

The mental health and mortality impact of death of a partner with dementia

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KEY POINTS

- In the year before bereavement, partners of the deceased with dementia were more likely to be diagnosed with depression and receive psychotropic medication than partners from bereavements without dementia.
- After bereavement, partners of the deceased with dementia were less likely to initiate psychotropic medication, and were more likely to be alive at one year, than partners from bereavements without dementia.
- Prior to the bereavement, subjects who died with dementia were less likely to receive palliative care.
- Services need to address the needs of carers for individuals dying with dementia prior to the bereavement, and improve access to palliative care.

ABSTRACT

OBJECTIVE: Caring for a partner with dementia and partner bereavement are independently associated with poor health. An understanding of the health effects of living with a partner dying with dementia can help optimise support. We describe health in the year before and after loss of a partner with dementia compared to other bereavements.

METHODS: In a UK primary care database, 2624 older individuals whose partner died with dementia during 2005-2012 were matched with 7512 individuals experiencing bereavement where the deceased partner had no dementia recorded.

RESULTS: Prior to bereavement, partners of the deceased with dementia were more likely to be diagnosed with depression (OR 2.31, 1.69-3.14) and receive psychotropic medication (OR 1.34, 1.21-1.49) than partners from bereavements without dementia. In contrast, psychotropic medication initiation two months after dementia bereavement was lower (HR 0.69, 0.56-0.85). Compared to other bereaved individuals, mortality after bereavement was lower in men experiencing a dementia bereavement (HR 0.68 (0.49-0.94) but similar in women (HR 1.02, 0.75-1.38). Prior to bereavement, those who died with dementia were less likely to receive palliative care (OR 0.47, 0.41-0.54).

CONCLUSION: In the year before bereavement, partners of individuals dying with dementia experience poorer mental health than those facing bereavement from other causes and their partner is less likely to receive palliative care. In the year after, individuals whose partner died with dementia experience some attenuation of the adverse health effects of bereavement. Services need to address the needs of carers for individuals dying with dementia and improve access to palliative care.

1 Introduction

Caring for a partner with physical or mental disability is associated with an increased risk of health problems (Schulz and Beach, 1999, Roth et al., 2009). These adverse effects are primarily reported in those with high levels of caregiver strain and carers for partners with dementia have been identified as experiencing higher levels of strain and health problems than other carers (Schulz and Beach, 1999, Roth et al., 2009, Ory et al., 1999, Pinguart and Sorensen, 2003b).

Bereavement is a well-established risk factor for poor psychological and physical health with an increased risk of death, cardiovascular events, depression and psychotropic medication use in the year after death of a partner (Stroebe et al., 2007, Moon et al., 2011, Carey et al., 2014, Shah et al., 2013c). However, analysis of routine data suggests that the subsequent mortality effect is absent in those whose partner dies of dementia (Elwert and Christakis, 2008). One possible explanation for this is that the pre-death grief associated with caring for a partner with dementia (Lindauer and Harvath, 2014), may result in many detrimental effects to health being realised prior to the point of bereavement, leaving no additional mortality risk burden afterwards. Two small studies of dementia caregivers have identified high levels of depressive symptoms in the year before death of a partner with a reduction in symptoms after bereavement, along with a reported sense of relief for a majority of dementia caregivers (Schulz et al., 2001, Schulz et al., 2003). These findings suggest that any increases in providing support would have the greatest benefit to caregivers immediately prior to the bereavement. However, the difficulty of identifying a terminal phase of the disease process for dementia as compared to say cancer, means many people with

dementia may experience poorer access to end of life care which may limit opportunities to support partners both before and after bereavement (Sachs et al., 2004).

In this study, we use data from a large English primary care database to test the hypothesis that the effect on mental health, measured by a clinical diagnosis of depression and use of psychotropic medication, in the year before bereavement differs between those whose partners die with a diagnosis of dementia and others experiencing bereavement. We also examine whether access to palliative care before bereavement and the health impact of bereavement, measured by initiation of psychotropic medication and risk of death in the first year after bereavement, differ between these groups. Understanding these differences is important in developing and targeting appropriate support for carers of people with dementia.

2 Methods

2.1 Data source

The Health Improvement Network (THIN) is an established primary care database which collects anonymised data from United Kingdom (UK) primary care (family) practices. It includes a full record of diagnoses and prescribing, and has been shown to be demographically representative of the UK (Lewis et al., 2007, Blak et al., 2011). A feature of the THIN database is the family number which allows practices to identify patients who live in the same household (Shah et al., 2010).

2.2 Identification of Couples

Out of 495 practices providing data to the THIN scheme at study inception in 2010, we included all 401 practices active in the scheme between 2005 and 2008 which provided data for at least one year. We have previously described how we used historically collected data to determine retrospective composition of households between 2005 and 2008 for all registered patients aged 60 and over (Shah et al., 2012). This allowed us to determine an index date for each couple.

We based our approach to identification of cohabiting couples on an analysis of national survey data (Office for National Statistics 2005). This showed among those aged 60 and over, couples of the opposite sex living together in a household with less than ten years age difference are almost invariably (99.4%) married or cohabiting (Shah et al., 2012). We developed an algorithm which identified households that contained an older person aged 60 and over living with another adult aged 50+ years of opposite sex (Shah et al., 2012). We required included couples to have an age difference of ten years or less, and that no younger adult in the household be within 15 years of either of the couple. Couples where

either member had a record of residence in institutional care settings were excluded. This approach identified 171,720 eligible couples(Shah et al., 2012).

2.3 Bereavement

Couples were followed in the primary care record from their index date to their last practice data collection date up to September 2012. When one or both members of the couple deregistered from the participating general practice, both members of the couple were censored from the analysis at that point. The timing of bereavement was identified through the record of death in the deceased partner's primary care record. 35,872 older people (21% of couples) experienced bereavement during follow up.

2.4 Dementia Bereavement

We identified 2688 individuals who experienced a bereavement where their deceased partner had a diagnosis of dementia and who were registered with their GP for at least one year before the bereavement.

2.5 Matched Non-Dementia Bereavement Group

We identified an age (within 5 years at bereavement), sex and practice matched control group of individuals who experienced bereavement where their deceased partner had no record of a diagnosis of dementia. We required that their date of bereavement was within three years of the index patient with dementia bereavement. Up to three controls (n=7512) were identified, with 2624 (98%) dementia bereavements matched with at least one non-dementia bereaved control (Figure 1).

2.6 **Outcomes**

2.6.1 *Year before Bereavement*

We identified any diagnosis of depression in the year before bereavement in the primary care record by electronically searching for diagnostic codes for depression which are included in the UK Quality and Outcomes Framework (QOF)(General Medical Services Contract, 2015). QOF is a national pay for performance primary care incentive system in the UK which defines nationally agreed disease codes and standards of care for chronic conditions.

For psychotropic prescribing, we identified any prescription for anxiolytics, hypnotics, antidepressants and antipsychotics in the primary care record. Low dose amitriptyline (<50mg) prescribing was excluded as, in the UK, low dose amitriptyline may be prescribed for pain management.

We also identified whether the deceased partner had been identified as needing palliative care prior to their death. This was based on whether they had a Read code indicating inclusion on the palliative care register for the practice for the Quality and Outcomes framework(General Medical Services Contract, 2015).

2.6.2 *Year after Bereavement*

Analyses of psychotropic drug initiation were restricted to 1,938 patients with dementia bereavements who had not received any psychotropic medication prescriptions in the year before the bereavement. We created new matchsets for these 1,938 dementia bereavements (Figure 1), now matched on age, sex and practice as before plus no receipt of any psychotropic in the year before the bereavement, in individuals who experienced bereavement without a diagnosis of dementia in their partner's record. This resulted in

1883 dementia bereavements being successfully matched with 5331 patients experiencing non-dementia bereavement who had not received any psychotropic medication in the year before their bereavement date.

We also identified death of the bereaved individual in the first year after bereavement.

2.6.3 *Contact with Primary Care*

Contact was measured as contact days which were defined as the number of days on which there was a record of contact with primary care excluding administrative events(Shah et al., 2013a). This was assessed in both the year before and after bereavement.

2.7 **Analysis**

Analyses were carried out using both SAS version 9.2 (SAS Institute, Inc., Cary, North Carolina) and Stata version 13.0 (StataCorp). We adjusted all comparisons for the following: age (as a continuous variable, to account for small disparities post matching), comorbidity (using the Charlson Index(Khan et al., 2010) in categories of 0, 1, 2-3, 4+), smoking status (never, ex, current or unknown), year of bereavement (2007/8, 2009/10, 2011/2) and socio-economic status (using quintiles of the Townsend area deprivation score(Townsend et al., 1988)).

For dichotomous outcomes (depression diagnosis, receipt of psychotropic medication in the year before bereavement, palliative care) a conditional logistic model was used and results are presented as odds ratios.

For medication initiation in the year after bereavement, we present Kaplan-Meier estimates of the probability of bereaved individuals receiving a new first prescription of each class of drug in the two and twelve months after bereavement with individuals censored from the

analysis on death or deregistration(Shah et al., 2013c). We also present hazard ratios for initiation based on a Cox proportional hazards survival model, stratified by matchset.

For mortality after bereavement, a Cox proportional hazards survival model, stratified by match sets was used. For analyses for contact with primary care, a conditional Poisson model was used, with an offset that accounts for patients with less than one year follow up time(Carey et al., 2014).

3 Results

3.1 *Characteristics of Groups*

The baseline characteristics of the dementia bereavement and the non-dementia bereavement comparison group are summarised in Table 1. The dementia bereavement group was slightly older than the non-dementia bereavement group with a mean age of 80.4 compared to 79.6. Otherwise, the two groups were similar in their smoking status, co-morbidity scores and area deprivation.

3.2 *Depression Diagnosis and Medication Use in the Year before Bereavement*

In the year before bereavement, 83 (3.2%) patients whose partner had a diagnosis of dementia received a diagnosis of depression compared to 116 (1.5%) whose partner did not have a diagnosis of dementia (OR 2.31, 1.69-3.14). A similar pattern was seen when the outcome was restricted to a new diagnosis, defined as a patient without a diagnosis of depression in the year preceding the index depression diagnosis (Table 2).

722 (27.5%) of the dementia bereavement group received a prescription for a psychotropic drug in the year before bereavement compared to 1664 (22.2%) of the non-dementia bereavement group (OR 1.34, 1.21-1.49). This difference was seen separately for antidepressant (OR 1.52, 1.33-1.72) and anxiolytic/hypnotic (OR 1.15, 1.01-1.31) medication (Table 2). Gender stratified analysis did not modify our findings.

3.3 *Receipt of Palliative Care*

341 (13.0%) deceased partners with dementia received palliative care in the year before death compared to 1772 (23.6%) of partners who died without a diagnosis of dementia. The

odds ratio for receipt of palliative care for those with a diagnosis of dementia was 0.47 (0.41 to 0.54) compared to those dying without a diagnosis of dementia (Table 2).

3.4 Contact with Primary Care

Contact with primary care, summarised as average number of days before and after the bereavement is shown in Table 3. In the year before bereavement, those experiencing a dementia bereavement had slightly higher levels of contact with primary care compared to the non-dementia bereavement group with a mean 9.46 contact days compared to 8.96 (RR 1.04, 1.00-1.08). In the year after bereavement, contact for both groups increased to 11.60 and 11.39 respectively with attenuation of the difference between the groups (RR 1.00, 0.97-1.04).

3.5 Psychotropic Medication Initiation after Bereavement

In the year after bereavement, the risk of starting a new psychotropic medication was 15.0% for those experiencing dementia bereavement compared 18.2% in the non-dementia bereavement group (table 4). The adjusted hazard ratio for initiation among those experiencing a dementia bereavement was 0.81 (0.70-0.94) compared to the non-dementia bereavement group. Initiation in the first two months after bereavement showed a more marked difference with the hazard ratio for the dementia bereavement group being 0.69 (0.56-0.85). Analysis by drug type suggested the differences between the two bereavement groups was primarily explained by differences in anxiolytic and hypnotic prescribing in the first two months after bereavement (Table 4).

3.6 Mortality after Bereavement

Comparison of mortality experience between the two bereaved groups suggested a trend toward lower mortality in the dementia bereavement group (HR 0.84, 0.68-1.05) (Table 5).

Analysis stratified by gender showed a lower mortality in men experiencing dementia bereavement (HR 0.68, 0.49-0.94) but not women (HR 1.02, 0.75-1.38). However, a test for heterogeneity of effect between men and women was not significant (P=0.08).

4 Discussion

We have identified that older people living with a partner with dementia experience higher levels of depression and psychotropic medication use in the year before bereavement than others facing bereavement, and their partner is less likely to receive palliative care. In the year after dementia bereavement, new use of psychotropic medication is lower in those experiencing dementia bereavement than in those experiencing other bereavement and mortality is lower in men experiencing dementia bereavement.

4.1 *Strength and Limitations*

We have been able to describe key outcomes in a large unselected population of older people whose partner dies with dementia. The design of our study allows wider generalizability of our pre-bereavement findings which may not be possible in studies which recruit individuals based on expectation of death of a partner.

Our use of routine medical records leads to a number of potential limitations. Firstly, we identified couples indirectly through a marker of cohabitation in the primary care record. However, we confirmed the validity of this approach by comparison with contemporary national representative household surveys in England, which confirmed that 99.4% of couples selected using our criteria identify themselves as married or cohabiting (General Household Survey, 2005, 2007).

Secondly, our dementia bereavement group will include individuals whose partners have a wide range of severity of dementia, including those where dementia was a comorbidity, rather than the main health problem in the last year of life. However, the main effect of this potential misclassification would be to reduce differences between the dementia and non-

dementia bereavement groups, and would therefore not explain our findings. In addition, our findings are more likely to be generalizable to the mix of patients living with dementia in the community.

Thirdly, our outcomes relied on either a recorded diagnosis in primary care or prescribing decisions by clinicians. These codes or decisions will not be standardised across different practices, and are thus subject to more variation compared to objective assessments of mental health using standardised questionnaires. This has likely resulted in an underestimate of the prevalence depression overall, but the matched design in our study ensures that all comparisons are within practice, minimising the effect of between practice variations in diagnosis and prescribing. However, we cannot exclude the possibility that diagnosis or prescribing is biased by the clinician's knowledge that an individual's partner suffers from dementia. Nor can we discount that the greater primary care contact prior to bereavement for those with dementia partners, increased the likelihood of diagnosis, have overestimated the true underlying difference. However, the more than doubling of the rate of recorded diagnosis seems unlikely to be explained by the far small (4%) difference in primary care contact we estimated. After bereavement, we chose to report only on prescribing outcomes, as we believe that this approach is preferable as it avoids concerns over variations in diagnostic recording and coding between clinician related to knowledge of a recent bereavement and potential confusion between grief and depressive symptoms.

Fourthly, we were not able to characterise the caregiving role of those experiencing bereavement and level of care-giver strain experienced. Previous work has identified that those experiencing high levels of care-giver strain are the most vulnerable to adverse health

effects(Schulz and Beach, 1999, Roth et al., 2009). This means that our results are likely to underestimate the health effect on those with the greatest care-giving burden.

Finally, although we were unable to adjust for individual socioeconomic markers, neighbourhood indicators of socioeconomic deprivation, such as the Townsend score, have been shown to be acceptable proxies(Adams et al., 2005).

4.2 Context

Our finding of higher levels of depression and psychotropic medication use in the pre-bereavement period for people living with partners with dementia is consistent with the literature that caring for an individual with cognitive impairment has a greater impact on mental wellbeing than caring for an individual with physical health problems(Ory et al., 1999, Pinquart and Sorensen, 2003b, Tooth et al., 2008).

Our findings also support the concept of a pre-bereavement impact on health as both bereavement groups experienced high utilisation of psychotropic medication in the year before bereavement. A recent study using the Health and Retirement Survey in the United States, demonstrated poorer health measures, including increased depressive symptoms, in those experiencing widowhood in the two years after assessment(Vable et al., 2015).

In interpreting our findings in the year after bereavement, it should be noted that all comparisons are with a bereaved group. We have established, in previous work in the same dataset, that the year after bereavement is associated with higher levels of mortality and psychotropic medication use(Shah et al., 2012, Shah et al., 2013c). This means our finding of lower mortality and psychotropic use for individuals experiencing dementia bereavement must be interpreted as an attenuation of the impact of bereavement and not an absolute

protective effect compared to non-bereaved individuals. This was confirmed in a supplementary analysis (details available upon request) which compared the dementia bereaved group with a matched non-bereaved group, and showed no evidence of increased risk of death in the first year (HR=0.98, 95% 0.79-1.22)..

The attenuation of the rise in mortality in bereaved men whose partner died with dementia is consistent with findings of a United States Medicare based study(Elwert and Christakis, 2008). They found the only causes of death where there was no significant increase in risk of death for the bereaved spouse was when the deceased spouse died from Alzheimers or Parkinsons disease. Our work confirms and extends this finding.

4.3 Interpretation

Although caregiving is conventionally identified as deleterious to health, evidence suggests that the effects of caregiving are more complex and determined by both the strain associated with care giving and the nature of the condition which leads to the care need(Roth et al., 2013, Fredman et al., 2009, Pinquart and Sorensen, 2003a). Our findings demonstrate that the impact of living with a person with dementia in their last year of life differs from other conditions. A potential explanation for this difference is that living with a person with dementia may not offer some of the psychological benefits of a caring role(Pinquart and Sorensen, 2003a).

A potentially worrying finding in our study is that people dying with dementia were less likely to receive palliative care than individuals dying with other conditions. Palliative care is relatively well developed in the UK with hospital and community based teams working together with hospices. Patients may be referred by hospital or community physicians ((including general practitioners) and nurses, and in many cases self-referrals are accepted.

There are no restrictions on the types of terminal condition accepted for care, however our findings reinforce concerns over access to palliative care for people with dementia, and may reflect a number of potential access barriers (Sachs et al., 2004, Birch and Draper, 2008)¹. These include perceived difficulty in predicting the timing of death and also availability of palliative care services which are suitable for people with dementia. However, palliative care is an opportunity to offer practical and psychological support to carers and this may mean that dementia carers, with the highest levels of need, are not able to access this support. In addition, there is some evidence that palliative care improves partner health outcomes after bereavement (Christakis and Iwashyna, 2003). We noted that uptake of palliative care was low overall, perhaps because our comparison group included individuals who died unexpectedly where palliative care would not normally be offered.

Our finding that the effects of bereavement on health are less marked where the partner dies with dementia may be explained by a number of mechanisms. This may partly reflect pre-bereavement health effects where both psychological and physical illness occurs before bereavement (Vable et al., 2015). High levels of anticipatory grief are reported before bereavement in dementia carers and this is associated with pre-bereavement depression (Vable et al., 2015). This may mean that individuals who survive their partner with dementia are healthier than other bereaved individuals. As well as selection effects, the experience of grief after bereavement due to dementia is known to be different with relief reported by the majority of carers (Schulz et al., 2003). This may explain the lower immediate use of anxiolytics after bereavement where the partner dies with dementia. Indeed, improvement in health-related behaviours has been reported after dementia bereavement (Schulz et al., 2003).

Our work further challenges the assumption that the health effects of bereavement are an immutable consequence of grief and demonstrate how the effects of bereavement are modified by the circumstance of death (Shah et al., 2013b). This is reinforced by the potential gender differences in the effect of dementia bereavement on mortality with the attenuation in mortality rise restricted to men. This may reflect different gender roles for carers and needs further confirmation and exploration. Overall our findings highlight the potential for appropriate interventions to modify the health effects of bereavement and the need to support bereaved individuals before death of a partner.

It is important to reiterate that the experience of bereavement due to dementia attenuates but does not remove the effect of bereavement on health. In addition, dementia bereavement will be a heterogeneous experience for different individuals and some will be at risk of severe grief reactions which may be partly predicted by circumstances before death (Schulz et al., 2006).

In conclusion, our work highlights the vulnerability of individuals living with a partner with dementia in the period before bereavement and the need for health and social care services to respond to this need. Specifically, improving access to palliative care for people with dementia may be an important intervention to improve the health of carers as well as the wellbeing of people living with dementia.

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5.2 Conflicts of Interest

None

5.3 Ethics

Ethical approval: This study was approved by the South-East NHS Research Ethics Committee.

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Table 1: Characteristics of bereaved partner by whether the deceased had a diagnosis of dementia

| Characteristic | Bereaved | | | |
|-------------------------|--------------------------------|-------------|-----------------------------------|-------------|
| | Deceased Partner With Dementia | | Deceased Partner Without Dementia | |
| | n | % | n | % |
| Total | 2,624 | 100% | 7,512 | 100% |
| Gender | | | | |
| - Male | 965 | 37% | 2,673 | 36% |
| Age at bereavement* | | | | |
| - 55-69 | 167 | 6% | 534 | 7% |
| - 70-84 | 1,716 | 65% | 5,190 | 69% |
| - 85- | 741 | 28% | 1,788 | 24% |
| Year of bereavement | | | | |
| - 2005-08 | 1,059 | 40% | 3,321 | 44% |
| - 2009-12 | 1,565 | 60% | 4,191 | 56% |
| Smoking status | | | | |
| - Non | 1,289 | 49% | 3,557 | 47% |
| - Ex | 967 | 37% | 2,925 | 39% |
| - Current | 287 | 11% | 837 | 11% |
| - Missing | 81 | 3% | 193 | 3% |
| Townsend | | | | |
| - 1 (least deprivation) | 708 | 27% | 2,037 | 27% |
| - 2 | 665 | 25% | 1,884 | 25% |
| - 3 | 541 | 21% | 1,554 | 21% |
| - 4 | 447 | 17% | 1,207 | 16% |
| - 5 (most deprivation) | 194 | 7% | 662 | 9% |
| - Missing | 69 | 3% | 168 | 2% |
| Charlson Score | | | | |
| - 0 | 1,067 | 41% | 3,054 | 41% |
| - 1 | 637 | 24% | 1,923 | 26% |
| - 2 to 3 | 669 | 26% | 1,989 | 26% |
| - 4 or more | 251 | 10% | 546 | 7% |

* Mean age was 80.4 years (SD=6.6) for bereaved with Deceased Partner with Dementia, and 79.6 years (SD=6.5) for bereaved with Deceased Partner without Dementia.

Table 2: Depression diagnosis, psychotropic medication prescribing and partner access to palliative care in the year before bereavement in bereaved partners

| Outcome | | Bereaved | |
|---|------------|--|---|
| | | Deceased Partner With Dementia N=2,624 | Deceased Partner Without Dementia N=7,512 |
| Depression diagnosis | N | 83 | 116 |
| | % | 3.2% | 1.5% |
| | OR† | 2.31 (1.69-3.14) | 1 |
| New diagnosis only* | N | 73 | 102 |
| | % | 2.7% | 1.4% |
| | OR† | 2.37 (1.69-3.32) | 1 |
| Any Psychotropic | N | 722 | 1,664 |
| | % | 27.5% | 22.2% |
| | OR† | 1.34 (1.21-1.49) | 1 |
| Antidepressant | N | 448 | 925 |
| | % | 17.1% | 12.3% |
| | OR† | 1.52 (1.33-1.72) | 1 |
| Hypnotic/Anxiolytic | N | 398 | 1,004 |
| | % | 15.2% | 13.4% |
| | OR† | 1.15 (1.01-1.31) | 1 |
| Palliative Care (offered to partner) | N | 341 | 1,772 |
| | % | 13.0% | 23.6% |
| | OR† | 0.47 (0.41-0.54) | 1 |

*No diagnosis in the year preceding the index diagnosis

†Adjusted for age (bereavement), Townsend, Smoking, Charlson and Year of Bereavement.

Table 3: Contact with primary care in the year before and after bereavement in bereaved partners

| | | Year Before | | Year After† | |
|-----------------------|-------------|---|--|---|--|
| | | Deceased Partner With Dementia N=2,624 | Deceased Partner Without Dementia N=7,512 | Deceased Partner With Dementia N=2,624 | Deceased Partner Without Dementia N=7,512 |
| Contact days per year | Mean | 9.46 | 8.96 | 11.60 | 11.39 |
| | s.e. | 0.17 | 0.09 | 0.23 | 0.13 |
| | RR* | 1.04 (1.00-1.08) | 1 | 1.00 (0.97-1.04) | 1 |

*Adjusted for age (bereavement), Townsend, Smoking, Charlson and Year of Bereavement.

†Number of days registered after bereavement fitted as offset in model to account for varying time at risk.

Table 4: Psychotropic medication initiation rates and hazard ratios for initiation of psychotropic medication in the first two and twelve months after bereavement for bereaved partners

| Drug Group | Months after bereavement | Deceased Partner With Dementia N=1,883 | | Deceased Partner Without Dementia N=5,331 | | Dementia vs. Non Dementia Bereavement |
|------------------------|--------------------------|---|---------------------|--|---------------------|---------------------------------------|
| | | Number initiating | K-M Initiation Rate | Number initiating | K-M Initiation Rate | Hazard Ratio* (95% CI) |
| All Psychotropics | 0-2 ^a | 120 | 6.5% | 500 | 9.5% | 0.69 (0.56-0.85) |
| | 0-12 ^b | 259 | 15.0% | 910 | 18.2% | 0.81 (0.70-0.94) |
| Antidepressants | 0-2 ^a | 25 | 1.4% | 88 | 1.9% | 0.77 (0.49-1.21) |
| | 0-12 ^b | 111 | 6.8% | 317 | 8.6% | 0.79 (0.64-0.98) |
| Hypnotics/ Anxiolytics | 0-2 ^a | 96 | 5.1% | 431 | 8.2% | 0.63 (0.50-0.79) |
| | 0-12 ^b | 174 | 9.9% | 634 | 12.5% | 0.77 (0.65-0.92) |

^a-60 days, ^b- 365 days

* Adjusted for age (bereavement), Townsend, Smoking, Charlson and Year of Bereavement

Table 5: Mortality in the first year after bereavement for bereaved partners

| | | Deceased Partner With Dementia N=2,624 | Deceased Partner Without Dementia N=7,512 |
|------------------|--------------------|--|---|
| All | | | |
| Number of Deaths | n | 129 | 389 |
| | % | 4.9% | 5.2% |
| Adjusted Model* | HR (95% CI) | 0.84 (0.68-1.05) | 1 (Baseline) |
| Women | | | |
| Number of Deaths | n | 73 | 188 |
| | % | 4.4% | 3.9% |
| Adjusted Model* | HR (95% CI) | 1.02 (0.75-1.38) | 1 (Baseline) |
| Men | | | |
| Number of Deaths | n | 56 | 201 |
| | % | 5.8% | 7.5% |
| Adjusted Model* | HR (95% CI) | 0.68 (0.49-0.94) | 1 (Baseline) |

Note: Status at the end of one year for the following groups was - Deceased Partner with Dementia: Still registered (n=1,935, 73.7%), De-registered (n=112, 4.3%), Dead (n=129, 4.9%), Has less than 1 year of practice follow up (n=448, 17.1%); Deceased Partner without Dementia: Still registered (n=5,681, 75.6%), De-registered (n=411, 5.5%), Dead (n=389, 5.2%), Has less than 1 year of practice follow up (n=1,031, 13.7%)

*- Adjusted for age (bereavement), Townsend, Smoking, Charlson and Year of Bereavement.

Figure1: Summary of Matchsets

