Early-Life Mental Disorders and Adult Household Income in the World Mental Health Surveys

Norito Kawakami, Emad Abdulrazaq Abdulghani, Jordi Alonso, Evelyn J. Bromet, Ronny Bruffaerts, José Miguel Caldas-de-Almeida, Wai Tat Chiu, Giovanni de Girolamo, Ron de Graaf, John Fayyad, Finola Ferry, Silvia Florescu, Oye Gureje, Chiyi Hu, Matthew D. Lakoma, William LeBlanc, Sing Lee, Daphna Levinson, Savita Malhotra, Herbert Matschinger, Maria Elena Medina-Mora, Yosikazu Nakamura, Mark A. Oakley Browne, Michail Okoliyski, Jose Posada-Villa, Nancy A. Sampson, Maria Carmen Viana, and Ronald C. Kessler

Background: Better information on the human capital costs of early-onset mental disorders could increase sensitivity of policy makers to the value of expanding initiatives for early detection and treatment. Data are presented on one important aspect of these costs: the associations of early-onset mental disorders with adult household income.

Methods: Data come from the World Health Organization (WHO) World Mental Health Surveys in 11 high-income, five upper-middle income, and six low/lower-middle income countries. Information about 15 lifetime DSM-IV mental disorders as of age of completing education, retrospectively assessed with the WHO Composite International Diagnostic Interview, was used to predict current household income among respondents aged 18 to 64 ($n = 37{,}741$) controlling for level of education. Gross associations were decomposed to evaluate mediating effects through major components of household income.

Results: Early-onset mental disorders are associated with significantly reduced household income in high and upper-middle income countries but not low/lower-middle income countries, with associations consistently stronger among women than men. Total associations are largely due to low personal earnings (increased unemployment, decreased earnings among the employed) and spouse earnings (decreased probabilities of marriage and, if married, spouse employment and low earnings of employed spouses). Individual-level effect sizes are equivalent to 16% to 33% of median within-country household income, and population-level effect sizes are in the range 1.0% to 1.4% of gross household income.

Conclusions: Early mental disorders are associated with substantial decrements in income net of education at both individual and societal levels. Policy makers should take these associations into consideration in making health care research and treatment resource allocation decisions.

Key Words: Cross-national, early-onset, income, epidemiology, mental disorders, WHO World Mental Health (WMH)

Mental disorders are highly prevalent (1) and associated with substantial impairment (2,3). One of the most striking aspects of this impairment is that personal earnings and household income are substantially lower among people with mental disorders than others (4–9). These decrements would be important if low-income earnings were consequences rather than correlates (6,7), but evidence is far from definitive on this point because of possible reciprocal causation (10). Causal effects of low income on mental disorders have been documented in quasi-experimental studies of job loss (11) and time series studies of associations between unemployment rates and suicide rates (12). Studies of mental disorders predicting income earnings have not controlled for these reciprocal effects.

From the Department of Mental Health (NK), School of Public Health, the University of Tokyo, Tokyo, Japan; National Adviser for Mental Health (EAA), Ministry of Health, Baghdad, Iraq; IMIM—Hospital del Mar Research Institute, Parc de Salut Mar (JA); Department of Experimental and Life Sciences (JA), Pompeu Fabra University (UPF); Consorcio de Investigación Biomédica de Epidemiología y Salud Pública (CIBERESP), Barcelona, Spain; State University of New York at Stony Brook Department of Psychiatry (EJB), Stony Brook, New York; Universitair Psychiatrisch Centrum Katholieke Universiteit Leuven (RB), Leuven, Belgium; Chronic Diseases Research Center and Department of Mental Health (JMCdA), Faculdade de Ciências Médicas, Universidade Nova de Lisboa, Lisbon, Portugal; Department of Health Care Policy (WTC, WL, NAC, RCK), Harvard Medical School, Boston, Massachusetts; Instituto di Ricovero e Cura a Carattere Scientifico Centro S. Giovanni di Dio Fatebenefratelli (GdG), Brescia, Italy; Netherlands Institute of Mental Health and Addiction (RdG), Utrecht, The Netherlands; Institute for Development (JF), Research, Advocacy, and Applied Care, Beirut, Lebanon; School of Psychology (FF), University of Ulster, Derry, Northern Ireland; Health Services Research and Evaluation Center (SF), National School of Public Health Management and Professional Development, Bucharest, Romania; World Health Organization Collaborating Centre for Research and Training in Mental Health (OG), Neurosciences, Drug and Alcohol Abuse, Department of Psychiatry, University of Ibadan, Ibadan, Nigeria; Shenzhen Institute of Mental Health (CH), Shenzen, China; Harvard Pilgrim Health Care (MDL), Boston, Massachusetts; Department of Psychiatry (SL), The Chinese University of Hong Kong, Hong Kong, China; Research and Planning (DL), Mental Health Services Ministry of Health, Jerusalem, Israel; Department of Psychiatry (SM), Postgraduate Institute of Medical Education and Research, Sector-12, Chandigarh, India; Institute of Social Medicine, Occupational Health and Public Health (HM), Public Health Research Unit, University of Leipzig, Leipzig, Germany; Epidemiology and Psychosocial Research (MEM-M), National Institute of Psychiatry Ramon de la Fuente Muñiz, Mexico City, Mexico; Department of Public Health (YN), Jichi Medical University, Shimotsuke-shi, Japan; Discipline of Psychiatry (MAOB), School of Medicine, University of Tasmania, Hobart, Australia; Department of Global Mental Health (MO), National Centre of Public Health Protection, Sofia, Bulgaria; Instituto Colombiano del Sistema Nervioso (JP-V), Bogotá, Colombia; and Department of Social Medicine (MCV), Federal University of Espírito Santo (UFES), Vitória, Brazil.

Address correspondence to Ronald C. Kessler, Ph.D., Department of Health Care Policy, Harvard Medical School, 180 Longwood Avenue, Boston MA 02115; E-mail: kessler@hcp.med.harvard.edu.

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Large-scale long-term evaluations of the effects of mental disorder treatment interventions on income earnings would provide definitive evidence, but no such experiments exist. Suggestive evidence exists in longitudinal surveys that document associations of childhood mental disorders with subsequent educational attainment (13). Controlled treatment effectiveness trials also document significant effects of mental disorder treatment on short-term decreases in work disability and unemployment (14,15). However, such studies are incapable of estimating the more policy-relevant, long-term effects of mental disorders on income earnings (16).

One way to sort out the temporal order between mental disorders and income earnings would be to take advantage of the fact most common mental disorders start in childhood or adolescence (17) and use prospective epidemiological data to study long-term associations between early-onset mental disorders and subsequent income earnings. Several such studies exist. A recent U.S. study found retrospectively recalled emotional problems before age 17 predicted 20% reduced household income among adults aged 25 to 53 (18). Two prospective New Zealand studies found recurrent depression at ages 16 to 21 predicted low income at ages 21 to 25 (19) and that mental disorders at ages 18 to 25 predicted low workforce participation and low income at age 30 (20). A longitudinal U.K. study found that psychological problems by age 16 predicted a 28% reduction in household income at age 50 (21).

Such results, although compelling, are limited to a small number of high-income countries and few measures of early mental disorders. Large-scale prospective epidemiological studies with appropriate time intervals and measures do not exist in most countries. However, widely available cross-sectional epidemiologic data could provide an approximation in associations of retrospective reports about early-onset mental disorders with subsequent income. Such data are presented here from surveys carried out in 22 countries through the World Health Organization (WHO) World Mental Health (WMH) Survey Initiative (22). We examine retrospectively reported lifetime disorders as of age of completing education to establish a temporal priority of disorders before income. Disorders with later onsets are ignored because of uncertainties about temporal priority with income. Gross associations are decomposed to evaluate indirect effects through employment, marriage, spouse employment, earnings, and other income. We control level of education because we want to determine whether disorders predict subsequent income over and above previously documented associations of childhood-adolescent disorders with educational attainment (23).

Methods and Materials

Samples

The 22 countries include 6 classified by the World Bank as low/lower-middle (Colombia, India, Iraq, Nigeria, Peoples' Republic of China [PRC], and Ukraine), 5 upper-middle (Brazil, Bulgaria, Lebanon, Mexico, and Romania), and 11 higher (Belgium, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Northern Ireland, Portugal, Spain, and the United States) income countries (24). All surveys were based on probability samples of the adult household population either nationally representative (most countries), representative of urbanized areas (Colombia, Mexico), or representative of regions of the country (Brazil, India, Japan, Nigeria, PRC). More details about sampling are provided elsewhere (25). The weighted (by sample size) average response rate across surveys was 72.5%.

All WMH interviews were administered face-to-face by lay interviewers trained and supervised using standardized procedures described elsewhere (26). Informed consent was obtained using procedures approved by local institutional review boards. Interviews had two parts. Part I, administered to all respondents, assessed core mental disorders. All Part I respondents with any core mental disorder plus a probability subsample of other Part I respondents were administered Part II, which assessed correlates and disorders of secondary interest. The income questions were in Part II. Part II data were weighted to adjust for undersampling of Part II noncases and residual discrepancies between sample and population distributions on sociodemographic/geographic variables. There were 57,929 Part II respondents across surveys. Analysis was limited to nonstudent nonretired respondents aged 18 to 64.

Measures

Mental Disorders. Mental disorders were assessed with the WHO Composite International Diagnostic Interview (CIDI) Version 3.0 (27), a fully structured interview that generates research diagnoses of common mental disorders according to both DSM-IV (used here) and ICD-10 criteria. The 15 disorders considered here include anxiety disorders (panic, generalized anxiety, social phobia, specific phobia, agoraphobia without panic, posttraumatic stress, and separation anxiety), mood disorders (major depression/dysthymia and bipolar), disruptive behavior disorders (oppositional defiant, conduct, attention-deficit/hyperactivity, and intermittent explosive), and substance disorders (alcohol and illicit drug abuse). Methodological studies found CIDI diagnoses to have generally good concordance with blinded clinical diagnoses based on the Structured Clinical Interview for DSM-IV (28).

Alcohol and drug abuse were subtyped into cases with and without dependence, resulting in 17 rather than 15 measures of disorder. However, alcohol and drug dependence among respondents without a history of abuse were not assessed in most surveys, making it impossible to generate total-sample dependence diagnoses. Abuse, not dependence, is consequently the focus of our analysis of substance use disorders. However, five WMH surveys assessed dependence without abuse (DWOA; Iraq, Northern Ireland, Portugal, Romania, Sao Paulo Brazil). DWOA made up relatively small proportions of all lifetime dependence (16.6% of alcohol dependence and 17.4% of drug dependence) and even smaller proportions of lifetime dependence as of age of completing education (2.2% of all lifetime alcohol dependence and 1.3% of all lifetime drug dependence). Given that DWOA was not assessed in the other WMH countries, these cases were excluded from the analyses in the five countries where it was assessed.

Income Earnings. Household income, personal earnings, and spouse earnings were assessed for the 12 months before interview. Earnings were defined as wages or stipends from employment excluding pensions, investments, financial assistance, and other sources of income. As in most community surveys, item-level nonresponse rate for income-earning questions was nontrivial (range .8%–18.3%; interquartile range 2.2%–7.0%) (7). Regression-based imputation was used to impute these missing values. Mental disorders were not strongly related to missing income-earning data.

Employment Status. Respondents were asked whether they were currently employed or self-employed, unemployed, disabled, homemakers, students, or retired. Students and retired were excluded from analysis.

Sociodemographic Variables. Sociodemographics considered here include sex, education, and time since completing education. In addition to continuous years of education, categories were defined for no education, less than secondary education, completing secondary education, some postsecondary school, com-