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Research Article

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Trends and Determinants of Chronic Obstructive Pulmonary Disease in Dessie Comprehensive Specialized Referral Hospital, 2017 to 2022, Ethiopia

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Abstract

Introduction: *Chronic obstructive pulmonary disease (COPD) is a large group of lung diseases characterized by obstruction of air flow that interferes with normal breathing. In fact, COPD recently became the third leading cause of death behind heart disease and cancer. It is estimated that between 12.7 and 14.7 million adults over the age of 18 have a diagnosis of COPD.*

Objective: *To determine trends of chronic obstructive pulmonary diseases in Dessie referral hospital from 2017 to 2022, Dessie city Administration, North East, Ethiopia, 2022.*

Methods: *Institution based case retrospective cross sectional study was conducted from patients medical records at Dessie Referral Hospital between 2017-2022. The data was extracted/collected from all chronic obstructive pulmonary disease medical records the year between 2017-2022. Then the data was analyzing quantitatively using SPSS V-20.0. Finally, the data was summarized and presented in accordance with the variables via tables, and charts.*

Result: *Prevalence of COPD among patients who attend at Dessie comprehensive specialized referral hospital was 2.2%. The odds of the study subjects with having COPD among age between 40-49years of age (AOR: 2.24:95%CI 1.93-7.11), and 50-59years (AOR: 3.0: 95% CI 2.91-5.27), having family history of asthma (AOR: 4.07: 95% C 3.14-8.33), and patients from the rural area (AOR: 1.93: 95% CI 1.66–5.11) were statistically significant associated with COPD. Therefore, we can conclude that the prevalence of COPD was relatively high. Therefore, increase awareness, about the risk factors and preventive measures how COPD early manifest and the complication if not treated for long period should be recommended.*

Keywords: COPD, Trend, Dessie Referral hospital

Introduction

Chronic obstructive pulmonary disease (COPD) is a complex respiratory disease involving progressive and partly irreversible airway obstruction and persistent, low-grade pulmonary and systemic lung inflammation. Chronic obstructive pulmonary disease (COPD) is an umbrella term for conditions, including chronic bronchitis and emphysema that impede the flow of air in the bronchi and trachea. COPD as "a disease state characterized by airflow limitation that is not fully reversible. The air flow limitation is usually both progressive and associated with an abnormal inflammatory response of the lungs to noxious particles or gases." The main risk factor for the development of and deterioration of COPD is smoking. However, the disease can also occur in non-smokers and persists even after smoking cessation [1-3].

Over the past two decades, there has been a marked increase in COPD deaths (in most, but not all countries), a trend that is predicted to continue. Moreover, the impact of COPD is believed to be underestimated due to a lack of accurate epidemiological data from some countries, mis-diagnosis, and inconsistent use of the International Classification of Diseases (ICD) codes when reporting causes of death in patients with COPD [4,5].

However, estimating the costs of COPD is challenging, due to under-diagnosis and the presence of other coexisting diseases, and there appear to be no recent estimates. Many different methodologies are used to estimate the costs of chronic diseases such as COPD [6,7].

Chronic obstructive pulmonary disease is largely preventable, progressive respiratory disease that accounts a majority of emergency department visits and hospitalization. Chronic respiratory diseases represent a public health problem in both developed and developing countries because of their health and economic impacts. These respiratory diseases are predicted to become the third leading cause of death by 2020, according to the WHO. COPD is also the second most common reason for hospital admission in the aging [8,9].

According to the World Health Organization, it is the fifth most common cause of death and the 10th most burdensome disease worldwide (3). A number of coexisting conditions not directly related to COPD are associated with the disease, including cardiovascular disease, muscle wasting, type 2 diabetes, and asthma [3,10]. As a result, deaths in people with COPD are frequently attributed to another cause. In addition, among the coexisting conditions, depression deserves particular attention. COPD (especially at severe levels) leads to impairment in the activities of daily living, social and psychological functioning, and recreational activities. In view of the fragmentary nature of available information on COPD, there is a need for a comprehensive study of the disease, including the coexisting conditions and the burden of illness they cause in people with COPD. Chronic obstructive pulmonary disease also incurs significant financial costs associated with the care of patients and lost productivity of patients and care takers [10,11].

COPD was estimated to account for 2.7% of the disease burden and 3.2% of deaths in Europe and for 3.1% of the global disease burden and 5.5% of deaths worldwide. Different countries have estimated the prevalence of COPD to be more than 10% among adults aged 40 years and older [11]. While the current prevalence of COPD has become better understood, information about whether COPD prevalence is increasing, decreasing, or stable is still lacking. Other measures of burden of COPD such as COPD-specific mortality and disability-adjusted life years have been found to be increasing [12].

There is no-systematic recording/information about trends in prevalence, trends in COPD incidence and all-cause mortality (as opposed to COPD-specific mortality) in Ethiopia. Thus, there is no great emphasis nor Knowledge was given a bout trends of COPD prevalence, incidence, and mortality is important so that health care providers (i. e, physicians, nurses, respiratory therapists, educators, etc) and policy makers to optimize health services for individuals with COPD and efficiently plan future health care.

Therefore, we went to conduct the current study to determine the trends, incidence, prevalence, mortality and also to quantify the change in prevalence over time by sex and various age groups in COPD prevalence in Dessie referral hospital, Dessie administration.

Methods and Materials

Study area

The study was conducted at Dessie referral Hospital which is found in Dessie town located at a distance of 401 kilometers away from the capital city of Ethiopia, Addis Ababa. Dessie referral hospital provides curative and rehabilitative service for more than seven million populations in the catchment area. Since the hospital is the zonal referral hospital, it has more than 230 beds in the whole service area like pediatric ward, internal medicine, surgery, gyneobs and other fields. Finally, the data was collected, 2017-2022 in Dessie comprehensive specialized referral hospital.

Study Design, Populations

Institutional based retrospective cross sectional study design was used. All patients who come to Dessie Referral Hospital. All COPD cases who recorded on the medical record/patients file/charts as a newly diagnosed and on follow up with in the study years (2017-2022).

Eligibility Criteria

All COPD patients records in Dessie Referral hospital within the study years. Patients' file where the information/ variables are incomplete more than 10% was excluded from our study.

Sample Size Calculation and Sampling Technique

Sample size was included all patients who was diagnosed and recorded as chronic obstructive pulmonary diseases within the study year. Data was collected in such a way that, first we were collect documented diagnosis as COPD from health management information system (HMIS) registration book. Then we will register all Medical registration number and transfer to hospital card room workers to find the charts from shelf. Finally, the data was collected using prepared checklist via data collectors.

Study Variable

Dependent Variable

- Chronic pulmonary obstructive diseases (yes/no)

Independent variable

- Socio- demographic variable: sex, age, residence, occupation, family history, presence of other chronic illness and others.
- Clinical data: History of other respiratory illness, chronic illness, History of atopy, working condition, Recurrence

Data Collection Tools, Procedure and Quality Assurance

Patients who were diagnosed as COPD from both the internal medicine and pediatric ward was collected from HMIS registration book in the hospital OPD. Then, following patient identification, data collectors will have charts from the card room by assigned body. Three BSc nurse students was assigned as a data collector and they try to collect a data from both pediatric and internal medicine. Then, the principal investigators were assigned as a supervisor.

In order to keep the data quality, and the checklist completeness principal investigator and supervisor will checking of the data collection procedure on spot. At the end of the data collection, discussion was held with the data collectors and problems encountered so as to provide a timely solution.

The other activities that needs to accomplish to keep data quality is giving training for the data collector and supervisors. Following training pretest was conducted on 10 COPD patient cards then the result was included in the final result. Then for problems encountered during pretest like confusing, incompleteness and missed files was correct simultaneously.

Data Analysis Procedure, and Ethical Consideration

For data analysis, we used SPSS V20.0. So that we were able to do the magnitude of prevalence rates, changes overtime and determinants/associated factors.

Ethical clearance was obtained from Wollo University, college of medicine and health science, ethical review committee. Supporting letter will also be obtained from Dessie Referral hospital and Amhara public health institution (APHI). Confidentiality of the information was maintained throughout the research process by excluding the name as identification in the questioner and keeping their privacy.

Result

The data were collected retrospectively from the inpatient ward registration from 2017-2022 using three nurses. They were collected the data registered data as COPD in the registration book. Among 11, 448 overall admitted cases, 257 (2.2%) were diagnosed as COPD patients clearly separating from B. asthma.

Socio-Demographic Characteristics

Among these 257 COPD cases, 63.81% of the cases were female, 75.1% above 50, and 64.20% come from the urban area (Table-1).

Table 1: Socio-demographic data of COPD at Dessie comprehensive specialized referral hospital, Dessie, 2017-2022, Ethiopia.

Variable 11, 448		Frequency	
		N	Percentage
Age	Less than 40	26	10.12
	40-49	38	14.79
	50-59	82	31.91
	>60	111	43.19
Sex	Female	93	36.19
	Male	164	63.81
Residence	Urban	165	64.20
	Rural	92	35.79
Occupation	Farmer	37	14.39
	Daily worker	22	8.56
	Merchant	41	15.95
	Employee (Civil)	57	22.18
	Retired	63	24.51
	House wife	14	5.45
	Others	23	8.95

Clinical Characteristics

Among COPD cases, 22.57% were current smokers, 15.95% working in environmental condition that able to expose to chemicals, dusts etc, and most of the cases were started to manifest clinical sign and symptoms more than 5 years (71.98%). However, 55.64% of the cases were newly diagnosed. In addition, 66.9% of the cases had a history of self-chronic respiratory diseases, and 75.1% from family (Table- 2).

Table 2: Clinical variables of COPD at Dessie comprehensive specialized referral hospital, Dessie, 2017-2022, Ethiopia.

Variables		Frequency	
		N	Percentage
Smoking history	Current smoker	57	22.57
	X- smoker	62	24.12
	Never smoker	137	53.31
Exposure/Occupation	Yes	41	15.95
	No	216	84.05
Duration of illness	<5 years	72	28.02

	>5 years	185	71.98
Previously diagnosed COPD	Yes	114	44.36
	No	143	55.64
Previous history of chronic respiratory disease	Yes	172	66.9
	No	85	33.1
Family history	Yes	193	75.1
	No	64	24.9

Trends of Chronic Obstructive Pulmonary disease (COPD)

The progression of COPD is irregular, once increase and decrease in other months too. But the COPD since 2020 was dramatically increased to 2-4 folds from some of the month of the years (Table-3).

Table 3: Trends of COPD at Dessie comprehensive specialized referral hospital, Dessie, 2017-2022, Ethiopia.

	COPD per Months between 2017-2022											
	January	Feb	Mar	April	May	Jun	July	August	Sep	Oct	Nov	Sum
2017	1	5	3	0	4	8	6	9	9	3	1	49
2018	2	0	0	1	3	4	6	11	7	1	3	38
2019	3	3	1	6	1	1	1	3	1	2	0	22
2020	4	6	0	4	7	7	11	23	18	0	0	80
2021	0	0	0	2	1	4	4	7	11	8	0	37
2022	1	1	1	2	7	3	7	5	3	1	0	31
											COPD diag	257
											Total sear	11, 448

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FIGURE (Line graph)

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Figure 1: Shows the trends of COPD at Dessie comprehensive specialized referral hospital, Dessie, 2017-2022, Ethiopia.

Factors associated with COPD

In the bivariate logistic regression analysis being female sex, age between 40-60years, cases from the rural area, occupational exposure to chemicals, x-smokers, and family history of bronchial asthma were statistically significant to the presence of COPD. Whereas on the multivariate logistic regression, age (40-60 years), history of bronchial asthma, and being in a rural area, were had a significant to the presence of COPD [13-16].

The odds of having COPD among age between 40-49years of age (AOR: 2.24:95%CI 1.93-7.11), and 50-59years (AOR: 3.0: 95% CI 2.91-5.27), having family history of asthma (AOR: 4.07: 95% C 3.14-8.33), and patients from the rural area (AOR: 1.93: 95% CI 1.66–5.11) were had a significant role to the presence of COPD (Table-4)

Table 4: Factors associated with COPD in Dessie Comprehensive Specialized Referral Hospital, Ethiopia 2017-2022.

Variables		COD		COPD	AOD	P value
		Yes	No			
Sex	Male	164	5,750	+1	+1	
	Female	93	5,441	1.7 (1.23-2.98)	1.22 (0.84-3.71)	
Age	Less than 40	26	2,135	+1	+1	
	40-49	38	1,147	2.72 (3.08-7.31)	**2.24 (1.93-7.11)***	**0.023**
	50-59	82	3,279	2.05 (0.08-0.98)	**3.0 (2.91-5.27)***	**0.001**
	60 and above	111	4,630	1.97 (0.58-5.52)	3.5 (0.94-5.95)	
Family Hx of B. asthma	Yes	191	5016	3.56 (3.13-22.39)	**4.07 (3.14-8.33)***	**0.004**
	No	66	6,175	+1	+1	
Residence	Rural	92	3,778	1.09 (1.03-1.68)	**1.93 (1. 66-5.11)***	**0.000**
	Urban	165	7413	+1	+1	

Smoking history	Current smoker	195	4,181	2.57 (0.62-1.7)	0.73 (0.43-1.08)	
	X- smoker	24	4916	0.27 (3.13-22.39)	2.41 (0.82-13.06)	
	Never smoker	38	2094	+1	+1	
Exposure/ Occupation related chemical environment	Yes	164	6,994	1.06 (1.79-6.31)	1.73(0.89-4.62)	
	No	93	4197	+1	+1	

*Significant

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