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# Unrelieved symptoms of female cancer patients during their last months of life and long-term psychological morbidity in their widowers: A nationwide population-based study

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## ARTICLE INFO

### Article history:

Received 14 January 2009

Received in revised form 23 January 2009

Accepted 4 February 2009

Available online 5 March 2009

### Keywords:

Cancer

Terminal care

Symptom control

Bereavement

Family

Psychological morbidity

## ABSTRACT

**Aim:** To investigate if a cancer patient's unrelieved symptoms during the last 3 months of life increase the risk of long-term psychological morbidity in the surviving widower.

**Methods:** Men ( $n = 907$ ) younger than 80 years and living in Sweden, who had lost their wives due to cancer, were asked 4–5 years after their loss to answer an anonymous postal questionnaire that included questions about their current psychological morbidity and their wives' unrelieved symptoms during the last 3 months of life.

**Results:** If the wife suffered unrelieved anxiety or pain during the last 3 months of her life, then the widowers had a higher risk of sleep-related problems 4–5 years after the loss. When the wife had suffered from anxiety, the relative risks (RR) for the widowers' sleep-related problems were: difficulty falling asleep (RR 1.7, 95% CI 1.0–3.0) and waking up at night with anxiety (RR 4.9, 95% CI 1.5–15.7). When the wife had unrelieved pain, the widowers years later had an increased risk of difficulty falling asleep at night (RR 1.8, 95% CI 1.0–3.3).

**Conclusions:** The unrelieved patients' end-of-life problems increase the risk of widowers' long-term mental suffering. Efficient and effective diagnoses and treatment of pain and anxiety in terminally ill cancer patients are critical for both patients and their surviving widowers.

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## 1. Introduction

The loss of a loved one may have a negative psychological impact on family members<sup>1–5</sup> since the states of psychological

well-being of the cancer patient and their family members are closely interrelated during the disease period<sup>5,6</sup>; the patient's physical and psychological symptoms often affect long-term anxiety levels of the family members.<sup>3,6</sup> The

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doi:10.1016/j.ejca.2009.02.008

prevalence of distress and psychiatric morbidity in cancer patients varies considerably<sup>7</sup> and whilst physical pain of cancer patients is typically attended to by health professionals, the psychiatric morbidity in cancer patients is often unrecognised by doctors and is thus left untreated.<sup>7–9</sup>

The quality of health and palliative care influences the well-being of both the patients and their next-of-kin<sup>10</sup> and this influence may last for a long time after the patient's death.<sup>1–3,10,11</sup> The effects of sub-optimal health care are seen in other situations such as stillbirth, which may lead to long-term psychological morbidity in mothers.<sup>1</sup> Unrelieved pain in children with terminal cancer is one important risk factor for long-term distress in bereaved parents.<sup>2</sup> Similarly, wives observing unrelieved psychological symptoms in their male cancer-patient husbands in the last 3 months of life were found to experience an increase in the risk of psychological morbidity 2–4 years after the loss of their husbands.<sup>3</sup>

Gender plays a significant role in the presentation and features of psychological morbidity.<sup>12–14</sup> We have previously found that anxiety and depression in male cancer patients during their last months of life are associated with long-term anxiety and depression in the surviving widows. However, it has as yet been unclear whether the health of men who lose their wives due to cancer is similarly affected in the long-term as a result of observing the unrelieved psychological symptoms experienced by their wives. By employing methods similar to those used in our previous studies,<sup>1–3,15</sup> we investigated if the unrelieved symptoms experienced by female cancer patient during the last 3 months of their lives affected the widowers' long-term risk of psychological morbidity.

## 2. Patients and methods

This study was approved by the regional ethics committee of Karolinska Institutet in Stockholm.

Sweden has high-quality national registers that provide us with unique opportunities to conduct population-based epidemiological studies. Each resident in Sweden has his or her own unique Personal Registration Number, which enables us to conduct record linkages with all registers. From the Swedish Cancer Registry, we identified 3473 women who died from cancer of the breast, ovary or colon in 2000 or 2001 and who lived in the Northern Sweden, Gothenburg, Stockholm or Uppsala regions at the time of death. Through linkage to the Swedish Total Population Registry, information on marital status at the time of death of these women and related information on the husband were obtained. To be eligible for the study, the husband had to be younger than 80 years at the time of the study, have been born in a Nordic country, have a registered phone number, understand Swedish and have lived with his wife at the time of her disease and death. Nine hundred and seven men met these criteria and were eligible for the study. The study population has been described in detail elsewhere.<sup>16</sup>

### 2.1. Questionnaire

During a one and a half year long thorough qualitative preparatory phase, we developed a questionnaire based on in-

depth interviews and validated it face-to-face. At the start, ten in-depth interviews of target population-widowers gave us the information needed to construct the questionnaire. The validity of the questionnaire was tested in an additional ten face-to-face interviews of widowers. A pilot study was conducted in a group of 76 men to test the logistics and response rate of the study. At the end of this one and half year long phase, we finalised the validated questionnaire. We collected data by using an anonymous final version of the questionnaire for the main study from November 2004 to November 2005. This method is well established and has been successfully used in previous data collections within our group.<sup>3,15,17</sup> The questionnaire is divided into three sections: the men's current life and health condition, the women's disease period and the moment of death, and the 6-months period following the wife's death. There were 69 questions concerning the men's current life and health condition, 52 questions about the women's disease period and the moment of death, and 30 questions regarding to the 6-months period after the wife's death. Detailed contact information was given in our introductory and thank-you letters welcoming all participants to contact us. In addition, they were given contact information on professional psychological and emotional support on request.

The main outcome of our study is an assessment of the psychological well-being of the widowers 4–5 years after their wives' deaths. Anxiety and depression were assessed both by seven-point visual digital scales<sup>18</sup> and the Hospital Anxiety and Depression Scale (HADS).<sup>19</sup> Reported anxiety and depression were defined as lying between 3 and 7 on the seven-point visual digital scales. The HADS anxiety and depression were defined as lying between 8 and 21 on HADS. The participants were also asked about the possible frequency of: having difficulties when falling asleep, waking up at night with anxiety, intake of sleeping pills, intensive worrying, feeling that something bad was going to happen and intake of tranquilisers. The response categories were: 'no, never', 'yes, 1–3 times per month', 'yes, around once–twice per week', 'yes, around 3–4 times per week', 'yes, around 5–6 times per week', and 'yes, every day'. The main exposure is the widower's observation of the distress experienced by his wife in the last 3 months of her life. The women's distress in the last 3 months of her life was evaluated by asking questions such as: 'Did you notice if pain or depression or anxiety affected your wife's well-being during her last 3 months of life?' with response alternatives being: 'no, not at all', 'yes, a little', 'yes, moderately' and 'yes, a lot'.

We dichotomised outcome variables with yes and no. Cut-off points were based on our previous studies.<sup>3,15</sup> The percentages of the subjects in each category of the independent variables were calculated. The relative risks (RR) were calculated as the ratio of the percentages, together with a 95% confidence interval (CI) using the Mantel-Haenszel formula for the variance.<sup>20</sup> We adjusted our main findings for the widowers' ages at follow-up as well as accounts of their psychological condition during the year before their wives' cancer diagnoses. Adjusted RRs were calculated by using the GENMOD procedure with binomial distribution and log link. All statistical analyses were performed by using SAS statistical software (SAS Institute, Cary, NC, USA).

### 3. Results

Among the 907 men who were eligible for the study, 691 (76%) participated in the study and answered the questionnaire. The mean age of the respondents was 66 years. Ninety-five (10%) men declined, 104 (11%) men agreed to participate but did not return the questionnaire, 12 (1%) men were not reachable, two men (0.2%) died after the start of the data collection and three men (0.3%) did not participate for other reasons. The mean ages of the participants and nonparticipants were similar. The characteristics of the widowers are listed in Table 1.

The level of anxiety of the wife during her last 3 months of life was an important factor in determining the level of psychological morbidity in the surviving widower 4–5 years after the death of the wife (Table 2). Compared to husbands of those women who did not experience high levels of anxiety during their last 3 months of life, husbands of those women who experienced much anxiety during the last 3 months of their life had a higher risk of: having anxiety as seen in both the visual digital scale and HADS (RR 1.5, 95% CI 1.0–2.5 and RR 2.6, 95% CI 1.1–5.9 respectively), depression on the visual digital scale (RR 1.7, 95% CI 1.0–2.7), having difficulty falling asleep (RR 2.1, 1.2–3.5) and having awakened at night and experienced substantial anxiety (RR 6.3, 2.0–19.8) 4–5 years after their loss. After adjustment for the men's age and the previous mental well-being before their wives' diagnoses, the widowers whose wives had much anxiety did not have a statistically significant increased risk of anxiety as measured on the visual digital scale or HADS. They did, however, have a significantly greater risk of difficulty falling asleep (RR 1.7, 95% CI 1.0–3.0) and waking up at night with anxiety (RR 4.9, 95% CI 1.5–15.7). Fig. 1 further illustrates the percentage of widowers reporting psychological morbidity 4–5 years after the loss in relation to the wife's degree of anxiety during the last 3 months of her life.

Compared to husbands of cancer patients who had not observed their wives experiencing unrelieved pain in their last 3 months of life, husbands of women who had much unrelieved pain had a higher risk of anxiety measured by HADS (RR 1.8, 95% CI 1.0–3.4) and difficulty falling asleep (RR 1.9, 95% CI 1.1–3.3). No statistically significant differences in the risk of reported anxiety, depression or chronic stress were observed (Table 3). After adjustment for the men's age and previous mental well-being before their wives were diagnosed with cancer, men whose wives had much unrelieved pain did not have a significantly higher risk for anxiety measured on HADS (RR 1.7, 95% CI 0.8–3.6) but they still had a significantly greater risk of difficulty falling asleep at night (RR 1.8, 95% CI 1.0–3.3).

When compared to husbands of cancer patients who did not experience depression, the husbands of cancer patients who had been observed to be severely depressed showed a tendency towards increased risks for: anxiety as measured by HADS (RR 1.6, 95% CI 0.7–3.8), difficulty falling asleep (RR 1.5, 95% CI 0.8–2.8) and waking up at night with anxiety (RR 3.6, 95% CI 0.9–14.2); none of these relative risks were statistically significant. After adjustment for the men's age and previous state of mental well-being before their wives had been

**Table 1 – Characteristics of the men who lost their wives to cancer.**

Characteristics <sup>a</sup>	No. of men	%
Age, years		
30–50	42	6
51–60	154	22
61–70	283	41
71–80	207	30
Not indicated	5	1
Wife's primary cancer <sup>b</sup>		
Breast	398	58
Ovarian	140	20
Colon	107	15
Other <sup>c</sup>	29	4
Not indicated	17	2
Employment status		
Employed	270	39
Retired	382	55
On sick leave	26	4
Unemployed	7	1
Other	3	0
Not indicated	3	0
Level of education		
Primary school	264	38
Secondary school, 2 years	117	17
Secondary school, 3 years	126	18
University	180	26
Not indicated	4	1
Place of residence		
Rural	132	19
Small town	167	24
Medium-sized town	232	34
City >50000 inhabitants	157	23
Not indicated	3	0
Current marital status		
Married/cohabiting	123	18
Single	338	49
Has a partner but lives alone	210	30
Not indicated	20	3
Religious status		
Very religious	45	7
Quite religious	197	29
Somewhat religious	268	39
Not religious at all (atheist)	166	24
Not indicated	15	2

a At time of response to questionnaire.

b The primary cancer location according to the husband.

c Other primary cancers reported were liver and GI cancer. The diagnoses drawn from the Swedish Cancer Registry included only breast, colon, and ovarian cancer.

diagnosed, there was still a tendency for an increased risk of waking up at night with anxiety (RR 2.6 95% CI 0.6–10.4), while the tendency of increased risk of anxiety measured by HADS disappeared (RR 1.1, 95% CI 0.5–2.7) as had difficulty falling asleep at night (RR 1.2, 95% CI 0.6–2.2) (Table 4).

### 4. Discussion

In this population-based study, we found that unrelieved anxiety experienced by the female cancer patient during the last

**Table 2 – Psychological morbidity of the widowers in relation to their wives' anxiety during the last 3 months of life.**

Variables		Patient's distress owing to anxiety			
		None	A little	Moderate	Much
1.	Reported anxiety <sup>a</sup> – No./total No. (%)	18/76 (24)	56/215 (26)	68/234 (29)	48/131 (37)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.0 (0.7–1.7)	1.2 (0.8–1.9)	1.5 (1.0–2.5)
	Adjusted RR <sup>b</sup>	1.0	1.3 (0.9–2.1)	1.2 (0.8–2.0)	1.3 (0.8–2.3)
2.	Anxiety (HADS) <sup>c</sup> – No./total No. (%)	6/76 (8)	19/216 (9)	36/240 (15)	27/133 (20)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.1 (0.5–2.7)	1.9 (0.8–4.3)	2.6 (1.1–5.9)
	Adjusted RR <sup>b</sup>	1.0	0.6 (0.2–1.6)	1.5 (0.7–3.4)	1.6 (0.7–3.8)
3.	Reported depression <sup>a</sup> – No./total No. (%)	17/76 (22)	68/215 (32)	71/234 (30)	49/131 (37)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.4 (0.9–2.2)	1.4 (0.9–2.2)	1.7 (1.0–2.7)
	Adjusted RR <sup>b</sup>	1.0	1.3 (0.8–2.1)	1.2 (0.8–2.0)	1.4 (0.8–2.3)
4.	Depression (HADS) <sup>c</sup> – No./total No. (%)	11/58 (16)	31/197 (16)	41/174 (19)	29/116 (25)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.0 (0.5–1.9)	1.2 (0.7–2.2)	1.6 (0.8–2.9)
	Adjusted RR <sup>b</sup>	1.0	1.0 (0.5–1.9)	1.2 (0.6–2.2)	1.5 (0.8–2.9)
5.	Difficulty falling asleep at night <sup>d</sup> – No./total No. (%)	13/74 (18)	38/215 (18)	53/237 (22)	48/133 (36)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.0 (0.6–1.8)	1.3 (0.7–2.2)	2.1 (1.2–3.5)
	Adjusted RR <sup>b</sup>	1.0	1.0 (0.5–1.6)	1.1 (0.6–1.9)	1.7 (1.0–3.0)
6.	Waking up at night with anxiety <sup>d</sup> – No./total No. (%)	3/74 (4)	12/215 (6)	19/236 (8)	34/133 (26)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.4 (0.4–4.7)	2.0 (0.6–6.5)	6.3 (2.0–19.8)
	Adjusted RR <sup>b</sup>	1.0	1.2 (0.3–4.1)	1.8 (0.6–6.0)	4.9 (1.5–15.7)
7.	Intake of sleeping pills <sup>d</sup> – No./total No. (%)	5/74 (7)	13/215 (6)	19/237 (8)	18/133 (14)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	0.9 (0.3–2.4)	1.2 (0.5–3.1)	2.0 (0.8–5.2)
	Adjusted RR <sup>b</sup>	1.0	0.8 (0.3–2.2)	1.0 (0.4–2.7)	2.1 (0.8–5.5)
8.	Intensive worries <sup>d</sup> – No./total No. (%)	0/74 (0)	5/215 (2)	2/237 (1)	10/133 (8)
9.	Feeling that something bad will happen <sup>d</sup> – No./total No. (%)	1/74 (1)	2/215 (1)	4/237 (2)	8/133 (6)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	0.7 (0.1–7.5)	1.2 (0.1–11.0)	4.4 (0.6–34.9)
	Adjusted RR <sup>b</sup>	1.0	0.8 (0.3–2.2)	1.0 (0.4–2.7)	2.1 (0.8–5.5)
10.	Intake of tranquilisers <sup>d</sup> – No./total No. (%)	3/74 (4)	9/215 (4)	9/237 (4)	7/133 (5)
	RR little/mod/much patient anxiety vs no anxiety (CI)	1.0	1.0 (0.3–3.7)	0.9 (0.3–3.4)	1.3 (0.3–4.9)
	Adjusted RR <sup>b</sup>	1.0	0.8 (0.3–2.2)	1.0 (0.4–2.7)	2.1 (0.8–5.5)

a Based on visual digital scale: 3–7.

b Adjusted for the men's age (as continuous variable) and men's mental well-being before the wives' diagnosis of cancer (whether or not they had anxiety or depression or were taking medication for the mental morbidity before the wives' diagnosis).

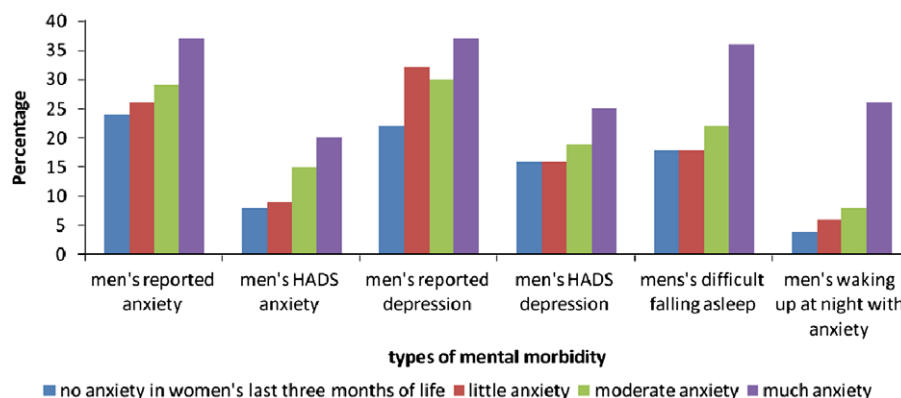
c Based on Hospital Anxiety and Depression Scale: 8–21.

d At least 1–2 times per week.

months of her life increased the risk of her widower experiencing difficulty falling asleep and waking up at night 4–5 years afterwards. Awareness of the cancer patient's unrelieved physical pain during the last months of life also affects the husband years after the death of his wife.

Our findings are partly in agreement with a previous study of widows carried out by our research group.<sup>3</sup> The investiga-

tors found that unrelieved anxiety experienced by male cancer patients during the last 3 months of their lives is reflected in the higher risks of psychological morbidity in surviving wives 2–4 years after the loss: 2.5 (1.4–4.3) for depression, 3.4 (1.4–8.2) for anxiety, 1.7 (1.2–2.5) for difficulties falling asleep, and 2.5 (1.1–5.5) for waking up at night with anxiety. Depression in the male cancer patients had the same



**Fig. 1 – Percentage of widower's mental morbidity in relation to the different degrees of the deceased wife's anxiety in her last 3 months of life.**



**Table 3 – Psychological morbidity of the widowers in relation to their wives' unrelieved pain during the last 3 months of life.**

Variables		Patient's distress owing to unrelieved pain			
		None	A little	Moderate	Much
1.	Reported anxiety <sup>a</sup> – No./total No. (%)	26/99 (26)	49/166 (30)	61/216 (28)	52/169 (31)
	RR little/mod/much patient pain vs no pain (CI)	1.0	1.1 (0.7–1.7)	1.1 (0.7–1.6)	1.2 (0.8–1.7)
	Adjusted RR <sup>b</sup>	1.0	1.0 (0.7–1.6)	1.0 (0.7–1.5)	1.1 (0.7–1.7)
2.	Anxiety (HADS) <sup>c</sup> – No./total No. (%)	11/101 (11)	18/168 (11)	25/220 (11)	34/171 (20)
	RR little/mod/much patient pain vs no pain (CI)	1.0	1.0 (0.5–2.0)	1.0 (0.5–2.0)	1.8 (1.0–3.4)
	Adjusted RR <sup>b</sup>	1.0	0.8 (0.4–2.0)	1.0 (0.5–2.2)	1.7 (0.8–3.6)
3.	Reported depression <sup>a</sup> – No./total No. (%)	28/99 (28)	50/166 (30)	74/216 (34)	53/170 (31)
	RR little/mod/much patient pain vs no pain (CI)	1.0	1.0 (0.7–1.6)	1.2 (0.8–1.7)	1.1 (0.8–1.6)
	Adjusted RR <sup>b</sup>	1.0	1.0 (0.7–1.6)	1.2 (0.8–1.7)	1.1 (0.7–1.6)
4.	Depression (HADS) <sup>c</sup> – No./total No. (%)	20/95 (21)	28/150 (19)	34/201 (17)	31/147 (21)
	RR little/mod/much patient pain vs no pain (CI)	1.0	0.9 (0.5–1.5)	0.8 (0.5–1.3)	1.0 (0.6–1.7)
	Adjusted RR <sup>b</sup>	1.0	1.1 (0.6–2.0)	0.9 (0.5–1.7)	1.1 (0.6–2.0)
5.	Difficulty falling asleep at night <sup>d</sup> – No./total No. (%)	14/99 (14)	37/167 (22)	53/219 (24)	45/169 (27)
	RR little/mod/much patient pain vs no pain (CI)	1.0	1.6 (0.9–2.7)	1.7 (1.0–2.9)	1.9 (1.1–3.3)
	Adjusted RR <sup>b</sup>	1.0	1.6 (0.9–3.0)	1.7 (0.9–3.0)	1.8 (1.0–3.3)
6.	Waking up at night with anxiety <sup>d</sup> – No./total No. (%)	9/99 (9)	10/167 (6)	19/219 (9)	28/168 (17)
	RR little/mod/much patient pain vs no pain (CI)	1.0	0.7 (0.3–1.6)	1.0 (0.4–2.0)	1.8 (0.9–3.7)
	Adjusted RR <sup>b</sup>	1.0	0.5 (0.2–1.3)	0.7 (0.3–1.6)	1.4 (0.7–2.9)
7.	Intake of sleeping pills <sup>d</sup> – No./total No. (%)	5/99 (5)	11/167 (7)	21/219 (10)	17/169 (10)
	RR little/mod/much patient pain vs no pain (CI)	1.0	1.3 (0.5–3.6)	1.9 (0.7–4.9)	2.0 (0.8–5.2)
	Adjusted RR <sup>b</sup>	1.0	1.2 (0.4–3.4)	1.7 (0.7–4.5)	1.8 (0.7–4.9)
8.	Intensive worries <sup>d</sup> – No./total No. (%)	2/99 (2)	3/167 (2)	6/219 (3)	4/169 (2)
	RR little/mod/much patient pain vs no pain (CI)	1.0	0.9 (0.2–5.2)	1.4 (0.3–6.6)	1.2 (0.2–6.3)
	Adjusted RR <sup>b</sup>	1.0	0.5 (0.1–3.8)	0.7 (0.1–4.0)	0.9 (0.2–5.2)
9.	Feeling that something bad will happen <sup>d</sup> – No./total No. (%)	2/99 (2)	3/167 (2)	6/219 (3)	3/169 (2)
	RR little/mod/much patient pain vs no pain (CI)	1.0	0.9 (0.1–5.2)	1.4 (0.3–6.6)	0.9 (0.1–5.2)
	Adjusted RR <sup>b</sup>	1.0	0.4 (0.1–2.9)	0.6 (0.1–3.1)	0.5 (0.1–3.1)
10.	Intake of tranquilisers <sup>d</sup> – No./total No. (%)	1/99 (1)	6/167 (4)	11/219 (5)	9/169 (5)
	RR little/mod/much patient pain vs no pain (CI)	1.0	3.6 (0.4–29)	5.0 (0.7–38.0)	5.3 (0.7–41.0)
	Adjusted RR <sup>b</sup>	1.0	2.4 (0.3–21.1)	4.2 (0.6–31.9)	4.1 (0.5–32.7)

a Based on seven-point visual digital scale: 3–7.

b Adjusted for the men's age (as continuous variable) and men's mental well-being before the wives' diagnosis of cancer (whether or not they had anxiety or depression or were taking medication for the mental morbidity before the wives' diagnosis).

c Based on Hospital Anxiety and Depression Scale: 8–21.

d At least 1–2 times per week.

effect and increased the risk of long-term mental morbidity for the widows: depression 2.6 (1.3–5.5), difficulty falling asleep 1.6 (1.0–2.6). The wives' observation of unrelieved pain in male cancer patients had no effect on long-term morbidity of surviving widows. The differences in the magnitude and pattern of the associations between the studies on widows and widowers could be due to the gender difference in the response to the loss.<sup>21,22</sup>

Chronic pain is common among cancer patients, especially advanced cancer patients.<sup>23</sup> For those women that experienced unrelieved pain during the last 3 months of their lives, the corresponding widowers to these women experienced sleep-related problems 4–5 years after the death of their wives. This is consistent with results from a previous small-scale study, which found that relatives of patients who had severe unrelieved pain before death were more likely to be left with sleeping disturbances.<sup>24</sup> Our previous study<sup>3</sup> on widows did not find any association between the pain experienced by the cancer patient and the psychological morbidity reported by the surviving wife. The influence of the suffering of the dying spouse on the survivor may be different for men and women, as seen in a comparison of widows and widow-

ers response to the dying spouse's degree of suffering from depression. Widows had a 2.6 times increased risk of long-term depression if the deceased husband had experienced severe depression in the last 3 months of his life. In contrast with this, widowers did not have a higher risk of long-term depression if his deceased wife had severe depression in the last 3 months of her life.

The final stage of cancer patients' lives is the critical period in determining the mental well-being of their relatives.<sup>25</sup> The mechanism behind the association between the patient's anxiety and long-term psychological morbidity in widowers could be 'learned helplessness'.<sup>26</sup> The fact that the man realised that neither he nor the health care professionals could help or ameliorate the suffering of his wife may lead to feelings of helplessness and hopelessness, which in turn may lead to depression and sleeping disturbances. A similar mechanism may explain why a spouse caring for a husband or a wife with Alzheimer's Disease has an increased risk of depression.<sup>27</sup>

Our study cohort was identified from the Swedish National Register, which enabled us to enroll a non-selected nationwide cohort of men who had lost their wives to certain types

**Table 4 – Psychological morbidity of the widowers in relation to their wives' depression during the last 3 months of life.**

Variables	Patient's distress owing to depression			
	None	A little	Moderate	Much
1. Reported anxiety <sup>a</sup> – No./total No. (%)	12/39 (31)	53/195 (27)	79/269 (30)	47/153 (31)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.9 (0.5–1.5)	1.0 (0.6–1.6)	1.0 (0.6–1.7)
Adjusted RR <sup>b</sup>	1.0	0.9 (0.5–1.5)	0.8 (0.5–1.4)	0.8 (0.5–1.4)
2. Anxiety (HADS) <sup>c</sup> – No./total No. (%)	5/39 (13)	13/197 (7)	40/273 (15)	32/156 (21)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.5 (0.2–1.4)	1.1 (0.5–2.7)	1.6 (0.7–3.8)
Adjusted RR <sup>b</sup>	1.0	0.4 (0.1–1.0)	0.9 (0.4–2.0)	1.1 (0.5–2.7)
3. Reported depression <sup>a</sup> – No./total No. (%)	13/39 (33)	57/195 (29)	84/269 (31)	52/153 (34)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.9 (0.5–1.4)	0.9 (0.6–1.5)	1.0 (0.6–1.7)
Adjusted RR <sup>b</sup>	1.0	0.7 (0.4–1.2)	0.7 (0.5–1.2)	0.8 (0.5–1.3)
4. Depression (HADS) <sup>c</sup> – No./total No. (%)	11/38 (29)	24/173 (14)	43/248 (17)	39/138 (28)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.4 (0.3–0.9)	0.6 (0.3–1.1)	1.0 (0.6–1.7)
Adjusted RR <sup>b</sup>	1.0	0.5 (0.2–0.9)	0.5 (0.3–1.0)	0.9 (0.5–1.7)
5. Difficulty falling asleep at night <sup>d</sup> – No./total No. (%)	8/37 (22)	32/194 (16)	63/272 (23)	49/155 (32)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.8 (0.4–1.5)	1.1 (0.6–2.1)	1.5 (0.8–2.8)
Adjusted RR <sup>b</sup>	1.0	0.6 (0.3–1.3)	0.8 (0.4–1.5)	1.2 (0.6–2.2)
6. Waking up at night with anxiety <sup>d</sup> – No./total No. (%)	2/38 (5)	10/194 (5)	28/271 (10)	29/155 (19)
RR little/mod/much patient depression vs no depression (CI)	1.0	1.0 (0.2–4.3)	2.0 (0.5–7.9)	3.6 (0.9–14.2)
Adjusted RR <sup>b</sup>	1.0	0.9 (0.2–4.0)	1.5 (0.4–5.9)	2.6 (0.6–10.4)
7. Intake of sleeping pills <sup>d</sup> – No./total No. (%)	3/38 (8)	10/194 (5)	24/272 (9)	20/155 (13)
RR little/mod/much patient depression vs no depression (CI)	1.0	0.7 (0.2–2.3)	1.1 (0.4–3.5)	1.6 (0.5–5.2)
Adjusted RR <sup>b</sup>	1.0	0.5 (0.1–1.8)	0.8 (0.3–2.6)	1.3 (0.4–4.2)
8. Intensive worries <sup>d</sup> – No./total No. (%)	0/38	5/194 (3)	4/272 (1)	8/155 (5)
9. Feeling that something bad will happen – No./total No. (%)	0/38	5/194 (3)	4/272 (1)	6/155 (4)
10. Intake of tranquilisers <sup>d</sup> – No./total No. (%)	1/38 (3)	8/194 (4)	12/272 (4)	9/155 (6)
RR little/mod/much patient depression vs no depression (CI)	1.0	1.6 (0.2–12.2)	1.7 (0.2–12.5)	2.2 (0.3–16.9)
Adjusted RR <sup>b</sup>	1.0	0.5 (0.1–1.8)	0.8 (0.3–2.6)	1.3 (0.4–4.2)

a Based on seven-point visual digital scale: 3–7.

b Adjusted for the men's age (as continuous variable) and men's mental well-being before the wives' diagnosis of cancer (whether or not they had anxiety or depression or taking medication for the mental morbidity before the wives' diagnosis).

c Based on Hospital Anxiety and Depression Scale: 8–21.

d At least 1–2 times per week.

of cancer during a certain time-period. To our knowledge, this is, to date, one of the largest sets of data collected from a cohort of widowers. Moreover, our questionnaire was finalised after extensive preparation and validation, which minimises potential measurement errors. In addition, our study had no interviewer-related bias since the questionnaires were anonymous and self-administered.

The current study reports all the information related to the research without any selection to avoid researcher-dependent publication bias. Even though the total number of questions is 153 in the questionnaire, it covers a broad content not only limited to current research questions and three different time periods: the men's current life and health condition, the women's disease period and the moment of death, and the 6 month period following the wife's death. Each section covers broad aspect questions with the mental morbidity of widowers 4–5 years after the wife's death as one part. The anxiety and depression were measured both by HADS and the visual digital scale. Sleep-related problems and worrying were measured from different aspects.

Our findings suggest that there is a causal relationship between patients' end-of-life problems and widowers' long-term mental suffering. Thus, it is important to recognise and relieve the psychological symptoms in patients who are dying from cancer and to improve the psychological and professional emotional support provided during palliative care.

Adequate medical care and communication are critical not only for the terminal cancer patients but also for the surviving widowers.

## 5. Limitations

The study results should be interpreted with caution for the following reasons. First, the study results might suffer from recall bias since the information was collected retrospectively. The widower with mental morbidity could potentially over report that his deceased wife had experienced more unrelieved distress than she really had. However, our study did not find associations between the wife's unrelieved distress and the widowers' anxiety or depression. This indicates that the widower with mental morbidities was able to report just as well as widowers without mental morbidities with regard to the level of unrelieved distress in the last 3 months of the wife's life. Furthermore, a previous study on widows did not find that the depression status of the widow led to an over reporting of the distress in the husband's last 3 months of life.<sup>3</sup> Thus, the recall bias could be considered minor. Second, nonparticipants might report differently from those who provided information. However, our study had a high response rate, which should minimise this problem. In addition, there was no significant difference in the demographic characteristics between participants and non participants.

## Conflict of interest statement

None declared.

## Acknowledgements

This study was supported by the Swedish Cancer Society, Swedish Research Council. Professor Gunnar Steineck, as principal investigator, had full access to all of the data in the study and takes responsibility for the integrity of the data and accuracy of the data analysis. Acquisition of data: Hauksdóttir, Valdimarsdóttir, Onelöv, Steineck. Analysis and interpretation of data: Jonasson, Steineck. Drafting of the manuscript: Jonasson, Steineck. Critical revision of the manuscript for important intellectual content: Jonasson, Hauksdóttir, Valdimarsdóttir, Onelöv, Steineck. Study supervision: Steineck. We thank the men who participated in the study and provided information.

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