General Hospital Psychiatry 37 (2015) 513–517

Contents lists available at ScienceDirect

General Hospital Psychiatry

journal homepage: http://www.ghpjournal.com

Prevalence of depressive symptoms among patients with a chronic nonspecific lung disease in five ethnic minority groups

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ARTICLE INFO

Article history:
Received 8 July 2015
Revised 9 August 2015
Accepted 18 August 2015

Keywords:
Depressive symptoms
Ethnic minority groups
Asthma
COPD
HELIUS study

ABSTRACT

Objective: Earlier studies found chronic nonspecific lung disease (CNSLD) to be associated with depressive symptoms. We aimed to assess whether the association between CNSLD and depressive symptoms varies between ethnic groups.
Methods: We used questionnaire data from 10916 participants of the HELIUS study in Amsterdam from six different ethnic groups. We applied logistic regression analysis to determine the association between CNSLD and depressive symptoms and interaction terms to test whether this association varied between ethnic groups.
Results: CNSLD prevalence was higher among South-Asian Surinamese, Turkish and Moroccans (10.1% to 12.5%) than African Surinamese, Dutch and Ghanaians (4.8% to 6.3%). The prevalence of depressive symptoms was higher among participants with CNSLD (28.4% vs. 13.7%). This association was not significantly different between ethnic groups. The absolute prevalence of depressive symptoms was higher among the CNSLD patients from ethnic minority groups (19.2 % to 35.6%) as compared with the Dutch-origin majority group (11.2%).
Conclusions: CNSLD is associated with a high risk of depressive symptoms, especially among the five ethnic minority groups. These results imply a need to monitor the mental health of CNSLD patients in particular when a patient is from an ethnic minority group.

1. Introduction

Asthma and chronic obstructive pulmonary disease (COPD) are major chronic respiratory diseases. Because these diseases share many characteristics, it was proposed in 1959 that both diseases were to be diagnosed as one and the same under the term *chronic nonspecific lung diseases* (CNSLDs) [1,2]. Today however, in view of the differences in inflammatory pathology, COPD is an umbrella diagnosis to describe emphysema and chronic bronchitis, whereas asthma has become a stand-alone disease.

Both asthma and COPD are associated with an increased risk of having mental diseases such as major depressive disorder (MDD) [3–5]. For COPD, estimates of prevalence of depressive symptoms range from 8% to 80% [6]. Patients suffering from COPD reported that the severity of depressive symptoms was one of the largest negative influences on their quality of life [7]. MDD and depressive symptom severity are associated with increased persistent smoking, higher exacerbation frequency, longer hospitalization, decreased physical and social functioning and higher mortality [8–10]. Given these negative effects of a comorbid MDD in COPD patients, the adequate treatment of MDD is of key importance. However, Kunik et al. [11] showed that only 31% of all COPD patients suffering from a comorbid MDD was actually being treated for this disorder despite the negative influence on COPD prognosis.

As with COPD, several studies have shown an increased prevalence of MDD among asthma patients as compared with the non-asthmatic population and a positive link between asthma severity and MDD [3]. Several studies have shown an association between depressive symptoms and both exacerbation frequency and airway instability in asthma patients [12–14]. Furthermore, Ritz et al. [15] showed that MDD can have a negative influence on total respiratory resistance in asthma patients but not in healthy subjects.

Ethnicity might play a role in the association between asthma or COPD and MDD [16]. Earlier studies suggest that there are ethnic differences in MDD prevalence. In European studies, an association was found between the Turkish and Moroccan ethnicity and MDD [16–21]. This association might be partially explained by health care-related factors such as the chance of receiving guideline care or chance of disease identification in primary care being lower among ethnic minority groups [22–26]. However, social factors such as perceived social support and coping strategy also differ between ethnic groups and have been shown to affect the prevalence of depressive symptoms as well as the association between depressive symptoms and asthma or COPD [27–31]. If the vulnerability of developing MDD when having asthma or COPD is affected by these psychosocial factors, it is possible that ethnicity also influences the prevalence of depressive symptoms within an asthma or COPD population.

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http://dx.doi.org/10.1016/j.genhosppsych.2015.08.003
0163-8343/

Because MDD may have such a high impact on quality of life in asthma or COPD patients and on the prognosis of their disease, monitoring the mental health of these patients is crucial. As there is little information on the association between asthma or COPD and MDD among different ethnic groups, the general aim of this study is to identify ethic groups with an increased risk for developing comorbid MDD next to a preexisting asthma or COPD diagnosis. Because of data restrictions, this study uses the combined diagnosis CNSLD instead of analyzing asthma and COPD separately (see Methods). The specific aims of this study were to assess (a) the prevalence of CNSLD and MDD among five ethnic minority groups living in Amsterdam and (b) associations between CNSLD and depressive symptoms or MDD within these different ethnic groups. We hypothesized that the association between CNSLD and depressive symptoms/MDD is stronger within ethnic minority groups than among ethnic Dutch.

2. Methods

2.1. Data collection

Data were provided by the HELIUS study (acronym for healthy life in an urban setting), a large-scale, multiethnic cohort study on health and health care utilization among different ethnic groups living in Amsterdam, The Netherlands. The aims and design of the HELIUS study are described previously by Stronks et al. [32]. Participants between 18 to 70 years old living in Amsterdam were randomly sampled through the municipality register of Amsterdam, stratified for ethnicity. Data were collected by questionnaire. The study protocols were approved by the Academic Medical Center (AMC) Ethical Review Board, and all participants provided written informed consent.

Baseline data collection of the HELIUS study is still ongoing. For the current study, we used baseline data collected until December 2013, including data of 11,356 participants for whom questionnaire data were available. All participants filled in an extensive questionnaire, including information on demographic factors, lifestyle, cardiovascular health, mental health and other comorbidities. For the current analyses, we excluded participants who did not fill in any information regarding their CNSLD status ($n = 61$) or participants who had missed more than one item on the depressive symptoms scale ($n = 112$, of which 14 were already excluded due to a missing CNSLD status), as described below. Furthermore, we excluded ethnic groups with small number of participants: Javanese Surinamese ($n = 132$), other Surinamese ($n = 128$) and unknown ethnicity ($n = 21$).

2.2. CNSLD and other comorbidities

Participants were asked to indicate which illnesses or diseases they have or have had in the past 12 months. For this, participants were presented a list of 20 specific diseases or groups of diseases and had to indicate whether these diseases were diagnosed by a doctor. For this study, CNSLD patients were identified as those who mentioned that they suffered from one of the following lung diseases: asthma, chronic bronchitis, lung emphysema or COPD. For the current analyses, only CNSLD which was reported to be diagnosed by a doctor was considered as a positive diagnosis. In a similar manner, self-reported prevalence of other comorbidities was measured (for a full list of the measured comorbidities, we refer the reader to supplemental Table S1).

2.3. Depressive symptoms

Presence of depressive symptoms was assessed by the patient health questionnaire (PHQ-9), which determines the prevalence of depressive symptoms over the preceding 2 weeks. It consists of nine items, with a response scale varying from 0 (*never*) to 3 (*nearly every day*). A sum score is obtained by summing all nine scores (range, 0–27). If one of the nine items was missing, the mean score of the other eight items was used to replace the missing item. If more than one item was missing, the sum score was considered missing. Participants having a sum score of 10 or higher were considered to have depressive symptoms [33,34]. Furthermore, as validated by Lowe et al., the PHQ-9 is able to ascertain whether a participant is suffering from MDD by using a categorical algorithm [35]. However, the current HELIUS dataset does not contain enough participants with MDD to ensure sufficient power for an ethnic comparison of the influence of CNSLD on MDD. Therefore, depressive symptoms were used as the outcome measure for the main analyses. In addition, supplementary explorative analyses were conducted replacing depressive symptoms by MDD as the main outcome variable.

2.4. Ethnicity

Participant's ethnicity was defined according to the country of birth of the participant as well as that of his/her parents. Specifically, a participant was considered as of non-Dutch ethnic origin if he/she fulfilled either of the following criteria: (a) he or she was born abroad and has at least one parent born abroad (first generation); or (b) he or she was born in the Netherlands but both his/her parents were born abroad (second generation) [36]. Of the Surinamese immigrants in the Netherlands, approximately 80% is either Creole (African origin) or Hindustani (South Asian origin). Both Surinamese subgroups were classified according to self-reported ethnic origin.

2.5. Statistical analyses

Characteristics of the study population are described by reporting means (with standard deviation) or percentages. Chi-square analysis was used to determine differences in prevalence of depressive symptoms and MDD according to ethnicity. Using binary logistic regression analysis, the association between CNSLD and depressive symptoms was determined, using depressive symptoms (yes/no) as the dependent variable. In the first model, we only controlled for age and gender, whereas the second model also controlled for smoking and education level as potential confounders. For the third model, we added the comorbidities with the strongest influence on the association between CNSLD and having depressive symptoms: intestinal disorders persisting over 3 months, chronic myalgia or pain spread throughout the body, neck or shoulder ache and other pain-related comorbidities (back ache, osteoarthritis, arthritis and elbow ache) (Table S1). Finally, a fourth model was used including all comorbidities.

To examine whether the association between CNSLD and depressive symptoms existed for each of the ethnic groups, the same binary logistic models were repeated but stratified for ethnicity. In addition, to formally test whether the association between having CNSLD and having depressive symptoms was modified by ethnicity, we included an interaction term between CNSLD and ethnicity. Finally, a sensitivity analysis was performed in which we included as a positive case those participants who reported having a disease with or without a clinical diagnosis.

3. Results

Participants diagnosed with CNSLD were older than participants without CNSLD, but the difference was relatively small (Table 1). There were more female participants in both the CNSLD and non-CNSLD group, with a greater share of female participants in the CNSLD group. (For a similar comparison based on ethnic background, we refer the reader to supplemental Table S2). Education level was lower and smoking prevalence higher among participants with CNSLD. The prevalence of comorbidities like intestinal disorders and pain syndromes was higher among patients with a CNSLD diagnosis.

The ethnic groups that were analyzed for this study are described in Table 2. South-Asian Surinamese and Turkish participants showed the