Risk of Neurodegeneration and Cardiovascular Diseases in Fibromyalgia and Chronic Fatigue Syndrome

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Introduction

Fibromyalgia (FM) and chronic fatigue syndrome (CFS) have similar symptoms, including pain and psychological distress (1, 2). One of the pathomechanisms underlying those diseases is inflammation, a typical contributor to neurodegenerative diseases and cardiovascular diseases (CVDs) (3, 4). However, the prevalence and risks of neurodegeneration and CVDs induced by FM and CFS have not been compared. This study sought to estimate prevalence and compare cumulative risks of neurodegeneration and CVDs between FM and CFS by analyzing multiregional, real-world data collected from the TriNetX research platform.

Methodology

- We collected data from the TriNetX Global Collaborative Network, which provides access to real-world data from 118 healthcare organizations. We defined two cohorts based on the ICD-10 codes: the FM cohort and the CFS cohort of adult patients (≥ 18 years old).
- We estimated the prevalence of neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, Huntington's disease, and multiple sclerosis, as well as cardiovascular disorders such as major adverse cardiovascular events (MACEs), ischemic brain complications, and ischemic heart diseases.
- We compare the cumulative risks of those diseases after conducting 1: 1 propensity score matching using age at index, gender, BMI, systolic blood pressure, diastolic blood pressure, diabetes, hypertension, metabolic disorders, chronic kidney disease, COPD, mood disorders, sleep disorders, HbA1c, LDL, HDL, cholesterol, and triglyceride levels. We conducted data analyses in May 2024, utilizing built-in functions.

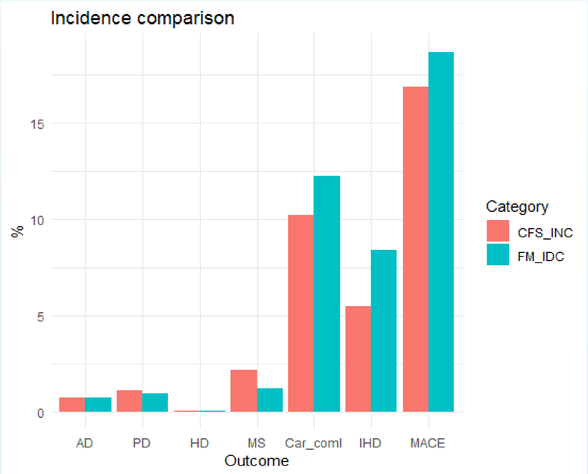
Results

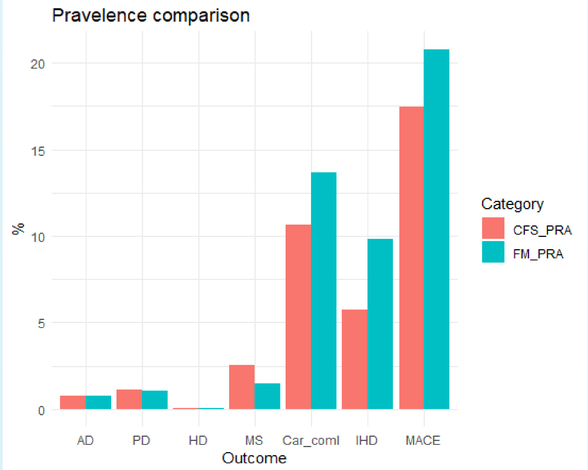
Cohort characteristics

Cohort	Patient count before matching	Patient count after matching
FM	1,279,507	32,737
CFS	32,868	32,737

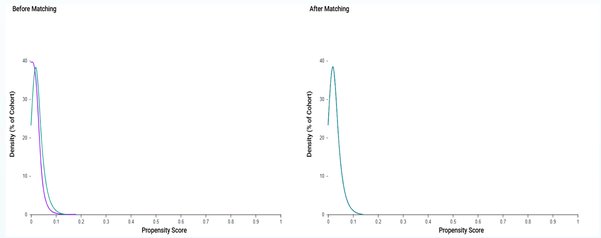
Demographics	Cohort	Before matching	After matching
Age at index	1 - FM	50.5 +/- 15.2	52.0 +/- 16.7
	2 - CFS	52.5 +/- 17.0	52.5 +/- 17.0
Gender (female)	1 - FM	74.3%	65%
	2 - CFS	64.6%	64.6%

Incidence and prevalence of outcomes in FM and CFS



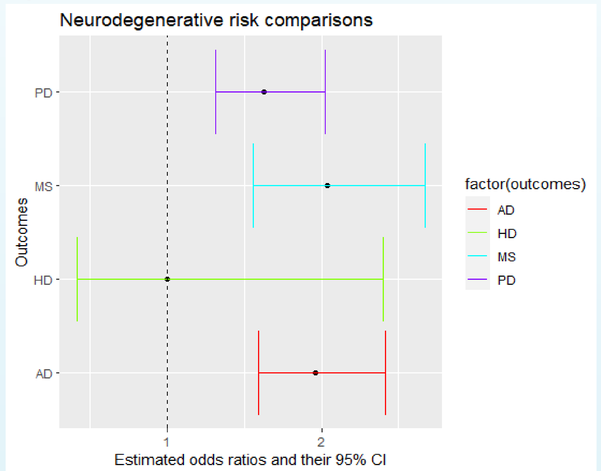


Propensity score matching was well executed

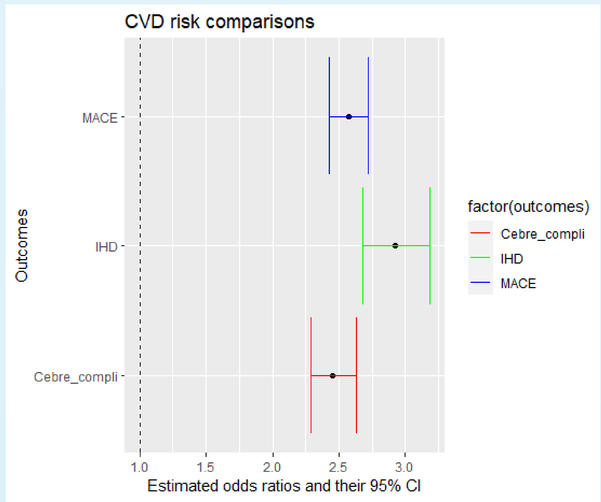


Most standardized differences between the FM (n = 32,737) and CFS (n = 32,737) were < 0.1 after matching

Odds of neurodegenerative disorders induced by FM > CFS



Odds of CVD complications induced by FM > CFS



Conclusion

FM might have a higher risk of neurodegeneration and cardiovascular disorders compared to CFS. This is the first study using large-scale, multiregional data from TriNetX to estimate prevalence and compare the cumulative risks of neurodegeneration and cardiovascular disorders caused by FM and CFS.

The findings raise the need for further investigation of the differences in pathomechanisms by which FM and CFS impact the central nervous system and cardiovascular system. Our study also supports further studies regarding the prevention and prognosis of neurodegeneration and cardiovascular risks in FM and CFS

References

1. Clauw D. J. (2014). Fibromyalgia: a clinical review. JAMA, 311(15), 1547–1555. https://doi.org/10.1001/jama.2014.3266

2. Prins, J. B., van der Meer, J. W., & Bleijenberg, G. (2006). Chronic fatigue syndrome. Lancet (London, England), 367(9507), 346–355. https://doi.org/10.1016/S0140-6736(06)68073-2

3. Romano, G. F., Tomassi, S., Russell, A., Mondelli, V., & Pariante, C. M. (2015). Fibromyalgia and chronic fatigue: the underlying biology and related theoretical issues. Advances in psychosomatic medicine, 34, 61–77. https://doi.org/10.1159/000369085

4. Alfaddagh A, Martin SS, Leucker TM, Michos ED, Blaha MJ, Lowenstein CJ, Jones SR, Toth PP. Inflammation and cardiovascular disease: From mechanisms to therapeutics. Am J Prev Cardiol. 2020 Nov 21;4:100130. doi: 10.1016/j.ajpc.2020.100130

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