A multinational study of mental disorders, marriage, and divorce

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Abstract

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Objective—Estimate predictive associations of mental disorders with marriage and divorce in a cross-national sample.

Method—Population surveys of mental disorders included assessment of age at first marriage in 19 countries (*n* = 46 128) and age at first divorce in a subset of 12 countries (*n* = 30 729). Associations between mental disorders and subsequent marriage and divorce were estimated in discrete time survival models.

Results—Fourteen of 18 premarital mental disorders are associated with lower likelihood of ever marrying (odds ratios ranging from 0.6 to 0.9), but these associations vary across ages of marriage. Associations between premarital mental disorders and marriage are generally null for early marriage (age 17 or younger), but negative associations come to predominate at later ages. All 18 mental disorders are positively associated with divorce (odds ratios ranging from 1.2 to 1.8). Three disorders, specific phobia, major depression, and alcohol abuse, are associated with the largest population attributable risk proportions for both marriage and divorce.

Conclusion—This evidence adds to research demonstrating adverse effects of mental disorders on life course altering events across a diverse range of socioeconomic and cultural settings. These effects should be included in considerations of public health investments in preventing and treating mental disorders.

Keywords

mental disorders; marriage; divorce

Introduction

One of the ways that mental disorders may have adverse life course consequences is by impairing a person's ability to form and maintain marital relationships. Marriage confers a variety of benefits (1). Entering a marriage improves earnings as well as physical and mental health, while divorce has negative effects on subsequent earnings and on the economic and social wellbeing of children (2). If mental disorders reduce the likelihood of marriage or increase the likelihood of divorce, they would limit access to these benefits of marriage. Epidemiological evidence, all of which comes from studies in high-income Western countries, is mixed with respect to associations between mental disorders and subsequent marriage, but consistent in finding a positive association between mental disorders and subsequent divorce.

Several studies have found that higher scores on scales of non-specific distress are associated with lower likelihood of subsequent marriage (3-5), but other studies have not found evidence of this predictive association (6-8). No association between alcohol problems and marriage was found in either of two studies that examined this relationship (4, 8). The only study to examine associations between a broad range of mental disorders and subsequent marriage found countervailing effects at different ages of marriage: mental disorders were positively associated with early marriage (i.e., prior to age 18) and negatively associated with marriage at later ages (9). The finding of variation across age at marriage is particularly important in light of evidence that early marriage may have adverse rather than beneficial effects (10).

With respect to divorce, studies report that married individuals with higher levels of distress (8, 11-13), alcohol use (14), or psychiatric disorders (15) are more likely to divorce. An important limitation of prior studies of both marriage and divorce has been the focus within studies on associations with particular mental disorders, disregarding potential confounding by co-occurring disorders as well as potential mutually reinforcing or countervailing interactions between disorders.

This study uses data from epidemiologic surveys conducted in 19 high-, middle-, and low-income countries to examine the associations between psychiatric disorders and subsequent marriage and data on 12 of these countries to examine associations between psychiatric disorders and subsequent divorce. The range of psychiatric disorders is broader than in previous studies, notably including more extensive assessment of externalizing disorders. Using these data, we examine the associations between each type of disorder and marriage, controlling for co-occurring disorders, and whether associations between disorders and marital relationships are different when disorders co-occur than when they occur in isolation. In addition, because of the large size and diversity of the sample, we also investigate variations in the associations of mental disorders with marriage and divorce across population subgroups. There is some evidence that in the United States, there are sex differences in relationship between health and marital status that have changed over time (16), but these patterns have not been examined in cross-national perspective. The population level effects of psychiatric disorders are then estimated to summarize the societal burden of mental disorders in lost years of marriage.

Aims of the study

To examine associations between a broad range of mood, anxiety, impulse control, and substance use disorders with subsequent marriage and divorce in a large, diverse cross-national epidemiological sample.

Material and methods

Samples

Data on marriage come from epidemiological surveys conducted in 19 countries: five classified by the World Bank as low or lower-middle income (Colombia, India, Nigeria, China, and Ukraine), five as upper-middle income (Brazil, Bulgaria, Lebanon, Mexico, and Romania), and nine as high income (The United States, Belgium, France, Germany, Italy, Netherlands, Spain, Japan, and New Zealand) (See Table 1). Twelve of these countries also collected information on the timing of divorce in respondents' first marriages. The countries lacking data on divorce were all high-income countries: Belgium, France, Germany, Italy, the Netherlands, Spain, and New Zealand. Surveys were carried out in multistage clustered area probability household samples representative of specific regions (Brazil, India, and China) or the entire nation (the remaining countries). Sample sizes ranged from 2357 (Romania) to 12 790 (New Zealand). Response rates ranged from 45.9% (France) to 98.8% (India). The average response rate, weighted by sample size, is 64.9%. Recruitment and consent procedures were approved by local Human Subjects committees monitoring the study in each country. The 7-day interviewer training and field quality control procedures

were standardized across countries. A more detailed discussion of World Mental Health (WMH) training, quality control, and survey implementation is presented elsewhere (17).

The interview was divided into two parts. Part I assessed core disorders and was completed by all respondents. Part II assessed additional disorders and numerous correlates and was completed by 100% of respondents who met criteria for any Part I disorder plus a probability subsample of other Part I respondents (100% of Part I respondents in Romania). Based on a concern with the possibility of recall bias, disorders defined as beginning in childhood that often remit in early adulthood (attention deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder, and separation anxiety disorder) were assessed only among respondents in the age range 18–44. The Part I samples were weighted to adjust for differential probabilities of selection and residual discrepancies between sample and census on socio-demographic and geographic variables. The Part II samples were additionally weighted to adjust for under-sampling of Part I respondents without Part I disorders. A more detailed discussion of WMH sampling and weighting is presented elsewhere (18).

Diagnostic assessment

Diagnoses were based on Version 3.0 of the WHO Composite International Diagnostic Interview (CIDI) (19), a fully structured lay-administered interview that generates diagnoses according to both ICD-10 and DSM-IV criteria. DSM-IV criteria are used here. Translation and back translation followed standard WHO procedures (20).

The 19 lifetime diagnoses include three mood disorders (major depressive disorder, dysthymia, and bipolar disorder), eight anxiety disorders [panic disorder with or without agoraphobia, generalized anxiety disorder, social phobia, specific phobia, agoraphobia without panic disorder, post-traumatic stress disorder (PTSD), and separation anxiety disorder], four impulse control disorders (attention deficit hyperactivity disorder, conduct disorder, intermittent explosive disorder, and oppositional-defiant disorder), and four substance use disorders (alcohol abuse, alcohol dependence drug abuse, and drug dependence). The prevalence of each disorder in the total sample and the range of prevalence of each disorder across the countries in the sample are presented in Table S1 (see Supporting Information section).

Blinded clinical reappraisal interviews found generally good concordance between DSM-IV diagnoses based on the CIDI (21) and those based on the Structured Clinical Interview for DSM-IV (22). The CIDI included retrospective disorder age-of-onset reports based on a special question sequence that has been shown experimentally to improve recall accuracy. Premarital onset of any mental disorder was defined as having a disorder with age of onset less than the age at first marriage.

Statistical analysis

Discrete time survival models (23, 24) were specified to estimate covariate-adjusted associations between premarital mental disorders and age of first marriage in the entire sample and age of first divorce in the subsample of respondents with at least one marriage. In these models, each year a respondent is at risk, up to their age at the occurrence of the

outcome or their age at interview, is represented by a separate observation. Models for first marriage included all person-years up to the age at first marriage or age at interview for those respondents who had never married. Models for divorce included all person-years from the first year of marriage through the age at divorce, age at widowhood for those respondents who reported that their first marriage ended in the death of their spouse, or age at interview for those respondents still married to their first spouse. The resulting person-year datasets are analyzed using logistic regression models with dummy-variable covariates specifying the year of life that each observation represents. Chronological age was used as the time scale. In models for age at first marriage, additional statistical controls were included for sex, age, educational attainment, and country. In models for divorce, statistical controls were included for sex, age, educational attainment, years since marriage, months dating prior to marriage, and country. Premarital mental disorders were added as time-varying covariates, i.e., as present in the year of onset and subsequent person-years. Model coefficients are presented as odds ratios, which indicate the relative odds of the outcome in a person who had onset of a disorder prior to the outcome compared with someone without the disorder at the time of the outcome.

Comparisons of alternative models using fit statistics, Bayes and Akaike information criteria, were conducted to evaluate two additional issues. First, departures from additivity of the effects of individual disorders on marriage and divorce were assessed by comparing a model with all the mental disorders as simultaneous predictors (i.e., a model assuming additivity of effects on the logit scale) with a model including the mental disorders *and* a set of dummy variables indicating the total number of disorders. These dummy variables can be interpreted as diffuse interactions (25) between the disorders, which indicate whether and how associations between disorders and outcomes are modified by comorbid disorders. A significant interaction indicates a departure from additivity of the effects of individual disorders. A positive interaction indicates supra-additive effects (i.e., that disorders are more strongly associated with marriage or divorce when they occur together than when they occur in isolation), and a negative interaction indicates sub-additive effects.

Second, variations in the associations of disorders with marriage and divorce were assessed by comparing series of models including interaction terms. Variation in the association of disorders with marriage was examined with respect to sex, country income level (low, medium and high), and time period (early, on-time and late age at marriage). Age at marriage was defined as 'early' for person-years prior to age 18, as 'on-time' for person-years from age 18 to the age at the country-specific 75th percentile of age at marriage for each country, and as 'late' for person-years beyond the country-specific 75th percentile of age at marriage. Variation in the association of disorders with divorce was examined with respect to years since first marriage, months dating prior to marriage, sex, age period, and income level of country. Models were compared in a 'top-down' order, from the most expanded model to a model with no interaction terms. Population attributable risk proportions were estimated using the covariate-adjusted discrete time survival models. Model-based predicted prevalence of each outcome was calculated under two conditions, first using the actual sample distribution of premarital mental disorders and second after simulating the removal of their effect by artificially setting all disorder indicators to 'zero'.

The difference between the predicted prevalence under these two conditions is interpreted as the reduction or increase in the outcome attributable to premarital disorders under the assumption that the models represent actual causal relationships.

Results

Prevalence of marriage and divorce in the sample

The proportion of people marrying early (before age 18) varies dramatically across countries from lows of 0.2% in Japan, 0.4% in Germany, and 0.6% in the two surveys in China to highs of 12.3% in Mexico and 13.8% in India (Table 2). Between 31.0% (Colombia) and 65.5% (Ukraine) of people unmarried before age 18 got married 'on-time', meaning prior to the age at which 75% of adults in their country were married. Of people still unmarried at this age, between 24.4% (Colombia) and 75.4% (Ukraine) married for the first time at a later age.

The proportion of marriages ending in separation or divorce was 17.9% for the 12 countries for which data were available. Separation and divorce were relatively uncommon in Lebanon (4.4%) and the China studies (8.1% and 5.0%) and much higher in Colombia (25.0%), Ukraine (25.6%), Brazil (28.0%), and the United States (39.6%).

Mental disorders and marriage

In separate survival models, 14 of the 18 disorders are significantly associated with lower likelihood of marriage after adjustment for sex, age, country, and educational attainment with significant odds ratios (OR) in the range of 0.6 to 0.8 (Table 3, column 1). The disorders significantly associated with marriage include all 10 internalizing disorders, all four substance use disorders, and none of the externalizing disorders. When all 18 disorders are entered as simultaneous predictors (Table 3, Column 2), the ORs are attenuated for those disorders negatively associated with marriage in the adjusted bivariate model, with statistical significance sustained for nine disorders. Conduct disorder, which was not associated with marriage prior to adjustment for co-occurring disorders, is positively associated with marriage (OR = 1.2, 95% CI 1.0–1.3) after this adjustment.

Associations between individual disorders and marriage were not modified by the number of co-occurring disorders; when a categorical variable indicating the total number of co-occurring premarital disorders was added to the model including all the individual disorders, it was not significantly associated with marriage ($\chi_4^2 = 1.5$, $P = 0.833$). This finding supports the additivity of effects of individual disorders to the logit of the relative odds of marriage.

Testing of models with statistical interactions found that the best fitting model is one that includes a statistical interaction between disorders and age at marriage (early, on-time and late age at marriage). The rightmost three columns of Table 3 show associations between disorders and marriage separately for each of these time periods. Associations between disorders and marriage are generally null for early age at marriage, but negative associations come to predominate at later ages. ORs for early marriage are nearly equally divided between those less than and those >1.0. Only two reach statistical significance: a weak positive association (OR = 1.3, 95% CI 1.1–1.6) between specific phobia and early

marriage, and a strong negative association (OR = 0.5, 95% CI 0.3–0.8) between Attention deficit hyperactivity disorder (ADHD) and early marriage. Six ORs < 1.0, indicating lower odds of marriage, reach statistical significance for on-time marriage and five reach statistical significance for late marriage. Major depressive disorder, bipolar disorder, and alcohol abuse are significantly associated with lower likelihood of both on-time and late marriage.

Mental disorders and divorce

In separate survival models, all 18 mental disorders are significantly associated with divorce after adjustment for sex, age, country, years since marriage, months dating prior to marriage, and educational attainment (Table 4, Column 1). The adjusted bivariate ORs ranged from 1.2 to 1.8. There is some attenuation of these associations when all 18 disorders are examined simultaneously, but 17 of the 18 ORs remain >1, indicating higher risk for divorce, with eight reaching statistical significance. Statistically significant ORs are the range 1.2–1.6.

Contrary to the results regarding marriage, there is some evidence that the associations between specific disorders and divorce are modified by the number of co-occurring disorders. Accounting for the specific associations of each of the 18 individual disorders with divorce, the number of co-occurring disorders is significantly associated with divorce ($\chi_4^2 = 9.6$, $P = 0.047$) (Table 4, Column 3). The ORs associated with having two, three, or four disorders are not different than one, indicating that the joint effects of an individual's first four co-occurring disorders on divorce are additive. The OR associated with having five or more disorders is significantly less than one (OR = 0.6, 95% CI 0.4–0.9), indicating that for the relatively small group of individuals with extremely high levels of comorbidity, additional disorders are not associated with additional increases in risk of divorce.

Interactions of disorders with years since first marriage, months dating prior to marriage, sex, age period and income level of country were tested. The main effects model was found to have the best fit according to both Akaike and Bayes information criteria (detailed results available on request).

Population attributable risk proportions

Discrete time survival models for marriage and divorce were used to simulate changes in the prevalence of marriage and divorce attributed to mental disorders, under the assumption that the associations in these models represent causal effects (Table 5). The estimated population attributable risk proportions are useful because they combine information on the prevalence and strength of association with the outcome for each disorder into a single term that can be compared across individual disorders and with other factors affecting marriage and divorce. Specific phobia accounts for an increase of 3.6% in the prevalence of early marriage and a decrease of 1.2% in the prevalence of late marriage. Major depressive disorder and alcohol abuse are associated with decreases in the prevalence of on-time or late marriage of over 1%.

The same three disorders have the largest population attributable risks for divorce. Specific phobia, major depression, and alcohol abuse are associated with the largest proportions of

divorces (1.3%, 4.0% and 2.9% respectively). PTSD is associated with slightly smaller population attributable risk than specific phobia, 1.0% of divorces.

Taken together, the estimated impact of mental disorders is a 1.9% increase in the prevalence of early marriage, reductions in on-time and late marriage of 2.7% and 6.7% respectively, and a 12% increase in the prevalence of divorce.

Discussion

Evidence from this large multinational sample suggests that mental disorders contribute to reducing time spent in marriage both by reducing the overall probability of becoming married and by increasing the likelihood of divorce among people who marry. The evidence adduced here in support of this conclusion differs in important ways from previous studies. First, only disorders with onset prior to age at first marriage were considered as predictors of marriage and only disorders with onset prior to age at first divorce were considered as predictors of divorce. This specification reduces the possibility that the results arise from reverse causality, i.e., the effect of marriage on marriage and divorce on onset of psychiatric disorders. Second, the diverse cross-national sample, including population-based samples from low-, middle-, and high-income countries, suggests that the observed patterns are not restricted to a narrow social or cultural setting. Statistical tests found no evidence that the association between mental disorders and marital outcomes varies across countries at different income levels. It is important to note that the sample is not global, and there are likely to be exceptions to these patterns. However, the consistency of results across this diverse set of countries provides strong confirmation that these relationships have broad cross-cultural validity.

There are some important deviations from the general pattern of negative associations between mental disorders and subsequent marriage. First, associations of impulse control disorders with marriage contrast with those of mood, anxiety, and substance use disorders. There are no significant associations with marriage for this group of disorders in the adjusted bivariate models, and in the model with all disorders, there is a weak but statistically significant *positive* association between conduct disorder and marriage. Disinhibition in interpersonal relationships associated with these disorders may facilitate formation of marital relationships, after accounting for comorbid disorders. ADHD, which is associated with impaired rather than disinhibited interpersonal relationships, is strongly negatively associated with early marriage. ADHD has not been assessed in prior epidemiological studies of the consequences of mental disorder for marital relationships.

Second, as previous studies in the United States had found (9), the association between mental disorders and marriage varied across age at marriage. Prior to age 18, associations of mental disorders with marriage are generally quite weak with the exceptions of the *positive* association between specific phobia and marriage and the negative association between ADHD and marriage mentioned above. The negative association between mental disorders and marriage emerges in the on-time and late marriages. Previous researchers commenting on evidence of a positive association between mental disorders and early marriage have suggested that distressed adolescents may be motivated to marry in order to escape stressful

home environments (26). Negative associations of mental disorders with on-time and late marriages may arise from combination of functional limitations associated with the disorders and stigma (27), negative perceptions of people with disorders by potential partners.

Although the associations between individual psychiatric disorders and first marriage are relatively weak, ranging from 0.7 to 0.9 in the additive logistic model, the evidence supports additivity of effects of co-occurring disorders. This implies that the total impact of disorders on marriage for a person with multiple co-occurring disorders, which can be estimated by multiplying the odds ratios associated with each individual disorder, may be quite large. For instance, at late ages of marriage, the odds of becoming married for a person with a history of specific phobia, major depression, and alcohol abuse would be $0.8 \times 0.7 \times 0.7 = 0.4$, relative to a person with no disorder. Additivity of effects also implies that removing the effect of any single disorder would have an equally positive impact for individuals with complex psychopathology involving multiple disorders as for individuals with a single disorder.

Associations of mental disorders with divorce in a first marriage are more pervasive across categories of disorder, including impulse control disorders. These associations are consistent across countries, despite wide cross-national variations in the baseline divorce rates. A previous study that examined the consistency of risk factors for divorce in the United States also found that the risk factors for divorce are very similar across historical periods with wide variation in rates of divorce (28). These associations are likely to reflect two interrelated factors. First, people with psychiatric disorders are likely to have difficulty in managing interpersonal relationships over time. Second, people with psychiatric disorders may be impaired in other areas of life, such as work performance, and those extra-familial limitations have secondary effects on fulfilling role expectations within the family. It is likely that mental disorders account for some portion of the association reported between divorce and behaviors during marriage, such as frequent intoxication (14).

There is some evidence of a departure from additivity in the joint effects of multiple co-occurring disorders on divorce, but only at very high levels of comorbidity which affect a small portion of the population. Associations with divorce are roughly additive for the first four premarital disorders. The increment of risk associated with an additional disorder is only reduced for the fifth or higher number disorders. For instance, the predicted relative odds of divorce in a first marriage for a person with a premarital history of the same three disorders examined above – specific phobia, major depression, and alcohol abuse – compared to a person with no premarital disorder would be $1.1 \times 1.4 \times 1.5 \times 0.9 = 2.1$. If, in addition, this person also had panic disorder and posttraumatic stress disorder, the predicted odds of first divorce relative to someone with no disorder would be the same: $1.1 \times 1.4 \times 1.5 \times 1.1 \times 1.4 \times 0.6 = 2.1$.

Taken together, mental disorders account for a small but meaningful reduction in the proportion of people who marry and increase in the proportion of people in their first marriage who divorce. These estimates are based on the assumption that the coefficients reported in Tables 1 and 2 represent causal effects of disorders on marriage or divorce. While the models from which these coefficients were derived are covariate adjusted, this

assumption is unlikely to hold. Therefore, estimates of the population attributable risk should be taken as heuristic upper bounds to the likely societal effects of disorders on marriage and divorce.

Notably, about half of the societal impact of mental disorders on divorce is attributed to two disorders: major depression and alcohol abuse. These two disorders also have among the largest population attributable risks for on-time and late marriage. Clinical and / or public health interventions that aim to reduce the negative impact of disorders on marital relationships might be best targeted at these conditions. Current intervention programs that target major depression or alcohol abuse should also consider assessing intervention effects on marital relationships.

Several limitations of this study should be noted. First, assessments of mental disorders are based on retrospective reports and are thus likely to be underestimates of the actual prevalence of disorders. Second, reporting accuracy may differ across countries because of differences in the extent to which mental illness is stigmatized. Statistical adjustment for variations across individual countries minimizes the likelihood that this type of variation affects the pooled cross-national results. Third, the survey data did not allow for separate analysis of the impact of mental disorders on formation of relationships on the one hand and entry into marriage on the other. Future studies that make this distinction could advance understanding of how particular disorders disrupt romantic relationships.

Evidence of an adverse impact on marital relationships adds to evidence regarding the impact of mental disorders on a range of adverse events across the lifespan, including early termination of education (29) and lower earnings (30). Findings that were originally reported in the United States have now been reported in cross-national studies, suggesting mental disorders disrupt life course trajectories across a very wide range of cultural and social settings. In addition, through effects on marriage, mental disorders are likely to have various adverse ramifications, including increased exposure to other adverse events and reduced quality of family environment for children (1).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

References

1. Ribar, DC. What do social scientists know about the benefits of marriage? a review of quantitative methodologies. Bonn, Germany: Institute for the Study of Labor; 2004.

2. Amato PR. The consequences of divorce for adults and children. J Marriage Fam. 2000; 62:1269–1287.

3. Hope S, Rodgers B, Power C. Marital status transitions and psychological distress: longitudinal evidence from a national population sample. Psychol Med. 1999; 29:381–389. [PubMed: 10218928]

4. Horwitz AV, White HR, Howell-White S. Becoming married and mental health: a longitudinal study of a cohort of young adults. J Marriage Fam. 1996; 58:895–907.

5. Mastekaasa A. Marriage and psychological well-being – some evidence on selection into marriage. J Marriage Fam. 1992; 54:901–911.

6. Kim HK, Mckenry PC. The relationship between marriage and psychological well-being – a longitudinal analysis. J Fam Issues. 2002; 23:885–911.

7. Lamb KA, Lee GR, Demaris A. Union formation and depression: selection and relationship effects. J Marriage Fam. 2003; 65:953–962.

8. Simon RW. Revisiting the relationships among gender, marital status, and mental health. Am J Sociol. 2002; 107:1065–1096. [PubMed: 12227382]

9. Forthofer MS, Kessler RC, Story AL, Gotlib IH. The effects of psychiatric disorders on the probability and timing of first marriage. J Health Soc Behav. 1996; 37:121–132. [PubMed: 8690874]

10. Loughran, DS.; Zissimopoulos, JM. Are there gains to delaying marriage? The effect of age at first marriage on career development and wages. Santa Monica, CA: Rand; 2004.

11. Bulloch AG, Williams JV, Lavorato DH, Patten SB. The relationship between major depression and marital disruption is bidirectional. Depress Anxiety. 2009; 26:1172–1177. [PubMed: 19798680]

12. Mastekaasa A. Psychological well-being and marital dissolution – selection effects. J Fam Issues. 1994; 15:208–228.

13. Wade TJ, Pevalin DJ. Marital transitions and mental health. J Health Soc Behav. 2004; 45:155–170. [PubMed: 15305757]

14. Collins RL, Ellickson PL, Klein DJ. The role of substance use in young adult divorce. Addiction. 2007; 102:786–794. [PubMed: 17493107]

15. Kessler RC, Walters EE, Forthofer MS. The social consequences of psychiatric disorders, III: probability of marital stability. Am J Psychiatry. 1998; 155:1092–1096. [PubMed: 9699699]

16. Liu H, Umberson DJ. The times they are a changin': marital status and health differentials from 1972 to 2003. J Health Soc Behav. 2008; 49:239–253. [PubMed: 18771061]

17. Pennell, BE.; Mneimneh, ZN.; Bowers, A. Implementation of the world mental health surveys. In: Kessler, RC.; Üstün, TB., editors. The WHO World Mental Health Surveys: global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press; 2008. p. 33-57.

18. Kessler RC, Heeringa S, Lakoma MD, et al. Individual and societal effects of mental disorders on earnings in the United States: results from the national comorbidity survey replication. Am J Psychiatry. 2008; 165:703–711. [PubMed: 18463104]

19. Kessler RC, Üstün TB. The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). Int J Methods Psychiatr Res. 2004; 13:93–121. [PubMed: 15297906]

20. Harkness, J.; Pennell, BE.; Villar, A.; Gebler, N.; Aguilar-Gaxiola, S.; Bilgen, I. Translation procedures and translation assessment in the World Mental Health Survey Intitiative. In: Kessler, RC.; Üstün, TB., editors. The WHO World Mental Health Surveys: global perspectives on the epidemiology of mental disorders. New York: Cambridge University Press; 2008. p. 91-113.

21. Kessler RC, Abelson J, Demler O, et al. Clinical calibration of DSM-IV diagnoses in the World Mental Health (WMH) version of the World Health Organization (WHO) Composite International Diagnostic Interview (WMHCIDI). Int J Methods Psychiatr Res. 2004; 13:122–139. [PubMed: 15297907]

22. First, MB.; Spitzer, RL.; Gibbon, M.; Williams, JBW. Structured clinical interview for DSM-IV-TR axis i disorders, research version, non-patient edition (SCID-I / NP). New York: Biometric Research, New York State Psychiatric Institute; 2002.

23. Efron B. Logistic regression, survival analysis and the Kaplan–Meier Curve. J Am Stat Assoc. 1988; 83:414–425.

24. Willett JB, Singer JD. Investigating onset, cessation, relapse and recovery: why you should, and how you can, use discrete-time survival analysis to examine event occurence. J Consult Clin Psychol. 1993; 61:952–965. [PubMed: 8113496]

25. Gustafson P, Kazi AM, Levy AR. Extending logistic regression to model diffuse interactions. Stat Med. 2005; 24:2089–2104. [PubMed: 15887285]

26. Quinton, D.; Rutter, M. Parenting breakdown: the making and breaking of inter-generational links. Brookfield, VT: Gower Publishing Company; 1988.

27. Link B, Phelan J. Conceptualizing stigma. Annu Rev Sociol. 2001; 27:363–385.

28. Teachman JD. Stability across cohorts in divorce risk factors. Demography. 2002; 39:331–351. [PubMed: 12048955]

29. Lee S, Tsang A, Breslau J, et al. Mental disorders and termination of education in high-income and low- and middle-income countries: epidemiological study. Br J Psychiatry. 2009; 194:411–417. [PubMed: 19407270]

30. Levinson D, Lakoma M, Petukhova M, et al. The associations of serious mental illness with earnings in the WHO World Mental Health surveys. under review. Br J Psychiatry. 2010; 197:114–121. [PubMed: 20679263]

31. Posada-Villa JA, Aguilar-Gaxiola S, Magaña CG, Gomez LC. Prevalence of mental disorders and service use: preliminary results from the National Mental Health Study Colombia, 2003. (In

Spanish: prevalencia de trastornos mentales y uso de servicios: resultados preliminares del Estudio Nacional de Salud Mental Colombia, 2003). Rev Colomb Psiquiatr. 2004; 33:241–262.

32. Gureje O, Lasebikan VO, Kola L, Makanjuola VA. Lifetime and 12-month prevalence of mental disorders in the Nigerian Survey of Mental Health and Well-Being. Br J Psychiatry. 2006; 188:465–471. [PubMed: 16648534]

33. Lee S, Tsang A, Zhang M-Y, et al. Lifetime prevalence and inter-cohort variation in DSM-IV disorders in metropolitan China. Psychol Med. 2007; 37:61–71. [PubMed: 17038208]

34. Bromet EJ, Gluzman S, Paniotto V, et al. Epidemiology of psychiatric and alcohol disorders in Ukraine: findings from the Ukraine Mental Health Survey. Soc Psychiatry Psychiatr Epidemiol. 2005; 40:681–690. [PubMed: 16160752]

35. Viana MC, Teixeira MG, Beraldi F, Bassani Ide S, Andrade LH. Sao Paulo Megacity Mental Health Survey – a population-based epidemiological study of psychiatric morbidity in the Sao Paulo metropolitan area: aims, design and field implementation. Rev Bras Psiquiatr. 2009; 31:375–386. [PubMed: 20098829]

36. Tomov T, Hinkov H, Zarkov Z, Mladenova M, Vasilev S, Okolyiski M. National representative epidemiological survey of common mental illness in Bulgaria. Soc Med. 2008; 4:16–21.

37. Karam EG, Mneimneh ZN, Karam AN, et al. 12-month prevalence and treatment of mental disorders in Lebanon: a National epidemiologic survey. Lancet. 2006; 367:1000–1006. [PubMed: 16564362]

38. Medina-Mora M-E, Borges G, Lara C, et al. Prevalence of mental disorders and use of services: results from the Mexican National Survey of Psychiatric Epidemiology. Salud Mental. 2003; 26:1–16.

39. Florescu S, Ciutan M, Popovici G, Galaon M, Ladea M, Petukhova M. The Romanian Mental Health Study: main aspects of lifetime prevalence and service use of DSM-IV disorders [Romanian]. Manag Health. 2009; 3:22–30.

40. Bruffaerts R, Bonnewyn A, Desmarets S, Van Oyen H, Demyttenaere K. Prévalence des troubles mentaux dans la population belge. Résultats de l'étude ESEMeD (European Study of the Epidemiology of Mental Disorders). Rev Med Liege. 2003; 58:741–750. [PubMed: 14978848]

41. Alonso J, Angermeyer M, Bernert S, et al. Sampling and methods of the European Study of Epidemiology of Mental Disorders (ESEMeD) Project. Acta Psychiatr Scand. 2004; 109:8–20.

42. De Girolamo G, Polidori G, Morosini G, et al. Prevalenza dei disturbi mentali in Italia, fattori di rischio, stato di salute ed uso dei servizi sanitari: Il progetto ESEMeD-WMH. Epidemiol Psichiatr Soc. 2005; 14:1–100. Supplemento 8. [PubMed: 16447815]

43. Kawakami N, Takeshima T, Ono Y, et al. Twelve-month prevalence, severity, and treatment of common mental disorders in communities in Japan: preliminary finding from the World Mental Health Japan Survey 2002–2003. Psychiatry Clin Neurosci. 2005; 59:441–452. [PubMed: 16048450]

44. Wells JE, Oakley-Browne MA, Scott KM, et al. Te Rau Hinengaro: the New Zealand Mental Health Survey (NZMHS): overview of methods and findings. Aust N Z J Psychiatry. 2006; 40:835–844. [PubMed: 16959009]

45. Haro JM, Palacín C, Vilagut G, et al. Epidemiology of mental disorders in Spain: methods and participation in the ESEMeD-Spain project. Actas Esp Psiquiatr. 2003; 31:182–191. [PubMed: 12838441]

46. Kessler RC, Berglund P, Chiu WT, et al. The US National Comorbidity Survey Replication (NCS-R): design and field procedures. Int J Methods Psychiatr Res. 2004; 200413:69–92. [PubMed: 15297905]

Significant outcomes

- Mental disorders are associated with lower likelihood of marriage at the age of 18 years or later across 19 low-, medium-, and high-income countries.

- Mental disorders are associated with higher likelihood of divorce across 12 low-, medium-, and high-income countries.

- Among mental disorders, specific phobia, major depression and alcohol abuse are associated with the largest population attributable risk proportions for both reduction in marriage and increase in divorce.

Limitations

- Data are based on retrospective recall of the symptoms of mental disorders.

- The association between mental disorders and divorce may partially reflect the influence of prior marital distress.

Table 1

WMH sample characteristics by World Bank income categories[*]

Country by income category	Survey	Sample characteristics[†]	Field dates	Age range	Sample size Part I	Part II	Response rate[‡]
Low and Lower-middle							
Colombia (31)	NSMH	All urban areas of the country (approximately 73% of the total national population)	2003	18–65	4426	2381	87.7
India[§]	WMHI	Pondicherry region	2003–2005	18–97	2992	1373	98.8
Nigeria (32)	NSMHW	21 of the 36 states in the country, representing 57% of the national population. The surveys were conducted in Yoruba, Igbo, Hausa and Efik languages	2002–2003	18–100	6752	2143	79.3
PRC (33)	Beijing-WMH Shanghai-WMH	Beijing and Shanghai metropolitan areas	2002–2003	18–70	5201	1628	74.7
PRC[§]	Shenzhen	Shenzhen metropolitan area. Included temporary residents as well as household residents	2006–2007	18–88	7134	2476	80.0
Ukraine (34)	CMDPSD	Nationally representative	2002	18–91	4725	1720	78.3
Total					31 230	11 721	
Upper-middle							
Brazil (35)	São Paulo Megacity	São Paulo metropolitan area	2005–2007	18–93	5037	2942	81.3
Bulgaria (36)	NSHS	Nationally representative	2003–2007	18–98	5318	2233	72.0
Lebanon (37)	LEBANON	Nationally representative	2002–2003	18–94	2857	1031	70.0
Mexico (38)	M-NCS	All urban areas of the country (approximately 75% of the total national population)	2001–2002	18–65	5782	2362	76.6
Romania (39)	RMHS	Nationally representative	2005–2006	18–96	2357	2357	70.9
Total					21 351	10 925	
High							
Belgium (40)	ESEMeD	Nationally representative. The sample was selected from a national register of Belgium residents	2001–2002	18–95	2419	1043	50.6
France (41)	ESEMeD	Nationally representative. The sample was selected from a national list of households with listed telephone numbers	2001–2002	18–97	2894	1436	45.9
Germany (41)	ESEMeD	Nationally representative	2002–2003	18–95	3555	1323	57.8
Italy (42)	ESEMeD	Nationally representative. The sample was selected from municipality resident registries	2001–2002	18–100	4712	1779	71.3
Japan (43)	WMHJ 2002–2006	Eleven metropolitan areas. Although samples from a clustered household sample, there was no within-household clustering because of setting the sampling fraction so that some	2002–2006	20–98	4129	1682	55.1

Country by income category	Survey	Sample characteristics[†]	Field dates	Age range	Sample size		Response rate[‡]
					Part I	Part II	
		households were skipped after enumeration because residents fall below the specified sampling fraction households were skipped after enumeration because residents fall below the specified sampling fraction					
The Netherlands (41)	ESEMeD	Nationally representative. The sample was selected from municipal postal registries	2002–2003	18–95	2372	1094	56.4
New Zealand[‖] (44)	NZMHS	Nationally representative	2003–2004	18–98	12 790	7312	73.3
Spain (45)	ESEMeD	Nationally representative	2001–2002	18–98	5473	2121	78.6
United States (46)	NCS-R	Nationally representative	2002–2003	18–99	9282	5692	70.9
Total					47 626	23 482	

NSMH, The Colombian National Study of Mental Health; WMHI, World Mental Health India; NSMHW, The Nigerian Survey of Mental Health and Wellbeing; B-WMH, The Beijing World Mental Health Survey; S-WMH, The Shanghai World Mental Health Survey; CMDPSD, Comorbid Mental Disorders during Periods of Social Disruption; NSHS, Bulgaria National Survey of Health and Stress; LEBANON, Lebanese Evaluation of the Burden of Ailments and Needs of the Nation; M-NCS, The Mexico National Comorbidity Survey; RMHS, Romania Mental Health Survey; ESEMeD, The European Study Of The Epidemiology Of Mental Disorders; WMHJ2002–2006, World Mental Health Japan Survey; NZMHS, New Zealand Mental Health Survey; NCS-R, The US National Comorbidity Survey Replication.

[*]
The World Bank. (2008). Data and Statistics. Accessed May 12, 2009 at: http://go.worldbank.org/D7SN0B8YU0.

[†]
Most WMH surveys are based on stratified multistage clustered area probability household samples in which samples of areas equivalent to counties or municipalities in the United States were selected in the first stage followed by one or more subsequent stages of geographic sampling (e.g., towns within counties, blocks within towns, and households within blocks) to arrive at a sample of households, in each of which a listing of household members was created and one or two people were selected from this listing to be interviewed. No substitution was allowed when the originally sampled household resident could not be interviewed. This is the design used in the studies listed above unless otherwise noted. These household samples were selected from census area data in all countries other than France (where telephone directories were used to select households) and the Netherlands (where postal registries were used to select households). Several WMH surveys (Belgium, Germany, and Italy) used municipal resident registries to select respondents without listing households. The Japanese sample is the only totally un-clustered sample, with households randomly selected in each of the four sample areas and one random respondent selected in each sample household. 13 of the 21 surveys are based on nationally representative (NR) household samples.

[‡]
The response rate is calculated as the ratio of the number of households in which an interview was completed to the number of households originally sampled, excluding from the denominator households known not to be eligible either because of being vacant at the time of initial contact or because the residents were unable to speak the designated languages of the survey. The weighted average response rate is 64.9%.

[§]
Country-specific data are currently unpublished.

[‖]
New Zealand interviewed respondents 16+ but for the purposes of cross-national comparisons we limit the sample to those 18+.

Table 2

Prevalence of early, on-time, and late marriage and divorce or separation across the WMH countries[*]

Country by income category	Early marriage		On-time marriage		Late marriage		Divorce or separation	
	%	SE	%	SE	%	SE	%	SE
Low and lower middle								
Colombia	6.3	0.9	31.0	1.7	24.4	2.0	25.0	1.7
India	13.8	1.0	51.8	2.1	74.4	4.6	2.5	0.4
Nigeria	7.4	0.6	45.8	1.5	69.3	3.7	19.9	1.2
China (Beijing / Shanghai)	0.6	0.2	56.7	1.8	71.7	4.0	8.1	1.1
China (Shenzen)	0.6	0.3	37.4	1.2	67.8	2.8	5.0	0.6
Ukraine	3.8	0.7	65.5	1.7	75.4	2.6	25.6	1.6
Upper middle								
Brazil	10.7	0.9	52.2	1.2	66.0	2.9	28.0	1.6
Bulgaria	8.7	0.6	61.5	1.5	66.8	2.7	10.2	1.1
Lebanon	9.9	1.2	44.9	2.3	55.1	4.7	4.4	1.0
Mexico	12.3	1.0	48.1	1.5	48.4	2.7	11.8	0.9
Romania	5.8	0.7	58.3	1.3	68.8	1.8	12.1	0.8
High								
Belgium	1.2	0.4	54.5	2.0	58.9	3.4	N/A	N/A
France	2.2	0.7	48.5	2.8	50.4	4.1	N/A	N/A
Germany	0.4	0.2	39.3	2.2	44.4	2.4	N/A	N/A
Italy	2.6	0.4	55.9	1.6	58.4	3.0	N/A	N/A
Japan	0.2	0.1	57.7	1.8	67.2	3.8	9.7	1.1
The Netherlands	1.5	0.6	47.5	2.2	59.4	4.4	N/A	N/A
New Zealand	1.3	0.2	51.6	1.1	52.6	1.8	N/A	N/A
Spain	1.9	0.4	52.2	1.6	59.7	3.6	N/A	N/A
United States	6.5	0.5	53.9	1.2	58.9	2.0	39.6	1.1
All countries	5.3	0.1	51.0	0.3	58.5	0.6	17.9	0.3

[*] Early marriage = marriage prior to age 18; On-time marriage = Marriage between 18 and country-specific 75th percentile for age at marriage among those not married before 18; Late marriage = marriage after the 75th percentile of age of marriage among those not married before the 75th percentile of age at marriage. Divorce or Separation is given as the proportion of people who were ever married. Information on the timing of divorce was not available from Belgium, France, Germany, Italy, the Netherlands, New Zealand, and Spain.

Table 3

Association between premarital mental disorders and the age of first marriage[*]

| Disorder | Model 1: Individual disorders | | Model 2: All disorders | | Model 3: All disorders by age period[†] | | | | | |
| | | | | | Early marriage | | On-time marriage | | Late marriage | |
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Anxiety										
Panic disorder	0.7	0.6, 0.8	0.9	0.8, 1.0	0.8	0.5, 1.2	1.0	0.8, 1.1	0.8	0.7, 1.1
GAD	0.7	0.6, 0.8	0.8	0.8, 0.9	1.1	0.7, 1.9	0.9	0.8, 1.0	0.9	0.7, 1.2
Social phobia	0.8	0.8, 0.9	1.0	0.9, 1.0	0.9	0.7, 1.1	0.9	0.8, 1.0	1.0	0.9, 1.2
Specific phobia	0.9[‡]	0.9, 1.0	1.0	1.0, 1.1	1.3	1.1, 1.6	1.0	1.0, 1.1	0.8	0.7, 0.9
Agoraphobia	0.8	0.7, 0.9	0.9	0.8, 1.1	0.9	0.5, 1.5	0.9	0.7, 1.1	0.6	0.4, 0.9
PTSD	0.7	0.6, 0.7	0.8	0.7, 0.9	0.9	0.6, 1.5	0.9	0.8, 1.1	0.8	0.6, 1.1
SAD/ASA	0.8	0.7, 0.8	0.9	0.8, 0.9	0.8	0.6, 1.1	0.9	0.8, 1.1	0.8	0.6, 1.1
Mood										
Major depression	0.6	0.6, 0.7	0.7	0.6, 0.7	1.1	0.8, 1.5	0.8	0.7, 0.8	0.7	0.6, 0.8
Dysthymia	0.6	0.5, 0.7	0.8	0.7, 0.9	1.0	0.5, 2.1	0.9	0.7, 1.1	0.7	0.6, 1.0
Bipolar	0.7	0.6, 0.8	0.8	0.7, 0.9	1.1	0.6, 2.1	0.8	0.7, 1.0	0.7	0.5, 0.9
Impulse										
ODD	0.9	0.8, 1.0	1.1	0.9, 1.2	0.9	0.5, 1.6	0.9	0.7, 1.1	1.3	0.8, 2.1
CD	1.0	0.9, 1.1	1.2[‡]	1.0, 1.3	1.4	0.9, 2.2	1.0	0.9, 1.2	1.3	0.9, 1.8
ADHD	0.9	0.8, 1.0	1.0	0.9, 1.2	0.5	0.3, 0.8	1.1	0.9, 1.3	1.1	0.7, 1.7
IED	1.0	0.9, 1.1	1.1	1.0, 1.2	0.9	0.6, 1.5	1.1	1.0, 1.2	0.9	0.7, 1.2
Substance										
Alcohol abuse w / without dependence	0.8	0.8, 0.9	1.0	0.9, 1.1	1.0	0.4, 2.5	0.9	0.8, 1.0	0.7	0.6, 0.9
Alcohol dependence	0.6	0.6, 0.7	0.7	0.7, 0.8	1.2	0.3, 5.1	0.8	0.7, 0.9	0.8	0.6, 1.1
Drug abuse w / without dependence	0.7	0.7, 0.8	0.9	0.8, 1.0	1.0	0.3, 3.8	0.7	0.6, 0.8	1.2	0.9, 1.6
Drug dependence	0.6	0.5, 0.7	0.8	0.7, 1.0	2.1	0.4, 10.4	0.9	0.6, 1.1	0.8	0.5, 1.3

SAD, seasonal affective disorder; PTSD, post-traumatic stress disorder; GAD, generalized anxiety disorder; ASA, adult separation anxiety; ODD, oppositional defiant disorder; CD, conduct disorder; IED, intermittent explosive disorder.

*
Odd ratios estimated in discrete time survival models. In Model 1, associations are estimated for each disorder separately, with statistical controls for sex, age, country, and educational attainment. In Model 2, associations are estimated for all disorders simultaneously with the same statistical controls. In Model 3, associations are estimated for all disorders simultaneously, stratified by age of marriage, with the same statistical controls.

†
Early Marriage = marriage prior to age 18, On-time marriage = between age 18 and the country-specific 75th percentile of age at marriage, Late marriage = above the country-specific 75th percentile of age at marriage.

‡
Bound of confidence interval rounds to 1, but *P*-value < 0.05.

Table 4

Association between premarital mental disorders and the age of first divorce in all countries[*]

Disorder	Model 1: Individual disorders		Model 2: All disorders		Model 3: All disorders with number of disorders	
	OR	95% CI	OR	95% CI	OR	95% CI
Anxiety						
Panic disorder	1.4	1.1, 1.6	1.1	0.9, 1.3	1.1	0.9, 1.3
GAD with hierarchy	1.4	1.2, 1.8	1.2	0.9, 1.5	1.1	0.9, 1.4
Social phobia	1.4	1.2, 1.6	1.3	1.2, 1.5	1.1	1.0, 1.3
Specific phobia	1.3	1.2, 1.5	1.2[†]	1.0, 1.3	1.1[†]	1.0, 1.3
Agoraphobia	1.6	1.3, 2.0	1.4[†]	1.0, 1.8	1.3[†]	1.0, 1.7
PTSD	1.7	1.4, 2.1	1.5	1.2, 1.8	1.4	1.2, 1.7
SAD/ASA	1.5	1.3, 1.8	1.4	1.2, 1.7	1.3	1.1, 1.5
Mood						
Major depression	1.6	1.5, 1.8	1.6	1.4, 1.8	1.5	1.3, 1.7
Dysthymia	1.5	1.2, 1.9	1.0	0.7, 1.3	1.0	0.8, 1.3
Bipolar	1.6	1.2, 2.1	1.2	0.9, 1.6	1.3	1.0, 1.7
Impulse						
ODD	1.8	1.4, 2.2	1.3	0.9, 1.7	1.2	0.9, 1.5
CD	1.7	1.3, 2.3	1.4	1.0, 2.0	1.3	0.9, 1.8
ADHD	1.6	1.2, 2.0	1.1	0.8, 1.5	1.1	0.9, 1.4
IED	1.2	1.1, 1.4	1.1	0.9, 1.3	1.0	0.8, 1.2
Substance						
Alcohol abuse w / without dependence	1.7	1.5, 1.9	1.6	1.4, 1.9	1.4	1.2, 1.7
Alcohol dependence	1.8	1.5, 2.2	1.0	0.8, 1.3	1.2	0.9, 1.6
Drug abuse w / without dependence	1.8	1.4, 2.2	1.6	1.2, 2.2	1.3	0.9, 1.7
Drug dependence	1.7	1.3, 2.4	0.7	0.5, 1.2	0.9	0.6, 1.4
Number of disorders						
Exactly two disorders	.	...	.	...	1.0	0.8, 1.2
Exactly three disorders	.	...	.	...	0.9	0.7, 1.1
Exactly four disorders	.	...	.	...	1.0	0.7, 1.3
5+ disorders	.	...	.	...	0.6	0.4, 0.9

SAD, seasonal affective disorder; PTSD, post-traumatic stress disorder; GAD, generalized anxiety disorder; ASA, adult separation anxiety; ODD, oppositional defiant disorder; CD, conduct disorder; IED, intermittent explosive disorder.

*
Odd ratio estimated in discrete time survival models. In Model 1, associations are estimated for each disorder separately, with statistical controls for sex, age, country, years since marriage, months dating prior to marriage, and educational attainment. In Model 2, associations are estimated for all disorders simultaneously with the same statistical controls. In Model 3, associations are estimated for all disorders and the total number of disorders simultaneously, along with the same statistical controls.

†
Bound of confidence interval rounds to 1.0, but *P*-value < 0.05.

Table 5

Population attributable risk proportions of marriages and divorces because of mental disorders[*]

Disorder	Marriages[†]			Divorces (%)
	Early (%)	On-time (%)	Late (%)	
Anxiety				
Panic disorder	−0.3	0.0	−0.2	0.1
GAD	0.2	−0.1	−0.1	0.2
Social phobia	−0.6	−0.4	0.0	0.6
Specific phobia	3.6	0.1	−1.2	1.3
Agoraphobia	−0.2	0.0	−0.3	0.4
PTSD	−0.1	−0.1	−0.3	1.0
SAD/ASA	−0.6	−0.1	−0.2	0.9
Mood				
Major depression	0.3	−1.0	−2.2	4.0
Dysthymia	0.0	−0.1	−0.2	−0.1
Bipolar	0.1	−0.1	−0.3	0.3
Impulse				
ODD	−0.1	−0.1	0.1	0.2
CD	0.5	0.0	0.1	0.3
ADHD	−0.9	0.1	0.1	0.0
IED	−0.1	0.1	−0.1	−0.1
Substance				
Alcohol abuse w / without dependence	0.0	−0.3	−1.2	2.9
Alcohol dependence	0.1	−0.2	−0.3	0.3
Drug abuse w / without dependence	0.0	−0.4	0.2	0.5
Drug dependence	0.2	−0.1	−0.1	−0.2
All disorders	1.9	−2.7	−6.7	12.0

SAD, seasonal affective disorder; PTSD, post-traumatic stress disorder; GAD, generalized anxiety disorder; ASA, adult separation anxiety; ODD, oppositional defiant disorder; CD, conduct disorder; IED, intermittent explosive disorder.

[*] PARPs estimated as the change in predicted prevalence of the outcome when the effects of premarital mental disorders are removed from the population. Positive percentages indicate increases in the outcome associated with the presence of the disorder.

[†] Early Marriage = marriage prior to age 18, On-time marriage = between age 18 and the country-specific 75th percentile of age at marriage, Late marriage = above the country-specific 75th percentile of age at marriage.