

# ***Etiologies of chronic cough in adult patients: Is it hard to be diagnosed?***

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## **Abstract**

**Background:** Chronic cough is often the key symptom not only of chronic pulmonary diseases but for other important extrapulmonary pathologies, in particular upper airway and gastrointestinal diseases.

**Objective:** This study was designed to determine the etiology of chronic cough and the usefulness of the available diagnostic tests in reaching its causes.

**Methods:** One hundred patients presenting with chronic cough at Baghdad Teaching Hospital Outpatient Clinic were enrolled in this study. The patients underwent a full clinical interview, physical examination with indicated diagnostic test(s) (such as chest x ray, bronchoscope, PFT, GIT study, sinus X ray or CT).

**Results:** An etiology of chronic cough was determined in 93% of the patients. Post nasal drip is the leading cause of chronic cough reported in 31% of the patient, while asthma gastro-

esophageal reflux disease, and chronic bronchitis seen in (26, 20, and 6 % respectively).

The diagnosis of chronic cough can be reached by comprehensive history, proper physical examination, and chest X ray findings in 66 % patients, further more sophisticated and invasive tests like: PFT, upper GIT study , expectorated sputum examination (AFB, Gram staining, cytology), fiberoptic bronchoscope, and full ENT evaluation including sinuses X ray or sinuses CT scanning, are need in the rest.

**Conclusion:** The etiology of chronic cough can often be diagnosed safely with a simple initial evaluation (history, physical examination and chest X-ray). Postnasal drip, asthma and gastroesophageal reflux disease account for the etiology in more than three quarter of the patients.

**Key words:** Cough, Asthma, Post nasal drip, Gastroesophageal reflux disease, chronic bronchitis.

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## ***Introduction:***

**C**ough is a symptom that has been experienced by every human and is an essential protective mechanism that ensures the removal of mucus, noxious substances, and infectious organism from the larynx, trachea, and large bronchi <sup>(1)</sup>. It is one of the most common symptoms for which patients seek medical attention <sup>(2)</sup>. When cough last more than 3 weeks it is called chronic <sup>(1,3,4)</sup>

It is caused by stimulation of sensory nerves in the mucosa of the pharynx, larynx, trachea and bronchi <sup>(5)</sup>. The afferent limb of the cough reflex includes the sensory branches of the trigeminal, glossopharyngeal, superior laryngeal, and vagus nerves. The efferent limb includes recurrent laryngeal and spinal nerves <sup>(6)</sup>.

It may be a sign of disease outside the respiratory system and is a useful indicator for both patient and physician for initiating diagnoses and treatment of disease process <sup>(1)</sup>. Lesions in the nose, ears, pharynx, larynx, bronchi, lungs, and pleura can cause cough <sup>(6)</sup>.

About 11% to 18% of the general population have chronic cough <sup>(7)</sup>, with a variety causes.

Asthma, gastroesophageal reflux, and rhinitis with postnasal drip, chronic obstructive airway disease, bronchiectasis, post infectious cough, and drugs induced notably angiotensin converting enzyme inhibitor are the most frequent causes of chronic cough and can be easily diagnosed <sup>(8)</sup>. Other inflammatory, infectious, vascular, psychogenic and malignant conditions can be diagnosed relatively less <sup>(1)</sup>.

Identification of a potential cause of cough has been reported in 78% to 99% of patient presenting at cough clinic <sup>(3)</sup>.

## ***Methods:***

This is a descriptive study of patients presenting with chronic cough. It was conducted from January 2007 to July 2008. One hundred consecutive patients with chronic cough were collected from the respiratory outpatient clinic at Baghdad Teaching Hospital.

Those patients with cough of more than 3 weeks are enrolled in this study. Each subjected to comprehensive medical history with proper physical examination and chest X

ray examination, stresses on quality of cough, it's relieving and exacerbating causes, other associated symptoms especially those related to upper airway, upper gastrointestinal, and cardiovascular diseases. Full medical history was reported.

If medical history, physical exam, and chest roentgenogram do not suggest an etiology, the 1<sup>st</sup> additional study ordered is pulmonary function testing (spirometry before and after administration of bronchodilator). The need for other more sophisticated and invasive tests was directed according to the data gained from the initial workup. The presence of suggestive features of post nasal drip syndrome, directed for an ENT evaluation prior to performing pulmonary function testing. Expecterated sputum examination, and fiber optic bronchoscopy, each or both were ordered if chest X-ray features suggestive of infection or malignancy.

If an etiology still did not emerge upper GIT endoscopy were ordered even in the absence of upper GIT symptoms. If we diagnose the patient as a case of GERD then we give the patient trial of antireflux treatment, we considered GERD as a cause to his cough only after relieve of his complain following treatment. For all cases that had been diagnosed as PND, asthma, or GERD from only history and physical examination, further study were done to confirm the diagnosis, (Including PFT, upper GIT study, full ENT evaluation with sinuses X ray or CT scan).

When history, physical examination and the investigations suggest more than one cause, the cause was determined by observing which specific therapy eliminate cough as a complaint.

## Results

This study was conducted on 100 patients with chronic cough, 61 females (61%), 39 males (39%), Female to male ratio = 1.56/1 (Table 1). They had complained of cough for an average of 12±23 months (range 3weeks-15years).

The age ranged between (18-81) years, with mean age of 42.28±17.09 years.

Females' age ranged between (18-67) years and the mean was 40.31±15.74 years. Males' age ranged between (19-81) years, and the mean age was 45.35±18.82years (Table 1). The frequency of chronic cough according to

age group were 13% for those of (11-20) years,14% for those of (21-30) and (31-40) years,18% for those of (41-50) years, 24% for those of (51-60) years,12% for those of (61-70) years, 4% for those of (71-80) years ,and 1% for those of (81-90) years (Table 2).

An etiology for chronic cough was assigned to 93% of patients (figure 1). Overall, 31% of patients with chronic cough had PND, 26% had asthma, 20% had GERD, 6% had chronic bronchitis, 10% had miscellaneous etiologies, and 7% were unknown (Figure 2).

Those of miscellaneous etiologies, the cause were due to pulmonary tuberculosis infection in 3%.z Bronchogenic carcinoma, bronchiectasis, and ACEI usage each constituted 2%, while due to left ventricular failure, constituted 1% of the cases (Figure 3)

Table 3 describes the evaluation of patients in terms of the types of tests ordered, as well as the number of patients for whom a diagnostic tests help in the diagnosis of the etiology of chronic cough.

Of the 93 patients for whom a diagnosis could be made, 66 were accomplished with history, physical examination, and chest X ray, 7 by PFT, 6 by upper GIT study, 4 by expecterated sputum examination (AFB, Gram staining, cytology ), 1 by fiberoptic bronchoscope, and the remaining 9 by the full ENT evaluation including sinus X- ray or CT scanning.

## Discussion:

In our study female: male ratio was 1.56:1, (61 vs. 39 %), consistent with that reported by Irwin et al <sup>(3)</sup>, in which the female: male ratio was 1.36:1. Enhancement of cough reflex in female due to hormonal variation can explain female preponderance, Morice et al <sup>(9)</sup>, also by Dicipinigaitis PV et al <sup>(10)</sup>.

We found that the etiology can be determined in 93% of patients , result of (99%) found by Irwin et al <sup>(3)</sup>, however in up to 20% of patients with cough the cough remain unexplained according to McGarvey et al <sup>(11)</sup>. So our result lies in between. Our study shows that the commonest causes of cough is PND (31%), in Irwin et al study also it was the commonest cause of cough (41%), the same was found by Mello et al <sup>(12)</sup> study, but the difference between the frequency can be explained by the fact that differences might be related to the place of the study that our patient were selected from

respiratory outpatient clinic while those in Irwin study were selected from outpatient clinic (not specialized in respiratory medicine). So possibly those with cough and symptoms of PND might consult ENT clinic are missed in our study, while all patient with cough were seen by Irwin in their study.

We found that asthma is the cause of chronic cough in 26%, which is approximately the same reported by Irwin et al<sup>(3)</sup> 24%.

In our study, we found that 20% of the causes were due to GERD, this finding was similar to that of Irwin et al<sup>(3)</sup> study in which GERD accounted for (21%) of causes. Also, we found that 6% of the etiologies are due to chronic bronchitis, approximately similar to what was found by Irwin et al<sup>(3)</sup> study in which chronic bronchitis account for (5%) of causes.

In our study PND, asthma, and GERD are the most common conditions associated with chronic cough that they account to 77% of all causes, similar result found by Irwin et al<sup>(3)</sup> in that study they found (86%) of the causes is due to the above three causes, but the difference between the incidence can be explained by the fact that in Irwin study they found the cause of cough in 99% of cases while in our study we found the cause in 93% of cases. So the incidence in our study may increase and reach that of Irwin if we could identify the cause of cough in those (7%) unknown cases. Also pratter et al<sup>(13)</sup>, McGarvey et al<sup>(11)</sup>, and Poe et al<sup>(14)</sup>: all found that PND, asthma, GERD are the three most common condition associated with chronic cough.

Regarding the miscellaneous etiologies, we found that 3% of the etiologies were due to pulmonary tuberculosis but in comparison to the study which was done by Irwin<sup>(3)</sup> in which tuberculosis was not encountered as a cause of chronic cough but instead they encountered other causes (sarcoidosis, Zenker's diverticulum) which we could not encounter. This can be explained by the fact that there were differences in the places of the study.

Over all we found that two third of etiology could be determined by history, physical exam, and chest X ray, similar result was found by Irwin study. This mean we can reach diagnosis with cost reduction.

### **Conclusions:**

The etiology of chronic cough can often be diagnosed with a simple initial evaluation (careful history, full physical examination and chest X ray), that in nearly two third of the patients the etiology will be identified. PND causes, asthma and GERD account for the etiology in more than three quarter of the patients.

### **Recommendations:**

1. In patients with chronic coughs, if a careful history, physical examination, and chest X ray cannot identify the etiology of chronic cough, a major focus should be screening for PND, asthma, and GERD.
2. More sophisticated test like bronchoscope, CT scan testing should be reserved for those patients in whom no diagnosis is reached, and when history, physical examination and the evaluation suggest more than one cause, the cause was determined by observing which specific therapy eliminate cough as a complaint.

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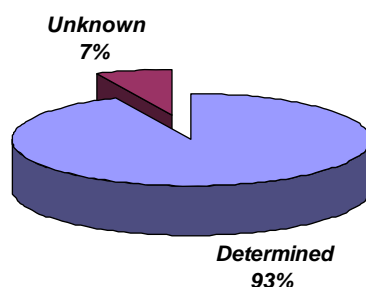
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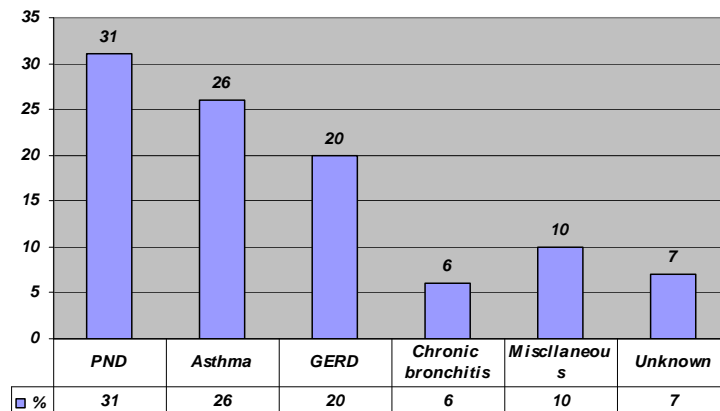
**Table 1: Gender of patients' chronic cough with their mean age**

Gender	Number	Mean age (years) + SD
Male	39	45.35±18.82
Female	61	40.31±15.74
Total	100	42.28±17.09

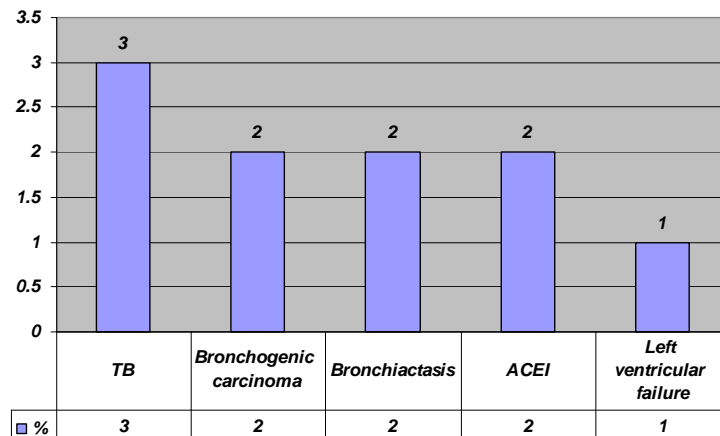
**Figure 1: Percentage of determination of the causes of chronic cough**



**Figure 2: Causes of chronic cough**



**Figure (3): Miscellaneous causes of chronic cough**



**Table 2; Frequency of chronic cough according to age**

Age(years)	Frequency %
11-20	13
21-30	14
31-40	14
41-50	18
51-60	24
61-70	12
71-80	4
81-90	1
Total	100

**Table 3: the way of diagnosing chronic cough**

<b>Type of investigation required for diagnosis</b>	<b>no</b>
History + physical examination + chest X ray	66
Full ENT evaluation including sinus X ray or CT scan	9
PFT	7
Upper GIT study	6
Expectorated sputum examination	4
Fiber optic bronchoscope	1
<b>Total</b>	<b>93</b>

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