Investigating the association between pain burden and multimorbidity among United States adults with pain

David R. Axon, PhD, [1] Andrea Gonzalez, [1] & Jordyn Quevedo [1]

[1] R. Ken Coit College of Pharmacy, The University of Arizona, Tucson, AZ, USA

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THE UNIVERSITY OF ARIZONA College of Pharmacy

Background

- Multimorbidity and pain are common among United States (US) adults.
- Little is known about the association between pain burden and multimorbidity among US adults.

Objectives

- To investigate the association between pain burden and multimorbidity among US adults.

Methods

- US adults aged ≥18 with available data on level of pain in the 2019 Medical Expenditure Panel Survey (MEPS) dataset were included in the study.
- Pain was classified as extreme, quite a bit, moderate, little, or none.
- Multimorbidity was defined as having two or more chronic conditions from the list of conditions available in MEPS.
- Multivariable logistic regression was used to assess the association between pain burden and multimorbidity after accounting for confounders.
- The analysis was weighted to produce nationally representative estimates.
- No pain served as the reference group.
- The a priori alpha was 0.05.

Results

- A total of 17,261 individuals from the dataset were included in the study, which represented a weighted sample of 242,169,897 United States adults.
- Of these, 9,188 had <2 comorbid conditions, which represented a weighted sample of 140,396,386 (58.0%; 95% confidence interval [CI]: 56.9%, 59.0%)
- Meanwhile, 8,073 had ≥2 comorbid conditions, which represented a weighted sample of 101,773,511 (42.0% (95% CI: 41.0%, 43.1%).

Table 1. Characteristics of United States adults in the weighted study population (N=242,169,897)

Characteristic		<2 Comorbid Conditions N=140,396,386 % (95% Confidence Interval)	≥2 Comorbid Conditions N= 101,773,511 % (95% Confidence Interval)	p
Pain interference	Extreme	0.5 (0.3-0.7)	4.2 (3.6-4.7)	<0.0001
	Quite a bit	2.0 (1.7-2.4)	11.0 (10.2-11.8)	
	Moderate	3.3 (2.9-3.7)	12.7 (11.7-13.7)	
	Little	15.9 (15.0-16.8)	29.1 (27.9-30.3)	
	None	78.3 (77.3-79.3)	43.1 (41.7-44.4)	
Demographic variables:				
Age	≥65 years	6.7 (6.2-7.3)	41.0 (39.4-42.7)	<0.0001
	40-64 years	37.2 (35.9-38.4)	46.8 (45.3-48.2)	
	18-39 years	56.1 (54.8-57.4)	12.2 (11.2-13.2)	
Sex	Male	48.9 (48.0- 49.9)	47.4 (46.3-48.5)	0.0693
	Female	51.1 (50.1-52.0)	52.6 (51.5-53.7)	
White race	Yes	75.4 (73.5-77.2)	81.5 (79.9-83.0)	<0.0001
	No	24.6 (22.8-26.5)	18.5 (17.0-20.1)	
Hispanic	Yes	20.6 (18.5-22.7)	11.0 (9.6-12.4)	<0.0001
	No	79.4 (77.3-81.5)	89.0 (87.6-90.4)	
Economic variables:				
Education	≤High school	38.3 (36.6-40.1)	41.2 (39.5-42.9)	0.0010
	>High school	61.7 (59.9-63.4)	58.8 (57.1-60.5)	
Employment	Employed	79.5 (78.5-80.5)	52.3 (50.7-53.9)	<0.0001
	Unemployed	20.5 (19.5-21.5)	47.7 (46.1-49.3)	
Health provision	Private	73.2 (71.5-75.0)	62.8 (61.2-64.4)	<0.0001
	Public	16.2 (15.0-17.4)	33.9 (32.4-35.5)	
	None	10.6 (9.4-11.7)	3.3 (2.7-3.9)	
Marriage	Married	49.5 (48.1-51.0)	55.6 (54.1-57.1)	<0.0001
	Not married	50.5 (49.0-51.9)	44.4 (42.9-45.9)	
Income	Low	25.1 (23.6-26.5)	27.6 (26.1-29.1)	0.0013
	Mid-high	74.9 (73.5-76.4)	72.4 (70.9-73.9)	
Health variables:				
Good overall health	Yes	94.9 (94.4-95.5)	78.7 (77.5-79.8)	<0.0001
	No	5.1 (4.5-5.6)	21.3 (20.2-22.5)	
Good mental health	Yes	94.7 (94.2-95.3)	87.3 (86.4-88.2)	<0.0001
	No	5.3 (4.7-5.8)	12.7 (11.8-13.6)	
Regular physical activity	Yes	54.0 (52.5-55.5)	46.8 (45.4-48.3)	<0.0001
	No	46.0 (44.5-47.5)	53.2 (51.7-54.6)	
Current smoker	Yes	13.2 (12.2-14.1)	15.3 (14.1-16.4)	0.0018
	No	86.8 (85.9-87.8)	84.7 (83.6-85.9)	
Limitation variables:				
Activities of daily living limitation	Yes	0.7 (0.5-0.9)	3.4 (2.9-3.9)	<0.0001
	No	99.3 (99.1-99.5)	96.6 (96.1-97.1)	
Instrumental activities of daily living limitation	Yes	1.0 (0.8-1.3)	6.1 (5.5-6.8)	<0.0001
	No	99.0 (98.7-99.2)	93.9 (93.2-94.5)	
Functional limitation	Yes	3.2 (2.8-3.6)	25.5 (24.3-26.7)	<0.0001
	No	96.8 (96.4-97.2)	74.5 (73.3-75.7)	
Work limitation	Yes	2.6 (2.3-3.0)	18.3 (17.2-19.4)	<0.0001
	No	97.4 (97.0-97.7)	81.7 (80.6-82.8)	

Results continued

Table 2. Chronic conditions of United States adults in the study organized from most to least common condition

Chronic condition	Weighted percentage (95% confidence interval)
Hypertension	82.9 (81.7-84.2)
Hypercholesterolemia	29.4 (28.5-30.3)
Joint pain	28.9 (27.8-30.1)
Arthritis	23.9 (23.0-24.8)
Asthma	13.3 (12.8-13.9)
Cancer	11.1 (10.5-11.7)
Other heart disease	10.8 (10.2-11.3)
Diabetes	10.5 (10.0-11.1)
Coronary heart disease	4.5 (4.1-4.8)
Stroke	3.6 (3.3-3.9)
Myocardial infarction	3.5 (3.1-3.8)
Angina	1.9 (1.6-2.2)
Chronic bronchitis	1.6 (1.4-1.8)
Emphysema	1.6 (1.4-1.8)

Table 3. Associations between pain interference and multiple comorbid conditions among United States adults in the study in logistic regression analyses

Characteristic	Unadjusted Odds Ratio (95% Confidence Interval)	Adjusted Odds Ratio (95% Confidence Interval)
Extreme vs. no pain interference	15.0 (10.7-21.2)	2.8 (1.8-4.4)
Quite a bit vs. no pain interference	10.0 (8.2-12.2)	2.5 (2.0-3.2)
Moderate vs. no pain interference	7.0 (6.0-8.3)	2.8 (2.3-3.4)
Little vs. no pain interference	3.3 (3.0-3.6)	2.2 (2.0-2.4)
Demographic variables:		
Age, ≥65 vs. 18-39 years		17.5 (14.9-20.4)
Age, 40-64 vs. 18-39 years		5.0 (4.4-5.6)
Sex, male vs. female		1.1 (1.0-1.2)
White race, yes vs. no		1.3 (1.1-1.5)
Hispanic, yes vs. no		0.7 (0.6-0.8)
Economic variables:		
Education, ≤high school vs. >high school		1.0 (0.9-1.1)
Employment, employed vs. unemployed		0.9 (0.8-1.0)
Health provision, private vs. none		1.8 (1.4-2.2)
Health provision, public vs. none		2.0 (1.6-2.4)
Marriage, married vs. not married		0.9 (0.8-1.0)
Income, low vs. mid-high		0.9 (0.8-1.0)
Health variables:		
Good overall health, yes vs. no		0.4 (0.3-0.4)
Good mental health, yes vs. no		0.9 (0.7-1.1)
Regular physical activity, yes vs. no		0.9 (0.9-1.0)
Current smoker, yes vs. no		1.1 (0.9-1.3)
Limitation variables:		
Activities of daily living limitation, yes vs. no		0.5 (0.3-0.8)
Instrumental activities of daily living limitation, yes vs. no		1.2 (0.8-1.7)
Functional limitation, yes vs. no		2.1 (1.8-2.6)
Work limitation, yes vs. no		1.8 (1.5-2.2)

Conclusion

- Greater levels of pain burden were associated with greater odds of multimorbidity among US adults.
- Several other factors are also associated with multimorbidity among US adults, which may warrant further investigation.