Does Poor Mental Health Explain Excess Mortality after Marital and Non-Marital Separation?

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Introduction

Symptoms of poor mental health are consistent findings after divorce[1–6], and both divorce[7–13] and poor mental health[14–16] are important determinants of elevated mortality risk. However, the extent to which poor mental health explains post-divorce excess mortality is unclear. Divorce and mental health are bi-directionally associated, so that poor mental health increases the probability of divorce, but divorce also has an effect on mental health.[4–6,17–22] Thus, the elevated mortality risk after divorce may result from chronic poor mental health before divorce, changes in mental health related to divorce, or symptoms of poor mental health that emerge after divorce.

To our knowledge, only one prospective study has examined how the emergence of depression predicts post-divorce mortality.[23] The study was based on the HRS survey and showed that depression that emerged at the time of divorce predicted increased mortality risk, whereas chronic depression that was already present before divorce did not have a similar effect. However, the HRS sample only includes individuals older than 50,[24] and the association between divorce, mental health and mortality may be different for younger age groups and for those separating from non-marital unions. Non-marital unions are less stable than marriages and an increasing proportion of separations are thus non-marital.[25–27]

In Finland, the prevalence of psychotropic medication use increases rapidly before divorce and non-marital separation, followed by a post-separation decline.[20,28] Among married couples, the risk of separation also remains elevated more than two years after psychotropic medication use or psychiatric hospital care of either spouse has been initiated.[21] Thus the elevated post-separation mortality risk may partly follow clinically significant symptoms of poor mental health present more than two years before separation. This suggests that the time period already before separation may be essential to prevent post-separation excess mortality.

In addition to psychological symptoms and depression, unhealthy behavior such as excessive risk-taking and alcohol use are suggested expressions of internal psychological distress.[29–32] Individuals in poor mental health commonly engage in unhealthy behaviors such as excess alcohol use, physical inactivity and smoking,[14,16] and accordingly, the post-divorce mortality risk is particularly high for external and alcohol-related causes of death.[11,33–35] Mortality risk attributable to these causes is particularly high among men.[11] Men have been suggested to express psychological distress in the form of unhealthy external behavior more often than women, who in turn would show more internal depressive symptoms.[29–31] However, this gendered hypothesis in ways to express distress is not clearly supported by newer studies,[32,36] and internal psychological symptoms such as depression may be present simultaneously with external symptoms such as alcohol use.

Excess mortality due to external and alcohol-related causes is pronounced immediately after divorce, with a reduction thereafter.[11] Among women the excess mortality attributable to external and alcohol-related causes of death is high only six months after divorce, but among men the mortality risk shows a strong reduction during the four years following divorce.[11] However, changes in psychotropic medication prevalence before and after divorce are very similar among men and women.[20]

To our knowledge, no previous studies have assessed how mortality risk changes over time since non-marital separation. However, individuals in long-term continuous non-marital unions show prevalence of psychotropic medication use similar to individuals in long-term continuous marriages, and the changes in prevalence are quite similar before and after separation from long-term non-marital cohabitation compared to prevalence trajectories before and after divorce.[20,28] This suggests that the time patterns of post-separation mortality risk may be similar to the time patterns of post-divorce mortality risk, with pre-separation mental health associated with post-separation mortality risk.

This study combines information from various administrative registers to examine how poor mental health explains changes in mortality risk in relation to time since marital and non-marital separation. It aims to answer whether purchases of psychotropic medication and hospital care with psychiatric diagnosis before, during and after separation can explain the excess in all-cause mortality, and mortality due to external and alcohol-related causes.

Data and methods

The study uses an 11% random sample of the Finnish population aged 25 to 64, with an additional random sample of deceased individuals added to cover 80% of all deaths during years 1995 to 2012. These annually collected data from Statistics Finland include exact dates of entering non-marital and marital cohabitation, exact dates of separation from these unions, and annual socio-economic and household information from 1995 to 2012, as well as mortality follow-up until the end of year 2012. Statistics Finland has further linked these data to information on medication purchases and hospitalizations from 1995 to 2012 (the Ethics Committee of Statistics Finland's permission TK-53-339-13). The information on psychotropic medication purchases comes from the administrative register held by the Social Insurance Institution, and information on psychiatric hospitalizations from the administrative register of National Institute of Health and Welfare.

Psychotropic medication purchases and hospitalizations with a psychiatric diagnosis are referred to as psychiatric morbidity. Psychotropic medication includes purchases of psycholeptics (ATC-codes N05) and psychoanaleptics (N06) excluding anti-dementia drugs (N06D). Hospitalizations include in-patient care with a psychiatric diagnosis (ICD-10 codes F20-F69, F99). The exact dates of medication purchases and the dates of entry to and exit from hospital care are recorded.

In addition to all-cause mortality we analyzed external and alcohol-related causes of death (ICD-10 codes F10, G312, G4051, G621, G721, I426, K292, K70, K860, K8600, O354, P043V01-X44, X44-Y09, Y16-Y86, Y88-Y89, Y870-Y872).

We followed 213,224 individuals that were continuously cohabiting with either a non-marital or a marital partner from 1995 to 1997 for subsequent separation and death from 1998 to 2012. During the follow-up period we observed 38,500 separations and 39,702 deaths. We used Cox regression to analyze how separation was related to the risk of death. The outcome variable was time from the beginning of follow-up (Jan 1st, 1998) until death, and censoring occurred at the end of follow-up (Dec 31st, 2012), bereavement, or emigration.

We first present age-adjusted models that show the hazard ratios (HR) for post-separation all-cause mortality and mortality attributable to external and alcohol-related causes of death. These models are then further adjusted for psychiatric morbidity before, during, and after separation, before other covariates are added to produce the final models. Finally, we present estimates for the changes in mortality risk (HR) over time since the separation, and examine how adjustment for psychiatric morbidity affects these estimates.

Psychiatric morbidity is measured throughout the entire follow-up period. Any individual is considered to experience psychiatric morbidity if he or she purchases psychotropic drugs twice within six months. In Finland, clinical doctors prescribe all psychotropic drugs, and all residents are entitled to reimbursement for medication expenses for products to be used within the next three months.[37] Thus individuals on continuous medication are expected to make drug purchases at least once within three months. Recovery is assumed to take place when no purchases are made within 12 months. For psychiatric hospitalizations, psychiatric morbidity begins on the date of entry into a hospital, and ends 12 months after exit from hospital care.

Individuals may have multiple spells of psychiatric morbidity during the follow-up. All spells that begin more than six months before the date of separation are classified as psychiatric morbidity before separation. Spells that end or begin within six months prior to separation, or within 6 months after separation, are classified as psychiatric morbidity during separation. Spells of psychiatric morbidity that begin more than 6 months after separation are considered as psychiatric morbidity after separation.

Preliminary findings and next steps

Compared to the continuously married, the age-adjusted HR for post-separation all-cause mortality was 2.45 (95% CI 2.33-2.57) among men and 1.68 (1.56-1.82) among women (Fig 1). The excess was much larger for external and alcohol-related causes of death. Adjustment for psychiatric morbidity after separation had little effect on this excess, but psychiatric morbidity before and during the separation process attenuated it by 20-30%. For other than external and alcohol-related causes, the attenuation was up to 50%. These results suggest that more attention should be given to social relationships in the treatment of psychiatric morbidity, and that support for individuals considering separation or going through it is needed to alleviate psychiatric morbidity and associated deaths.

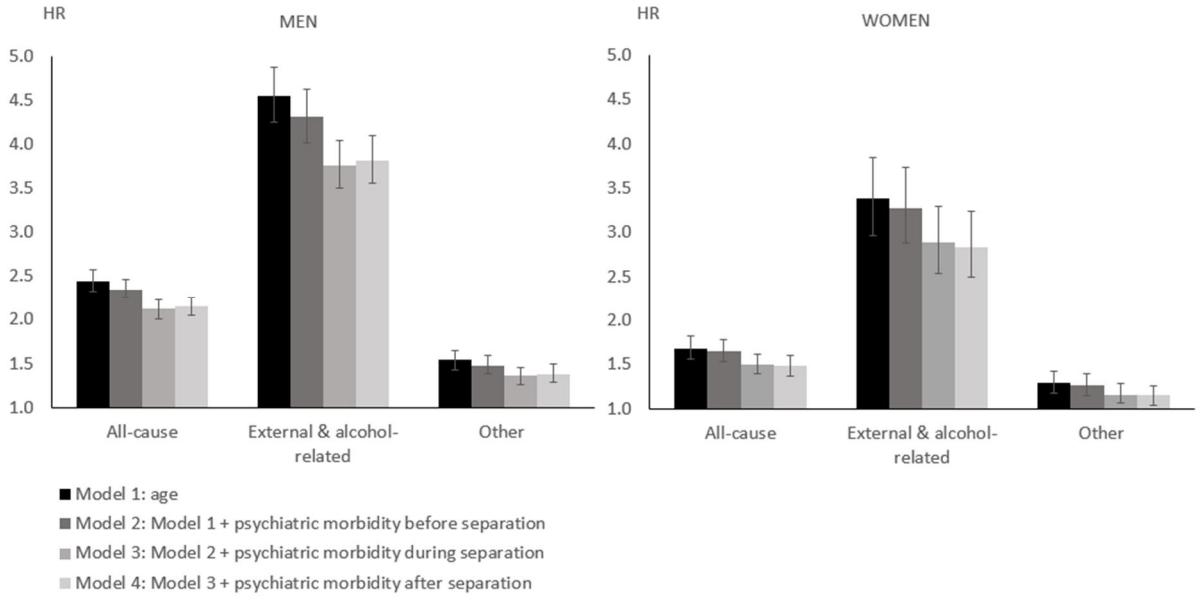

Fig 1. Excess mortality after marital separation (HR and 95% CI) by gender and cause of death

The next step of the analyses will be to assess the time patterns of post-separation mortality and how these are explained by time patterns in psychiatric morbidity. When examining how mortality risk varies in relation to time since the separation, the mortality of the continuously cohabiting will be used as the reference category, and time since the separation will be split into periods: 0 to 6 months, 6 months to 3 years, 3 to 8 years, and more than 8 years. This will allow us to assess whether mortality risk is higher immediately after separation and declines thereafter, and whether psychiatric morbidity explains excess mortality similarly during the entire follow-up time since the separation.

We will further assess whether the age-adjusted mortality patterns are similar for non-marital and marital separations, and whether psychiatric morbidity affects these time patterns similarly regardless of the union being non-marital or marital.

Finally, socio-demographic covariates will be added to the models. These include educational level, social class, main activity, income, housing tenure, and having children younger than 18 years living in the household.

References

1. Afifi, T. O., Cox, B. J. & Enns, M. W. Mental health profiles among married, never-married, and separated/divorced mothers in a nationally representative sample. *Soc. Psychiatry Psychiatr. Epidemiol.* **41,** 122–129 (2006).
2. Alonso, J. *et al.* Prevalence of mental disorders in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. *Acta Psychiatr. Scand. Suppl.* 21–27 (2004).
3. Breslau, J. *et al*. A multinational study of mental disorders, marriage, and divorce. *Acta Psychiatr. Scand.* **124,** 474–486 (2011).
4. Johnson, D. R. & Wu, J. An Empirical Test of Crisis, Social Selection, and Role Explanations of the Relationship Between Marital Disruption and Psychological Distress: A Pooled Time-Series Analysis of Four-Wave Panel Data. *J. Marriage Fam.* **64,** 211–224 (2002).

5. Strohschein, L. *et al.* Marital transitions and mental health: are there gender differences in the short-term effects of marital status change? *Soc. Sci. Med. 1982* **61,** 2293–2303 (2005).
6. Wade, T. J. & Pevalin, D. J. Marital transitions and mental health. *J. Health Soc. Behav.* **45,** 155–170 (2004).
7. Ikeda, A. *et al*. Marital status and mortality among Japanese men and women: the Japan Collaborative Cohort Study. *BMC Public Health* **7,** 73 (2007).
8. Johnson, N. J *et al*. Marital status and mortality: the national longitudinal mortality study. *Ann. Epidemiol.* **10,** 224–238 (2000).
9. Liu, H. Till Death Do Us Part: Marital Status and U.S. Mortality Trends, 1986 – 2000. *J. Marriage Fam.* **71,** 1158–1173 (2009).
10. Manzoli, L. *et al*. Marital status and mortality in the elderly: a systematic review and meta-analysis. *Soc. Sci. Med. 1982* **64,** 77–94 (2007).
11. Metsä-Simola, N. & Martikainen, P. The short-term and long-term effects of divorce on mortality risk in a large Finnish cohort, 1990-2003. *Popul. Stud.* **67,** 97–110 (2013).
12. Murphy, M., Grundy, E. & Kalogirou, S. The increase in marital status differences in mortality up to the oldest age in seven European countries, 1990–99. *Popul. Stud.* **61,** 287–298 (2007).
13. Sbarra, D. A., Law, R. W. & Portley, R. M. Divorce and Death: A Meta-Analysis and Research Agenda for Clinical, Social, and Health Psychology. *Perspect. Psychol. Sci. J. Assoc. Psychol. Sci.* **6,** 454–474 (2011).
14. Druss, B. G. & Walker, E. R. Mental disorders and medical comorbidity. *Synth. Proj. Res. Synth. Rep.* 1–26 (2011).
15. K. Lönnqvist, J. Psychiatric Aspects of Suicidal Behaviour: Depression. in *The international handbook of suicide and attempted suicide* 107–120 (2008).
16. Walker, E. R., McGee, R. E. & Druss, B. G. Mortality in Mental Disorders and Global Disease Burden Implications. *JAMA Psychiatry* **72,** 334–341 (2015).
17. Blekesaune, M. Partnership Transitions and Mental Distress: Investigating Temporal Order. *J. Marriage Fam.* **70,** 879–890 (2008).
18. Butterworth, P. & Rodgers, B. Mental health problems and marital disruption: is it the combination of husbands and wives' mental health problems that predicts later divorce? *Soc. Psychiatry Psychiatr. Epidemiol.* **43,** 758–763 (2008).
19. Idstad, M. *et al.* Mental distress predicts divorce over 16 years: the HUNT study. *BMC Public Health* **15,** (2015).
20. Metsä-Simola, N. & Martikainen, P. Divorce and changes in the prevalence of psychotropic medication use: A register-based longitudinal study among middle-aged Finns. *Soc. Sci. Med.* **94,** 71–80 (2013).
21. Metsä-Simola, N., Martikainen, P. & Monden, C. W. Psychiatric morbidity and subsequent divorce: a couple-level register-based study in Finland. *Soc. Psychiatry Psychiatr. Epidemiol.* **53,** 823–831 (2018).
22. Mojtabai, R. Increase in antidepressant medication in the US adult population between 1990 and 2003. *Psychother. Psychosom.* **77,** 83–92 (2008).
23. Malgaroli, M., Galatzer-Levy, I. R. & Bonanno, G. A. Heterogeneity in Trajectories of Depression in Response to Divorce is Associated with Differential Risk for Mortality. *Clin. Psychol. Sci. J. Assoc. Psychol. Sci.* **5,** 843–850 (2017).
24. Juster, F. T. & Suzman, R. An Overview of the Health and Retirement Study. *J. Hum. Resour.* **30,** S7–S56 (1995).
25. Jalovaara, M. Socioeconomic Resources and the Dissolution of Cohabitations and Marriages. *Eur. J. Popul. Rev. Eur. Démographie* **29,** (2013).
26. Heuveline, P. & Timberlake, J. M. The Role of Cohabitation in Family Formation: The United States in Comparative Perspective. *J. Marriage Fam.* **66,** 1214–1230 (2004).
27. O'Connor, T. G. *et al*. Factors moderating change in depressive symptoms in women following separation: findings from a community study in England. *Psychol. Med.* **35,** 715–724 (2005).
28. Metsä-Simola, N. & Martikainen, P. The effects of marriage and separation on the psychotropic medication use of non-married cohabiters: a register-based longitudinal study among adult Finns. *Soc. Sci. Med. 1982* **121,** 10–20 (2014).
29. Horwitz, A. V. *Are emotional distress and alcohol problems differential outcomes to stress?: an exploratory test*. (1994).
30. Horwitz, A. V., White, H. R. & Howell-White, S. The use of multiple outcomes in stress research: a case study of gender differences in responses to marital dissolution. *J. Health Soc. Behav.* **37,** 278–291 (1996).
31. Simon, R. W. Revisiting the Relationships among Gender, Marital Status, and Mental Health. *Am. J. Sociol.* **107,** 1065–1096 (2002).
32. Slopen, N. *et al*. Sex, stressful life events, and adult onset depression and alcohol dependence: are men and women equally vulnerable? *Soc. Sci. Med. 1982* **73,** 615–622 (2011).
33. Lund, R., Holstein, B. E. & Osler, M. Marital history from age 15 to 40 years and subsequent 10-year mortality: a longitudinal study of Danish males born in 1953. *Int. J. Epidemiol.* **33,** 389–397 (2004).
34. Martikainen, P. *et al*. Differences in mortality by marital status in Finland from 1976 to 2000: analyses of changes in marital-status distributions, socio-demographic and household composition, and cause of death. *Popul. Stud.* **59,** 99–115 (2005).
35. Rogers, R. Marriage, Sex, and Mortality. *J. Marriage Fam.* **57,** 515 (1995).
36. Hill, T. D. & Needham, B. L. Rethinking gender and mental health: a critical analysis of three propositions. *Soc. Sci. Med. 1982* **92,** 83–91 (2013).
37. Sihvo, S. *et al*. Increase in the duration of antidepressant treatment from 1994 to 2003: a nationwide population-based study from Finland. *Pharmacoepidemiol. Drug Saf.* **19,** 1186–1193 (2010).