness are also significantly determined by the severity of the disease [17, 18]. A recent study of COPD patients in Germany revealed that in comparison to a control group from the region of Augsburg, excess (direct) costs resulting from healthcare utilization ranged between 2,595 and 8,924 EUR per patient in 2012 [17]. The indirect costs (e.g., due to work absence) were significantly higher ranging from 8,621 to 27,658 EUR [17].

Indicator

GEDA 2014/2015-EHIS surveyed the prevalence of known COPD during the past 12 months based on an instrument from the indicator set of the European health monitoring by using self-administered paper-based or online questionnaires. Respondents were asked, ‘During the past 12 months, have you had any of the following diseases or conditions?’ This question was followed by a list of conditions that also included ‘chronic bronchitis, chronic obstructive pulmonary disease, emphysema’. Out of a total of 24,016 respondents aged 18 years or older (13,144 women, 10,872 men), 1,314 respondents (696 women and 618 men) with missing information on the indicator were excluded from the analysis. COPD prevalence was calculated using a weighting factor that corrects for deviations within the sample from the German population structure (as of 31 December 2014) with regard to gender, age, district type and education. The district type reflects the degree of urbanisation and corresponds to the regional distribution in Germany. The International Standard Classification of Education (ISCED) was used to classify the responses provided on educational level [19]. Lange et al. [20] set out the details of the methodology applied in GEDA 2014/15-EHIS including a description of the method used to calculate the weighting factor and an assessment of the response rate. Background information on GEDA 2014/15-EHIS are also provided in the article German Health Update: New data for Germany and Europe, which was published in Issue 1/2017 of the Journal of Health Monitoring.
The 12-month prevalence of known COPD is 5.8% for women and 5.7% for men.

When comparing these results on the prevalence of known COPD with the results from previous epidemiological studies, considerable methodological differences need to be taken into account. For example, a comparison with the results from the interview survey of adults aged 18 years or older conducted by the Robert Koch Institute in 2012 (GEDA 2012) is not possible because both the type of the interview (written/online questionnaire now, telephone interview then) and the indicator differ [21]. GEDA 2012 surveyed the 12-month prevalence of physician-diagnosed chronic bronchitis defined as coughing with phlegm for at least 3 months per year [21].

Prevalence estimates for this indicator were 6.0% for women and 4.0% for men [21].

Besides interview data, COPD prevalence estimates are mainly based on data obtained from a pulmonary function test (spirometry) [4, 6, 18, 22, 23]. However, there is poor agreement between estimates of spirometrically defined and self-reported COPD prevalence [4, 6, 22, 24, 25]. For example in a population-based cohort study among adults 41 to 90 years of age from the region of Augsburg (KORA), less than 40% of participants with spirometrically defined COPD reported to have physician-diagnosed COPD [22]. This was explained by a high

**Table 1**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Gender</th>
<th>% (95% CI)</th>
<th>% (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Total</td>
<td>Low education</td>
</tr>
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</tr>
<tr>
<td>18-29 Years</td>
<td>Women</td>
<td>5.8 (5.2-6.4)</td>
<td>2.4 (1.6-3.5)</td>
</tr>
<tr>
<td>18-29 Years</td>
<td>Men</td>
<td>5.7 (5.2-6.3)</td>
<td>1.3 (0.8-2.3)</td>
</tr>
<tr>
<td>30-44 Years</td>
<td>Women</td>
<td>3.4 (2.7-4.4)</td>
<td>7.4 (4.5-11.9)</td>
</tr>
<tr>
<td>30-44 Years</td>
<td>Men</td>
<td>6.3 (5.4-7.4)</td>
<td>2.8 (1.2-6.2)</td>
</tr>
<tr>
<td>45-64 Years</td>
<td>Women</td>
<td>5.1 (4.3-5.9)</td>
<td>7.2 (5.2-9.8)</td>
</tr>
<tr>
<td>45-64 Years</td>
<td>Men</td>
<td>6.3 (5.4-7.4)</td>
<td>12.1 (8.8-16.3)</td>
</tr>
<tr>
<td>≥ 65 Years</td>
<td>Women</td>
<td>11.0 (9.5-12.7)</td>
<td>10.8 (8.6-13.5)</td>
</tr>
<tr>
<td>≥ 65 Years</td>
<td>Men</td>
<td>12.5 (10.9-14.3)</td>
<td>15.5 (11.7-20.1)</td>
</tr>
</tbody>
</table>

CI=Confidence interval

* n=50 additional missing values (25 women and men) when stratifying by educational level
In both genders, the 12-month prevalence of known COPD increases strongly with age.

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Figure 1
12-month prevalence of known COPD according to gender and federal state (n=12,448 women; n=10,254 men)
Source: GEDA 2014/2015-EHIS

Confidence intervals in parentheses

number of undiagnosed COPD cases [22], a fact that results in an underestimation of the actual COPD prevalence when using self-reported information [1, 9, 25, 26].

In line with other studies, GEDA 2014/2015-EHIS survey data also demonstrate that COPD is an age-associated disease [1, 4-7]. A comparison with prevalence estimates of spirometrically defined COPD must, however, take into account that lung function generally decreases with age and also shows considerable variation in the older population [27-29]. In particular, age-specific estimates on COPD prevalence based on spirometry data differ depending on the chosen reference criteria and method of examination, e.g. with or without the use of medications to dilate airways [1, 9, 22, 27-29]. Besides,
The presence of COPD was more often reported by women and men with a low educational level than by those with a higher one.
nal of Health Monitoring) as well as in COPD awareness and care provision [36, 38-40]. Periodically repeated collection of nationally representative population-based data on major modifiable risk factors as well as on lung function, diagnosis, symptoms, and mortality of COPD is essential in order to identify successes and remaining or new challenges of COPD prevention and care.

References


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