World Journal of *Clinical Cases*

World J Clin Cases 2022 April 16; 10(11): 3321-3638





Published by Baishideng Publishing Group Inc

W J C C World Journal of Clinical Cases

Contents

Thrice Monthly Volume 10 Number 11 April 16, 2022

REVIEW

3321 Encouraging specific biomarkers-based therapeutic strategies for hepatocellular carcinoma Yao M, Yang JL, Wang DF, Wang L, Chen Y, Yao DF

ORIGINAL ARTICLE

Clinical and Translational Research

Autophagy-related long non-coding RNA prognostic model predicts prognosis and survival of melanoma 3334 patients

Qiu Y, Wang HT, Zheng XF, Huang X, Meng JZ, Huang JP, Wen ZP, Yao J

3352 Identification of circ_0000375 and circ_0011536 as novel diagnostic biomarkers of colorectal cancer Yin TF, Du SY, Zhao DY, Sun XZ, Zhou YC, Wang QQ, Zhou GYJ, Yao SK

Retrospective Study

3369 Echocardiography in the diagnosis of Shone's complex and analysis of the causes for missed diagnosis and misdiagnosis

Li YD, Meng H, Pang KJ, Li MZ, Xu N, Wang H, Li SJ, Yan J

- Predictors and prognostic impact of post-operative atrial fibrillation in patients with hip fracture surgery 3379 Bae SJ, Kwon CH, Kim TY, Chang H, Kim BS, Kim SH, Kim HJ
- 3389 Added value of systemic inflammation markers for monitoring response to neoadjuvant chemotherapy in breast cancer patients

Ke ZR, Chen W, Li MX, Wu S, Jin LT, Wang TJ

3401 Washed microbiota transplantation reduces serum uric acid levels in patients with hyperuricaemia Cai JR, Chen XW, He YJ, Wu B, Zhang M, Wu LH

Clinical Trials Study

Concurrent chemoradiotherapy using gemcitabine and nedaplatin in recurrent or locally advanced head 3414 and neck squamous cell carcinoma

Huo RX, Jin YY, Zhuo YX, Ji XT, Cui Y, Wu XJ, Wang YJ, Zhang L, Zhang WH, Cai YM, Zheng CC, Cui RX, Wang QY, Sun Z, Wang FW

META-ANALYSIS

3426 Effect of enhanced recovery after surgery on inflammatory bowel disease surgery: A meta-analysis Peng D, Cheng YX, Tao W, Tang H, Ji GY

Accuracy of ultrasound elastography for predicting breast cancer response to neoadjuvant chemotherapy: 3436 A systematic review and meta-analysis

Chen W, Fang LX, Chen HL, Zheng JH



Camban	World Journal of Clinical Cases
Conten	Thrice Monthly Volume 10 Number 11 April 16, 2022
3449	Association of chronic obstructive pulmonary disease with mild cognitive impairment and dementia risk: A systematic review and meta-analysis
	Zhao LY, Zhou XL
	CASE REPORT
3461	Circulating tumor DNA genomic profiling reveals the complicated olaparib-resistance mechanism in prostate cancer salvage therapy: A case report
	Yuan F, Liu N, Yang MZ, Zhang XT, Luo H, Zhou H
3472	Difference and similarity between type A interrupted aortic arch and aortic coarctation in adults: Two case reports
	Ren SX, Zhang Q, Li PP, Wang XD
3478	Combination therapy (toripalimab and lenvatinib)-associated toxic epidermal necrolysis in a patient with metastatic liver cancer: A case report
	Huang KK, Han SS, He LY, Yang LL, Liang BY, Zhen QY, Zhu ZB, Zhang CY, Li HY, Lin Y
3485	Unusual glomus tumor of the lower leg: A case report
	Wang HY, Duan P, Chen H, Pan ZY
3490	Pulmonary <i>Cladosporium</i> infection coexisting with subcutaneous <i>Corynespora cassiicola</i> infection in a patient: A case report
	Wang WY, Luo HB, Hu JQ, Hong HH
3496	Preoperational diagnosis and management of breast ductal carcinoma <i>in situ</i> arising within fibroadenoma: Two case reports
	Wu J, Sun KW, Mo QP, Yang ZR, Chen Y, Zhong MC
3505	Reconstruction of complex chest wall defects: A case report
	Huang SC, Chen CY, Qiu P, Yan ZM, Chen WZ, Liang ZZ, Luo KW, Li JW, Zhang YQ, Huang BY
3511	Young children with multidrug-resistant epilepsy and vagus nerve stimulation responding to perampanel: A case report
	Yang H, Yu D
3518	Intramedullary nailing for pathological fractures of the proximal humerus caused by multiple myeloma: A case report and review of literature
	Xu GQ, Wang G, Bai XD, Wang XJ
3527	Double tracheal stents reduce side effects of progression of malignant tracheoesophageal fistula treated with immunotherapy: A case report
	Li CA, Yu WX, Wang LY, Zou H, Ban CJ, Wang HW
3533	Ankylosing spondylitis complicated with andersson lesion in the lower cervical spine: A case report
	Peng YJ, Zhou Z, Wang QL, Liu XF, Yan J
3541	Severe gastric insufflation and consequent atelectasis caused by gas leakage using AIR-Q laryngeal mask airway: A case report
	Zhao Y. Li P. Li DW. Zhao GF. Li XY



Contor	World Journal of Clinical Cases
Conten	Thrice Monthly Volume 10 Number 11 April 16, 2022
3547	Hypereosinophilic syndrome presenting as acute ischemic stroke, myocardial infarction, and arterial involvement: A case report
	Sun RR, Chen TZ, Meng M
3553	Cytochrome P450 family 17 subfamily A member 1 mutation causes severe pseudohermaphroditism: A case report
	Gong Y, Qin F, Li WJ, Li LY, He P, Zhou XJ
3561	Patellar dislocation following distal femoral replacement after extra-articular knee resection for bone sarcoma: A case report
	Kubota Y, Tanaka K, Hirakawa M, Iwasaki T, Kawano M, Itonaga I, Tsumura H
3573	Qingchang decoction retention enema may induce clinical and mucosal remission in left-sided ulcerative colitis: A case report
	Li PH, Tang Y, Wen HZ
3579	Anti-nuclear matrix protein 2+ juvenile dermatomyositis with severe skin ulcer and infection: A case report and literature review
	Wang YT, Zhang Y, Tang T, Luo C, Liu MY, Xu L, Wang L, Tang XM
3587	Ultrasound-guided local ethanol injection for fertility-preserving cervical pregnancy accompanied by fetal heartbeat: Two case reports
	Kakinuma T, Kakinuma K, Matsuda Y, Ohwada M, Yanagida K, Kaijima H
3593	Successful apatinib treatment for advanced clear cell renal carcinoma as a first-line palliative treatment: A case report
	Wei HP, Mao J, Hu ZL
3601	Del(5q) and inv(3) in myelodysplastic syndrome: A rare case report
	Liang HP, Luo XC, Zhang YL, Liu B
3609	Papillary thyroid microcarcinoma with contralateral lymphatic skip metastasis and breast cancer: A case report
	Ding M, Kong YH, Gu JH, Xie RL, Fei J
3615	Contrast-enhanced ultrasound manifestations of synchronous combined hepatocellular- cholangiocarcinoma and hepatocellular carcinoma: A case report
	Gao L, Huang JY, Lu ZJ, Lu Q
3624	Thyrotoxicosis after a massive levothyroxine ingestion: A case report
	Du F, Liu SW, Yang H, Duan RX, Ren WX
3630	Pleomorphic adenoma of the left lacrimal gland recurred and transformed into myoepithelial carcinoma after multiple operations: A case report
	Huang WP, Li LM, Gao JB



Contents

Thrice Monthly Volume 10 Number 11 April 16, 2022

ABOUT COVER

Editorial Board Member of World Journal of Clinical Cases, Chi-Yuan Yeh, MD, PhD, Assistant Professor, Chief Doctor, radiation oncology, Tungs' Taichung MetroHarbor Hospital, Taichung 43503, Taiwan. peteryeh46@gmail.com

AIMS AND SCOPE

The primary aim of World Journal of Clinical Cases (WJCC, World J Clin Cases) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC's CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Hua-Ge Yn; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.

NAME OF JOURNAL	INSTRUCTIONS TO AUTHORS
World Journal of Clinical Cases	https://www.wjgnet.com/bpg/gerinfo/204
ISSN	GUIDELINES FOR ETHICS DOCUMENTS
ISSN 2307-8960 (online)	https://www.wjgnet.com/bpg/GerInfo/287
LAUNCH DATE	GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH
April 16, 2013	https://www.wjgnet.com/bpg/gerinfo/240
FREQUENCY	PUBLICATION ETHICS
Thrice Monthly	https://www.wjgnet.com/bpg/GerInfo/288
EDITORS-IN-CHIEF Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku	PUBLICATION MISCONDUCT https://www.wjgnet.com/bpg/gerinfo/208
EDITORIAL BOARD MEMBERS	ARTICLE PROCESSING CHARGE
https://www.wjgnet.com/2307-8960/editorialboard.htm	https://www.wjgnet.com/bpg/gerinfo/242
PUBLICATION DATE	STEPS FOR SUBMITTING MANUSCRIPTS
April 16, 2022	https://www.wjgnet.com/bpg/GerInfo/239
COPYRIGHT	ONLINE SUBMISSION
© 2022 Baishideng Publishing Group Inc	https://www.f6publishing.com

© 2022 Baishideng Publishing Group Inc. All rights reserved. 7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA E-mail: bpgoffice@wjgnet.com https://www.wjgnet.com



WJCC

World Journal of **Clinical Cases**

Submit a Manuscript: https://www.f6publishing.com

World J Clin Cases 2022 April 16; 10(11): 3449-3460

DOI: 10.12998/wjcc.v10.i11.3449

ISSN 2307-8960 (online)

META-ANALYSIS

Association of chronic obstructive pulmonary disease with mild cognitive impairment and dementia risk: A systematic review and meta-analysis

Li-Ying Zhao, Xue-Lai Zhou

Specialty type: Medicine, research and experimental	Li-Ying Zhao, Department of Geriatrics, Traditional Chinese Medical Hospital of Zhuji, Zhuji 311800, Zhejiang Province, China
Provenance and peer review: Unsolicited article; Externally peer	Xue-Lai Zhou, Department of Respiratory Medicine, Traditional Chinese Medical Hospital of Zhuji, Zhuji 311800, Zhejiang Province, China
reviewed.	Corresponding author: Xue-Lai Zhou, MD, Deputy Director, Department of Respiratory
Peer-review model: Single blind	Medicine, Traditional Chinese Medical Hospital of Zhuji, No. 521 Donger Road, Zhuji 311800, Zhejiang Province, China. zxl13626883598@163.com
Peer-review report's scientific	
quality classification	
Grade A (Excellent): 0	Abstract
Grade B (Very good): B, B	BACKGROUND
Grade C (Good): 0	Chronic obstructive pulmonary disease (COPD) is a common public health issue
Grade D (Fair): 0	that has been linked to cognitive dysfunction.
Grade E (Poor): 0	
	AIM
P-Reviewer: Biondi A, Byeon H	To investigate the relationship between COPD and a risk of mild cognitive
Received: November 10, 2021	impairment (MCI) and dementia.
Peer-review started: November 10,	METHODS
2021	A comprehensive literature search of the PubMed, Embase, Google Scholar, and
First decision: January 11, 2022	Cochrane Library electronic databases was conducted. Pooled odds ratios (OR)
Revised: January 25, 2022	and mean differences (MD) with 95% confidence intervals (CIs) were calculated
Accepted: February 23, 2022	using a random or fixed effects model. Studies that met the inclusion criteria were
Article in press: February 23, 2022	assessed for quality using the Newcastle Ottawa Scale.
Published online: April 16, 2022	RESULTS
	Twenty-seven studies met all the inclusion criteria. Meta-analysis yielded a strong association between COPD and increased risk of MCI incidence ($OR = 2.11$,

95%CI: 1.32-3.38). It also revealed a borderline trend for an increased dementia risk in COPD patients (OR = 1.16, 95%CI: 0.98-1.37). Pooled hazard ratios (HR) using adjusted confounders also showed a higher incidence of MCI (HR = 1.22, 95%CI: -1.18 to -1.27) and dementia (HR = 1.32, 95%CI: -1.22 to -1.43) in COPD patients. A significant lower mini-mental state examination score in COPD patients was noted (MD = -1.68, 95%CI: -2.66 to -0.71).

CONCLUSION



Zaishidena® WJCC | https://www.wjgnet.com

Our findings revealed an elevated risk for the occurrence of MCI and dementia in COPD patients. Proper clinical management and attention are required to prevent and control MCI and dementia incidence in COPD patients.

Key Words: Mild cognitive impairment; Chronic obstructive pulmonary disease; Dementia; Meta-analysis

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: Chronic obstructive pulmonary disease (COPD) is a common public health issue that has been linked to cognitive dysfunction. The current meta-analysis was performed to investigate the relationship between COPD and mild cognitive impairment (MCI) and dementia risk. Twenty-seven studies met all the inclusion criteria. Meta-analysis yielded a strong association between COPD and an increased risk of MCI incidence (odds ratio = 2.11, 95% confidence interval: 1.32-3.38). Our findings revealed an elevated risk for the occurrence of MCI and dementia in COPD patients. Proper clinical management and attention are required to prevent and control MCI and dementia incidence in COPD patients.

Citation: Zhao LY, Zhou XL. Association of chronic obstructive pulmonary disease with mild cognitive impairment and dementia risk: A systematic review and meta-analysis. World J Clin Cases 2022; 10(11): 3449-3460

URL: https://www.wjgnet.com/2307-8960/full/v10/i11/3449.htm DOI: https://dx.doi.org/10.12998/wjcc.v10.i11.3449

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a progressive multicomponent lung disease that occurs more commonly in the elderly [1]. It is characterised by a partially irreversible chronic obstruction of lung airflow resulting in an abnormal decrease in blood oxygen levels, potentially leading to cognitive dysfunction[2]. Various studies have estimated that the prevalence of cognitive impairment in COPD patients ranges from 16% to 57% [3,4]. A prior review of 17 individual studies by Yohannes et al [5] showed that 32% of COPD patients showed some signs of cognitive dysfunction, with no less than 25% of patients showing at least mild cognitive impairment (MCI).

Cognitive impairment in COPD patients may compromise their capability to self-care and adhere to treatment regimens, making the relationship between COPD and cognitive impairment important for devising therapeutic approaches for COPD[6,7]. Some studies have focused on the relationship between COPD and neurologic function, but with inconsistent conclusions[8]. Data based on the Atherosclerosis Risk in Communities study showed that reduced lung function was associated with poor cognitive performance and higher risk of dementia hospitalization[9]. Data based on Taiwanese National Health Insurance Research Database showed that COPD patients exhibited a 1.27-fold higher risk of developing dementia^[10].

To our knowledge, there has only been one published meta-analysis investigating the statistical association of COPD with cognition dysfunction. Zhang et al[11] concluded that COPD patients had an elevated risk of cognitive dysfunction. Similarly, only one single meta-analysis has looked at the relationship between COPD and dementia. Pooling data from three studies, Wang et al[12] showed that COPD patients faced a higher risk of developing dementia. However, these important clinical questions have not been investigated in a more thorough and conclusive manner. As such, we conducted a comprehensive systematic review and meta-analysis to investigate the association between COPD and the risk of MCI and dementia.

MATERIALS AND METHODS

Search strategy

Our meta-analysis was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines[13]. We conducted a comprehensive search using PubMed, Embase, Google Scholar, and Cochrane Library online databases for articles published prior to March 31, 2021. The following key terms were used: "Chronic Obstructive Pulmonary Disease" OR "COPD" OR "Chronic Obstructive Airway Disease" OR "COAD" AND "Mild Cognitive impairment" OR "MCI" OR "Cognitive dysfunction" OR "Cognitive decline" AND "Dementia". Studies cited by articles that met the inclusion criteria were manually searched to identify additional eligible studies. Study eligibility





Figure 1 Flow diagram for study selection.

was not restricted based on language, sex, or publication year. Systematic reviews, conference abstracts, and editorials were excluded due to insufficient data presentation details.

Eligibility criteria

Inclusion criteria: We included studies that: (1) Investigated the association between COPD and a risk of MCI or dementia; (2) adopted a definite outcome of cognitive impairment or dementia in COPD and non-COPD subjects; (3) reported raw values necessary to calculate odds ratios (OR) or hazard ratios (HRs) for the incidence of cognitive impairment or dementia; (4) contained case controls, were prospective or retrospective-cohort, or had a cross-sectional design; and (5) compared the association between COPD and non-COPD patients.

Exclusion criteria: We excluded studies that: (1) Did not report relevant outcomes; or (2) were full-text inaccessible.

Data collection and analysis

All eligible studies were separately screened by two reviewers to determine whether they met the inclusion criteria. Screening was first conducted at the abstract content level, with relevant studies further investigated at the full-text level. Articles published in languages other than English were machine-translated using Google Translate, with the translated version reviewed. The following information was extracted from the included studies for summarization and analysis: Author, year, study design type, group investigated, sample size, diagnostic criteria for COPD, adjusted confounder for calculating pooled ratio, MCI prevalence, dementia prevalence, and scales used for cognitive assessment.

Quality assessment

Study quality was assessed independently by two separate reviewers using the Newcastle-Ottawa Scale (NOS)[14], which examined three components: Selection, comparability, and ascertainment of outcome. Disagreements were resolved through discussion.

Publication bias

Publication bias was assessed using Funnel plot analysis and Egger's regression test[15,16].



	MCI in C	MCI in COPD MCI in control				Odds ratio		Odds ratio					
Study or subgroup	Events	Events Total		Events Total		M-H, random, 95%Cl		M-H, random			ı, 95%Cl		
Fekri <i>et al,</i> 2017	39	87	20	60	9.4%	1.63 [0.82, 3.22]				+		-	
Lutsey <i>et al,</i> 2019	730	2490	2953	6108	11.7%	0.44 [0.40, 0.49]			-				
Martinez <i>et al,</i> 2014	426	1812	2917	15723	11.6%	1.35 [1.20, 1.51]				-	-		
Singh <i>et al,</i> 2013	78	288	238	1639	11.2%	2.19 [1.63, 2.93]					-		
Singh <i>et al,</i> 2014	52	171	178	1254	11.0%	2.64 [1.84, 3.80]						_	
Siraj <i>et al,</i> 2020	5545	64397	15693	243420	11.7%	1.37 [1.32, 1.41]					•		
Taskiran <i>et al,</i> 2015	27	167	3	34	6.4%	1.99 [0.57, 6.99]			_				-
Thakur <i>et al,</i> 2010	66	1202	6	302	8.5%	2.87 [1.23, 6.68]							
Villeneuve <i>et al,</i> 2012	16	45	6	50	7.4%	4.05 [1.42, 11.55]						- C	
Xie <i>et al,</i> 2019	97	515	68	4220	11.1%	14.17 [10.23, 19.63]							
Total (95%Cl)		71174		272810	100.0%	2.11 (1.32, 3.38)					•	•	
Total events	7076		22082										
Heterogeneity: $Tau^2 = 0$	49. $Chi^2 = 6$	98 67 df	=9(P<0)	00001).	$1^2 = 99\%$		0.1	0.2	0.5	i	2	5	10
Test for overall effect: Z	= 3.12 (<i>P</i> =	0.002)	- 5 (7 < 0	,,	1 = 5576			Favou	urs COF	D	Favou	irs	

B Study or subgroup Hazard ratio Hazard ratio log [Hazard ratio] SE Weight IV, Fixed, 95%Cl IV. Fixed. 95%Cl 0.108 3.6% 1.31 [1.06, 1.62] Lutsey et al, 2019 0.27 1.33 [0.96, 1.84] Singh et al, 2014 0.2852 0.1663 1.5% 1.21 [1.16, 1.26] Siraj et al, 2020 0.1906 0.0215 91.2% Xie et al, 2019 0.392 0.107 3.7% 1.48 [1.20, 1.83] Total (95%Cl) 100.0% 1.22 [1.18, 1.27] Heterogeneity: $Chi^2 = 4.08$, df = 3 (P = 0.25); $I^2 = 26\%$ 0.2 0.5 5 Test for overall effect: Z = 9.86 (P < 0.00001) Favours control Favours COPD

DOI: 10.12998/wjcc.v10.i11.3449 Copyright © The Author(s) 2022.

Figure 2 Forest plot examining the association of chronic obstructive pulmonary disease with mild cognitive impairment risk. A: Odds ratios; B: Hazard ratios.

Statistical analysis

Mean differences (MDs) with 95% confidence intervals (CIs) were calculated for continuous outcomes. For categorical outcomes, ORs and HRs with 95%CIs were calculated to estimate pooled findings. Heterogeneity between studies (measurable heterogeneity) was evaluated using l^2 statistics. If l^2 values > 50%, a random-effects model was applied, otherwise a fixed-effect model was applied. Statistical analyses were performed using Review Manager software (Version 5.3, Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration 2014).

RESULTS

Literature search

Preliminary screening of PubMed, Embase, Google Scholar, and Cochrane Library databases yielded 234 results (Figure 1). Review of article title and abstract resulted in 72 remaining studies. Full-text review further excluded 45, leaving 27 studies[3,4,10,17-40] that were ultimately included in the metaanalysis.

Properties and characteristics of included studies

Relevant study data, including the diagnostic criteria for COPD, sample size, and disease assessment scales for all the 27 included studies[3,4,10,17-40] are shown in Table 1. The included studies were published between 1996 and 2020, and study sample sizes ranged from 20 to 243420 subjects. Ten studies[17,19-22,28,29,34,35,39] were case-controlled, ten were cross-sectional[3,4,24-26,32,36-38,40], four were prospective-cohort[18,27,30,31], and three were retrospective-cohort[10,23,33]. Seventeen studies[4, 17-22,25,31,32,34-40] reported cognitive impairment data based on the mini-mental state examination (MMSE) scoring system. Twenty-two studies used the GOLD criteria, three[10,23,33] reported the ICD-9 CM criteria, and two[3,26] followed the standardized guidelines for COPD diagnosis. The quality score was high in twelve studies, medium in seven, and low in six (Supplementary Table 1). The assessment criteria involving the NOS uses three broad criteria: Selection, comparability, and exposure, where the selection defines and analyses the cases and control subjects included in the study, comparability defines the matching or comparison of cases and control subjects for better empirical investigation, and exposure determines whether the study was conducted in a blinded or unbiased manner along with the response of the subjects.



WJCC | https://www.wjgnet.com

NOS Country or Groups Diagnostic Assessment MCI Dementia No. Ref. Study design Age Adjusted variables quality investigated criteria (%) (%) region scales score Mermit Çilingir 7 1 Turkey Case Control COPD-E (n = 30);COPD-E-71.8 ± GOLD MMSE: RCS NA NA NA et al[17], 2020 COPD-S (n = 54);12.3; COPD-S- 62 ± Control (n = 37)10.2; Control-65.9 ± 12.8 2 Xie *et al*[18], China COPD (*n* = 515); No COPD-82.9 ± 9.7 GOLD MMSE 2.9; 1.6 8 Prospective Age, gender, marital status, education level, 18.8; COPD (n = 4220)2019 Cohort alcohol drinking, current exercise, BMI, 14.6 baseline prevalence of HTN, DM, and stroke COPD (n = 87);3 Samareh Fekri et Iran Case Control COPD-60.4 ± 9.8; GOLD MMSE 51.7; NA 7 Age and sex 36.6 al[19], 2017 Control (n = 60)Control-58.1 ± 9.8 4 Gupta *et al*[20], India Case Control COPD-(n = 40); COPD-57.2 ± 9.1; GOLD MMSE Age NA NA 5 2013 Control (n = 40)Control-56.9 \pm 9.2 5 Li et al[21], 2013 China Case Control Mild COPD-(n = 27); Mild COPD-70.4 ± GOLD MMSE Age, sex, education level, BMI, smoking NA NA 6 Severe COPD-(n =7.7; Severe COPDstatus, and CVD 35); Control (*n* = 27) 68.2 ± 7.8; Control- 66.2 ± 7.1 Li et al[22], 2013 China Mild COPD-69.2 ± GOLD MMSE Age, sex, education level, BMI, smoking NA 8 Case Control Mild COPD-(n = 37); NA 6 Severe COPD-(n =8.1; Severe COPDstatus, and CVD 48); Control (*n* = 37) 67.6 ± 7.6; Control- 66.5 ± 6.9 7 7 Liao et al[23], Taiwan Retrospective COPD (n = 20492); No COPD-68.2 ± 12.4; ICD-9CM NA Age and sex NA 13.29.11 COPD (n = 40765)2015 Cohort No COPD-67 ± 12.5 8 8 Martinez et al Michigan Cross-sectional COPD (*n* = 1812); No COPD-70.3 ± 9.0; GOLD ADL Baseline cognition 16.5; 3.9:3.1 [24], 2014 COPD (*n* = 15723) No COPD-68.7 ± 12.4 9.9 9 Dal Negro et al Italy COPD with LTOT (n COPD with LTOT- GOLD Age, gender, smoking history, BMI, NA 6 Cross-sectional MMSEMRC; CAT 32.8 [25], 2015 = 73); COPD without 70.9 ± 8.9; No dyspnoea score, ABG, and lung function LTOT (*n* = 73) COPD with LTOT- 71.2 ± 9.1 10 Singh et al[26], COPD (n = 288); No MCI-82.7 ± 11.2; Standard BDI; CDR BDI-II Depression, history of stroke, NA 7 United States Cross-sectional 14.6; APOEe4 genotype, DM, HTN, CAD, and 2013 COPD (*n* = 1639) Normal Cognition- criteria 27.1 79.7 ± 12.5 BMI BDI 7 Singh et al[3], Total COPD (n =COPD-80.8 ± 7.5; Standard BDI-II depression, history of stroke, NA 11 United States Cross-sectional NA APOEe4 genotype, smoking, DM, HTN, 2014 1425); COPD (n = No COPD-79.1 ± criteria CAD, z-scores, and BMI 171); No COPD (n = 7.5 1254)

Table 1 Baseline and clinical characteristics of included studies

Zhao LY et al. Association of COPD with MCI and dementia risk

12	Lutsey <i>et al</i> [27], 2019	United States	Prospective Cohort	COPD (<i>n</i> = 2490); No COPD (<i>n</i> = 6108)	COPD-55.1 ± 5.8; No COPD-53.9 ± 5.7	GOLD	NA	Age, sex, education level, race, center, cigarette smoking and pack-years of smoking, physical activity, BMI, systolic BP, BP medication use, diabetes, HDL, LDL lipid-lowering medications, CAD, heart failure, stroke, apolipoprotein E genotype, and fibrinogen	NA	NA	6
13	Siraj <i>et al</i> [<mark>28</mark>], 2020	United Kingdom	Case Control	COPD (<i>n</i> = 64397); No COPD (<i>n</i> = 243420)	COPD-66.4 ± 10.9; No COPD-65.7 ± 11	Standard criteria	NA	Age, sex, GP, BMI, smoking status, modified CCI, CV disease, corticosteroid use, and socioeconomic class	NA	NA	7
14	Villeneuve <i>et al</i> [29], 2012	Canada	Case Control	Total COPD ($n = 45$); Control ($n = 50$)	COPD-68.4 ± 8.7; Control-67.4 ± 8.7	GOLD	MMSE; MoCA	Age and education	36.0; 12.0	NA	5
15	Yeh <i>et al</i> [<mark>30</mark>], 2018	Taiwan	Prospective Cohort	COPD (<i>n</i> = 10260); No COPD (<i>n</i> = 20513)	COPD-65.6 ± 11.8; No COPD-65.5 ± 11.9	GOLD	NA	Age, sex, each comorbidity, inhaled corticosteroid, and oral steroids	NA	11.1; 8.81	4
16	Ozge <i>et al</i> [<mark>31</mark>], 2006	Turkey	Prospective cohort	COPD (<i>n</i> = 54); Control (<i>n</i> = 24)	COPD-64.6 ± 8.5; Control-62.4 ± 8.4	GOLD	MMSE,BDS, CDR, IADL	Age and sex	NA	NA	6
17	Favalli <i>et al</i> [<mark>32</mark>], 2008	Turkey	Cross-sectional	COPD (<i>n</i> = 21); Control (<i>n</i> = 20)	COPD-74.6 ± 5.4; Control-73.7 ± 4.5	GOLD	MMSE; GDS	NA	NA	NA	5
18	Liao <i>et al</i> [<mark>10]</mark> , 2015	Taiwan	Retrospective Cohort	COPD (<i>n</i> = 8640); No COPD (<i>n</i> = 17280)	COPD-68.7 ± 10.7; No COPD-68.7 ± 10.7	ICD-9CM	Self-administered questionnaire	Age and sex	NA	5.22; 7.06	6
19	Thakur <i>et al</i> [<mark>33</mark>], 2010	United States	Retrospective Cohort	COPD (<i>n</i> = 1202); Control (<i>n</i> = 302)	COPD-58.2 ± 6.2; Control-58.5 ± 6.2	ICD-9CM	MRC; BODE index; MMSE	Age, sex, race, educational attainment, and smoking history	5.5; 2.0	NA	7
20	Zhou <i>et al</i> [<mark>34</mark>], 2012	China	Case Control	COPD (<i>n</i> = 110); Control (<i>n</i> = 110)	COPD-80.9 ± 1.7; Control-80.8 ± 1.5	GOLD	CDR; MMSE	Age and education	NA	NA	6
21	Dodd <i>et al</i> [4], 2013	United Kingdom	Cross-sectional	COPD-E (<i>n</i> = 30); COPD-S (<i>n</i> = 50); Control (<i>n</i> = 30)	COPD-E-70 ± 11; COPD-S-69 ± 8; Control-65 ± 8	GOLD	MMSE	Age	NA	NA	7
22	Isoaho <i>et al</i> [<mark>35</mark>], 1996	Finland	Case Control	COPD (<i>n</i> = 81); Control (<i>n</i> = 245)	COPD-70.4 ± 4.8; Control-71.3 ± 5.9	GOLD	MMSE	Age and sex	17.0; 13.0	7.1; 3.2	6
23	Lima <i>et al</i> [<mark>36</mark>], 2007	Brazil	Cross-sectional	COPD (<i>n</i> = 30); Control (<i>n</i> = 34)	COPD-65 ± 8; Control-66 ± 8	GOLD	MMSE; DSM-IV	NA	NA	NA	5
24	Ozyemisci- Taskiran <i>et al</i> [37], 2015	Turkey	Cross-sectional	COPD-E (<i>n</i> = 133); COPD-S (<i>n</i> = 34); Control (<i>n</i> = 34)	COPD-E-69.3 ± 8.9; COPD-S-67.5 ± 8.9; Control-68.3 ± 8.8	GOLD	MMSE; HAD; BODE	Age and sex	22.6	NA	6
25	Salik <i>et al</i> [<mark>38</mark>], 2007	Turkey	Cross-sectional	COPD (<i>n</i> = 32); Control (<i>n</i> = 26)	COPD-66.7 ± 2.5; Control-65.7 ± 7.3	GOLD	MMSE; MCS	NA	NA	NA	5
26	Sarınç Ulaşlı <i>et al</i> [<mark>39</mark>], 2013	Turkey	Case Control	COPD (<i>n</i> = 112); Control (<i>n</i> = 44)	COPD-65 ± 7.6; Control-64 ± 9	GOLD	MMSE	Age and sex	NA	NA	5

27	Tomruk <i>et al</i> [40], 2015	Turkey	Cross-sectional	COPD (<i>n</i> = 35); Control (<i>n</i> = 36)	COPD-62.9 ± 6.3; Control-60.8 ± 6.2	GOLD	MMSE	Age	NA		NA	4
----	--	--------	-----------------	--	--	------	------	-----	----	--	----	---

COPD: Chronic obstructive pulmonary disease; S: Stable; E: Exacerbation; GOLD: Global Initiative for Chronic Obstructive Lung Disease; CAT: COPD Assessment Test; MMSE: Mini-Mental State Examination; COPD: Chronic obstructive pulmonary disease; LTOT: Long-term oxygen treatment; HAD: Hospital Anxiety and Depression; BODE: (B) BMI, (O) the severity of airflow obstruction (FEV1), (D) severity of dyspnea (modified Medical Research Council Dyspnea Scale), (E) exercise capacity; ICD-9CM: International Classification of Diseases, Ninth Revision, Clinical Modification; BDI: Beck Depression Inventory; IADL: Instrumental activities of daily living scale; CDR: Clinical dementia rating; BMI: Body mass index; CVD: Cardiovascular Disease; GP: General practice; DM: Diabetes mellitus; ABG: Arterial blood gas; HTN: Hypertension; CAD: Coronary artery disease; HDL: High Density lipoprotein; LDL: Low density lipoprotein; NA: Not applied.

Association of COPD with MCI risk

Ten studies[3,18,19,24,26-29,33,37] detailing 71174 COPD patients and 22082 control subjects investigated the association of COPD with MCI risk. Our meta-analysis indicated a strong association between COPD and an increased MCI incidence risk (OR = 2.11, 95% CI: 1.32-3.38). A significant degree of heterogeneity was observed (l^2 = 99%). Using a random effects model, we demonstrated that COPD patients were 1.26 times more susceptible to MCI compared to non-COPD controls (Figure 2A).

Adjusted HRs for MCI risk in COPD patients

Pooling adjusted HRs from four studies [3,18,27,28] investigating the relationship between COPD and MCI incidence revealed a significant association (HR = 1.22, 95%CI: -1.18 to -1.27; $l^2 = 26\%$] (Figure 2B).

Association of COPD with risk of dementia

Seven studies[10,18,23,24,27,28,30] involving 108606 COPD patients and 347939 control subjects, investigated the relationship between COPD and dementia risk. Pooling these data showed a borderline trend for an increased dementia risk in COPD patients compared to non-COPD control patients (OR = 1.16, 95%CI: 0.98-1.37). A high degree of heterogeneity was observed ($l^2 = 94\%$). Our meta-analysis showed that COPD patients were more susceptible to dementia (Figure 3A).

Adjusted HRs for dementia risk in COPD patients

Pooling adjusted HRs from six studies[10,18,23,27,28,30] investigating the relationship between COPD and dementia incidence revealed a significant association (HR = 1.32, 95%CI: -1.22 to -1.43; I²: 99%) (Figure 3B).

MMSE score in COPD and non-COPD patients

Seventeen studies [4,17-22,32,35-40,25,31,34] involving 1392 COPD patients and 5097 control subjects, reported mean MMSE score data for both COPD and non-COPD patients. Pooling these results showed a significant lower MMSE score in COPD patients compared to controls (MD = -1.68, 95% CI: -2.66 to -0.71] (Figure 4). A high degree of heterogeneity among these seventeen studies was observed ($I^2 = 96\%$).

Publication bias

Egger's tests did not show any significant publication bias for the examined comparisons. Figure 5 shows the funnel plot of the studies included in each comparison. However, no significant publication

A		Dementia in	COPD	Dementia in	control							
	Study or subgroup	Events	Total	Events	Total	Weight	Odds ration M-H, Random 95%Cl		Odds ratio M-H, Random, 95	5%Cl		
	Liao <i>et al,</i> 2015	522	8640	706	17280	15.9%	1.51 [1.34, 1.70]					_
	Liao et al, 2015	1697	20492	2553	40675	16.8%	1.35 [1.26, 1.44]		-	1.		
	Lutsey et al, 2019	229	2490	616	6108	14.9%	0.90 [0.77, 1.06]			1		
	Martinez et al, 2014	102	1812	801	15723	13.6%	1.11 [0.90, 1.37]					
	Siraj et al, 2020	1151	64397	4609	243420	16.8%	0.94 [0.88, 1.01]					
	Xie <i>et al,</i> 2019	15	515	68	4220	5.9%	1.83 [1.04, 3.23]			+		
	Yeh <i>et al,</i> 2018	619	10260	1194	20513	16.2%	1.04 [0.94, 1.15]					
	Total (95%Cl)		108606		347939	100.0%	1.16 [0.98, 1.37]			•		
	Total events	4335		10547				⊢				
	Heterogeneity: Tau ² = Test for overall effect:	0.04; Chi ² = 95.86 Z = 1.69 (<i>P</i> = 0.09	6, df = 6 (<i>P</i> < 9)	< 0.00001); l ² =	= 94%			0.05	0.2 Favours COPD	1 Favours Co	5 ontrol	2 0

5			COPD	Control	н	azard ratio	Hazard ratio				
Study or subgroup	log[Hazard Ratio]	Total	Total	Weight	IV, Random, 95%Cl	IV, Random, 95%Cl					
Liao et al. 2015	0.55	0.05	8640	17280	17.2%	1.73 [1.57, 1.91]				+	
Liao <i>et al</i> , 2015	0.239	0.002	20492	40765	23.5%	1.27 [1.27, 1.27]			•		
Lutsey et al, 2019	0.077	0.0818	2490	6108	11.9%	1.08 [0.92, 1.27]			+-		
Siraj et al, 2020	0.1222	0.0184	64397	243420	22.4%	1.13 [1.09, 1.17]					
Xie <i>et al,</i> 2019	0.6366	0.2903	515	4220	1.8%	1.89 [1.07, 3.34]			I—	•	-
Yeh <i>et al,</i> 2018	0.35	0.005	10260	20513	23.4%	1.42 [1.41, 1.43]				•	
Total (95% Cl)			106794	332306	100.0%	1.32 [1.22, 1.43)			•		
Heterogeneity: Tau ² =	0.01; Chi ² = 517.52, df = 5	(<i>P</i> < 0.000	001); I ² = 9	9%		-	0.2	0.5	1	2	+ 5
Test for overall effect:	Z = 7.00 (P < 0.00001)						0.2	0.5	1	2	5
							Fai	yours Con	trol Fav	ours CO	סכ

DOI: 10.12998/wjcc.v10.i11.3449 Copyright © The Author(s) 2022.

Figure 3 Forest plot examining the association of chronic obstructive pulmonary disease with dementia risk. A: Odds ratios; B: Hazard ratios.

	MMSE score in COPD			MMSE score in control				Mean difference	Mean difference
Study or subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95%Cl	IV, Random, 95%Cl
Cilinger et al, 2020	25.8	4.6	54	24	5.5	37	4.9%	1.80 [-0.36, 3.96]	<u> </u>
Dodd <i>et al,</i> 2013	28	2	50	30	1	30	6.2%	-2.00 [-2.66, -1.34]	-
Favalli et al, 2008	26.9	1.9	21	28.2	1.4	20	5.9%	- 1.30 [-2.32, -0.28]	
Fekri et al, 2017	22.5	2.4	87	23.6	2.8	60	6.1%	- 1.10 [-1.97, -0.23]	
Gupta et al, 2013	22.4	2.4	40	27.8	1.5	40	6.0%	-5.40 [-6.28, -4.52]	
lsoaho et al, 1996	26.6	3.4	81	26.4	5.4	245	6.0%	0.20 [-0.80, 1.20]	
Li and Fei, 2013	24.5	2.2	37	28	2.1	37	6.0%	-3.50 [-4.48, -2.52]	
Li et al, 2013	24.8	1.9	27	27.6	2.9	27	5.7%	-2.80 [-4.11, -1.49]	
Lima <i>et al,</i> 2007	26	3.5	30	28.1	1.9	34	5.6%	-2.10 (-3.51, -0.69]	
Negro et al, 2015	20.1	3.1	73	22	2.3	73	6.0%	- 1.90 [-2.79, -1.01]	
Ozge et al, 2006	24.6	3.7	54	27.3	1.9	24	5.8%	-2.70 [-3.95, -1.45]	
Salik et al, 2007	24.8	2	32	25.4	3.2	26	5.6%	-0.60 [-2.01, 0.81]	
Taskiran et al, 2015	29	2	34	28	2	34	6.0%	1.00 [0.05, 1.95]	
Tomruk et al, 2015	23.9	3.3	35	29.5	1.1	36	5.8%	-5.60 [-6.75, -4.45]	
Ulasli et al, 2013	23.8	4.4	112	26.7	2.9	44	5.8%	-2.90 [-4.08, -1.72]	-
Xie et al, 2019	22.9	3.5	515	22.1	3.8	4220	6.3%	0.80 [0.48, 1.12]	-
Zhou <i>et al,</i> 2012	27.1	1.7	110	27.3	1.6	110	6.3%	-0.20 [-0.64, 0.24)	
Total (95%Cl)			1392			5097	100.0%	-1.68 [-2.66, -0.71]	•
Heterogeneity: Tau ² = 3.8	9; Chi² = 379.0	51, df =	16 (<i>P</i> < 0	.00001); l ² =	96%				
Test for overall effect: Z =	3.39(P = 0.0)	007)	-10 -5 0 5 10						

DOI: 10.12998/wjcc.v10.i11.3449 Copyright © The Author(s) 2022.

Figure 4 Forest plot examining mini-mental state examination score differences between chronic obstructive pulmonary disease and control groups.

biases were observed for the association of COPD with risk of MCI and dementia, MCI risk in COPD patients, dementia risk in COPD patients, and comparison of MMSE score between the COPD and control groups.

DISCUSSION

This study is the first systematic review and meta-analysis examining the association between COPD and the risk of MCI and dementia. We found that patients with COPD are 2.11 times more susceptible to MCI and 1.16 times more susceptible to dementia. Moreover, lower MMSE scores were observed in COPD patients, indicating greater cognitive impairment.

Raishideng® WJCC | https://www.wjgnet.com



Figure 5 Funnel plot. A: Mild cognitive impairment (MCI); B: Dementia; C: MCI risk in chronic obstructive pulmonary disease (COPD) patients; D: Dementia risk in COPD patients; E: Comparison of mini-mental state examination score between COPD and control groups.

COPD-associated neurological impairment and dementia put a great burden on the patients and the healthcare system. In particular, declining cognition leads to COPD patients requiring more assistance for daily activities[41]. Our analysis was performed based on the reported adjustments within individual studies for confounding factors such as age, sex, smoking, body mass index, education level, diabetes mellitus, and previous history of stroke or cardiovascular disease[10,23,27,28,30]. Studies by Thakur et al[33], Singh et al[26], and Martinez et al[24] reported data as ORs for adjusted confounders and therefore were not included in the calculations for pooled incidence for MCI or dementia.

From a clinical approach, COPD can lead to pulmonary encephalopathy, hypoxemia, and inflammation, all of which may impact brain function[42]. Indeed, COPD patients exhibit a unique neurophysiological profile stemming from neurotoxicity featuring deficits of attention, motor, memory, and cognitive domain executive function^[4]. Interestingly, the relationship between COPD and dementia persists even after accounting for the presence of vascular disease, suggesting that COPD is an independent predictor of dementia.

Our findings are consistent with the previous literature[5,11,12,42,43]. However, the available literature on the relationship between dementia and COPD remains limited, as only seven studies were found for this meta-analysis. Our study also had several other limitations. The included studies had different designs, which may be one of the leading causes of heterogeneity. Additional sources of heterogeneity may include different geographical population, variation in the diagnostic criteria of COPD, and diversity in the factors undertaken for the multivariate analysis of each included studies.

WJCC | https://www.wjgnet.com

The included studies also lacked long-term follow-up data, as well as data that would facilitate subgroup analysis based on co-morbidities, age, and gender. Finally, different studies varied on how they assessed and diagnosed COPD and cognitive impairment.

CONCLUSION

Our meta-analysis revealed an elevated risk for MCI and dementia in COPD patients. Proper clinical management and attention are necessary to prevent or mitigate the incidence of MCI and dementia in COPD patients.

ARTICLE HIGHLIGHTS

Research background

Chronic obstructive pulmonary disease (COPD) is a common public health issue that has been linked to cognitive dysfunction. No clear evidence is available for the relationship between COPD and mild cognitive impairment (MCI) and dementia risk.

Research motivation

To our knowledge, there has only been one published meta-analysis with limited number studies investigating the statistical association of COPD with cognition dysfunction.

Research objectives

The current meta-analysis was performed to investigate the relationship between COPD and MCI and dementia risk.

Research methods

A comprehensive search was performed using PubMed, Embase, Google Scholar, and Cochrane Library online databases for articles published prior to March 31, 2021.

Research results

Twenty-seven studies met all the inclusion criteria. Meta-analysis yielded a strong association between COPD and an increased risk of MCI incidence. It also revealed a borderline trend for an increased dementia risk in COPD patients. A significant lower MMSE score in COPD patients was noted.

Research conclusions

Our findings revealed an elevated risk for the occurrence of MCI and dementia in COPD patients. Proper clinical management and attention are required to prevent and control MCI and dementia incidence in COPD patients.

Research perspectives

Further large prospective observational studies are needed to strengthen the evidence on this important subject.

FOOTNOTES

Author contributions: Zhao LY conceived and designed the study; Zhao LY and Zhou XL were involved in literature search and data collection; Zhao LY analyzed the data; Zhao LY and Zhou XL wrote the paper; Zhao LY edited the manuscript; all authors read and approved the final manuscript.

Conflict-of-interest statement: The authors deny any conflict of interest for this article.

PRISMA 2009 Checklist statement: The authors have read the PRISMA 2009 Checklist, and manuscript was prepared and revised according to the PRISMA 2009 Checklist.

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is noncommercial. See: https://creativecommons.org/Licenses/by-nc/4.0/



Country/Territory of origin: China

ORCID number: Li-Ying Zhao 0000-0002-8106-609X; Xue-Lai Zhou 0000-0002-6652-7038.

S-Editor: Fan JR L-Editor: Wang TQ P-Editor: Yu HG

REFERENCES

- Singh D, Agusti A, Anzueto A, Barnes PJ, Bourbeau J, Celli BR, Criner GJ, Frith P, Halpin DMG, Han M, López Varela 1 MV, Martinez F, Montes de Oca M, Papi A, Pavord ID, Roche N, Sin DD, Stockley R, Vestbo J, Wedzicha JA, Vogelmeier C. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease: the GOLD science committee report 2019. Eur Respir J 2019; 53 [PMID: 30846476 DOI: 10.1183/13993003.00164-2019]
- Ranzini L, Schiavi M, Pierobon A, Granata N, Giardini A. From Mild Cognitive Impairment (MCI) to Dementia in 2 Chronic Obstructive Pulmonary Disease. Implications for Clinical Practice and Disease Management: A Mini-Review. Front Psychol 2020; 11: 337 [PMID: 32184750 DOI: 10.3389/fpsyg.2020.00337]
- Singh B, Mielke MM, Parsaik AK, Cha RH, Roberts RO, Scanlon PD, Geda YE, Christianson TJ, Pankratz VS, Petersen RC. A prospective study of chronic obstructive pulmonary disease and the risk for mild cognitive impairment. JAMA Neurol 2014; 71: 581-588 [PMID: 24637951 DOI: 10.1001/jamaneurol.2014.94]
- 4 Dodd JW, Charlton RA, van den Broek MD, Jones PW. Cognitive dysfunction in patients hospitalized with acute exacerbation of COPD. Chest 2013; 144: 119-127 [PMID: 23349026 DOI: 10.1378/chest.12-2099]
- Yohannes AM, Chen W, Moga AM, Leroi I, Connolly MJ. Cognitive Impairment in Chronic Obstructive Pulmonary Disease and Chronic Heart Failure: A Systematic Review and Meta-analysis of Observational Studies. J Am Med Dir Assoc 2017; 18: 451.e1-451.e11 [PMID: 28292570 DOI: 10.1016/j.jamda.2017.01.014]
- 6 Chang SS, Chen S, McAvay GJ, Tinetti ME. Effect of coexisting chronic obstructive pulmonary disease and cognitive impairment on health outcomes in older adults. J Am Geriatr Soc 2012; 60: 1839-1846 [PMID: 23035917 DOI: 10.1111/j.1532-5415.2012.04171.x
- 7 Campbell NL, Boustani MA, Skopelja EN, Gao S, Unverzagt FW, Murray MD. Medication adherence in older adults with cognitive impairment: a systematic evidence-based review. Am J Geriatr Pharmacother 2012; 10: 165-177 [PMID: 22657941 DOI: 10.1016/j.amjopharm.2012.04.004]
- Schou L, Østergaard B, Rasmussen LS, Rydahl-Hansen S, Phanareth K. Cognitive dysfunction in patients with chronic 8 obstructive pulmonary disease--a systematic review. Respir Med 2012; 106: 1071-1081 [PMID: 22579108 DOI: 10.1016/j.rmed.2012.03.013]
- Pathan SS, Gottesman RF, Mosley TH, Knopman DS, Sharrett AR, Alonso A. Association of lung function with cognitive decline and dementia: the Atherosclerosis Risk in Communities (ARIC) Study. Eur J Neurol 2011; 18: 888-898 [PMID: 21244584 DOI: 10.1111/j.1468-1331.2010.03340.x]
- Liao WC, Lin CL, Chang SN, Tu CY, Kao CH. The association between chronic obstructive pulmonary disease and 10 dementia: a population-based retrospective cohort study. Eur J Neurol 2015; 22: 334-340 [PMID: 25303726 DOI: 10.1111/ene.12573
- 11 Zhang X, Cai X, Shi X, Zheng Z, Zhang A, Guo J, Fang Y. Chronic Obstructive Pulmonary Disease as a Risk Factor for Cognitive Dysfunction: A Meta-Analysis of Current Studies. J Alzheimers Dis 2016; 52: 101-111 [PMID: 26967208 DOI: 10.3233/JAD-150735]
- 12 Wang Y, Li X, Wei B, Tung TH, Tao P, Chien CW. Association between Chronic Obstructive Pulmonary Disease and Dementia: Systematic Review and Meta-Analysis of Cohort Studies. Dement Geriatr Cogn Dis Extra 2019; 9: 250-259 [PMID: 31543892 DOI: 10.1159/000496475]
- Moher D, Liberati A, Tetzlaff J, Altman DG; PRISMA Group. Preferred reporting items for systematic reviews and meta-13 analyses: the PRISMA statement. Ann Intern Med 2009; 151: 264-269, W64 [PMID: 19622511 DOI: 10.7326/0003-4819-151-4-200908180-00135
- Stang A. Critical evaluation of the Newcastle-Ottawa scale for the assessment of the quality of nonrandomized studies in 14 meta-analyses. Eur J Epidemiol 2010; 25: 603-605 [PMID: 20652370 DOI: 10.1007/s10654-010-9491-z]
- 15 Egger M, Davey Smith G, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. BMJ 1997; 315: 629-634 [PMID: 9310563 DOI: 10.1136/bmj.315.7109.629]
- 16 Begg CB, Mazumdar M. Operating characteristics of a rank correlation test for publication bias. *Biometrics* 1994; 50: 1088-1101 [PMID: 7786990]
- Mermit Çilingir B, Günbatar H, Çilingir V. Cognitive dysfunction among patients in chronic obstructive pulmonary 17 disease: Effects of exacerbation and long-term oxygen therapy. Clin Respir J 2020; 14: 1137-1143 [PMID: 32772486 DOI: 10.1111/crj.13250
- 18 Xie F, Xie L. COPD and the risk of mild cognitive impairment and dementia: a cohort study based on the Chinese Longitudinal Health Longevity Survey. Int J Chron Obstruct Pulmon Dis 2019; 14: 403-408 [PMID: 30863040 DOI: 10.2147/COPD.S1942771
- 19 Samareh Fekri M, Hashemi-Bajgani SM, Naghibzadeh-Tahami A, Arabnejad F. Cognitive Impairment among Patients with Chronic Obstructive Pulmonary Disease Compared to Normal Individuals. Tanaffos 2017; 16: 34-39 [PMID: 286384221
- Gupta PP, Sood S, Atreja A, Agarwal D. A comparison of cognitive functions in non-hypoxemic chronic obstructive 20 pulmonary disease (COPD) patients and age-matched healthy volunteers using mini-mental state examination questionnaire



and event-related potential, P300 analysis. Lung India 2013; 30: 5-11 [PMID: 23661909 DOI: 10.4103/0970-2113.106119]

- 21 Li J, Huang Y, Fei GH. The evaluation of cognitive impairment and relevant factors in patients with chronic obstructive pulmonary disease. *Respiration* 2013; 85: 98-105 [PMID: 23207572 DOI: 10.1159/000342970]
- 22 Li J, Fei GH. The unique alterations of hippocampus and cognitive impairment in chronic obstructive pulmonary disease. *Respir Res* 2013; 14: 140 [PMID: 24359080 DOI: 10.1186/1465-9921-14-140]
- 23 Liao KM, Ho CH, Ko SC, Li CY. Increased Risk of Dementia in Patients With Chronic Obstructive Pulmonary Disease. *Medicine (Baltimore)* 2015; 94: e930 [PMID: 26061317 DOI: 10.1097/MD.0000000000930]
- 24 Martinez CH, Richardson CR, Han MK, Cigolle CT. Chronic obstructive pulmonary disease, cognitive impairment, and development of disability: the health and retirement study. *Ann Am Thorac Soc* 2014; 11: 1362-1370 [PMID: 25285360 DOI: 10.1513/AnnalsATS.201405-187OC]
- 25 Dal Negro RW, Bonadiman L, Bricolo FP, Tognella S, Turco P. Cognitive dysfunction in severe chronic obstructive pulmonary disease (COPD) with or without Long-Term Oxygen Therapy (LTOT). *Multidiscip Respir Med* 2015; 10: 17 [PMID: 25932326 DOI: 10.1186/s40248-015-0013-4]
- 26 Singh B, Parsaik AK, Mielke MM, Roberts RO, Scanlon PD, Geda YE, Pankratz VS, Christianson T, Yawn BP, Petersen RC. Chronic obstructive pulmonary disease and association with mild cognitive impairment: the Mayo Clinic Study of Aging. *Mayo Clin Proc* 2013; 88: 1222-1230 [PMID: 24182702 DOI: 10.1016/j.mayocp.2013.08.012]
- 27 Lutsey PL, Chen N, Mirabelli MC, Lakshminarayan K, Knopman DS, Vossel KA, Gottesman RF, Mosley TH, Alonso A. Impaired Lung Function, Lung Disease, and Risk of Incident Dementia. *Am J Respir Crit Care Med* 2019; 199: 1385-1396 [PMID: 30433810 DOI: 10.1164/rccm.201807-12200C]
- 28 Siraj RA, McKeever TM, Gibson JE, Gordon AL, Bolton CE. Risk of incident dementia and cognitive impairment in patients with chronic obstructive pulmonary disease (COPD): A large UK population-based study. *Respir Med* 2020; 177: 106288 [PMID: 33401149 DOI: 10.1016/j.rmed.2020.106288]
- 29 Villeneuve S, Pepin V, Rahayel S, Bertrand JA, de Lorimier M, Rizk A, Desjardins C, Parenteau S, Beaucage F, Joncas S, Monchi O, Gagnon JF. Mild cognitive impairment in moderate to severe COPD: a preliminary study. *Chest* 2012; 142: 1516-1523 [PMID: 23364388 DOI: 10.1378/chest.11-3035]
- 30 Yeh JJ, Wei YF, Lin CL, Hsu WH. Effect of the asthma-chronic obstructive pulmonary disease syndrome on the stroke, Parkinson's disease, and dementia: a national cohort study. *Oncotarget* 2018; 9: 12418-12431 [PMID: 29552322 DOI: 10.18632/oncotarget.23811]
- 31 Ozge C, Ozge A, Unal O. Cognitive and functional deterioration in patients with severe COPD. *Behav Neurol* 2006; 17: 121-130 [PMID: 16873924 DOI: 10.1155/2006/848607]
- 32 Favalli A, Miozzo A, Cossi S, Marengoni A. Differences in neuropsychological profile between healthy and COPD older persons. Int J Geriatr Psychiatry 2008; 23: 220-221 [PMID: 17562525 DOI: 10.1002/gps.1847]
- 33 Thakur N, Blanc PD, Julian LJ, Yelin EH, Katz PP, Sidney S, Iribarren C, Eisner MD. COPD and cognitive impairment: the role of hypoxemia and oxygen therapy. Int J Chron Obstruct Pulmon Dis 2010; 5: 263-269 [PMID: 20856825 DOI: 10.2147/copd.s10684]
- 34 Zhou G, Liu J, Sun F, Xin X, Duan L, Zhu X, Shi Z. Association of chronic obstructive pulmonary disease with cognitive decline in very elderly men. *Dement Geriatr Cogn Dis Extra* 2012; 2: 219-228 [PMID: 22719748 DOI: 10.1159/000338378]
- 35 Isoaho R, Puolijoki H, Huhti E, Laippala P, Kivelä SL. Chronic obstructive pulmonary disease and cognitive impairment in the elderly. *Int Psychogeriatr* 1996; 8: 113-125 [PMID: 8805092 DOI: 10.1017/s1041610296002517]
- 36 Lima OM, Oliveira-Souza Rd, Santos Oda R, Moraes PA, Sá LF, Nascimento OJ. Subclinical encephalopathy in chronic obstructive pulmonary disease. *Arg Neuropsiquiatr* 2007; 65: 1154-1157 [PMID: 18345421 DOI: 10.1590/s0004-282x2007000700012]
- 37 Ozyemisci-Taskiran O, Bozkurt SO, Kokturk N, Karatas GK. Is there any association between cognitive status and functional capacity during exacerbation of chronic obstructive pulmonary disease? *Chron Respir Dis* 2015; 12: 247-255 [PMID: 26071384 DOI: 10.1177/1479972315589748]
- 38 Salik Y, Ozalevli S, Cimrin AH. Cognitive function and its effects on the quality of life status in the patients with chronic obstructive pulmonary disease (COPD). Arch Gerontol Geriatr 2007; 45: 273-280 [PMID: 17343931 DOI: 10.1016/j.archger.2006.12.002]
- 39 Sarınç Ulaşlı S, Oruç S, Günay E, Aktaş O, Akar O, Koyuncu T, Ünlü M. [Effects of COPD on cognitive functions: a case control study]. *Tuberk Toraks* 2013; 61: 193-199 [PMID: 24298960 DOI: 10.5578/tt.5841]
- 40 Soysal Tomruk M, Ozalevli S, Dizdar G, Narin S, Kilinc O. Determination of the relationship between cognitive function and hand dexterity in patients with chronic obstructive pulmonary disease (COPD): a cross-sectional study. *Physiother Theory Pract* 2015; 31: 313-317 [PMID: 25625565 DOI: 10.3109/09593985.2015.1004768]
- 41 **Dulohery MM**, Schroeder DR, Benzo RP. Cognitive function and living situation in COPD: is there a relationship with self-management and quality of life? *Int J Chron Obstruct Pulmon Dis* 2015; **10**: 1883-1889 [PMID: 26392762 DOI: 10.2147/COPD.S88035]
- 42 Baird C, Lovell J, Johnson M, Shiell K, Ibrahim JE. The impact of cognitive impairment on self-management in chronic obstructive pulmonary disease: A systematic review. *Respir Med* 2017; 129: 130-139 [PMID: 28732820 DOI: 10.1016/j.rmed.2017.06.006]
- 43 van Beers M, Janssen DJA, Gosker HR, Schols AMWJ. Cognitive impairment in chronic obstructive pulmonary disease: disease burden, determinants and possible future interventions. *Expert Rev Respir Med* 2018; 12: 1061-1074 [PMID: 30296384 DOI: 10.1080/17476348.2018.1533405]

Zaishideng® WJCC | https://www.wjgnet.com



Published by Baishideng Publishing Group Inc 7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA Telephone: +1-925-3991568 E-mail: bpgoffice@wjgnet.com Help Desk: https://www.f6publishing.com/helpdesk https://www.wjgnet.com

