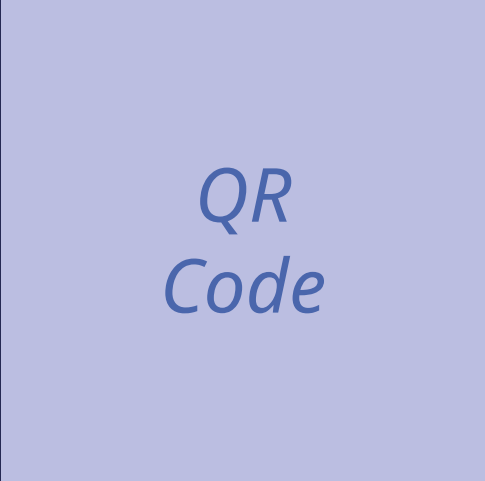


What are macro-level social determinants associated with mental health outcomes in Disability-Adjusted Life Year (DALY) for the population living in the Organisations for Economic Co-operation and Development (OECD) nations?



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Aim

- This study aimed to identify macro-level social determinants associated with mental health outcomes in the OECD nations with consistent and validated methods.
- The results would inform policymakers about the insights on the leverage points to closing the health disparities.

Introduction

Globally, mental disorders are the leading cause of infirmity that can cause severe health burdens¹.

DALY rates caused by mental disorders were 1.3 times higher in high-income countries (HICs) than in low- or middle-income countries.

OECD member states varied across North and South America, Europe and Asia-Pacific regions, and thus, they likely represented HICs around the globe.

Existing studies implied that the following social factors were associated with mental disorders in HICs: national social protection expenditures; unemployment status, poverty; income level; and gender disparities². However, none explored the association at the national level, and those studies tended to investigate specific mental disorders selectively.

What social determinants affect mental disorders in the HICs was still unclear at the national level, and the generalizability to broader mental health conditions is still questionable. Reflecting upon these, this study aimed to identify macro-level social determinants associated with mental health outcomes in the OECD nations with consistent methods.

Methods

An ecological study allows for exploring overall frequencies of health conditions in a sequence of populations, which can address the research question.

To ensure the rigour and quality of this study, the strengthening of the reporting of observational studies in epidemiology (STROBE) checklist was used to structure the study design³.

- The study used two public data sources: Institute for Health Metrics and Evaluation's (IHME) Global Health Data Exchange (GHDx) for the dependent variable and OECD statistical data for independent variables.
- The sample size is 38 countries and from the Year 2019.
- Dependent variable⁴:
 - A dependent variable was DALY rates per 100,000 population attributed to a code “B.6 Mental Disorders”, which consisted of all mental disorders in the International Classification of Diseases (ICD) version 10, were collected for each country.
 - Hence it was not limited to specific mental disorders. The extracted data were standardised for age.
- Independent variables (social determinants)⁵
 - Gini coefficients (range: 0 to 1): a nation's income distribution. A Gini coefficient of 1 implies that a single person in the nation receives all the income.
 - Social Institutions and Gender Index (SIGI): national-level gender inequalities. Higher SIGI scores indicate greater gender inequality.
 - Unemployment rates and working hours needed to exit poverty are socioeconomic indicators, a proportion of the unemployed population, and the easiness of escaping poverty, respectively.
 - Social protection expenditures (SOCX): a statistic on national social protection expenditures on various social policies. A higher SOCX score implies greater spending on social protection.
- Statistical methods:
 - Descriptive statistics were examined to confirm missing values and three assumptions (i.e., linear relationship, normally distributed and consistency of the standard deviation).
 - Simple linear regression (SLR) models were performed with the two-tailed significance test at the 5% level.
 - 2x2 Pearson’s correlation matrix was calculated to estimate the pairwise associations between the dependent and independent variables

- Results**
- Descriptive statistics shown in table 1:
 - All OECD nations were eligible as they have sufficient data, and social determinants were diversified among the OECD members.
 - SLR results shown in table 2:
 - Model 1: greater income inequalities were correlated with higher mental health burdens.
 - Model 2: unemployment has no association with mental disorders despite a large coefficient.
 - Model 3: larger gender disparities were correlated with higher mental health burdens.
 - Model 4: difficulties in exiting poverty were associated with higher mental health burdens.
 - Model 5: higher social protection expenditure was associated with lower mental health burdens.

Table 1: Characteristics of Participants and Descriptive Statistics for Associated Independent Variables

Country	DALYs	GINI	Unemployment Rate	SIGI	hours needed to escape poverty	SOCX17
Australia	458.81	0.33	5.3%	32.2%	9.33	22.5%
Austria	411.52	0.28	4.6%	23.4%	23.88	24.3%
Belgium	414.52	0.26	5.4%	22.4%	25.33	26.6%
Canada	624.11	0.30	5.8%	36.6%	29.00	28.1%
Chile	675.88	0.30	7.4%	72.2%	29.00	14.0%
Colombia	1351.28	0.30	10.8%	30.0%	29.00	14.0%
Costa Rica	868.75	0.48	12.0%	55.8%	29.00	14.0%
Czech Republic	868.75	0.25	2.1%	39.6%	38.58	17.9%
Denmark	458.85	0.26	5.1%	20.8%	0.00	26.2%
Estonia	316.93	0.31	4.6%	28.2%	17.17	14.5%
Finland	266.52	0.27	6.8%	30.6%	0.13	24.5%
France	418.53	0.30	8.5%	22.2%	12.83	31.2%
Germany	442.41	0.29	3.2%	30.0%	2.67	26.2%
Greece	476.16	0.31	17.5%	54.2%	15.08	21.1%
Hungary	525.61	0.28	3.5%	51.4%	30.83	17.4%
Iceland	323.38	0.28	4.0%	51.4%	16.75	19.0%
Ireland	360.09	0.29	4.6%	34.2%	0.00	14.7%
Israel	389.59	0.35	3.9%	34.2%	27.58	17.3%
Italy	412.81	0.33	10.2%	27.0%	20.50	24.7%
Japan	238.98	0.33	2.5%	48.0%	0.00	23.8%
Korea	238.98	0.35	3.8%	46.8%	4.25	12.6%
Latvia	471.39	0.35	6.5%	35.6%	19.67	13.7%
Lithuania	369.44	0.36	6.5%	31.2%	11.92	14.4%
Luxembourg	346.57	0.32	5.6%	31.2%	4.42	17.4%
Mexico	1368.01	0.42	3.7%	58.0%	26.17	7.6%
Netherlands	477.48	0.30	3.4%	32.2%	10.83	24.7%
New Zealand	506.36	0.30	4.3%	33.4%	10.67	16.9%
Norway	317.30	0.26	3.8%	29.0%	32.00	24.6%
Poland	437.17	0.28	3.3%	34.8%	11.50	17.2%
Portugal	373.79	0.32	6.7%	22.4%	35.33	22.3%
Slovak Republic	373.79	0.24	5.8%	33.0%	39.00	17.1%
Slovenia	365.64	0.25	4.5%	25.8%	21.67	19.8%
Spain	380.32	0.33	14.2%	28.6%	32.83	22.5%
Sweden	311.05	0.28	6.9%	21.0%	27.25	24.4%
Switzerland	473.07	0.31	4.5%	16.2%	26.13	24.9%
Turkey	1624.01	0.40	14.0%	50.2%	21.00	11.9%
United Kingdom	523.41	0.37	4.0%	35.0%	1.42	28.3%
United States	768.91	0.39	3.7%	35.8%	47.08	29.8%
OECD average	526.95	0.31	6.1%	35.4%	19.38	19.9%
OECD median	427.85	0.30	4.9%	32.6%	20.75	20.4%

Table 2: Simple Linear Regression Models for Predicting DALYs Caused by Mental Disorder and their Standardised Coefficients with t-statistics

Model	Unstandardised Coefficients	Pearson's r^2	R Square	Sig.	95.0% Confidence Interval for B	
					Lower	Upper
1 (Constant)	4.92			0.00	4.06	5.77
	GINI	0.45**	0.20	0.01	1.26	6.64
2 (Constant)	5.92			0.00	5.63	6.21
	Unemployment	0.29	0.09	0.08	-0.40	7.86
3 (Constant)	5.67			0.00	5.24	6.10
	SIGI	0.37*	0.14	0.02	0.22	2.51
4 (Constant)	5.87			0.00	5.61	6.12
	Hours needed to escape poverty	0.01	0.41*	0.01	0.00	0.03
5 (Constant)	6.74		0.17	0.00	6.20	7.29
	SOCX17	-2.96	-0.35*	0.13	-5.59	-0.32

Note. a. Dependent Variable: log2_DALYs

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

Main interpretations of the study results:

- Greater social disparities in income or gender were associated with worsened mental health outcomes.
- More difficulty exiting poverty might lead to deteriorating mental health outcomes.
- The nation's larger social spending was more likely to have improved mental health outcomes.
- Yet the findings suggested no association between the unemployment rates and mental health outcomes.

Note that these findings apply to national-level inferences and mental disorders in general. Hence the associations found in this study could not be implied to individual patients or specific mental disorders.

- What this study adds:
 - In contrast to previous studies⁶ that focused on specific mental disorders, the findings of this study offer more generalisable implications to a broad range of mental health conditions, further increasing their relevance for policymakers and public health professionals in OECD member states.
 - This study's use of validated national-level secondary data for both dependent and independent variables provides a more robust and appropriate approach to investigating the relationships between macro-level social determinants and mental health outcomes at the population level.

Limitations

- The study findings would not indicate the causality or direction of effect due to the observational nature of the analysis. The social disparities might worsen the health outcome; however, mental disorders also could make people absent from work or have poor cognitive performance and, as a consequence, lead to more inferior socioeconomic status.
- Estimated determinant coefficients (r^2) implied a poor explanatory power of the regression models. Therefore, other uncontrolled variables might largely remain unexplored.

Conclusion

- A higher mental disorders burden was associated with greater income and gender disparities in society.
- Countries having difficulties in exiting poverty were found to have poorer mental health outcomes.
- A lower burden of mental disorders was observed with larger investments in social protection.
- The study did not find any association between unemployment rates and mental health conditions.
- Although the models lacked explanatory power, the study highlights the potential role of certain macro-level social determinants in shaping mental health outcomes.

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