Detection of Chronic Obstructive Pulmonary Disease among Smokers Aged ≥40 years Attending Primary Health Care Centers in Baghdad-AL-Karkh and AL-Resafa

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Abstract:

Background: Chronic obstructive pulmonary disease causes permanent morbidity, premature mortality and great burden to the healthcare system. Smoking is it's most common risk factor and Spirometry is for diagnosing COPD and monitoring its progression.

Objectives: Early detection of chronic obstructive pulmonary disease in symptomatic smokers' ≥ 40years by spirometry.

Methods: A cross sectional study on all symptomatic smokers aged ≥ 40 years attending ten PHCCs in Baghdad Alkarkh and Alrisafa. Those whose FEV1/FVC was <70% on spirometry; after giving bronchodilator, were considered COPD +ve.

Results: Overall, airway obstruction was seen in 206(46.8%). It is significantly associated with increase age (50-y), more in male and increase with increase duration and amount of smoking

Conclusions: COPD was prevalent among men and women. Early diagnosis of COPD is good for both patient and community. Routine spirometry is an easy way for screening and identifying asymptomatic patients. Before adoption of spirometry Cost-effectiveness is needed.

Keywords: chronic obstructive pulmonary disease, primary health care centers, smokers.

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Introduction:

Chronic Obstructive Pulmonary Disease (COPD), refers to a group of diseases that cause airflow blockage and breathing-related problems (1). It includes emphysema and chronic bronchitis. COPD is a result of lung inflammation, damage and narrowing. Abnormalities in the small lung airways lead to limitation of airflow of the bronchial passages. Airways become narrow for several reasons. Destruction of parts of the lung may happen, mucus blocking the airways, as well as inflammation and congestion of the airway lining. Symptoms are breathlessness, excessive sputum production, and chronic cough "smoker's cough", it is a life-threatening lung disease that is under-diagnosed, and may progressively lead to death (2). Burden of COPD: WHO reported that :(3)

COPD was previously more among men, now both genders are equally affected due to increased tobacco use by women. Data showed that 65 million people of the world had moderate -severe (COPD). In 2019, COPD.

- caused the death of more than 3.23 million people (5% of all deaths globally).
- 90% of these deaths occur in adults of less than 70 years of age, in low- and middle-income countries.
- Globally, COPD was the 5th leading cause of death in 2002, while in 2030 it will become the 3rd leading cause of death.
- In the next 10 years, there will be an expected increase in the total deaths from COPD by more than 30%, therefore urgent action is needed to reduce the underlying risk factors, especially the use of tobacco.
- Early diagnosis and treatment, in addition to smoking cessation support, is crucial to slow down the progression of symptoms and reduce exacerbations.
- Information from high-income countries revealed that it is difficult and expensive to collect accurate epidemiologic data on COPD.

Although COPD is a big public health problem, still no data about prevalence of the disease is available in Iraq.

Causes of COPD: COPD develops gradually with time. Mostly resulting from a combination of risk factors which are the following: -tobacco exposure due to active smoking or passive exposure due to second-hand smoke, are the most important causes of COPD (4-5). Severity of COPD is affected by the amount and duration of smoking. The number of pack

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years smoked (packs of cigarettes per day multiplied by the number of years), should be ascertained as a key step in the evaluation of patients with suspected COPD, as most of patients (nearly eighty percent) with COPD in the USA have a history of cigarette smoking (5). When taking history of smoking the age of starting as well as the age of quitting must be taken. With enough exposure to smoke, almost all smokers will develop a reduction in the function of their lungs.(3) There also seems to be a genetic predisposition to COPD, since some smokers develop severe disease in spite of fewer pack years(6) while other smokers have little or no symptoms despite many pack years (7-8).indoor air pollution: biomass fuel (wood, crop residue, animal dung,) or coal which is often used for heating and cooking in most of the low and middle income countries, where levels of smoke exposure is high (9) , in addition to occupational exposure from dusts, chemicals, or fumes;. These exposures are useful to explain the 20 % of patients with COPD (defined by lung function alone) and the 20 % of patients who died from COPD who never smoked (10). vents early life, like poor growth in utero, premature delivery, and recurrent or severe respiratory infections in childhood that prevent the growth of the lung (9) childhood asthma may progress to COPD, therefore history of asthma should be looked for (11); -alpha-1 antitrypsin deficiency, which is a rare genetic condition that can cause COPD at a young age .(12).

Clinical features: Symptoms and type of onset**:** the three main symptoms of COPD are shortness of breath, chronic cough, and sputum production. Most commonly, patients will have exertional dyspnea as the earliest symptom. Wheezing and chest tightness are less common symptoms. Nevertheless, any of these symptoms can take place independently and with variable intensity. Patients with COPD may present in three different ways (13): Patients who have few complaints but live with an extremely sedentary lifestyle, need vigilant questioning to unfold a history that is suggestive of COPD. Such patients shift their expectations and limit their activity unknowingly to avoid exertional dyspnea (14) Patients presenting with respiratory symptoms mostly complain of dyspnea and chronic cough. Initially dyspnea may be noted only during exertion. However, it gradually progresses to become noticeable with less exertion or even at rest. Chronic cough is associated by sputum production which occurs initially in the morning, but may progress to appear throughout the day (15). The volume of the sputum is usually less than 60 ml. The sputum is often mucoid, but with exacerbation, it becomes purulent. Patients who present with events of increased coughing, purulent sputum formation, wheezing tiredness, and dyspnea that occur intermittently, with or without fever. Diagnosis of such patients can be difficult, since the combination of wheezing with dyspnea may lead to a wrong diagnosis of asthma. On the other hand, other illnesses with similar signs and symptoms are usually incorrectly diagnosed as an exacerbation of COPD (e.g., heart failure, bronchiectasis, and bronchiolitis) (16). As the severity of the COPD increases, the interval between exacerbations decreases. The majority of COPD patients are overweight or obese, due to activity limitations. On the other hand, weight loss may also occur (may be due to shortness of breath while eating). Weight loss commonly reflects higher severity of the disease and hence associated with a worse prognosis. Co morbid diseases that may be associated with COPD include bronchiectasis, lung cancer, cardiovascular disease, metabolic syndrome, osteoporosis, skeletal muscle weakness, depression, anxiety, and cognitive dysfunction. As well as that a family history of COPD or other chronic respiratory illness, may be reported (17). Physical examination: On physical examination of the chest, findings can vary with the severity of the COPD. In the early phases of the disease, the physical examination may be normal or may show only prolonged expiration or wheezes on forced exhalation. With the increase in severity of the airway obstruction, physical examination may show hyperinflation, reduced breath sounds (18), wheezes, crackles at the bases of the lung, with/or without distant heart sounds. Sever disease will feature itself in the form of increased antero-posterior diameter of the chest ("barrel-shaped" chest) and a depressed diaphragm, chest percussion will show limited movement. End stage COPD, Patients may relieve dyspnea by adopting certain positions, like leaning forward with their arms outstretched and weight supported on the palms or elbows, use of the accessory respiratory muscles of the nerd, shoulder girdle, expiration through pursed lips, paradoxical retraction of the lower interspaces during inspiration (Hoover's sign (19), cyanosis and neck vein distention. A clue to ongoing and heavy cigarette smoking, is the presence of yellow stains on the fingers due to tobacco burning from nicotine and tar (20). Diagnosis of COPD**:** Spirometer is the golden standard device for the diagnosis of Asthma and COPD, Spirometry**:** is the test used to assess lung function by measuring the amount of air inhaled, and amount exhaled and how quickly air exhale. It is used for the diagnosis of asthma, chronic obstructive pulmonary disease (COPD), and other conditions that affect breathing. The spirometer measures the Forced Expiratory Volume of air in the first second of expiration FEV1 & Forced Vital Capacity FVC. The FEV1/ FVC ratio in normal subject it is around 75%.

Subjects and Methods

Study Design: Cross-sectional study.

Study Setting: The study was conducted in six PHCCs in Baghdad Al-Karkh and AL-Resafa Health Directorate during the period from the 1st of August, 2016 to the end of February, 2017. Study Population**:** Smokers aged ≥ 40 years attending the nominated PHCCs Sampling and Sampling Technique: all smokers aged ≥ 40 years, attending the nominated PHCCs during the study period.

Ethical consideration: Approval of the research committee in the Ministry of health, and the permission of Al-karkh and Al-Risafa Health Directorates was taken in addition to the consent of participants in the study.

Data Collection Tool: A questionnaire was prepared for collecting data. The questionnaire included socio-demographic questions (name, age, sex economic status), questions related to the symptoms of the eligible sample and questions related to the amount, duration and type of smoking.

Detection of cases by Spirometer: Lung Function was tested for all study population with a questionnaire positive (with positive signs and symptoms) and any person with FEV1/FVC% ≤ 70% is considered COPD. With airway limitation the FEV1 falls proportionally more than the FVC, so the FEV1\ FVC ratio is reduced (< 70%) . This is called obstructive pattern. A dose of bronchodilator Ventolin inhaler or nebulizer is given and re-examination performed after 15 minutes. Diagnosis should only be made using post-bronchodilator spirometry. Airflow obstruction is defined as a reduced post-bronchodilator forced expiratory volume in one second FEV1/forced vital capacity (FVC) ratio < 70%.

Data analysis: Entering of data according to a timetable and analysis was performed using EPI-INFO statistical tool. The Chi square test X2 was used for statistical analysis with a P value ≤0.05.

Months / Activity	July 2016	Aug. 2016	Sept. 2016	Oct. 2016	Nov. 2016	Dec. 2016	Jan. 2017	Feb. 2017
Protocol Proposal								
Data collection								
Data analysis								
Writing & Submitting								

Figure 1: The timetable plan of the research

Results:

Response rate: Out of the 450 approached PHCC clients, only 440 responded to the questionnaire and agreed to participate in the current study, resulting in a response rate of 97.7% Sociodemographic characteristics of the studied sample: Table (1) illustrated the distribution of the sample according to the socio- demographic characteristics. Three quarters (326; 74.1%) of the sample were males. The average age of the respondents was 49.8±7.4 years within a range of (40 – 80) years. Majority (388; 88.2%) of the sample were below 60 years of age. Mean BMI was 30.6±4.3 Kg/m2 within a range (17.5 - 51.7Kg/m2). More than half (260; 59.1%) of the studied sample stated that they had been smokers for 20 years or more. The average duration of cigarette smoking was 18.8±9.3 years, ranging between (2- 41) years. More than one-third (158; 35.9%) of the respondents reported smoking 21 cigarettes per day. The average number of cigarettes smoked per day was 25.9±1.05 cigarettes within a range from (5 – 66) cigarettes per day.

Table (1) Distribution of the studied sample according to the socio-demographic characteristics

Socio-demographic characteristic		Number	Percentage
Age	40 years -	238	54.1
	50 years -	150	34.1
	60 years-	52	11.8
Gender	Male	326	74.1
	Female	114	25.9
Perceived Economical Status	Good	68	15.5
	Moderate	339	77.0
	Poor	33	7.5
Employment Status	Governmental employee	198	45.0
	Non-employee	91	20.7
	Self-employee	85	19.3
	Retired	66	15.0
BMI	Underweight	2	0.5
	Healthy weight	38	8.6
	Overweight- Pre-Obese	139	31.6
	Obese	261	59.3
Duration of smoking	<10 years	130	29.5
	<20 years	50	11.4
	20 years and more	260	59.1
Number of cigarettes smoked daily	≤10	115	26.1
	11-20	167	38.0
	21 or more	158	35.9

Symptoms of chronic obstructive pulmonary disease (COPD): Table (2) shows distribution of the sample according to the presence of COPD symptoms. Less than half (187; 42.5%) of the sample stated that they suffered from shortness of breath, and only (100; 22.7%) had chronic cough, while more than half (268; 60.9%) stated having sputum.

Table (2): Distribution of the sample according to the presence of COPD symptoms

Symptoms		Number	Percent
Shortness of breath	No	253	57.5
	Yes	187	42.5
Chronic cough	No	340	77.3
	Yes	100	22.7
Sputum	No	172	39.1
	Yes	268	60.9

Yet more than half 262 (59.5%) of the interviewed sampled stated that having symptoms affect their daily activities such as walking, doing house chores….etc. COPD prevalence: Less than half (206; 46.8%) of the interviewed sample had a FEV1/FVC of ≤ 70, thus were diagnosed as having COPD. As for the remaining (234; 53.2%) of the studied sample had a FEV1/FVC ratio of more than 70. COPD association with socio-demographic characteristics: Table (3) illustrates the distribution of COPD according to socio-demographic characteristics of the studied sample. Age showed a statistically significant association with developing COPD, as the percent reaches 54% at the age of fifties and dropped back to 26.9% in the 60s and above. Gender also had a statistically significant association with COPD. Half of males (50.6%) had COPD. Another statistical significance was observed between having COPD and perceived economic status, nearly two-thirds (69.7%) of the studied sample that perceived their economic status to be poor had COPD. Employment status also showed a significant association with COPD, it was higher among self-employed respondents (55.3%) and dropped to (27.5%) among unemployed participants. Although half (134; 51.3%) of obese had COPD, while among those of healthy weight only (39.5%) had COPD, yet BMI showed no statistical significance. The current study also showed that the duration of smoking was statistically associated with COPD; the percentage of having COPD reached 53.1% among those who had been smoking for 20 years or more. Number of cigarettes smoked per day also showed a significant association, among those who smoked 21 or more cigarettes, 66.5% had COPD, while the percent decreased to 13% among those who smoked 10 or less cigarettes per day.

Table (3): The distribution of COPD according to socio-demographic characteristics of the studied sample

Socio-demographic characteristics		Diagnosis		Test	P value
		No COPD	COPD		
		No.(%)	No.(%)		
Age	40 years-	127 (53.4)	111(46.6)	X2= 11.377; d.f.=2	0.003
	50 years-	69 (46.0)	81 (54.0)		
	60 years–	38 (73.1)	14 (26.9)		
Gender	Male	161(49.4)	165(50.6)	X2=7.279; d.f.=1	0.007
	Female	73(64.0)	41(36.0)		
Perceived Economic State	Good	43 (63.2)	25(36.8)	X2=9.704; d.f.=2	0.008
	Moderate	181 (53.4)	158(46.6)		
	Poor	10 (30.3)	23(69.7)		
Employment Status	Governmental employee	99 (50.0)	99(50.0)	X2=17.959; d.f.=3	≤ 0.000
	Not-employed	66(72.5)	25 (27.5)		
	Self-employee	38(44.7)	47(55.3)		
	Retired	31(47.0)	35(53.0)		
BMI	Underweight	2 (100.0)	0	Fisher's Exact Test=6.206; d.f.=3	N.S 0.085
	Healthy weight	23(60.5)	15(39.5)		
	Overweight	82(59.0)	57(41.0)		
	Obese	127(48.7)	134(51.3)		
Duration of Smoking	<10	87(66.9%)	43(33.1%)	X2= 14.152; d.f.=2	0.001
	<20	25(50%)	25(50%)		
	≥20 years	122 (46.9)	138(53.1)		
Number of cigarettes smoked daily	≤ 10	100 (87.0)	15 (13.0)	X2= 78.626; d.f.=2	≤ 0.000
	11-20	81 (48.5)	86 (51.5)		
	21 or more	53 (33.5)	105(66.5)		

Discussion:

The study showed a significant association between age and having COPD, X2= 11.377; d.f.=2, P= ≤ 0.000, This agrees with the study of William, which states that COPD increases Significantly with age. (21), The study also showed a significant association between being male and having COPD, X2=7.279; d.f.=1,P=0.007, This agrees with the study of Georgios that finds that men have higher prevalence than women in COPD(22). The study demonstrated a statistically significant association between perceived economic state and having COPD. X2=9.704; d.f. =2, P=0.008 Being self-employed was highly associated with developing COPD; as seen in Table (3), X2=17.959; d.f.=3, P= ≤ 0.000. The study was unsuccessful in obtaining a significant association between BMI and COPD, figure (3) shows the distribution of the sample by their BMI, Fisher's Exact Test=6.206; d.f.=3, P= 0.085, This disagrees with the study of Jiachen (23) who found a significant increase in BMI with the development of COPD. The most likely explanation is that although many COPD patients develop obesity due to reduced activity others may develop reduction in body weight and hence BMI due to the difficulty in breathing while eating. A significant association was found between the duration spent smoking (in years) with having COPD, As shown in figure (3), X2=14.152, d.f.=2, P= ≤ 0.000, This matches the results of the study of Juanne(24) , who found a significant association between COPD and duration of smoking. The study also illustrated a significant association between the number of cigarettes smoked daily and having COPD, X2= 78.626; d.f.=2, P=≤ 0.000, this agrees with the study of Anne (25) where a significant associated was found.

Conclusion

COPD is prevalent not only among men but also among women. Increased duration and number of cigarettes smoked were highly associated with COPD. Early diagnosis of patients with COPD is good for the patient and the community. The healthcare worker must suspect the possible diagnosis from symptoms and risk factors, consider screening with Spirometry

Recommendations: Routine Spirometry is a simple procedure for screening and detecting asymptomatic smokers with undiagnosed airway obstruction since the early diagnosis of airway obstruction provides a good opportunity to conduct various smoking cessation measures and because larger benefits for lung function occur with earlier quitting of smoking. However, before spirometry can be adopted in all PHCCs, additional data about the actual benefit of early interventions and the cost-effectiveness of screening is needed. Tobacco smoke exposure reduction is important for both primary prevention and management of COPD. Both the Framework Convention on Tobacco Control and WHO initiatives such as MPOWER and Tobacco Cessation enable progress in this area.

Conflict of interest: The authors did not face any conflict of interest in regards to any of the subject matter or materials discussed in this manuscript.

Author's contributions

Dr. Isra Ali Abd Ala: the main author of this article as part of the requirement for attaining Diploma in FETP

gathering the data and making and analyzing the statistics.

Dr. Nada Abdul-Wahhab Mousa: mentor to the main author, supervisor, and corresponding author of the article.

Dr. Faris Al-Lami: Resident Advisor of Iraq Field Epidemiology Training Program, choosing the subject of the article, supervisor to the main author.

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الكشف عن مرض الانسداد الرئوي المزمن بين المدخنين الذين تزيد أعمارهم عن 40 عامًا يراجعون مراكز الرعاية الصحية الأولية في بغداد - الكرخ و الرصافة

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أ.د. فارس حسن اللامي/ أستاذ في فرع طب المجتمع/ كلية الطب / جامعة بغداد.

الخلاصة:
خلفية: يسبب مرض الانسداد الرئوي المزمن مراضة دائمة ووفيات مبكرة وعبئاً ثقيلاً على نظام الرعاية الصحية. يعد التدخين من أكثر عوامل الخطر شيوعًا ، بينما يُستخدم قياس التنفس لتشخيص مرض الانسداد الرئوي المزمن ومراقبة تقدمه.
هدف الدراسة: الكشف المبكر عن مرض الانسداد الرئوي المزمن عند المدخنين الذين تزيد أعمارهم عن 40 عامًا ويعانون من أعراض عن طريق قياس التنفس.
الطرق البحثية: دراسة مقطعية لجميع المدخنين الذين تزيد أعمارهم عن 40 عامًا ووتظهر عليهم الأعراض والذين راجعوا عشر مراكز للرعاية الصحية الأولية في بغداد الكرخ والرصافة. أولئك الذين كان FEV1 / FVC لديهم أقل من 70٪ في قياس التنفس ؛ بعد إعطاء موسع قصبي ، اعتبر مشخصا لمرض الانسداد الرئوي المزمن.
النتائج: بشكل عام ، لوحظ انسداد مجرى الهواء في 206 (46.8٪) من عينة الدراسة. يرتبط مرض الانسداد الرئوي المزمن بشكل كبير بزيادة العمر (50 عامًا) ، ويزيد عند الذكور ويزيد مع زيادة مدة وكمية التدخين.
الاستنتاجات:مرض الانسداد الرئوي المزمن سائدُ بين الرجال والنساء. يعد التشخيص المبكر لمرض الانسداد الرئوي المزمن مفيدًا لكل من المريض والمجتمع. يعد قياس التنفس الروتيني طريقة سهلة لفحص وتحديد المرضى الذين لا تظهر عليهم أعراض. قبل اعتماد قياس التنفس هناك حاجة إلى فعالية التكلفة.
الكلمات المفتاحية: الانسداد تارئوي المزمن، المدخنون، 40 عاما، بغداد.