

Investigating the Characteristics Associated with Multimorbidity (≥ 2 Co-Occurring Conditions in an Individual) Among United States Adults with a Diagnosis of Asthma.

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INTRODUCTION

- Asthma is a chronic condition that involves inflammation of the airways in the lungs and affects more than 20 million adults in the United States (US).¹
- Multimorbidity is increasing across the US and is associated with poorer health, well-being, quality of life, and functionality, and increased hospital admissions, length of stays, healthcare use and costs, and mortality.²⁻³
- There is a need to better understand the factors associated with multimorbidity among US adults with asthma.

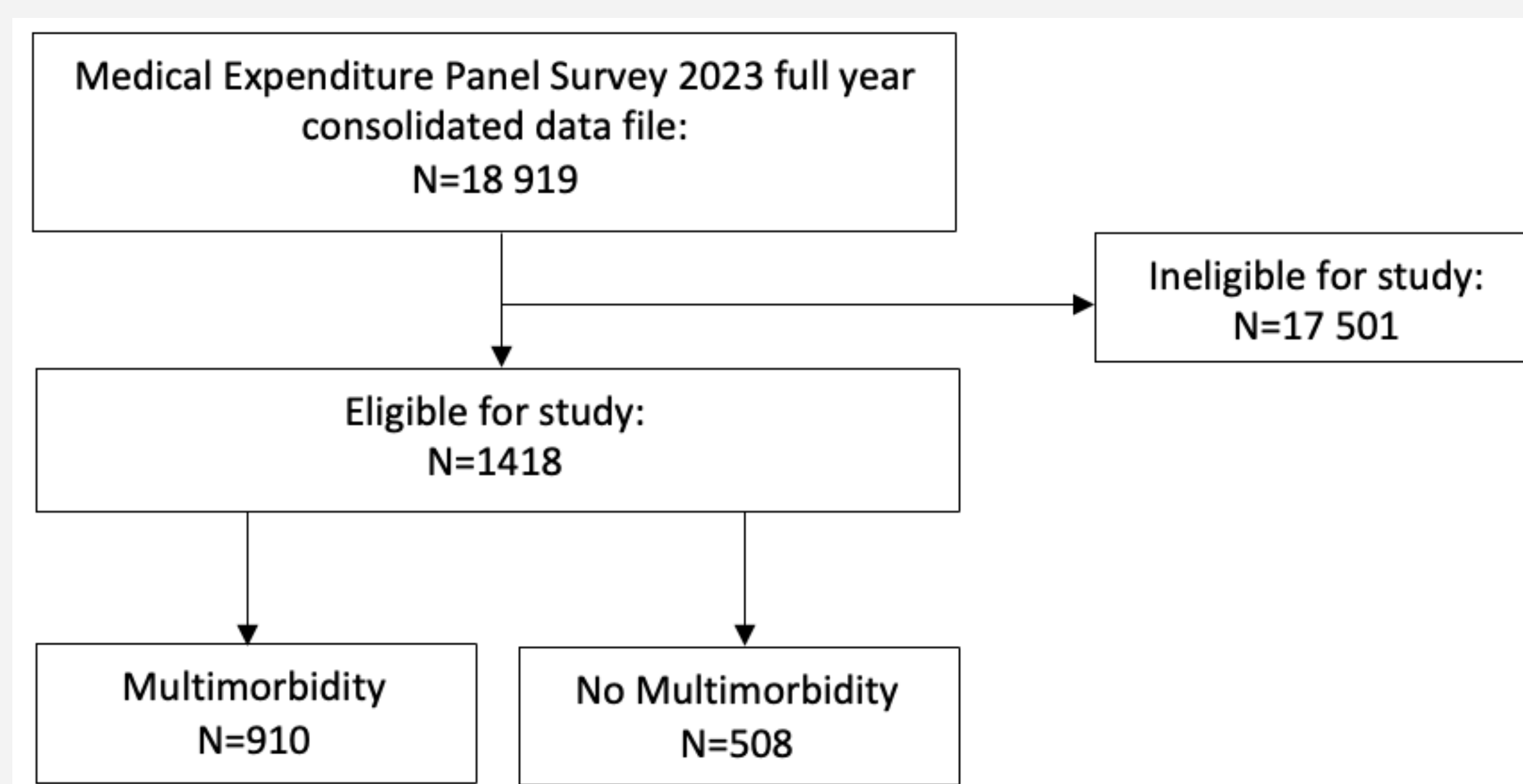
OBJECTIVES

- The objective of this study was to explore the characteristics associated with multimorbidity among adults with asthma in the US.

METHODS

- This cross-sectional database study utilized 2023 Medical Expenditure Panel Survey (MEPS) data.⁴
- The variables included are shown in Table 1.
- A multivariable logistic regression model assessed the predisposing, enabling, and need variables associated with multimorbidity (≥ 2 co-occurring conditions in an individual) among US adults (≥ 18 years) with asthma.
- Cluster, strata, and weighting variables maintained the complex data structure and provided nationally representative data estimates.
- The a-priori $\alpha = 0.05$.

FLOWCHART



RESULTS

Table 1. Demographics of US adults with asthma by multimorbidity status.

Variables	Multimorbidity % (95% CI)	No Multimorbidity % (95% CI)	p
Age, years			<0.0001
65+	33.3 (29.7, 37.0)	4.4 (2.8, 6.0)	
40-64	46.2 (41.9, 50.5)	26.9 (22.6, 31.2)	
18-39	20.5 (16.9, 24.1)	68.7 (64.3, 73.2)	
Sex			0.030
Male	40.9 (36.7, 45.2)	48.6 (43.0, 54.3)	
Female	59.1 (54.8, 63.3)	51.4 (45.7, 57.0)	
Hispanic			0.081
Yes	12.9 (9.6, 16.1)	17.4 (13.2, 21.6)	
No	87.1 (83.9, 90.4)	82.6 (78.4, 86.8)	
Race			0.239
White	75.8 (72.3, 79.3)	70.2 (64.7, 75.6)	
Black	12.3 (9.8, 14.9)	17.1 (12.3, 21.8)	
Asian	5.4 (2.9, 7.8)	4.9 (3.0, 6.8)	
Other / multiple	6.5 (3.9, 9.0)	7.8 (4.6, 11.1)	
Marriage status			<0.0001
Married	48.9 (44.7, 53.1)	40.6 (35.2, 46.0)	
Widowed / divorced / separated	32.0 (28.3, 35.8)	9.2 (6.7, 11.7)	
Not married	19.1 (15.6, 22.6)	50.2 (44.5, 55.9)	
Employment status			<0.0001
Employed	53.2 (48.5, 57.9)	84.3 (80.2, 88.4)	
Unemployed	46.8 (42.1, 51.5)	15.7 (11.6, 19.8)	
Insurance coverage status			<0.0001
Any private	58.8 (53.9, 63.8)	79.5 (75.3, 83.8)	
Public only	40.4 (35.5, 45.3)	16.7 (12.7, 20.7)	
Uninsured	0.8 (0.3, 1.3)	3.8 (1.9, 5.6)	
Household poverty status			0.005
Low income	33.5 (28.8, 38.2)	22.3 (17.5, 27.1)	
Middle income	26.3 (21.2, 31.3)	28.1 (22.7, 33.4)	
High income	40.2 (35.7, 44.8)	49.7 (43.7, 55.6)	
Education status			0.682
Up to and including high school	39.4 (34.6, 44.2)	37.8 (31.6, 44.1)	
More than high school	60.6 (55.8, 65.4)	62.2 (55.9, 68.4)	
Pain interference status			<0.0001
None	34.8 (30.1, 39.4)	71.8 (66.8, 76.7)	
Little / moderate	46.1 (41.4, 50.8)	24.9 (20.0, 29.9)	
Quite a bit / extreme	19.1 (15.7, 22.5)	3.3 (1.6, 5.0)	
Limitation status			<0.0001
Has a limitation	43.9 (39.6, 48.1)	8.6 (5.8, 11.4)	
No limitation	56.1 (51.9, 60.4)	91.4 (88.6, 94.2)	
Physical health status			<0.0001
Excellent / very good	34.7 (30.3, 39.2)	59.7 (53.7, 65.6)	
Good	36.0 (31.4, 40.6)	28.4 (22.9, 33.8)	
Fair / poor	29.3 (25.6, 32.9)	12.0 (8.4, 15.5)	
Mental health status			0.001
Excellent / very good	46.1 (41.7, 50.4)	59.4 (52.8, 65.9)	
Good	33.5 (29.5, 37.4)	27.0 (21.7, 32.4)	
Fair / poor	20.5 (17.4, 23.6)	13.6 (9.3, 17.9)	
Smoking status			0.004
Smoker	13.8 (11.0, 16.6)	8.0 (5.5, 10.5)	
Non-smoker	86.2 (83.4, 89.0)	92.0 (89.5, 94.5)	
Regular exercise status			0.051
Regular exercise	51.3 (47.2, 55.4)	58.1 (53.0, 63.1)	
No regular exercise	48.7 (44.6, 52.8)	41.9 (36.9, 47.0)	

RESULTS

Table 2. Adjusted odds ratios for multimorbidity versus no multimorbidity among US adults with asthma in the multivariable logistic regression model.

Variables	Adjusted Odds Ratio (95% CI)
Age, years: 65+ vs. 18-39	10.51 (5.8, 18.9)
Age, years: 40-64 vs. 18-39	3.92 (2.5, 6.2)
Sex: male vs. female	1.03 (0.7, 1.5)
Hispanic: yes vs. no	1.23 (0.7, 2.2)
Race: White vs. other / multiple	1.10 (0.6, 2.1)
Race: Black vs. other / multiple	0.79 (0.4, 1.7)
Race: Asian vs. other / multiple	1.08 (0.4, 2.8)
Marriage: married vs. never married	1.78 (1.1, 2.8)
Marriage: widowed / divorced / separated vs. not married	3.08 (1.8, 5.4)
Employment: employed vs. unemployed	0.79 (0.5, 1.2)
Insurance coverage: any private vs. uninsured	3.54 (1.5, 8.1)
Insurance coverage: public only vs. uninsured	4.67 (2.0, 10.9)
Household poverty: low income vs. high income	1.09 (0.6, 1.9)
Household poverty: middle vs. high income	1.11 (0.7, 1.8)
Education: up to and including vs. more than high school	0.78 (0.5, 1.2)
Pain interference: none vs. quite a bit / extreme	0.28 (0.1, 0.6)
Pain interference: little / moderate vs. quite a bit / extreme	0.61 (0.3, 1.3)
Limitation: has a limitation vs. no limitation	2.16 (1.2, 3.8)
Physical health: excellent / very good vs. fair / poor	0.42 (0.2, 0.8)
Physical health: good vs. fair / poor	0.77 (0.4, 1.4)
Mental health: excellent / very good vs. fair / poor	0.81 (0.4, 1.7)
Mental health: good vs. fair / poor	0.90 (0.4, 1.8)
Smoking: smoker vs. non-smoker	1.12 (0.6, 2.1)
Regular exercise: regular exercise vs. no regular exercise	1.33 (0.9, 1.9)

CONCLUSION

- This analysis identified the predisposing, enabling and need variables associated multimorbidity among adults with asthma in the US.
- Future work is needed to develop and evaluate interventions that target these variables to improve patient health outcomes.

REFERENCES

- CDC. Most recent national asthma data. Available online: https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm
- Johnston MC, et al. Prevalence of secondary care multimorbidity in mid-life and its association with premature mortality in a large longitudinal cohort study. *BMJ Open*. 2020;10:e033622.
- Zulman DM, et al. Multimorbidity and healthcare utilisation among high-cost patients in the US VA Health Care System. *BMJ Open*. 2015;5:e007771.
- AHRQ. Medical Expenditure Panel Survey Survey Background. Available online: https://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp.