

Original Article

The Use of Spirometry In COPD Diagnosis, Auditing a Snap Shot of The Current Practice In a Libyan Tertiary Center's Chest Unit.

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ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) is a highly prevalent condition in Benghazi, Libya, and is well-known to impose a significant burden on global mortality and morbidity. International guidelines firmly establish spirometry as the gold standard for diagnosing and monitoring COPD. However, in routine clinical practice, it is often observed that a diagnosis of COPD is made on clinical grounds alone, without the crucial objective confirmation provided by spirometric testing. **Objective:** This audit aimed to explore the practice of using spirometry to diagnose COPD, as recommended by international standards, within the Chest Unit of Benghazi Medical Center (BMC). **Material and Methods:** We conducted a retrospective review of all patient files available in the chest unit during March 2023. Data about patients' demographics and diagnostic workups, particularly the rationale relied upon by physicians to make the diagnosis, including imaging and pulmonary function tests they were compared to the standard practice recommended by the GOLD guidelines for COPD diagnosis. **Results:** From a total of 1129 outpatient files, we identified 143 patients who had been labeled as having COPD. Their ages ranged from 36 to 85 years, and the vast majority were male. Our analysis revealed that only 88 of these 143 COPD patients (61.5%) had undergone spirometer testing, while the remaining 55 patients (38.5%) had been diagnosed without this essential investigation. Smoking status was not detailed in 41 patients (28.7%), chest radiographs were absent from the files in 67.8% of cases, and CT scans of the chest were documented in only 28.7% of patients. **Conclusion:** We, in total, achieved 62% of the audit's standard for spirometry use, leading to the inference that spirometry remains underused in the diagnosis of COPD in this snapshot.

Keywords: Audit, Benghazi, COPD, Libya, Prevalence, Spirometry

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INTRODUCTION:

Chronic Obstructive Pulmonary Disease (COPD) continues to be a challenging condition with high global mortality and morbidity burden.[1]. It is currently rated as the 4th most common specific cause of death globally [2], the prevalence of COPD

ranges from 8.4 to 15 % and is on the rise worldwide ⁽³⁾. Spirometry is the gold standard test for COPD diagnosis; it helps in assessing disease severity as well as guiding the patient management, according to international guidelines [1]. That have considered Spirometry as a Gold standard in COPD diagnosis as follows:

1: Mild COPD	FEV ₁ /FVC < 70% FEV ₁ > or equal to 80% predicted With or without chronic symptoms (cough, sputum production)
2: Moderate COPD	FEV ₁ /FVC < 70% FEV ₁ between 50 and 80% predicted With or without chronic symptoms (cough, sputum production)
3: Severe COPD	FEV ₁ /FVC < 70% FEV ₁ between 30 and 50% predicted With or without chronic symptoms (cough, sputum production)
4: Very Severe COPD	FEV ₁ /FVC < 70% FEV ₁ < or equal to 30% predicted or FEV ₁ < 50% predicted plus chronic respiratory failure

Figure 1: Spirometric indexes to evaluate COPD SEVERITY.

(Where FEV₁ is forced expired volume in 1 second and FVC is forced vital capacity)[4]

However, in clinical practice, we encounter many patients being treated for presumed COPD without ever having a baseline spirometry. This audit was conducted within the Chest Unit of Benghazi Medical Center (BMC), a pivotal healthcare institution in Libya. BMC is the largest and main tertiary referral hospital in eastern Libya, serving a population of over one million people across a vast geographical area. The hospital is equipped with over 500 beds and provides a wide range of specialist services, including the respiratory medicine unit where this study was based. As the primary teaching hospital affiliated with the University of Benghazi, BMC is at the forefront of clinical care and medical education in the region. However, like many public hospitals in Libya, it faces significant operational challenges, including high patient load, resource limitations, and difficulties with systematic medical documentation and record-keeping, which can impact the standardization of care. We audited the local practice at the chest clinic- Benghazi Medical Centre against GOLD guidelines in patients labeled as having COPD regarding the use of spirometry to confirm COPD diagnosis. Spirometer- as an objective measurement of COPD - not only

confirms the diagnosis but also helps in assessing disease severity and guiding

subsequent management decisions, including pharmacotherapy. However, in routine clinical In practice, we frequently encounter a concerning trend: many patients are being treated for a presumed diagnosis of COPD without ever having undergone baseline spirometric confirmation. This practice can lead to two significant problems. Firstly, it can result in the underdiagnosis of true COPD patients, thereby depriving them of the benefits of appropriate treatment and disease management. Conversely, and perhaps more worryingly, it can lead to the over-diagnosis of non-COPD patients. This means individuals may be treated for a condition they do not have, subjecting them to unnecessary side effects from COPD medications and potentially delaying the correct diagnosis for their actual symptoms. Therefore, we sought to audit the local practice at the Chest Clinic of Benghazi Medical Centre against the GOLD guideline recommendations. We specifically focused on patients already labeled as having COPD, to determine the proportion in whom the diagnosis was objectively confirmed with spirometry. This audit aims to provide a snapshot of

our current standards and identify key areas for improvement in the diagnostic pathway for COPD at our tertiary institution.

MATERIALS AND METHODS:

1. Study Design and Setting:

This study was conceived as a retrospective clinical audit, designed to evaluate and compare real-world clinical practice in BMC chest unit against a pre-defined gold standard. The audit was conducted within the Respiratory Outpatient Clinic of the Chest Unit at Benghazi Medical Center (BMC). The unit manages a high volume of patients with chronic respiratory conditions, including COPD, asthma, and interstitial lung diseases. Data collection was carried out during the month of March 2023, providing a cross-sectional "snapshot" of the clinical documentation and practice at that point in time.

2. Patient Population and Case Identification:

The target population for this audit was all patients attending the respiratory outpatient clinic who had been formally labeled with a diagnosis of COPD by a physician. The initial sampling frame consisted of all 1,129 patient files registered and physically archived within the chest unit's dedicated storage area during the audit period. A systematic manual review of each of these 1,129 files was undertaken to identify those containing a documented diagnosis of COPD. Through this process, a total of 143 patient files meeting this criterion were identified and formed the final audit sample for in-depth analysis.

3. Data Collection Process and Variables:

The data collection was performed manually by the investigators through a meticulous review of the paper-based medical files. A standardized data extraction sheet was used to ensure consistency in the information collected from each file. The following data points were systematically sought and recorded for each of the 143 COPD patients:

- **Demographic Information:** Patient name, age, gender, nationality, and city of residence.
- **Spirometry Documentation:** The presence or absence of a spirometry report within the file was the primary data point. If present, the results were recorded, including the FEV1/FVC ratio and the post-bronchodilator FEV1 percentage of predicted, to determine severity according to GOLD criteria (i.e., Mild, Moderate, Severe, Very Severe).
- **Smoking History:** Detailed documentation of smoking status was assessed. Patients were

categorized as 'current smoker,' 'ex-smoker,' or 'never smoked.' The extent of documentation, such as pack-year history, was also noted.

- **Diagnostic Imaging:** The availability of reports or explicit notes regarding chest radiographs (CXR) and computed tomography (CT) scans of the chest within the file was recorded.
- **Pharmacological Treatment:** The current medications documented in the file were reviewed, with specific attention to the use of inhaled therapies, including Short-Acting Beta Agonists (SABA), Long-Acting Beta Agonists (LABA), Long-Acting Muscarinic Antagonists (LAMA), and Inhaled Corticosteroids (ICS).

4. Data Management and limitations:

The data extracted from the paper files were anonymized and entered into a computerized spreadsheet. It is crucial to acknowledge the significant challenges encountered during data collection. A substantial number of patient files for the broader outpatient population were not available for review as they are stored in the hospital's central archive, which was not accessible for this audit. Furthermore, the inherent issue of lost or missing files during inter-departmental patient movements meant that the 1,129 files reviewed likely represent only a fraction of the total patient load. Files with insufficient or illegible data were excluded from the analysis. Despite these limitations, the reviewed notes are considered a representative and valid snapshot of the documentation quality and clinical practice within the respiratory outpatient clinic.

5. Data Analysis:

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 18. Descriptive statistics were primarily employed. Categorical variables, such as the proportion of patients who underwent spirometry, smoking status, and medication use, were expressed as frequencies and percentages. Continuous variables, such as age, were summarized using means and ranges. The results were then compared against the audit standard, which was defined as "100% of patients diagnosed with COPD should have their diagnosis confirmed by post-bronchodilator spirometry," as per GOLD guidelines.

RESULT:

Out of 1129 Outpatient files registered in the Unit, only 143 patients were labeled as COPD of them, 141 were males, and their ages ranged from 36 to 85 years.

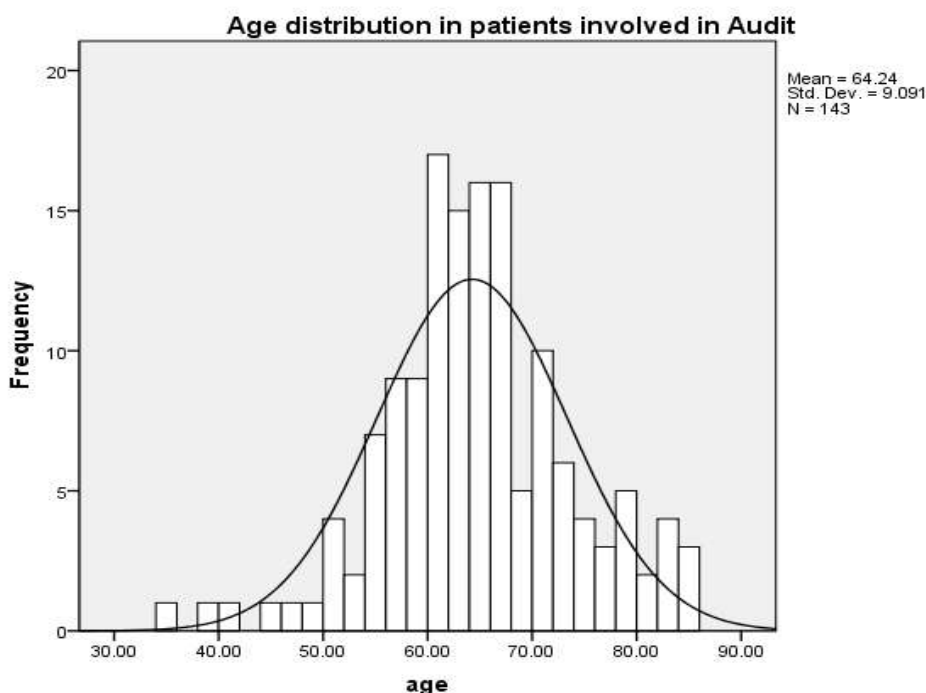


Figure 2: Age of the audited patients represented by normal distribution curve.

103 of them live in Benghazi and 35 from other suburban cities, while the remaining 15 patient residencies were not documented. Spirometry has been carried out in 88 Patients, 38.5% of the audited

COPD patients, and of those 88, the results of spirometry were as follows:

4 patients 4.5% with normal spirometric indexes, 3.4% with mild obstructive pattern, 39.7% moderate, 42% severe, and 10.2% very severe.

Table 1: Pulmonary Function Testing results in 88 patients:

Severity Level	Frequency	Percent (%)
Normal	4	4.5
Mild	3	3.4
Moderate	35	39.7
Severe	37	42.0
Very Severe	9	10.2
Total	88	100.0

Smoking status was documented in detail in 102 patients 71.3% and not documented in 41 others 28.7%.

Table 2: Smoking status documentation results.

Smoking Status	Frequency	Percent (%)
Current smoker	64	44.8
Ex-smoker	37	25.9
Smoking status not detailed	41	28.7
Never smoked	1	0.7
Total	143	100.0

Chest Radiograph was documented in 46 patients 32% while the majority, 79 patients 68% had no documented Chest radiographs in their files.

Table 3: Chest radiographs documentation.

Documentation Status	Frequency	Percent (%)
Documented	46	32.2
Not documented	97	67.8
Total	143	100.0

CT-scanning of the chest was documented only in 28.7% of patients.

Table 4: CT scan documentation.

Documentation Status	Frequency	Percent (%)
Documented	41	28.7
Not documented	102	71.3
Total	143	100.0

Drugs: LABA + ICS represented 58.7% of the medications while in 30.8% of cases drugs were not documented as shown in Table 5.

Table 5: Pharmacological therapy documentation.

Drug	Frequency	Percent (%)
LABA + ICS	84	58.7
Not documented	44	30.8
LAMA	6	4.2
Aminophylline	6	4.2
SABA	2	1.4
LABA	1	0.7
Total	143	100.0

SABA: short acting beta agonists, LABA: long-acting beta agonists, LAMA: long-acting muscarinic antagonists, ICS: inhaled corticosteroids.

DISCUSSION:

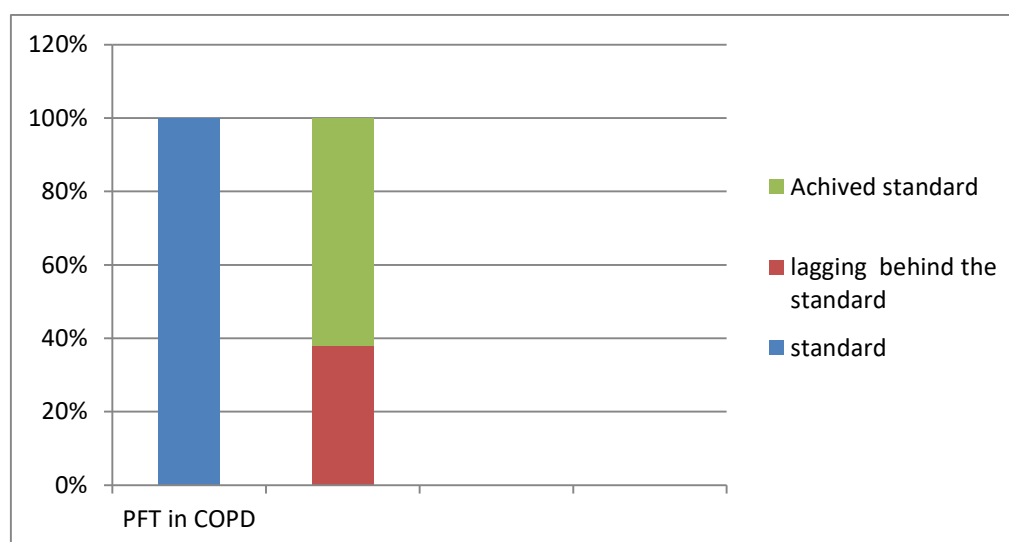
Although spirometry is the gold standard for diagnosing and monitoring COPD patients, it has been observed that many patients are being given

the diagnosis of COPD based only on clinical grounds without having a baseline spirometry, this may result in either under diagnosis of COPD patients therefore depriving them from having the benefit of treatment or over diagnosis of non COPD patients on the other hand i.e. treating patients for the wrong cause of their symptoms and subjugate them to unnecessary side effects of COPD treatments.

Out of 143 patients labeled as COPD 88 patients 61.5% had spirometry and the rest of them 55 patients 38.5% didn't have spirometry, that is to say more than a third of the audit population.

Perhaps this result emphasizes how spirometry is underutilized in Diagnosis and treatment of COPD in our practice! though it was readily available throughout the last 7 years in our center.

It was an encouraging point that: we - in total - achieved 62% of the Audit's standard and we expect to build on that in future Audit cycles.

**Figure 3:** Audit results compared to the standard practice.

Smoking status has not been documented in 41 patients 28.7%

By far, Cigarette smoking is substantially the most common risk factor for COPD since progression and severity of it are related directly to the pack years smoked, thus taking a detailed history of smoking with detailed documentation is a key step in the COPD patient evaluation process.

It is also necessary to document the doctor's request for smoking patients to quit smoking, as it is undoubtedly an important step for the success of the treatment plan.

Regarding chest X-ray, it was documented in 32% of patients, while the majority (68%) had no documented Chest radiographs in their files chest Radiograph has become a standard investigation in clinical evaluation due to its availability, safety in terms of minimal radiation exposure, and its helpful role in providing valuable information about the lung status [5] . However, CXR has a poor sensitivity in diagnosing and picking out COPD.

It is reasonable to obtain a chest X-ray in any COPD for:

- Exclusion of alternative diagnoses
- Evaluation of the co-morbid lung conditions (CA-Lung, Bronchiectasis, Pleural disease, etc.) whenever they exist.
- Assessment of COPD complications: (pneumonia, pneumothorax) that could be suggested by the clinical data.

It is assumed that all chest clinic visiting populations have chest radiographs at the very least! The documentation quality lagged behind the requested standards. CT-scanning of the chest was documented in 28.7% of the patients. Although computed tomography scanning is not recommended for the routine diagnosis of COPD, it is usually recommended when a complication like pneumonia, pneumothorax, or Bulla is perceived from the worsening symptoms.

Documenting chest scans whenever performed would be of great value to researchers and Auditors.

CONCLUSION:

The main results we came out with in the Audit include that: only 61.5% of patients labeled as COPD had a documented spirometry and this leads us to admit that spirometry is underused in diagnosis of COPD in this snap shot of the current practice, furthermore there was an obvious low recording of COPD key metrics and information like smoking status, chest imaging findings and drugs being used.

Recommendations:

In accordance with international guidelines' recommendations, we recommend carrying out spirometry testing in any patient suspected of having COPD.

Our Audit emphasizes the need for credible and detailed record keeping; a practical template for COPD patients may help achieve this with standardized data documentation.

Conflict of interest

There are no conflicts of interest and no financial support, and nosponsorship

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