Higher Anhedonia Is Associated With Poorer Clinical and Humanistic Outcomes Among US Adults With Major Depressive Disorder

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Background

- Anhedonia is a key symptom and part of the diagnostic criteria for major depressive disorder (MDD)[1]
- Anhedonia has been associated with longer times to remission and fewer depression-free days[2]
- The relationship between anhedonia and health-related outcomes was previously assessed utilizing the Snaith-Hamilton Pleasure Scale (SHAPS),[3] which measures one aspect of anhedonia, namely consummatory pleasure[4]
- The Dimensional Anhedonia Rating Scale (DARS),[5] which measures multiple dimensions of anhedonia, including interest/desire, motivation, effort, and consummatory pleasure, represents a more comprehensive measure of anhedonia and provides an opportunity to expand on this prior work

Objective

- To quantify the clinical, humanistic, and economic burden associated with a comprehensive measure of anhedonia among adults with MDD

Methods

Data sources and sample

- Adults diagnosed with depression were identified from the 2022 US National Health and Wellness Survey (NHWS)[6]
  - The NHWS is a nationally representative, self-reported, cross-sectional, online survey of the general adult population in the United States, completed by approximately 75,000 respondents annually
  - A quota sampling procedure was used, with strata by sex, age, and race, to ensure that the demographic composition of the NHWS sample was representative of the adult population in the United States.
- Participants with depression meeting inclusion criteria were recontacted to participate in an online cross-sectional survey which included anhedonia specific measures such as DARS
- Inclusion/exclusion criteria:
  - Self-reported a physician diagnosis of depression or current prescription use for treatment of depression
  - Self-reported experiencing depression in past 12 months
  - Participants were excluded if they self-reported experiencing, or having a physician diagnosis of, bipolar disorder or schizophrenia

Measures

- Anhedonia: DARS scale; higher total DARS scores (range: 0 to 68) indicate greater motivation, effort, and pleasure (i.e., less anhedonia)[5]
- Measured outcomes included:
  - Depression: 9-item Patient Health Questionnaire (PHQ-9), range: 0-27; higher scores indicate greater depression severity[7]
  - Anxiety: 7-item Generalized Anxiety Disorder Assessment [GAD-7], range: 0-21; higher scores indicate greater anxiety severity[8]
  - Health-related quality of life (HRQoL):
    - RAND-36 Mental Health Composite (MHC) and Physical Health Composite (PHC) scores, range: 0-100, 50 = population mean, 10 = population standard deviation (SD); higher scores indicate better HRQoL[9]
    - Health state utility: EQ-5D index scores, range: 0-1; 0 indicates a health state equivalent to death and 1 indicates a health state equivalent to perfect health[10]
  - Work productivity and activity impairment (WPAI), reported as percentages; higher scores are indicative of greater impairment[11]
  - Healthcare resource use: number of healthcare provider (HCP) visits in past 6 months
  - Annualized direct medical costs: calculated from healthcare resource use and Medical Expenditure Panel data[12]

Statistical analysis

- Generalized linear models (GLMs), with appropriate distribution and link functions, were used to assess outcomes as a function of level of anhedonia, while controlling for the following covariates: age, sex, race, Charlson Comorbidity Index (CCI),[13] and insurance status
  - Identity link was used for clinical and HRQoL outcomes, negative binomial distribution was used for work productivity and activity impairment (WPAI) outcomes, and log links were used for economic outcomes
  - As appropriate, parameter estimates or adjusted rate ratios with 95% confidence intervals were reported; *P* values <0.05, two-tailed were considered statistically significant
  - Adjusted means for outcome measures across the range of DARS scores were predicted and plotted based on corresponding multivariable GLM outputs

Results

- Sample characteristics are shown in **Table 1**
  - A total of 665 of the 8,270 NHWS respondents with depression who met inclusion criteria completed the recontact survey (mean age = 58.4 years, 78.3% female)
  - The average DARS score was 52.6 (range: 2 to 68, median: 55, mode: 68)

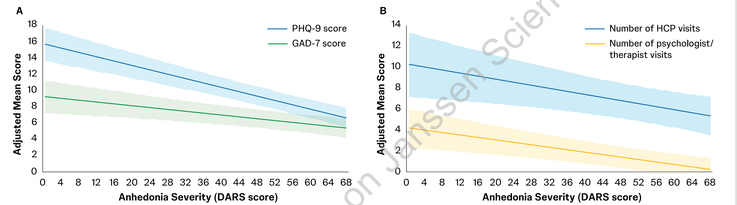
TABLE 1. Sociodemographic and health characteristics, N = 655

Characteristic	Mean ± SD or %
Age, years, mean ± SD	58.4 ± 13.4
Female, %	78.3%
Race, %	
White	86.2%
Black/African-American	7.5%
Asian	1.7%
Some other race / multi-race	4.7%
Hispanic, %	5.3%
Married/living with partner, %	45.7%
Employment, %	
Employed*	34.9%
Retired	37.3%
Short-/long-term disability	11.0%
Homemaker	5.9%
Student	2.1%
Not employed	8.9%
≥College/university degree, %	37.5%
Insurance type	
Commercially insured	33.8%
Medicaid	15.9%
Medicare	40.9%
Other type of insurance	3.9%
Smoking status	
Current smoker	20.6%
Former smoker	32.3%
Never smoker	47.1%
CCI score, mean ± SD	1.20 ± 1.97
BMI, mean ± SD	31.4 ± 8.1
Days exercising,† mean ± SD	5.6 ± 8.3
PHQ-9 score, mean ± SD	10.0 ± 6.6
GAD-7 score, mean ± SD	7.6 ± 5.9
DARS total score, mean ± SD	52.6 ± 13.5

*Employed full-time, part-time, or self-employed.
†Number of days in the past month of ≥20 minutes of vigorous exercise vigorously for the purpose of improving or maintaining your health, with the purpose of losing weight, or for enjoyment.
BMI, body mass index; CCI, Charlson comorbidity index; DARS, Dimensional Anhedonia Rating Scale; PHQ-9, 9-item Patient Health Questionnaire; SD, standard deviation.

- Clinical burden of anhedonia on MDD is shown in **Figure 1**
  - A. Higher severity of anhedonia (i.e., lower DARS scores) was associated with greater depression severity (β = –.132, *P* < 0.001) and greater anxiety severity (β = –.056, *P* < 0.001)
  - B. Higher severity of anhedonia (i.e., lower DARS scores) was also associated with more healthcare provider visits (Rate Ratio [RR] = .992, *P* = 0.002) and more psychologist visits (RR = .968, *P* = 0.015) in the past 6 months

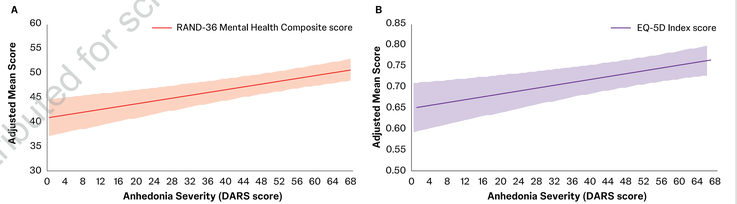
FIGURE 1. Adjusted clinical outcomes by anhedonia severity



Lower DARS scores indicate greater anhedonia; shading represents 95% confidence intervals.
Reference groups—age: 58.35, gender: male, race: White, insurance: commercial, Charlson comorbidity index (CCI): 1.20.
DARS, Dimensional Anhedonia Rating Scale; GAD-7, 7 item General Anxiety Disorder scale; HCP, healthcare provider; PHQ-9, 9-item Patient Health Questionnaire.

- Burden of anhedonia in MDD on HRQoL is shown in **Figure 2**
  - Higher severity of anhedonia (i.e., lower DARS scores) was associated with worse HRQoL, including:
    - A. poorer mental function (β = .144, *P* < 0.001)
    - B. lower EQ-5D index scores (β = .002, *P* < 0.001)

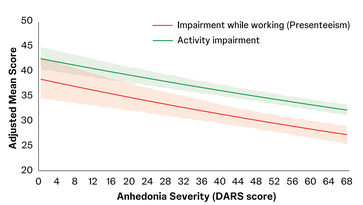
FIGURE 2. Adjusted humanistic outcomes by anhedonia severity: HRQoL



Lower DARS scores indicate greater anhedonia; shading represents 95% confidence intervals.
Reference groups—age: 58.35, gender: male, race: White, insurance: commercial, Charlson comorbidity index (CCI): 1.20.
DARS, Dimensional Rating Scale; HRQoL, health-related quality of life.

- Burden of anhedonia in MDD on work productivity and activity impairment is shown in **Figure 3**
  - Higher severity of anhedonia (i.e., lower DARS scores) was associated with greater impairment while working (RR = .995, *P* < 0.001) and greater activity impairment (RR = .996, *P* < 0.001)

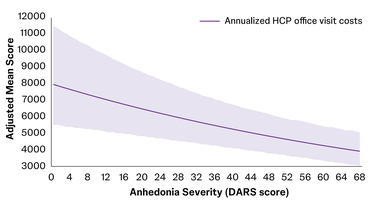
FIGURE 3. Adjusted work productivity outcomes by anhedonia severity: WPAI



Lower DARS scores indicate greater anhedonia; shading represents 95% confidence intervals.
Reference groups—age: 58.35, gender: male, race: White, insurance: commercial, Charlson comorbidity index (CCI): 1.20.
DARS, Dimensional Anhedonia Scale; WPAI, work productivity and activity impairment.

- Economic burden of anhedonia in MDD is shown in **Figure 4**
  - Higher severity of anhedonia (i.e., lower DARS scores) was associated with higher office visit costs (RR = .990, *P* < 0.001)

FIGURE 4. Adjusted economic outcomes by anhedonia severity: direct medical costs



Lower DARS scores indicate greater anhedonia; shading represents 95% confidence intervals.
Reference groups—age: 58.35, gender: male, race: White, insurance: commercial, Charlson comorbidity index (CCI): 1.20.
DARS, Dimensional Anhedonia Rating Scale; HCP, healthcare provider.

Limitations

- Data were self-reported and may be subject to methodological limitations, such as recall bias
- Adults with more severe depression and/or severe anhedonia may have been less likely to complete the recontact survey, resulting in a potential for sampling bias
- As this was a cross-sectional study design, no causal relation between anhedonia severity in MDD and outcomes can be made

Conclusions

- This study provides novel insight into the burden associated with anhedonia severity among adults with depression in the US, utilizing a comprehensive, multidimensional measure of anhedonia
- In adults with depression, higher levels of anhedonia were associated with greater clinical, humanistic, and economic burden
- These results highlight the need for efficacious treatments to help MDD patients with prominent anhedonia attain improved clinical, humanistic, work productivity, and economic outcomes

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