EXPLORING THE ASSOCIATION BETWEEN DISEASES OF DESPAIR AND INDUSTRY AND OCCUPATIONAL SETTING AMONG US WORKERS: A CROSS-SECTIONAL STUDY USING THE MEDICAL EXPENDITURE PANEL SURVEY, 2016-2020

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BACKGROUND and STUDY AIMS

- "**Diseases of despair**", or diagnoses related to **suicidal ideation/behavior, or alcohol/drug use**, have been rising rapidly the past two decades.[1, 2]
- Case and Deaton found **deaths of despair** (deaths attributed to suicide, alcohol/drug poisoning, or chronic liver disease) to be **more common among individuals without a Bachelor's Degree** with rates of deaths of despair rapidly rising from 2013-2019 among those without a bachelor's degree.[2]
- Between 1997 and 2015, adults employed in a service, manual labor, or transport occupation exhibited 2-3 times the mortality risk from accidental poisoning, compared to adults employed in managerial/administrative occupations.[3]
- Few studies have evaluated the trend in deaths/diseases of despair by employment setting, and no analysis has extended past 2015.[3,4]
- Thus, to provide a more updated analysis, **this study aimed to evaluate the relationship between industry and occupational settings and the prevalence of diseases of despair utilizing the Medical Expenditure Panel Survey (MEPS) data from 2016-2020.**

METHODS

Data Source

- This **Cross Sectional Study** used the **Medical Expenditure Panel Survey (MEPS)**, a collection of nationally representative surveys that gather information on socio-demographics, healthcare cost and utilization, and details of insurance coverage among the noninstitutionalized US population.[5]
- Two different household component data files between 2016-2020 were used:
  1. full-year consolidated data files to describe socio-demographics, employment status, industry and occupational categories, patient-reported health status and pain interference with normal work
  2. medical conditions files to describe diseases of despair diagnosis.
- These files were then linked by unique survey identifiers at the person-level, and person-specific weights were used to obtain national estimates. Weights were divided by 5 to maintain annual averages.

Study Participants

- MEPS survey participants were included if they were **16-64 years old and reported current employment** with a valid industry code in at least one of the three annual interview rounds.
  - Participants were excluded if missing values were recorded for any sociodemographic variables (education, household poverty level, race/ethnicity, sex, age, marital status).

Industry and Occupational Categorization

- The MEPS industry categorization strategy was adapted from the North American Industry Classification System, and the MEPS occupational categorization strategy was adapted from the Standard Occupation Code scheme.[6]
- To keep categories mutually exclusive, the most recent classifiable industry code recorded in the survey year was used and subjects were placed in an unclassifiable category if the industry code was missing or unclassifiable for all rounds of the survey.

Industry and Occupational Categorization (continued)

- Based on the Bureau of Labor Statistics[7], MEPS occupational categories were consolidated into the following groups:
  - **"White-collar"** (management, business, and financial operations, professional and related occupations, sales and related occupations, and office and administrative support occupations)
  - **"Blue-collar"** (farming, fishing, forestry, construction, extraction, maintenance, production, and transportation)
  - **Service**
  - **Unclassifiable** (individuals who only reported missing or "unclassifiable" industry codes for every survey round)

Outcome Measure

- **Diseases of despair** were defined using previously reported ICD-10-CM codes and CCSR categories and a subject was considered to have a disease of despair if any CCSR code was reported in at least 1 of the interview rounds of the MEPS-HC in any survey year.[1]

Table 1. ICD-10-CM and CCSR categories for disease of despair definitions

Disease of Despair	ICD-10-CM Codes / CCSR Categories [a]
Alcohol-related disorders	**ICD-10-CM codes:** K70, K73, K74, Y15, X45, F10 **CCSR categories:** MBD017
Substance-related disorders	**ICD-10-CM codes:** X40-X44, Y10-Y14, Y45-Y49, F11-F16, F19 **CCSR categories:** MBD001, MBD018, MBD019, MBD020, MBD021, MBD022, MBD023, MBD025, **MBD000**[b]
Suicide/ intentional self-inflicted injury	**ICD-10-CM codes:** X60-X84, U03, Y87 **CCSR categories**: MBD012, MBD027, MBD034, INJ075, EXT021

CCSR = Clinical Classifications Software Refined; CM = Clinical Modification; ICD = International Classification of Diseases;

[a]For confidentiality purposes, ICD-10-CM codes are recoded as missing and CCSR categories are collapsed into a broader body system code (ex. MPD000 for mental, behavioral and neurodevelopmental disorders) when a condition occurs in less than 20 survey respondents per file.[8]

[b]After conducting a frequency analysis of all MBDxxx codes present in the sample, it was determined that the MBD000 category primarily included conditions that would be classified as diseases of despair, with only a few CCSR categories unrelated to diseases of despair (i.e. MBD010 [Feeding and eating disorders] and MBD011 [Somatic disorders]).

Covariates

- Covariates included: i) age, ii) sex, iii) race/ethnicity, iv) education, v) marital status, vi) household poverty level, vii) region of residence, viii) survey year, ix) insurance coverage status, x) comorbidities, xi) smoking status, xii) self-reported physical health status, and xiii) self-reported level of pain interference

Analysis

- A descriptive analysis was conducted to compare the sociodemographic, medical, and employment characteristics among study subjects with or without a reported disease of despair.
  - To detect significant differences, t-tests and chi-square tests were conducted where appropriate.
- **Multiple variable logistic regression** models were estimated to examine the association between occupational/industry categories and having a disease of despair diagnosis, controlling for demographic and socioeconomic factors, region of residence, survey year, insurance coverage, smoking status, comorbidities, self-reported physical health status and level of pain interference.
- The models were assessed for multicollinearity through correlation matrices and variance inflation factors.

RESULTS

- Among the weighted sample, 1,661,635 (1.05%) were estimated to have ≥1 disease of despair.

Table 2. Descriptive statistics for occupational and industry categories, grouped by presence or absence of ≥ 1 disease of despair diagnosis

MEPS participants aged 16-64 reporting current employment, 2016-2020	No Disease of Despair	Disease of Despair	P-Value
Sample size (unweighted), n (%)	64,951 (98.97)	666 (1.03)	
Population size (weighted), n (%)	158,033,136 (98.95)	1,661,635 (1.05)	
Sociodemographic Variables			
Mean age in years (SE)	40.37 (0.10)	40.39 (0.84)	0.979
Female Sex, n (%)	76,372,530 (48.33)	781,439 (47.03)	0.688
Race/Ethnicity, n (%)			<0.001
Hispanic	28,465,052 (18.01)	213,045 (12.82)	
Non-Hispanic White	95,603,861 (60.50)	1,225,552 (73.76)	
Non-Hispanic Black	19,210,396 (12.16)	120,419 (7.25)	
Non-Hispanic Asian	10,038,014 (6.35)	21,626 (1.30)	
Non-Hispanic Other/Multiple Races	4,715,813 (2.98)	80,992 (4.87)	
Educational Attainment, n (%)			0.003
No Degree	15,233,525 (9.64)	160,273 (9.65)	
GED	4,981,514 (3.15)	127,552 (7.68)	
High School Diploma	63,483,802 (40.17)	681,748 (41.03)	
Bachelor's Degree	36,945,593 (23.38)	364,554 (21.94)	
Master's Degree	16,551,434 (10.47)	148,509 (8.94)	
Doctorate Degree	4,174,436 (2.64)	14,845 (0.89)	
Other Degree	16,662,833 (10.54)	164,153 (9.88)	
Occupational Categories, n (%)			<0.001
White-Collar	97,524,796 (61.71)	868,185 (52.25)	
Blue-Collar	30,970,062 (19.60)	370,008 (22.27)	
Service	26,931,915 (17.04)	409,477 (24.64)	
Unclassifiable	2,606,364 (1.65)	13,965 (0.84)	
Industry Categories, n (%)			<0.001
Natural Resources/Mining	2,713,827 (1.72)	34,532 (2.08)	
Construction	10,140,179 (6.42)	168,369 (10.13)	
Manufacturing	15,553,977 (9.84)	66,078 (3.98)	
Wholesale and Retail Trade	19,378,794 (12.26)	204,462 (12.30)	
Transportation and Utilities	8,187,235 (5.18)	88,118 (5.30)	
Financial Activities/Information	13,355,333 (8.45)	149,837 (9.02)	
Professional and Business Services	20,010,222 (12.66)	184,164 (11.08)	
Education, Health, and Social Services	37,246,808 (23.57)	376,752 (22.67)	
Leisure and Hospitality	14,425,530 (9.13)	248,439 (14.95)	
Other Services	7,515,297 (4.76)	65,041 (3.91)	
Public Administration/Military	8,750,421 (5.54)	68,032 (4.09)	
Unclassifiable	755,512 (0.48)	7,810 (0.47)	

MEPS = Medical Expenditure Panel Survey

Table 3. Multi-Variable logistic regression results of MEPS participants (2016-2020) aged 16-64 reporting current employment, by occupational and industry category

MEPS participants aged 16-64 reporting current employment, 2016-2020						
Occupational Categories (Ref: White-Collar)[a]	Unadjusted OR	95% CI	P Value	Adjusted OR	95% CI	P Value
Blue-Collar	1.342	0.998, 1.804	0.051	1.114	0.794, 1.564	0.532
Service	1.708	1.293, 2.257	<0.001	1.287	0.912, 1.816	0.151
Unclassifiable	0.602	0.269, 1.348	0.216	0.628	0.273, 1.444	0.273
Industry Categories (Ref: Professional & Business Services)	Unadjusted OR	95% CI	P Value	Adjusted OR	95% CI	P Value
Natural Resources/Mining	1.383	0.592, 3.229	0.453	1.473	0.655, 3.311	0.348
Construction	1.804	1.047, 3.109	0.034	1.607	0.905, 2.851	0.105
Manufacturing	0.462	0.253, 0.844	0.012	0.466	0.251, 0.864	0.016
Wholesale and Retail Trade	1.146	0.718, 1.830	0.566	0.932	0.570, 1.526	0.780
Transportation and Utilities	1.169	0.642, 2.129	0.608	1.212	0.655, 2.245	0.540
Financial Activities/Information	1.219	0.714, 2.081	0.467	1.410	0.809, 2.458	0.225
Education, Health, and Social	1.099	0.726, 1.663	0.654	1.226	0.805, 1.868	0.342
Leisure and Hospitality	1.871	1.201, 2.916	0.006	1.521	0.947, 2.444	0.083
Other Services	0.940	0.524, 1.689	0.837	0.798	0.432, 1.477	0.472
Public Administration/Military	0.845	0.543, 1.489	0.681	1.047	0.557, 1.968	0.886
Unclassifiable	1.123	0.364, 3.464	0.839	1.456	0.451, 4.697	0.529

CI = Confidence Interval; MEPS = Medical Expenditure Panel Survey; OR = Odds Ratio; Ref = Reference Group

CONCLUSION

- ✓ **Unadjusted analyses suggest that those working in the Service sector may be more likely to suffer from a Diseases of Despair than White Collar workers, but this association was not significant after multivariable adjustment.**
- ✓ **Contrary to prior research, those employed in the manufacturing setting were less likely to have a disease of despair compared to those in the professional/business services industry employees (OR:0.466, P=0.016).**
- ✓ **No other industry or occupational contrasts were significantly associated with diseases of despair after multivariable adjustment**

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