Predictors of mortality among a national sample of elderly widowed people: analysis of 28-year mortality rates

ANN BOWLING

Department of Primary Care and Population Health, University College London, Royal Free Campus, Rowland Hill Street, London NW3 2PF, UK
Address correspondence to: A. Bowling. Tel: (+44) 2077940500; Fax: (+44) 2077941224. Email: a.bowling@ucl.ac.uk

Abstract

Objective: to identify predictors of mortality among a national sample of elderly widowed people 28 years post-baseline interview.

Design and setting: face to face home interview survey across England.

Measures: physical, psychological, social, and socio-economic status and circumstances.

Results: excess risk of mortality, which had been noted up to six months post bereavement among males aged 75+, had disappeared. In contrast to findings up to 13 years post-bereavement, neither psycho-social factors, social circumstances nor social class independently predicted differentials in mortality when analysed up to 28 years post-bereavement. The most significant, independent predictors, up to the 28-year term, were, as would be expected, male sex, older age, poorer physical functioning, and expressed ‘relief at the death of the spouse’. When the sample was split by duration of widow(er)hood male sex and older age retained significance.

Conclusion: the increasing frailty of the sample overall, and reduced statistical power in split-sample analyses, may explain the loss of significance of physical functioning and ‘expressed relief at the death’ in the split-sample results. The psycho-social risk factors for mortality after bereavement reduce over time, although further examination of expressed relief would be worthwhile.

Keywords: physical functioning, survival, mortality, bereavement, old age, elderly

Introduction

Large studies across the developed world have indicated that married people have lower mortality rates than those who are widowed, divorced, separated or single [1–3]. Murphy, Grundy and Kalogirou (2007) [4] investigated mortality differentials by marital status among people aged 40–89 for seven European countries, and confirmed the mortality...
advantage of married men and women in all age groups studied. This is consistent with published meta-analyses [5, 6]. Not all results are entirely consistent. For example, the Alameda County Study indicated that marital status assumed primary importance for mortality only among respondents aged <60 years at baseline [7] and for males rather than females [8].

Previous research on mortality after bereavement has indicated an excess risk of death in the first 6 months of widow(er)hood, particularly for men [9–11], and in the first 7–12 months [12], which thereafter reduces as people adapt to widow(er)hood [13]. There are some exceptions. One study [14] showed an increased mortality rate after widowhood but not after widowerhood; another study [15] observed excess mortality during later years of widow(er)hood only among men aged under 65; and one study [16] observed increased mortality risk up to 11 years among both widows and widowers, although at a lower level than in the first 3 months of widow(er)hood. While some investigators have reported stronger effects with younger age, the influence of age is inconsistent; the influence of the socio-economic group on mortality after bereavement is also uncertain [17].

Analyses of a national interview survey of a random sample of recently widowed people over retirement age, in England, were conducted by Bowling & Benjamin (1985) [17]. They reported excess mortality in the first 6 months of widow(er)hood for males aged 75+; there were no differences with females or people <75 years (pre- and post-interview deaths were included in the analyses). The risk disappeared when the data were re-analysed 13.4 years post-widow(er)hood [18]. These interview data were unique in their inclusion of an extensive set of health, psycho-social and socio-economic variables. Multivariate analyses, adjusting for age and sex, of independent predictors of survival up to 6 years and 13.4 years post-bereavement, indicated that, as well as indicators of physical health and functioning, indicators of psycho-social adjustment to the bereavement at baseline interview had an early protective effect [18–21]. Baseline survey analyses ([22], p. 165) found that the widowed who found it most difficult to adjust were more likely to be female, to be younger, in poor health, to have difficulties with mobility, more difficulty in occupying their time and more reported financial problems. Potential causal pathways include the effects of psycho-social stress on health, health behaviour, role changes and reduced social support [11, 23], although more information about how to identify potentially vulnerable individuals is needed.

**Aim and methods**

The aim of this paper is to identify predictors of mortality among the responders to the above study: 361 elderly widowed respondents to face-to-face interview, plus 19 proxy interviews with carers. For the analyses presented here, 28-year mortality data from the survey of elderly widowed respondents were used to examine the relative importance of physical functioning, social and psychological circumstances, adjusting for age, sex and socio-economic status, as predictors of survival in older age. Cox proportional hazards models of mortality from time of widow(er)hood January 1979 up to June 2007 were conducted for the full sample, for the sample split by duration of widow(er)hood (<16 years; 16–28 years) and for males and females separately. Sensitivity analyses were conducted to examine the effects of non-response at baseline interview. The baseline sample and methods were described in full in early publications [22]. Survival and life table analyses, and examination of expected and observed deaths, of the full sample of responders and non-responders up to 6 years and up to 13 years, were reported earlier [18–21, 24].

**Results**

During the 28-year follow-up period, 334 of the 361 survey respondents were notified by the NHS Central Registry as deceased, leaving 27 who had either survived, or their status was unknown (e.g. lost to the system due to non-tracing of death, e.g. via emigration). Of the 139 non-responders to the study, 119 were notified as deceased either before the study fieldwork commenced, or subsequently, leaving 20 survivors or with untraced deaths. The 27 respondents and 20 non-respondents who had 'survived', or who may not have been identified by NCHNR, were excluded from the analyses.

Univariate analyses (Spearman’s product moment correlations and chi-square tests) showed that neither socio-economic status, social network, support or participation, self-reported, and interviewer assessed, problems with mental health, self-reported coming to terms with the death of their spouse, were significantly associated with duration of survival among the interview sample. Variables which achieved significance were age, sex, level of physical functioning, and interviewer assessments of whether or not relief was expressed at the death of the spouse (in most cases said to be due to the distressing nature of the illness). These significant variables were entered into Cox proportional hazard models.

These models were all statistically significant. The full sample model over 28 years, and also split by duration of widow(er)hood, showed that the hazard ratio for males was over one and a half to almost twice that of females (highly significant in each model) and was significantly reduced with each unit increase in year of birth (indicating younger age). The hazard ratio for mortality, in the full 28-year sample, but not the split duration samples, was significantly decreased for those with no difficulty with physical functioning (see Table 1 for full model and models split by duration). The hazard ratio was significantly reduced among people who were judged to express no relief at the death of their spouse in the full 28-year sample only. The separate models by gender showed that the hazard ratios decreased for both females and males, with every unit decrease in year of birth. Hazards were significantly reduced for males with no difficulty with physical functioning; these results were similar for females but did not
Predictors of mortality after bereavement

Table 1. Hazard ratios for mortality by predictor variables. The final model for deceased respondents; adjusted model: full sample and sample split by duration of widow(er)hood <16 years and 16–28 years

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Final model</th>
<th>Duration widowed &lt;16 years</th>
<th>Duration widowed 16–28 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relative hazard ratio (95% CI), P-value</td>
<td>Relative hazard ratio (95% CI), P-value</td>
<td>Relative hazard ratio (95% CI), P-value</td>
</tr>
<tr>
<td>No difficulty with any of the ADL self-care tasks listed (1) versus difficulty with any (0)</td>
<td>0.696 (0.540–0.898), 0.005</td>
<td>0.866 (0.666–1.125), 0.281</td>
<td>0.911 (0.544–1.526), 0.724</td>
</tr>
<tr>
<td>No relief at spouses death (1) versus lot/some/little relief (0)</td>
<td>0.786 (0.619–0.997), 0.047</td>
<td>0.846 (0.651–1.099), 0.210</td>
<td>0.688 (0.429–1.102), 0.120</td>
</tr>
<tr>
<td>Sex: male (1) versus female (0)</td>
<td>1.929 (1.490–2.497), 0.001</td>
<td>1.596 (1.211–2.103), 0.001</td>
<td>2.217 (1.168–4.206), 0.015</td>
</tr>
<tr>
<td>Year of birth (continuous)</td>
<td>0.945 (0.928–0.962), 0.001</td>
<td>0.959 (0.940–0.978), 0.001</td>
<td>0.952 (0.915–0.991), 0.015</td>
</tr>
</tbody>
</table>

No. of cases = 309; CI = confidence interval.

Achieve statistical significance (separate models by gender not shown).

Discussion

In contrast to the earlier analyses up to 13 years post-widow(er)hood, the adjusted analyses over this 28-year term showed that neither self-reported psycho-social factors, social circumstances nor social class independently predicted differentials in mortality in this sample of elderly widowed people. While earlier analyses showed that widowed males aged 75+ had excess risk of mortality at 6 months post-bereavement, the risk then disappeared. The most significant, independent predictors of mortality in the longer term among this group were, as would be expected, older age, male sex and poorer physical functioning. The latter variable, along with interviewer assessed relief at death of spouse, lost significance in the split duration models. This may be due to the samples all becoming frailer over time with age, and the reducing psychosocial impact of the bereavement over time. The split samples also reduced the statistical power of the analyses, which may explain loss of significance, or associations (e.g. with assessments of expressed relief at the death) may even have been spurious. Apart from obtaining mortality data, the sample was not followed up longitudinally, and therefore the analyses were limited to measures at baseline. The dynamics of social networks and support, and emotional well-being, had they been measured over time, would be expected to correlate with mortality differentials, although their directions of cause and effect on ill-health are not always clear [25]. In conclusion, the psycho-social risk factors for mortality after bereavement do reduce over time, although further examination of the meaning and influence of expressed relief at the death of a spouse would be worthwhile.

Key points

- Excess risk of mortality after bereavement among older widowers, up to 6 months after loss of a spouse, disappeared over a longer follow-up period.
- Baseline psycho-social risk factors for mortality up to 13 years post-bereavement, among elderly widows and widowers, were reduced in 28-year mortality follow-up.
- Significant predictors of mortality over 28 years of follow-up of elderly widowed people were, as expected, older age, male sex and poorer physical functioning.

Acknowledgements

Thanks are due to Essex Data Archive, especially Mr Jack Kneeshaw who converted the original punch card format files deposited into SPSS10 windows readable format, the Office for National Statistics Central Registry for flagging the deaths, and to Professor Ann Cartwright who directed the baseline survey of the elderly widowed at the Institute for Social Studies in Medical Care. The author is grateful to Professor Emily Grundy for comments on an earlier version of this paper.

Conflicts of interest

None declared.

Funding

The original survey and earlier analyses of mortality were funded by the Department of Health.

References

3. Valkonen T, Martikainen P, Blomgren J. Increasing excess mortality among non-married elderly people in developed


Received 8 September 2008; accepted in revised form 24 March 2009