Primary Health Care: Open Access

Research Article

Know Your Cough: A New Index to Assess Effects of Cough Severity on Patient's Health and Overall Symptoms – An Indian Survey Report

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Abstract

Cough intensity is an important determinant of global cough severity. Acute cough usually resolves in less than 2-3 weeks while if prolonged, it is considered chronic cough (lasting longer than 8 weeks). The classifying of cough based on 'severity' and its impact on the daily life of the patient is an important gap in the management. In most of the clinical studies conducted so far, there is generally a lack of specific and sensitive data of individual symptoms for cough evaluation.

Keywords: Chronic cough; Patient's health; Respiratory disease

Introduction

The relationship between physiologic measures of cough intensity and treatment decisions to improve the quality of patient's life is yet to be investigated. Therefore, there is a need to develop real time investigation which should be based on the clinical setting, population examined, and available expertise [1,2].

Generally, the management of cough either acute or chronic is based on etiology, type of cough and underlying and associated conditions. The diagnostic evaluation of cough can be challenging for physicians as it is a nonspecific symptom of respiratory disease including the inhalation of a foreign body, airway lesions, airway allergies, environmental pulmonary toxicants, non-asthmatic eosinophilic bronchitis, respiratory infections and post infectious cough, side effects of medications, and other otogenic causes with a broad differential diagnosis where the pattern of respiratory illness varies with age, gender and type of population. To enhance patient's satisfaction, there must be an effective evaluation and diagnostic approach to treat this disorder [2,3].

Guidelines to help health care providers for diagnosing and managing cough have been published globally, Europe and Japan reflecting its magnitude and importance to medical care around the world [2-6]. Various questionnaire based surveys have also been conducted in different regions to understand the prevalence, pathology and etiology of cough [7-10]. The American Laryngological, Rhinological and Otological Society have developed and validated a cough severity index (CSI) for chronic cough related to the upper airway, which is a short, simple instrument consisting of 10 questions which are scored from 0-4 and assess the cough of the patient in terms of its effect on disturbing day to day life. It is a universally standard CSI scale to measure treatment out comes in the clinical setting to quantify patient's symptoms of chronic cough of upper airway origin. However, the questions are very specific and are not all-inclusive when it comes to the general chronic cough population [11].

The present study is a survey report among Indian urban and semi-urban population coming to FPs which is a heterogenous mix in terms of standards of living, climatic and environmental conditions, nutritional and lifestyle habits as well as education status therefore can be a representative of the heterogenous world population. This study is based on two questionnaires; established CSI and another 8 point general know your cough (KYC) questionnaire designed by the authors. The aspect of addressing 'Quality of Life' in cough management is of importance for improving patient outcomes worldwide and the questionnaires and scores are designed to serve any population. We have made efforts to provide a clinically relevant and data driven approach based on real time studies which can be considered in future to help physicians for planning patient management for cough.

Materials and Methods

Participants' enrollment

A total of 23, 157 patients above age of 18 years were enrolled. The data collection was completed in 3 months (April 2017 to July 2017). The participants were randomly selected from general population from all the zones of India. All participants' information; demographic and personal, was entered into a database with the participant's diagnosis.

While recruitment, they all were examined for their previous history of cough (if any).

Study procedures

A survey named Know Your Cough (KYC) survey was conducted with over 2209 general physicians (GPs) in India.

The patients recorded their responses in the two questionnaires: an 8-point general KYC questionnaires – to understand general trends in cough epidemiology (Appendix 1) and ten point CSI questionnaire recommended by the American Laryngological, Rhinological and Otological society [11].

Questionnaire's characteristics

The 8-point general KYC questionnaire: It was designed as per the specific questions. The questions were divided in five categories: a) patient history, b) cough characteristics, c) symptoms accompanying with cough, d) co-existing conditions and e) medical trends for administering drugs. The percentage response rate of patients for every question was recorded.

Citation: Ashok M, Girish R, Varsha N (2017) Know Your Cough: A New Index to Assess Effects of Cough Severity on Patient's Health and Overall Symptoms – An Indian Survey Report. Prim Health Care 7: 277. doi: 10.4172/2167-1079.1000277

The 10-point CSI questionnaire: The questionnaire had 10 questions which were based on the common symptoms relating to chronic cough associated with upper airway pathology. The questions airway pathology. The questions were designed as per the day to day situations being faced by cough patients during the study period. Every question had to be answered based on 5 point Likert scale (i.e., 0=never; 1=almost never; 2=sometimes; 3=almost always; 4=always). The patients were asked to circle the response that indicated how frequently they experience the same symptoms. From the mean and standard deviation results, anyone with a score of 2 standard deviations (SD) above the mean (i.e., >3.23) was considered significantly or severely symptomatic for cough.

Based on the above findings from both the questionnaires, final CSI was calculated and shared with the treating GP along with the patient responses, for physician's consideration in planning patient management.

Results

KYC results

The percentage response rate of patients was calculated for all the questions.

Patient history: Overall, 85% (n=19683/23157) of the patients responded "Yes" for the presence of cough while starting the study, out of which 77.5% (n=15254/19683) showed symptoms of acute cough of the OPD patients who were not having cough currently, 85% (n=2953/3474) had some past history of cough in preceding 3 months. Figure 1 represents the percentage of patients and their duration of cough; 3 months before the study and at the study commencement.

Cough characteristics (time of worsening and cough type): Patients were asked for the time at which they feel their cough was worst, the percentage response rates were recorded for morning, afternoon, evening and night. Majority (39%) of the patients complained worsening condition during night time. For cough type, 66% felt that their cough was dry without phlegm and 34% complained of phlegm that needed to be spit (Figure 2).

Symptoms accompanying cough: The symptoms such as nasal symptoms, sore throat, fever and ear pain present with cough were
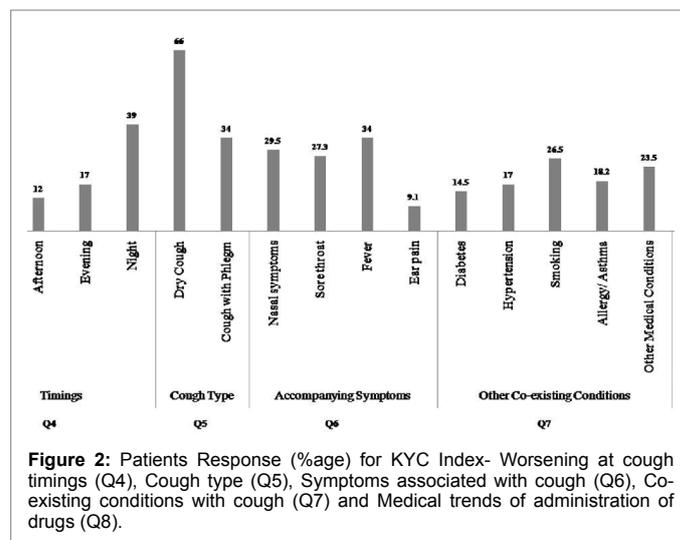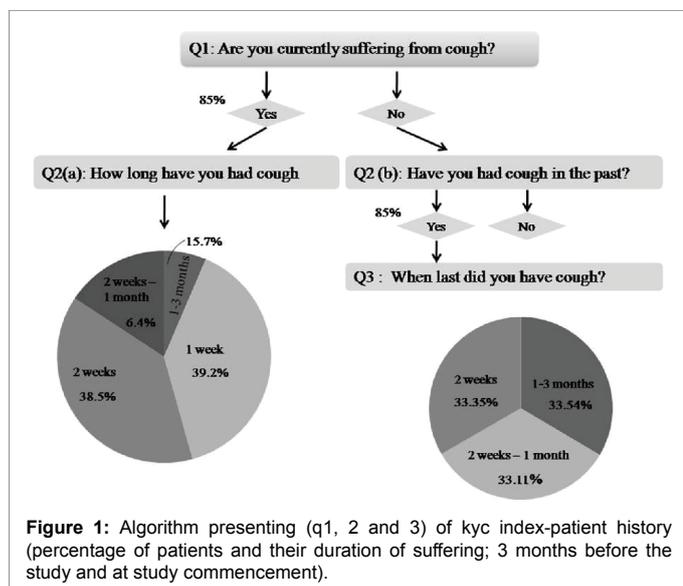
Figure 2: Patients Response (%age) for KYC Index- Worsening at cough timings (Q4), Cough type (Q5), Symptoms associated with cough (Q6), Co-existing conditions with cough (Q7) and Medical trends of administration of drugs (Q8).

also examined. Percentage response rates against all symptoms were recorded. Sore throat was found associated (34%) in many of the patients. The patients (77%) complained of some degree of breathlessness like 'run out of air' after coughing, 80% felt cough affected their voice and 77% also pointed that cough restricted their physical activity.

Common coexisting conditions with cough: Patients were evaluated for co-morbid conditions of which smoking (27%) was found to be the major risk factor. Diabetes (14%), hypertension (17%) and airway allergies/asthma (18%) were also associated co morbidities in patients.

Medical trends: On evaluation of medical trends followed; patients undergoing self-medication or taking prescribed medications, it was found that only 45% of patients were actually taking medicines prescribed by doctors and 17% were those who were on self-medication. Rest were either not taking or were dependent on local chemists recommendations.

CSI scores: The CSI scale results were evaluated on 0-4 scales. Figure 3 shows the scores evaluated. Each QOL parameter above was affecting 75-80% patients.

Severity index: The final severity index was calculated, considering CSIs>3.2=2 SD above the mean; significant cough severity was found in 8% (n=1853) patient population (Figure 4).

Discussion

The KYC survey is an initiative taken to prepare an index for the patients in India to evaluate cough severity so that to propose an efficient and well planned cough management system to GPs. In India, however, only some community-based studies with as many factors associated with cough have been investigated previously to study the prevalence and determinants of caregivers' practice for treating cough [9,10,12-14]. As per the latest survey (2016) conducted by Apte et al. in 880 urban cities and towns of India, cough was found to be the second most common symptom reported in primary care practice in India [10].

The KYC index was designed taking in to consideration the general problems reported in the patients with cough. CSI was considered as a key parameter to understand the trends in cough epidemiology. CSI gives a clear picture of severity of cough; if it is acute or chronic.
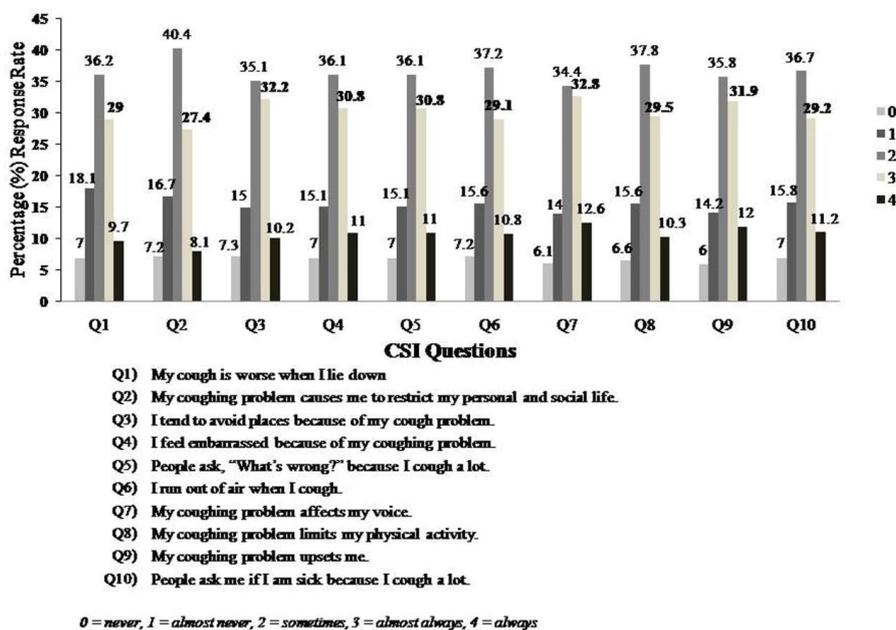

Figure 1: Algorithm presenting (q1, 2 and 3) of kyc index-patient history (percentage of patients and their duration of suffering; 3 months before the study and at study commencement).

Q1) My cough is worse when I lie down
Q2) My coughing problem causes me to restrict my personal and social life.
Q3) I tend to avoid places because of my cough problem.
Q4) I feel embarrassed because of my coughing problem.
Q5) People ask, "What's wrong?" because I cough a lot.
Q6) I run out of air when I cough.
Q7) My coughing problem affects my voice.
Q8) My coughing problem limits my physical activity.
Q9) My coughing problem upsets me.
Q10) People ask me if I am sick because I cough a lot.

0 = never, 1 = almost never, 2 = sometimes, 3 = almost always, 4 = always

Figure 3: CSI scores: Percentage response rates against scores.
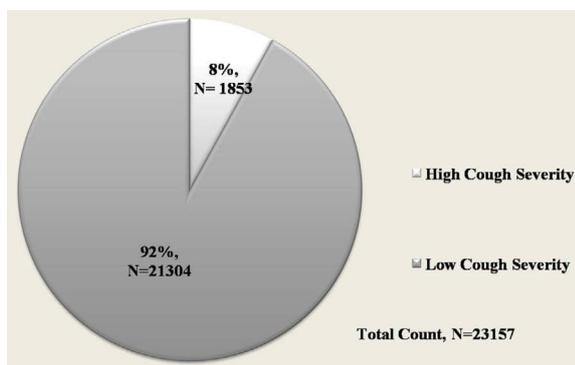

Figure 4: Cough severity index (CSI): Proportion of patients with severe cough.

The index was specifically categorized for the questions including all the important factors which were supported by the relevant literature and studies conducted in past. The present KYC survey included a large sample size for patients and GPs which was estimated utilizing the available information on the prevalence of cough in India which is 3.49% among the adults >35 years of age [13]. Therefore, we included all the adult patients without any gender, race or ethnicity bias.

Mahesh et al. in their study conducted at Mysore, India have shown that the prevalence of chronic cough and chronic phlegm, are the important indicators of respiratory morbidity and mortality, the study showed that the prevalence of chronic cough in the population studied was 2.5% and the prevalence of chronic phlegm was 1.2% [9]. Few pediatric studies have reported that nocturnal cough is a major risk factor for asthma and rhinitis [15,16]. We reported that dry cough was more prominent in the adult patients and they mostly complained worsening of cough in night when they lie down.

Cough is often accompanied with cold and soreness in throat.

Other symptoms like nasal secretions, fever and ear pain also coexist in many patients. A report on a questionnaire based survey for physicians in Mumbai, India for the prevalence and management of dry cough reported the associated symptoms 'frequently' were sore throat (73.0% physicians), sleep disturbance (51.4% physicians), fever (49.8% physicians), and nausea and vomiting (9.0% physicians). As per physicians, 19.6% of their patients had allergy/asthma and 19% physicians reported coronary artery diseases are the co-morbid conditions associated with cough [14]. We reported that besides above symptoms, almost 50-60% patients had co-morbid cardiovascular disease (CVD) risks with cough. Our survey report showed that many patients also felt some degree of breathlessness like 'run out of air' after coughing, reduced physical activity and affected voice after coughing.

For the various risk factors considered in questionnaire, environmental tobacco smoke is found to be the major risk factor. Jaakkola et al., quoted in their studies that smoking is the leading cause of cough especially in the women and children [17]. Jindal and his coworkers in their multicentre study on epidemiology of chronic obstructive pulmonary disease, reported that there is a significant relationship with tobacco smoking and environmental tobacco smoke exposure with all kind of respiratory disorders [12]. In our study, we reported 27% of patients had a smoking history.

Besides smoking, diabetes, hypertension and asthma or other airway allergies could also be associated with cough. A recent survey based analysis to understand the management of dry cough among primary care physicians in Indian clinical setting; 33% physicians suggested that hypertension is the most common comorbid condition associated with cough followed by diabetes (28% physicians) [14]. Cough is the initial worsening sign that may be associated with wheezing and shortness of breath in the asthmatic patients. Therefore airway allergies should always be kept in mind as a possibility for chronic cough.

Another important factor which is usually overlooked in many studies; self or prescribed medication was also considered. As this

survey was done in the patients who had come for doctor's consultation, the proportion of self-medication (17%) or direct buying from chemist (25%) may be lower. This component should be considered important; it has seen to be high in surveys done directly with general adult population. WHO in one of its survey conducted on non-prescribed use of antibiotics for children in an urban community in Mongolia reported that fewer than half of the respondents (n=210/503) had given antibiotics to the index child without a prescription for symptoms of upper respiratory tract infection such as cough (84%), fever (66%) or nasal (65%) and throat symptoms (60%). The main source of non-prescribed antibiotics were pharmacies (86%) [18]. Although, respiratory tract infections are the most common label associated with cough, still the practice of administering drugs without prescription or without diagnosis is being followed. In another Indian survey, it was reported that 68.7% of cough patients were treated without any specific underlying diagnosis [10]. Therefore, there is a need to educate GPs in India on cough management.

The strengths of our study were its large sample size, good study design, and good sampling strategy. Further, we have focused on all the factors which can help physicians for the management of cough to substantially improve patient's QoL.

Ciccone et al. had studied and recommended assigning care managers, besides GPs and family physicians (FPs), in the offices of GP /FP along with the support of dedicated software for data collection and care management decision to improve patient health outcomes [19]. Data of our study has highlighted some interesting results. However, the available information is based only on questionnaire filled by patients; the questionnaire obtained from physicians as well could have served a better purpose. Also, we have not validated the questionnaire on any statistical tests. Though, the index is not providing any diagnostic support to treat cough but it is a guiding tool for the physicians to opine on which symptoms indicate the type of severity (i.e., acute or chronic). This can help largely in opting for the treatment approach.

Based on these study results, we further recommend research which should include assessing treatment outcomes of patients in whom QOL parameters were considered in management decisions so that to identify and validate which factors and which order can work together to explain chronic cough.

Conclusion

The KYC survey has provided some important conclusions which are though not diagnostic but can be used by clinicians to evaluate the treatment. KYC covers a broad range of quantifiable effects of cough on patient's health and overall symptom severity, while simultaneously address clinical practicality.

Acknowledgement

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