



# **Chronic pain in widowers 4-5 years after loss**

**Hildur Guðný Ásgeirsdóttir**

**Thesis for the degree of Master of Public Health Sciences  
Centre of public health  
School of Health Sciences  
University of Iceland**



**HÁSKÓLI ÍSLANDS**

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**Thesis for the degree of Master of Public Health Sciences**

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**June 2011**



## **Langvarandi verkir hjá ekkum 4-5 árum eftir missi**

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## **Lokaritgerð til meistaraprófs í lýðheilsuvísindum**

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## Abstract

**Objective** Chronic pain is a complex state that affects a person's physical and psychological well-being and may endure for many years. Psychological morbidity has been suggested as important contributing factor to chronic pain; increased knowledge on potential mechanisms might therefore facilitate preventive efforts. The focus of this study was on the impact of spousal loss on the development of chronic pain, more specifically, the aim was to investigate the effect of experiencing low preparedness before a wife's death on the widower's chronic pain 4-5 years after loss.

**Methods** In a population-based study in the years 2004-2005, anonymous questionnaires were sent out to 907 men in Sweden who had lost a wife to cancer in 2000 and 2001. The questionnaires contained questions on circumstances around the death, such as the man's preparedness at the time of his wife's death and the men's physical and psychological health at follow-up. Psychological morbidity was measured by the Hospital Anxiety and Depression Scale (HADS) and by direct questions on psychological health. Logistic regression was used to evaluate the risk of chronic pain within two age groups by level of preparedness taking into account the influence of various covariates. When exploring the association between chronic pain and psychological morbidity we calculated relative risk with 95% CI.

**Results** Altogether 691/907 questionnaires were received (76%). 638 widowers answered a question on chronic pain, of those, 76 reported chronic pain (12%). Younger widowers were in general more likely to experience various pain symptoms; muscle tension (RR 1.38; CI 1.16-1.66), headache (RR 1.89; CI 1.49-2.41), burn out (RR 5.64; CI 2.08-15.32) compared with the older widowers. Younger widowers (38-61 years) who reported low degree of preparedness for their wife's death had compared to widowers with high degree of preparedness increased risk of experiencing chronic pain (OR 6.67; CI 2.49-17.82) 4-5 years after loss. The same did not apply for older widowers (62-80 years) (OR 0.81; CI 0.32-2.05). Both age groups who experienced chronic pain were at increased risk for psychological morbidity. Younger widowers with chronic pain reported increased risk of depression (a single item question on depression: RR 2.44; CI 1.03-5.79), anxiety (RR 2.12; CI 1.10-4.09) and sleep disorders (RR 4.09; CI 2.02-8.26) and older widowers of depression (RR 2.45; CI 1.60-3.76 and a single-item question: RR 2.17; CI 1.11-4.21) and anxiety (RR 2.04; CI 1.05-3.96).

**Conclusion** Younger men who are less prepared for their wife's death are at higher risk for experiencing chronic pain and other various pain symptoms 4-5 years after loss. In addition, those who experience chronic pain have also greater likelihood of experiencing psychological morbidity. The findings emphasize the importance of preparedness for a wife's death, identification on factors that might increase such preparedness are therefore called for. Our findings furthermore stress the importance of team work between health professionals when treating chronic pain and psychological morbidity among grieving individuals.

## Ágrip

**Inngangur** Langvarandi verkir hafa áhrif á líkamlega og andlega heilsu einstaklings og geta því haft áhrif á lífsgæði til lengri tíma. Aukin þekking á sálrænum áhrifavöldum á þróun langvarandi verkja er mikilvæg til þess að hægt sé að grípa til fyrirbyggjandi aðgerða. Sálræn áföll geta verið áhrifaþáttur og því er mikilvægt að kanna áhrif þeirra á langvarandi verki. Markmið þessarar rannsóknar var að kanna hvort áfall við að missa maka hafi áhrif á þróun langvarandi verkja, nánar tiltekið hvort líttill undirbúningur fyrir andlát eiginkonu hafi áhrif á upplifun verkja ekkla 4-5 árum eftir missi þeirra.

**Efniviður og aðferðir** Rannsóknin tók til 907 manna í Svíþjóð sem misst höfðu eiginkonu úr brjóst-, eggjastokka- eða ristilkrabbameini árið 2000 eða 2001. Árin 2004-2005 var sendur spurningalisti til þátttakenda sem innihélt spurningar um bakgrunn, sjúkdómstíma og lát konunnar (þ.m.t. um undirbúning fyrir lát hennar) og andlega og líkamlega líðan, (m.a. þunglyndi og kvíða sem mælt var með HADS-kvarðanum (the Hospital anxiety and depression scale) og um langvarandi verki). Logistísk aðhvarfsgreining var notuð til að kanna líkur á langvarandi verkjum eftir magni undirbúnings ekkils fyrir lát eiginkonu. Til að skoða tengsl milli langvarandi verkja og sálræna erfiðleika var hlutfallsleg áhættu reiknuð með 95% öryggismörkum.

**Niðurstöður** Svarshlutfall í rannsókninni var 76% (691/907). Af 638 ekkjum sem svöruðu spurningu um langvarandi verki, sögðust 76 (12%) upplifa langvarandi verki. Yngri ekkjar voru enn fremur í aukinni áhættu á að finna fyrir vöðvaspennu (RR 1.38; CI 1.16-1.66), höfuðverk (RR 1.89; CI 1.49-2.41), og einkennum þess að vera útbrunninn (RR 5.64; CI 2.08-15.32) samanborið við eldri hópinn. Niðurstöður sýndu að ef yngri ekkjar (38-61 árs) voru lítið undirbúnir fyrir lát eiginkonu jók það áhættu þeirra á upplifun langvarandi verkja 4-5 árum eftir missinn (OR 6.67; 95% CI 2.49-17.82). Sambandið kom ekki fram hjá eldri ekkjum (OR 0.81; 95% CI 0.32-2.05). Þeir ekkjar sem höfðu einkenni langvarandi verkja voru í aukinni áhættu á sálrænum heilsubresti svo sem þunglyndi (RR 2.44; CI 1.03-5.79 af spurningalista), kvíða (RR 2.12; CI 1.10-4.09) og svefntruflunum (RR 4.09; CI 2.02-8.26) hjá yngri ekkjum, einnig var aukin áhætta á þunglyndi (RR 2.45; CI 1.60-3.76 á HADS-kvarða yfir 8 og RR 2.17; CI 1.11-4.21 af spurningalista) og kvíða (RR 2.04; CI 1.05-3.96) hjá eldri ekkjum.

**Ályktanir** Niðurstöður benda til að undirbúningur fyrir lát eiginkonu hafi áhrif á líkamlega heilsu yngri ekkla, þannig að líttill undirbúningur eykur áhættu á að yngri ekkjar upplifi verki 4-5 árum eftir missinn. Að auki eru þeir sem upplifa langvarandi verki í aukinni áhættu á sálrænum erfiðleikum. Niðurstöður styðja mikilvægi undirbúnings fyrir lát aðstandanda auk tengsl sálræna áhrifaþátta á langvarandi verkjavandamál. Þetta kallar á rannsóknir á áhrifaþáttum sem auka undirbúning fyrir ástvinamissi. Einnig sýna niðurstöður mikilvægi þverfaglegrar samvinnu heilbrigðisstarfsfólks þegar unnið er með langvarandi verki og sálræna erfiðleika hjá syrgjandi einstaklingum.



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## **Background**

Chronic pain is defined as pain that exists past the normal expected period of healing, and has endured for 3 months or longer.<sup>1</sup> Epidemiological studies have indicated a prevalence of 10-25% of chronic pain symptoms in the community.<sup>2-5</sup> In a review on large community based studies on chronic widespread pain (N=1340-3174) a prevalence of 11% to 14% was reported.<sup>6</sup> Bergman et al. found a 11% prevalence of chronic widespread pain and a 24% prevalence of chronic regional pain in a cross sectional study in Sweden (N=2425.)<sup>2</sup> A population based prospective study consisting of 1404 English individuals reported new annual incidence rate of 6%.<sup>7</sup> Those results are similar to results in a four year follow-up study (N=2184) with a reported annual incidence risk of 8% and a low recovery rate of 5%.<sup>8</sup> Furthermore, 50% of the individuals with chronic pain at baseline had the same pain grade at follow-up four years later, 29% had increased severity and 21% had decreased severity, indicating a small change overall in pain severity in the four year follow-up time. When evaluating the prevalence of chronic pain, epidemiological studies vary in prevalence, possibly due to various case definitions of pain symptoms used, like widespread pain, back pain, arthritic pain. Also, different lengths of time periods are used in studies as a reference period (several weeks, three months and up to one year) which might explain different prevalence numbers. A study from England reported a double in increase in prevalence of chronic pain in the last 40 years<sup>9</sup>, however this increase could be explained by increased reporting or awareness of pain symptoms.

### **Development of chronic pain**

Commonly reported pain symptoms are low back pain, shoulder pain, muscle pain and fibromyalgia.<sup>6</sup> However, even though chronic pain is a symptom from various causes, the symptoms may continue following its original onset and should be recognised as an important condition that often becomes a disease in its own right. The experience of pain differs between individuals and is a complicated process where person's emotional state, anxiety degree, distraction, past experiences and other complex factors are known to play a role<sup>4 10</sup>. The sensation of pain is conducted by nerve fibres, and a central pain modulation system has been described that can enhance or diminish nociceptive signals from the periphery<sup>10</sup>. The reason for why pain evolves from being acute to chronic is not always evident. When persistent activation from nociceptors continues, pathological changes may develop and the thresholds for pain signals become lower<sup>11</sup>. Consequently, recurrent pain symptoms are

common and the best predictor for a pain episode is defined as having experienced musculoskeletal symptoms prior to that episode<sup>12</sup>.

Various factors are known to associate with the prevalence of chronic pain. The symptoms are more common in women, tend to increase with age and are known to be more common in individuals with lower education and those who belong to groups with lower socioeconomic status<sup>5 13</sup>. Furthermore, obesity, smoking, lack of physical activity and sleep problems have also been shown to be able to influence the development of chronic pain symptoms<sup>12 14 15</sup>. In a prospective longitudinal population-based study (N=6791), Jones et al found that, only 17% of the population had not reported pain problems in the previous month at all 3 data collection points in a four year follow up time. The individuals who reported no pain were more likely to have low vs. high levels of depression (RR 2.7) and anxiety (RR 2.1), as well as a threefold relative risk of having no somatic symptoms and a good quality sleep. Furthermore, psychosocial factors were measured at baseline and having low psychological distress, low illness behaviour, an absence of adverse life events and good quality sleep, were all found to be independent predictive factors for good musculoskeletal health at follow up<sup>16</sup>.

### **Impact on community**

The reported prevalence of chronic pain represents an effect on the whole community, individuals, families, employers and health care systems. Extensive economic costs may arise due to expenses of health care, therapy and medication, loss of income to families, job absenteeism and welfare payments to workers in the society<sup>17</sup>. Individuals with chronic pain report low self-esteem and poor self-rated health as well as major impairment in daily activities and quality of life<sup>3 5 12</sup>. A majority of chronic pain sufferers are unable or less able to attend social activities, perform household chores, drive a car, maintain an independent lifestyle, exercise or enjoy normal sleep<sup>4</sup>. As a consequence, chronic pain is a common reason for work disability, sick-leaves and long term absence from work. This is presented in a survey that was undertaken in 15 European countries (N= 46 394), the aim was to evaluate the prevalence of chronic pain and impact on daily life. Nineteen per cent of the participants reported chronic pain and results from interviews with those respondents showed that 61% were less able or unable to work outside the home, 19% had lost a job and 13% had changed jobs due to their pain<sup>4</sup>. In a population based study, including 8218 individuals who were followed up for 16 years, results showed that long-term sick leave is a predictive factor for later disability pension<sup>18</sup>. In a Swedish study (N=176 629) on sick leave prior to disability

pension, results showed that mental disorders and musculoskeletal diseases were the most common causes for sickness absence from work and disability pension<sup>19</sup>. Gjesdal et al. reported from a 9 year prospective cohort study (n=2493) that men, in particular, who had gone on disability pension because of musculoskeletal and mental problems were at increased mortality risk<sup>20</sup>. In sum, chronic pain conditions remain a major public health concern and it is therefore of utmost importance to increase understanding of the development of chronic pain and identify potentially avoidable risk factors.

### **Psychological risk factors**

During the last decades, the number of studies with a psychosomatic perspective have increased and greatly improved understanding of the complexity of pain development<sup>21</sup>. Individuals vary substantially in their responses to pain symptoms since these arise as a result of an interaction of biological, emotional, cognitive and social factors. Moreover, individuals differ in their personalities, emotional functioning and coping strategies which can also affect a perception of pain<sup>22</sup>. Somatization is defined as the process when psychological and social stress is expressed through physical symptoms. One explanation for this phenomenon is that psychosomatic symptoms evolve in patients that seek justification and attention of their suffering in daily life or after a psychological trauma, while inconsistently repressing sad feelings and painful memories<sup>7</sup>. Some individuals may therefore attend more to physical state rather than to their emotional feelings and interpret their body sensations as signs of disease. This is often accompanied by illness behavior and increased medical help-seeking<sup>23</sup>. McBeth and co-workers found in a prospective population-based study (N=1658), that indicators of somatization (psychological factors, patterns of illness behavior and help seeking) measured at baseline predicted the development of new chronic widespread pain in the following 12 months<sup>7</sup>. Wynne-Jones and co-workers found similar results in a prospective cohort study on individuals (N=957) involved in a motor vehicle accident. They reported that after a 12 month follow-up, 7.8% reported new chronic pain after the accident, and post collision physical symptoms was an independent factor (RR 2.5) to new widespread pain, but that pre-collision health seeking behavior and pre-collision somatization (RR 3.6 and RR 1.7) also were independent predictive factors<sup>24</sup>. Whether somatization is a common causal factor of chronic pain development is not entirely clear. However, a number of studies have reported that psychological factors are important risk factors for chronic pain development<sup>12 14 25</sup> and that after physical trauma, psychological factors have been reported to contribute to the development of chronic pain<sup>26-28</sup>. Furthermore, high levels of daily emotional distress and

lack of psychosocial support have been identified as a predictive factor of pain becoming a chronic problem<sup>25 29 30</sup>.

Whether psychological problems are a consequence or causal factor of chronic pain, chronic pain is frequently accompanied by psychological morbidity (e.g. depression and anxiety)<sup>4 31</sup>. Individuals with chronic pain have shown to have a higher prevalence of anxiety disorder (35%) compared to the general population (18%,  $p < 0.0001$ )<sup>31</sup>. The same study showed that the chronic pain group had as well significant associations to depression (OR 2.8), panic disorder (OR 4.3) and post-traumatic stress disorder (OR 3.7), compared to the general population group. When evaluating differences between individuals with chronic pain vs. individuals with acute pain, Gatchel et al. reported that subjects with chronic pain were more frequently diagnosed with a current major depressive disorder (25%) compared to subjects with acute pain (2.9%)<sup>25</sup>. On pain severity, Bair et al.<sup>32</sup> studied the psychiatric comorbidity effect on pain intensity and disability in 500 chronic pain patients. They found that the added morbidity of both depression and anxiety to chronic pain was strongly associated with more severe pain ( $p < 0.0001$ ) and greater likelihood of pain related disability ( $p < 0.0001$ ). McWilliams et al. found similar results, that multiple psychiatric disorders in chronic pain patients were associated with increased disability<sup>31</sup>.

Regarding mechanisms, several studies have suggested explanations for this comorbidity. Psychiatric disorders are known to modulate with neurotransmitters. Studies have suggested that serotonin and norepinephrine may decrease pain signals and that certain antidepressants might have an analgesic effect, although results have been conflicting<sup>33</sup>. Kroenke et al.<sup>34</sup> reported clinically significant reduction in pain symptoms (RR 2.4) in an intervention group receiving optimized antidepressant therapy and a pain self-management program ( $n = 123$ ), compared to a control group receiving usual pain management care ( $n = 127$ ). In addition, the intervention group was much more likely than usual care group to report overall improvement in their pain after a 12 month follow-up (RR 3.7). However, this might also reflect the effect of improved mood rather than an analgesic effect. When depression lifts, individuals might experience pain as being less intense, as well as they might become more active and motivated to work on their physical problems.

### **Psychological trauma and chronic pain**

Studies on the effects of psychological trauma and stressful life events on pain outcome have reported an association to chronic pain symptoms<sup>35-37</sup>. Lantz et al. found that experiencing stressful life events such as financial stress, parental or marital stress, assault and



loss of a loved one, have a long-term effect on self-rated health, including physical and functional limitation<sup>38</sup>. Survivors of the holocaust have reported higher pain levels ( $p < 0.005$ ) and more pain sites ( $p < 0.05$ ) 50 years after the war, compared to controls who did not experience war violence<sup>36</sup>. In a prospective cohort study on 9552 adults Kopec et al. found increased risk of chronic back pain when having experienced multiple stressful events in childhood<sup>39</sup>. Similarly, Jones et al.<sup>40</sup> reported from a prospective study of 7571 individuals, that experiencing maternal death and family- or financial difficulties in childhood, was associated with increased risk of chronic pain in adulthood (RR 2.0, 1.3 and 1.6 respectively).

Having experienced a trauma or having been otherwise exposed to stressful life events may therefore be of importance when examining possible causal factors for chronic pain. Regarding possible mechanisms behind this effect, one suggestion may be that experiencing traumatic events involves increased risk of shock, which again increases the risk of psychological morbidity, such as post traumatic stress disorder (PTSD). As with psychological morbidity, PTSD is known to be a possible co-morbid factor to chronic pain<sup>28 31 41</sup>. However, the interaction of traumatic experiences, PTSD symptoms, and mechanisms to chronic pain outcome is not clear. A study on 129 Vietnam combat veterans suffering from PTSD, reported that increased PTSD re-experiencing symptoms were related to increased pain levels<sup>42</sup>. Furthermore, a study on 309 survivors of intimate partner violence, showed that for women with a history of child abuse, PTSD symptom severity significantly mediated the relationship to chronic pain severity ( $p < 0.01$ ). Other studies however have not found this relationship<sup>37</sup>. Raphael et al. examined whether PTSD mediates the risk of pain in a prospective follow up study of a cohort of individuals with early childhood abuse or neglect ( $n = 458$ ). They found that even though childhood victimization increases risk for PTSD in adulthood, it did not seem to be an independent predictive risk factor for pain symptoms in adulthood. However, they found that childhood victimization with a combined effect of PTSD symptoms in childhood, significantly predicted ( $p < .0001$ ) increased pain symptoms 30 years later<sup>35</sup>, suggesting that it is the severity of the trauma that increases the risk, not just experiencing the trauma per se.

### **Loss and bereavement**

Loss of a loved one is a traumatic event that results in grief. It is one of the most difficult experiences one can encounter during a life time and may lead to long-term psychological and physical morbidity<sup>43-48</sup>. A longitudinal study on married persons followed up for a three-year period, showed that of 139 which became widowed during the follow up, levels of

psychological morbidity were higher during the first year after loss, but returned to pre-widowhood after that<sup>48</sup>. In a systematic literature review on mood and anxiety disorders in widowhood, Onrust and Cuijpers found that the prevalence of depression and anxiety were significantly higher in widowed individuals, especially during the first year of bereavement. The relative risks of psychological disorder ranged from 3.5-9.8 in widowed individuals compared to control group<sup>49</sup>. For some widowed individuals, psychological morbidity does not decrease in the later years of widowhood and it is demonstrated in the literature that bereavement is associated with increased risk of mortality<sup>46 50-52</sup>

In terms of physical health in bereaved individuals, studies have reported increased risk of adverse physical health consequences such as elevation of blood pressure, heart trouble, increased alcohol consumption, cancer diagnosis, sleep disturbances and weight loss<sup>44 53-58</sup>. In a review by Stroebe and co-workers<sup>43</sup> on health outcomes of bereavement, it is reported that bereaved individuals are more likely to have physical health problems and that those who are recently bereaved show more signs of physical ill-health. In addition, they report that bereaved individuals compared to their non-bereaved counterparts, have higher rates of medication use and hospitalisation, as well as higher rates of disability. Findings also suggest that the ones with intense grief symptoms and in most need of health services for physical health disorders are less likely to seek professional assistance when needed.

Regarding pain symptoms following the loss of a loved one, Bradbeer and co-workers<sup>59</sup> reported in their study on 1000 elderly individuals that widowed people have over threefold risk of having current moderate to severe pain (OR 3.4) 5-9 years after loss, compared with non-widowed controls. Furthermore, in a prospective study of 1532 elderly individuals, Lee et al. studied how the stressors related to spousal loss affect the physical functioning of the bereaved. They found that individuals who had lost their spouse through sudden death in the time of follow-up (N=335) had greater functional limitation 18 and 48 months after loss and that the effects even increased over time. However, this association was only seen for widowers, not widows<sup>60</sup>.

### *Being prepared*

Even though grief is considered a natural and inevitable process, it may lead to excessive morbidity – a morbidity that may even be avoided. Studies that have focused on avoidable psychological traumata in bereavement and on circumstances around death have indicated the importance of having been forewarned before the loss<sup>61-65</sup>. Preparedness for a loss of a loved one may be experienced differently by each individual. For some it may include having

received information, having communicated about the death, having arranged economic affairs or having had support from health care personnel to participate in the care at time of death<sup>66</sup>. The concept of forewarning and preparedness of an impending death of a loved one has been measured by different approaches, for example by asking the relative to evaluate the degree of preparedness at the time of death, or by asking how far in advance the relative was aware of the forthcoming death<sup>61 62 64</sup>. The latter approach was used in a study on widows (N=506) where a short awareness time of 24 hours or shorter was associated with doubled long-term risk of anxiety and a six-fold risk of intake of tranquillizing drugs, 2-4 years after loss<sup>65</sup>. The risk of short emotional awareness time has also been shown to be associated with increased risk of depression and absence from employment in fathers 4-9 years after the loss of a child to cancer<sup>62</sup>. Barry and co-workers<sup>64</sup> asked a direct question on how prepared the relative felt for the death, aiming to explore the relationship between perceived circumstances as well as preparedness for a loved one's death, and psychiatric outcomes. They found that perception of feeling unprepared for the death was significantly associated with complicated grief and major depressive disorder secondary to bereavement, 4-9 months after loss. To evaluate the long term harm of low preparedness for a wife's death, Hauksdottir and co-workers<sup>61</sup> asked the relatives to evaluate their degree of preparedness at the time of death, 4-5 years after loss. They reported that a low degree of preparedness for a wife's death to cancer is associated to anxiety (RR 2.3), emotional numbness (RR 2.2), low or moderate quality of life (RR 1.7) and sleep disorders (RR 2.0). This association was seen for younger widowers (38-61 years old). Age may be of importance since older people may in general be more prepared for the death of their spouse and younger individuals might be more vulnerable for a sudden death.

#### *Bereavement, preparedness and physical symptoms*

The effect of losing a spouse to cancer on an individual's physical wellbeing, such as experiencing chronic pain, has hardly been investigated. In Lee and co-worker's study previously described on functional limitation, loss-related stress was classified into stressors related to the death event by assessing whether the death was sudden. Assessments were made by the question „How long before your spouse's death did you realize that she/he was going to die?“. Their results report that men who experience a sudden death of their spouse, and men who were not with their spouse at the time of death had greater functional limitation at 18 and 48 months after loss. This association was only seen for widowers. This suggest that circumstances around death may affect the surviving widower's long term physical health

consequences. On preparedness, Barry and co-workers also reported an association between feeling unprepared for the loss of a loved one and traumatic grief symptoms<sup>64</sup>. Traumatic grief has been described by Prigerson and co-workers as a special form of emotional distress after loss<sup>67</sup>. In a study on 150 bereaved participants, they found that the individuals with high scores on traumatic grief had significantly increased risk for a poorer physical health outcome compared to those who scored low on traumatic grief<sup>55</sup>. The reason for these possible relationships is not entirely clear. Some studies suggest a complicated reaction in the brain. For example, Kersting et al. demonstrated for example in their study that acute grief after the death of an unborn child was related to the activation of physical pain network in the brain, hypothesizing that the same neural structures involved in the experience of physical pain are involved in the experience of social pain and loss<sup>68</sup>.

### **The importance of studying psychological risk factors for chronic pain**

Chronic pain is a symptom caused by underlying factors. Whether those factors are of psychological, traumatic or mechanical origin, it has become more and more evident that when managing chronic pain, physical factors should not only be approached, but also psychological. The emphasis in treatment of chronic pain is often on working through the pain rather than avoiding it and letting it control your life, often by motivating the individual and slowly increasing activity, function and strength. Impaired musculoskeletal health can be experienced with minor pathological findings. To reach the individual with chronic problems, treatments where psychological factors are addressed as well as physical factors can therefore have positive outcomes, for example by reducing anxiety, fear of pain and encourage activity<sup>69 70</sup>. An increased understanding of social and psychological associations with pain is therefore necessary to have in mind when evaluating an individual in chronic pain. Cognitive therapy in addition to physical therapy in treatment of chronic pain symptoms have given positive results (e.g. fewer health care visits and fewer days out of work in a 12 month follow-up)<sup>71</sup>. This mind-body association might however frequently be under recognized when managing acute pain, and should be taken under consideration for preventive efforts. This might be done with increased team work between health professionals specialized in the mind and body (psychiatrist, psychologists and physical therapists).

A better understanding on which individuals are at risk of the development of chronic pain following an intervention action early on by health professionals could help prevent unnecessary suffering. Investigating additional and avoidable risk factors connected to

psychological trauma such as loss of a loved one might therefore be of importance for the development of such preventive interventions.

### **Aim**

In this study, the overall aim is to study a relationship between the degree of a widower's preparedness before his wife's death and chronic pain symptoms 4-5 years after loss and whether the man's age affects this risk. Furthermore, the aim is to investigate the association of chronic pain and psychological morbidity following loss of a loved one.



## Article

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### **Low preparedness before a loss of a wife to cancer and the widower's chronic pain 4-5 years later – a population-based study**

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## **Abstract**

**Objective** Psychological morbidity has been suggested as important contributing factor to chronic pain; increased knowledge on potential mechanisms might therefore facilitate preventive efforts. The focus of this study was on the impact of spousal loss on the development of chronic pain, more specifically, the aim was to investigate the effect of experiencing low preparedness before a wife's death on the widower's chronic pain 4-5 years after loss.

**Methods** In a population-based study in the years 2004-2005, anonymous questionnaires were sent out to 907 men in Sweden who had lost a wife to cancer in 2000 and 2001. The questionnaires contained questions on circumstances around the death, such as the man's preparedness at the time of his wife's death and the men's physical and psychological health at follow-up. Psychological morbidity was measured by HADS and by direct questions on psychological health. Logistic regression was used to evaluate the risk of chronic pain within two age groups by level of preparedness with various covariate assessments. When exploring the association between chronic pain and psychological morbidity we calculated relative risk with 95% CI.

**Results** Altogether 691/907 questionnaires were received (76%). 638 widowers answered a question on chronic pain, of those 76 (12%) reported chronic pain. Younger widowers were in general more likely to experience various pain symptoms; muscle tension (RR 1.38; CI 1.16-1.66), headache (RR 1.89; CI 1.49-2.41), burn out (RR 5.64; CI 2.08-15.32) compared with the older group. Younger widowers (38-61 years) who reported low degree of preparedness for their wife's death had increased risk of experiencing chronic pain (OR 6.67; CI 2.49-17.82) 4-5 years after loss. The same did not apply for older widowers (62-80 years) (OR 0.81; CI 0.32-2.05). Both age groups who experienced chronic pain were at increased risk for psychological morbidity. Younger widowers with chronic pain reported increased risk of depression (a single item question on depression: RR 2.44; CI 1.03-5.79), anxiety (RR 2.12; CI 1.10-4.09) and sleep disorders (RR 4.09; CI 2.02-8.26) and older widowers of depression (RR 2.45; CI 1.60-3.76 and a single-item question: RR 2.17; CI 1.11-4.21) and anxiety (RR 2.04; CI 1.05-3.96).

**Conclusion** Younger men who are less prepared for their wife's death are at higher risk for experiencing chronic pain and other various pain symptoms 4-5 years after loss. In addition, those who experience chronic pain have also greater likelihood of experiencing psychological morbidity. The findings emphasize the importance of being prepared before a wife's death, identification on factors that might increase such preparedness are therefore called for.



## Introduction

Chronic pain is a common condition which can have severe consequences on the sufferer's daily activities, work and quality of life. It is recognized as a public health problem, being a common reason for work disability and long term sick-leaves<sup>4 5</sup>. Studies indicate that 10-25% of the population is suffering from chronic pain symptoms,<sup>2-5</sup> an increased understanding of risk factors may therefore prevent unnecessary suffering.

Previous researches suggest that psychological and psychosocial factors are important risk factors for the development of chronic pain<sup>12 14 25 30</sup>. Psychological trauma history has been suggested to increase risk of chronic pain<sup>39 40 72</sup> and psychological symptoms and lack of psychosocial support after physical trauma may contribute to pain becoming chronic<sup>26-28</sup>. However, the impact of different characteristics of traumatic exposures on chronic pain outcome is not sufficiently understood.

Traumatic life events, such as the loss of a loved one, may lead to long-term psychological and physical morbidity<sup>43-48</sup>. Identification of risk factors for morbidity in bereavement is thus of importance. Studies on preparedness for a loved one's death have shown an association between less forewarning and increased risk of later psychological morbidity for the bereaved<sup>61 64 65</sup>. Results from a study by Hauksdottir et al.<sup>61</sup> indicated that low preparedness for a wife's death to cancer is associated to increased risk of anxiety and anxiety related symptoms in younger widowers 4-5 years after the loss. However, the effect of losing a spouse to cancer on an individual's experience of chronic pain has not been investigated. In this study, the overall aim is therefore to study whether the widower's degree of preparedness before his wife's death affects the risk of experiencing chronic pain 4-5 years after loss.

## **Methods**

### **Study design and population**

For the study, all women in Sweden who died of cancer in the breast, ovary or colon in 2000 or 2001 and lived in Northern Sweden, Gothenburg and Stockholm or Uppsala health regions at time of death were identified. From the Swedish Population registry it was identified whether the women had a husband at the time of death. A husband was identified as eligible for the study if he was 80 years or younger at the time of the study, was born in one of the Nordic countries, had a registered telephone number, understood Swedish and had been living with his wife at the time of her disease and death. The study base consisted of 907 widowers that were included in the study. Anonymous questionnaires, based on in-depth interviews and previously tested in a pilot study, were sent out to the participants from November 2004 to November 2005.

The participants all gave informed consent of their participation. The study population and the development of the questionnaire have been described in detail elsewhere<sup>61 66 73 74</sup>. The study was approved by The Regional Ethics Committee of Karolinska institutet in Stockholm (reference number 03-411).

### **Measurements**

The study specific questionnaire was divided into three sections; a) the wife's disease period and the moments before death, b) the six month period after loss and c) the man's health condition at the time of the study.

For this particular study, the main exposure of interest was having experienced low preparedness before a wife's death. Preparedness was measured with the following question: "How prepared were you before your wife's death?" The answers were given on a visual-digital scale ranging from 1 labeled "Not at all prepared" to 7 "Very well prepared". The widower's answers were then subcategorized into low preparedness (VDS score of 1-2), intermediate preparedness (VDS 3-5) and high preparedness (VDS 6-7).

The main outcome measurements, chronic pain or pain related symptoms, were measured by the question "Do you have any of the following diseases?" with a list of various physical diseases, including chronic pain, muscle pain (fibromyalgia) and burn out (with the response alternatives "yes" or "no"). For other pain related outcomes the following question about physical symptoms was used: "Have you experienced any of the following symptoms

the last month?” with a list of various physical symptoms; muscle tension, headache and back pain (with the response alternatives “yes“ or “no“).

#### *Psychological health and sleep difficulties*

For measuring the widowers’ psychological health, depression and anxiety, we used an established psychometric scale, the Hospital Anxiety and Depression Scale (HADS)<sup>75</sup> which has shown good sensitivity and specificity (0.80 for both factors) and performed well in the estimation of anxiety disorders and depression in different populations<sup>76</sup>. In addition, we included several single-item questions for evaluating psychological health, like: “Are you depressed?” (with the response alternatives “yes“ or “no“), “Have you been waking up at night with anxiety the last month?” (with the response alternatives categorized into “Yes-once a week to every night of the week“ and “No-1-3 times a month“) and “How would you rate your quality of life during the last month?” with a visual digital scale ranging from 1 (“No quality of life”) to 7 (“Best possible quality of life”).

#### *Previous psychological morbidity*

Previous psychological morbidity was determined by the widowers’ answers to the following questions: “Did you experience anxiety during the year prior to your wife’s diagnosis?”, “Did you experience depression during the year prior to your wife’s diagnosis?” (both answered on a visual-digital scale ranging from 1-7) and “Did you receive treatment (medical or psychological) for anxiety, depression or other psychological problems before your wife’s diagnosis?” with response alternatives being “yes” or “no”. A positive answer on any of those three questions was identified as having experienced previous psychological morbidity.

### **Statistical analyses**

The questionnaires received were entered in the EpiData software program and statistical analyses were done by using the SPSS statistical program, PASW version 17. We used descriptive statistics to calculate the percentage of widowers within each characteristic category and used Chi-square tests and their corresponding p-values to estimate differences in characteristics between groups. We subdivided the widowers in our analyses in two age groups, the youngest age tertiles (38-61 years old) vs. middle and oldest age tertiles (62-80 years old). Previous findings from same study have shown that preparedness was more protective for psychological well-being in the age group 38-61years old.<sup>61</sup> We calculated the

relative risk (RR) and the 95% confidence interval to evaluate the risk difference between age groups for experiencing various pain symptoms, as well as for psychological morbidity in association with chronic pain. To take into account the influence of potential covariates, we used logistic regression to evaluate the adjusted odds ratios (OR) for chronic pain by level of preparedness with 95% confidence interval (CI). We adjusted for age, marital status, education, physical activity, parental status and previous psychological morbidity.

## **Results**

Questionnaires were received from 691 of the 907 eligible widowers (76%). 638 widowers answered a question on chronic pain and of those, 76 (12%) experienced chronic pain. Characteristics of widowers with and without chronic pain are presented in Table 1. Of widowers with chronic pain, 41% were in the younger age group, 38-61 years and 59% were in the older age group, 62-80 years. Moreover, widowers with pain were more likely to be not physically active (47% vs. 36% of widowers without pain) and to be on sick leave (16% compared to 2% of the widowers without pain). Widowers without chronic pain were more likely to be physically active (63%), non-smokers (43%) and to be in a new relationship (49%) compared to widowers with chronic pain (53%, 34% and 43% respectively) (see table 1).

### **Pain symptoms related to age**

Figure 1 shows pain-related outcomes among widowers, subcategorized in two age groups, 38-61 years and 62-80 years. Younger widowers were more likely to experience muscle tension (RR 1.38; CI 1.16-1.66), headache (RR 1.89; CI 1.49-2.41), burn out (RR 5.64; CI 2.08-15.32) compared with the older group.

### **Preparedness before a wife's death**

In table 2, results for the widower's experience of chronic pain 4-5 years after loss are presented within age groups by level of preparedness for their wife's death. Odds ratios are reported for having experienced low or intermediate degree of preparedness compared with high degree of preparedness as a reference. Younger widowers (38-61 years) who reported being low prepared for their wife's death had increased risk of experiencing chronic pain (OR 6.67; 95% CI 2.49-17.82) which was not the case with older widowers (62-80 years) (OR 0.81; 95% CI 0.32-2.05). Adjusting for age, marital status, education, physical activity, parental status and previous psychological morbidity resulted in similar OR (OR 7.17; 95% CI 2.23-23.13).

### **Pain and psychological well being**

Table 3 shows the association between widower's reported chronic pain and psychological morbidity. Younger widowers (38-61 years old) with chronic pain had increased risk of depression (a single-item question on depression: RR 2.44; CI 1.03-5.79), anxiety (RR 2.12; CI 1.10-4.09) and sleep disorders (RR 4.09; CI 2.02-8.26) compared to younger widowers

without chronic pain. They also had increased risk of estimating their quality of life, physical health and psychological well-being as being low/moderate (RR 1.72; CI 1.44-2.06, RR 1.91; CI 1.56-2.36 and RR 1.69; CI 1.48-2.24 respectively), compared to younger widowers without pain. Older widowers (62-80 years old) with chronic pain also had increased risk of reporting depression (HADS-depression score above 8: RR 2.45; CI 1.60-3.76 and a single-item question on depression: RR 2.17; CI 1.11-4.21) and anxiety (RR 2.04; CI 1.05-3.96) compared to older widowers without pain, as well as having increased risk of estimating their quality of life being low/moderate (RR 1.49; CI 1.21-1.83), and their physical health being low/moderate (RR 1.60; CI 1.33-1.93).

## **Discussion**

Firstly, we found that younger widowers (38-61 years old) who experience low degree of preparedness before their wife's death have an increased risk of experiencing chronic pain 4-5 years after the loss of their wife. However, this relationship was not found for older widowers (62-80 years old). Secondly, we found that younger widowers reported higher levels of chronic pain, muscle tension, headache and back pain compared to older widowers. In addition, we found that widowers, in all ages who experience chronic pain, are at increased risk for psychological morbidity.

### **Experience of chronic pain**

Of the widowers, 12% reported chronic pain. This is in agreement of previous studies that have shown a prevalence of 10-25% of chronic pain symptoms in the community<sup>2-4</sup>

Our focus was to investigate the impact of preparedness of loss on later pain symptoms. Bereavement has repeatedly been associated with various psychological symptoms<sup>43-46</sup>. A review of the literature indicated a limited number of studies exploring the relationship between experiencing the loss of a loved one and chronic pain. In a study of 1000 elderly people, Bradbeer and co-workers<sup>59</sup> reported that widowed people had increased risk of having current moderate (RR 3.1) and strong (RR 3.4) to severe pain compared with non-widowed controls 5-9 years post loss. Furthermore, those recently bereaved had increased activity-limiting pain. Other studies have reported bereaved individuals rating their health as poorer than non-bereaved controls<sup>77</sup> and reported increased risk of adverse physical health consequences in bereaved individuals; elevation of blood pressure, heart trouble, increased alcohol consumption, cancer diagnosis, sleep disturbances and weight loss loss.<sup>44 53-58</sup> In addition, it is demonstrated in the literature that bereavement is associated with increased risk of mortality, greater among men than women.<sup>46 50-52</sup>

### **Trauma and chronic pain**

When observing the degree of preparedness for a loved one's death, former studies have shown that low preparedness for a relative's death may decrease the long-term risk of psychological morbidity for the bereaved.<sup>61-64</sup> Previous results from same study showed that younger widowers (38-61 years old) with low degree of preparedness have increased risk for anxiety (RR 2.3), emotional numbness (RR 2.2), low or moderate quality of life (RR 1.7) and sleep disorders (RR 2.0)<sup>61</sup> compared to younger widowers with high preparedness. In our

current results, we found that in addition to these psychological symptoms, experiencing low preparedness also is associated with increased risk of physical symptoms, such as chronic pain.

The overall findings support what previous studies have indicated, that psychological trauma and stress can influence the development of chronic pain.<sup>35 38-40</sup> Low preparedness for the loss might be regarded as a traumatic experience which affects the grieving spouse. Lee and co-workers classified loss-related stress into stressors related to the death event by assessing whether the death was sudden.<sup>60</sup> Assessments were made by the question „How long before your spouse’s death did you realize that she/he was going to die?”. Their results from a study on 335 bereaved individuals indicated that men who experience a sudden death of their spouse, and men who were not with their spouse at the time of death had greater functional limitation at 18 and 48 months after loss, suggesting that circumstances around death may affect the surviving widower’s long term physical health consequences. The same results were not observed for women. Studies have indicated that experiencing psychological trauma such as intimate partner violence, sexual abuse and surviving the holocaust can increase the risk of chronic pain symptoms.<sup>36 37</sup> Furthermore, a relationship has been reported between trauma in childhood and chronic pain in adulthood. In a prospective cohort study (N=9552), Kopec et al.<sup>39</sup> found increased risk of chronic back pain when having experienced multiple stressful events in childhood. Similarly, Jones et al.<sup>40</sup> reported from a prospective study of 7571 individuals, that experiencing maternal death and family- or financial difficulties in childhood increased risk of chronic pain in adulthood (RR 2.0, 1.3 and 1.6 respectively).

A potential mechanism between low preparedness and chronic pain outcome may be that lack of preparedness initiates a shock at the time of death, which increases the risk of psychological complications and post-traumatic stress disorder symptoms (PTSD). PTSD is known to be a co-morbid factor to chronic pain<sup>28 31 41</sup> although the interaction of traumatic experiences, PTSD symptoms, and mechanisms to chronic pain outcome is not clear. Results from a study on 129 Vietnam combat veterans suffering from PTSD, indicated that increased PTSD re-experiencing symptoms were related to overall pain severity ( $p < 0.01$ ) and pain disability ( $p < 0.008$ )<sup>42</sup>. Furthermore, in a study on child abuse, PTSD symptom severity significantly mediated the relationship to chronic pain severity. Raphael et al.<sup>35</sup> examined whether PTSD mediates the risk of pain in a prospective follow up study of a cohort of individuals with early childhood abuse or neglect (n=458). They found that even though



childhood victimization increases risk for PTSD in adulthood, it did not seem to be an independent predictive risk factor for pain symptoms in adulthood. However, they found that childhood victimization with a combined effect of PTSD symptoms in childhood, significantly predicted ( $p < .0001$ ) increased pain symptoms 30 years later, suggesting that it is the severity of the trauma that increases the risk, not just experiencing the trauma per se.

### **Chronic pain and psychological outcomes**

We observed an association between chronic pain and depression, anxiety and sleep disorders for both age groups. This is in agreement with former studies who have reported that pain symptoms are frequently associated with psychological morbidity which can contribute to pain becoming chronic.<sup>4 12 26 31</sup> Bair et al<sup>32</sup> studied the relationship between psychiatric comorbidity on pain intensity and disability in 500 chronic pain patients. They found that the added morbidity of both depression and anxiety to chronic pain was strongly associated with more severe pain ( $p < 0.0001$ ) and greater pain related disability ( $p < 0.0001$ ). As for sleep disorders, chronic pain can be a predictor for insomnia.<sup>15</sup> Wilson et al<sup>78</sup> reported in a study on patients with chronic pain that insomnia alone, in the absence of major depression was associated with increased pain and distress. Based on our study design, we cannot conclude whether psychological morbidity is a cause for or a result of the pain symptoms. However, the impact of psychological morbidity on chronic pain might possibly explain the relationship between low preparedness and pain outcome. Barry and co-workers reported an association between feeling unprepared for the loss of a loved one and traumatic grief symptoms.<sup>64</sup> Traumatic grief has been described by Prigerson et al. as a special form of emotional distress with PTSD-like symptoms, including re-experiencing, avoidance, survivor guilt, separation distress, disbelief and symptoms of identification with the deceased<sup>67</sup>. When studying 150 bereaved participants, they found that the individuals with high scores on traumatic grief had significantly increased risk for a poorer physical health outcome such as headaches ( $p < 0.05$ ), heart trouble ( $p < 0.03$ ) and cancer diagnosis ( $p < 0.002$ ), compared to those who scored low on traumatic grief<sup>55</sup>. This was distinct from the symptoms of bereavement related depression and anxiety. Hereby they indicate that increased risk of long-term physical health impairment might not necessarily be explained from the stress of bereavement alone but also by how traumatic the individual's grief which, in our case, might be an impact of the low preparedness. In a study on unresolved parental grief, bereaved parents ( $n=499$ ) reported significant worse physical health compared with parents who had worked through their grief. In addition, fathers had increased risk of sleep difficulties (RR 6.7).<sup>79</sup>

## **The effect of age**

In our analyses, we subdivided the widowers in two age groups, the youngest age tertiles (38-61 years old) vs. middle and oldest age tertiles (62-80 years old). Health is more likely to be worse in older age groups and older individuals are generally in increased risk of experiencing chronic pain, compared to younger.<sup>58</sup> Studies have also shown that physical health complaints in recently bereaved people increases with higher age.<sup>55 59</sup> However, we observed higher risk of pain related symptoms for younger widowers, and that less prepared younger widowers had increased risk of chronic pain. The association was not seen for the older age group.

Some mechanisms seem plausible to explain the age differences. Younger men had increased risk of muscle tension, headache and burn out which are all stress related symptoms and could be an indication of a more stressful life in addition to their loss; these men are still occupationally active and may still have children living at home. However, older men are more likely to be retired which could indicate lower general stress levels.

Why preparedness is more protective for the younger age group is not clear. It is possible that younger men are less prepared in general for the loss of a spouse, which then possibly results in more emotional stress that could explain this difference. Previous data from this study have shown that, for the younger widowers, low preparedness increases the risk of shock at the time of death<sup>61</sup> which might contribute to a later posttraumatic stress disorder. For older widowers, death of a spouse may be thought more of as a natural part of the life cycle which could facilitate the widower's work through his grief, even though the loss came to him as a shock. Even though older widowed people have shown worse health in early bereavement<sup>55 59</sup>, resilience and a positive change in adaptive capacity can possibly increase with higher age and more life experiences. This could possibly explain why the long-term effect is less evident as for the younger age group.

## **Strengths and limitations**

The study is based on a large population based cohort with a relatively high participation rate (76%). These facts minimize the risk of selection induced problems. Since the widowers are followed up 4-5 years after their wife's death we get information on the long-term association between psychological stress and physical outcome. In the initial phase of the study, the measurements were well-tested in a qualitative setting, increasing the likelihood that they measure what it was intended to measure.

With regard to measurements on preparedness, the information is collected retrospectively, which might introduce a threat to the validity for the study, like if men with chronic pain somehow remember differently and have more negative thoughts about the time before their wife's death in a systematic way. This seems unlikely and would not explain the differences between the age groups; however, we have no data to conclude on this matter.

Another limitation of the study might be the outcome measurement. By the definition of "The International Association for the Study of Pain", a pain that persists past the normal time of healing and recurs for over three months is classified as chronic pain.<sup>1</sup> However, the perception of pain is difficult to classify since both sensory and emotional factors come together. In addition, how people react to and report how they feel pain is different between individuals and there might possibly be a generation difference on how one defines as *chronic* pain. We have measured chronic pain with a single-item question with two response alternatives and the participants are not asked how much pain they are experiencing and for how long. For example, we have no data on the severity of pain or if the pain has endured for over three months. On the other hand, reduced sensitivity in our outcome measure would, unrelated to exposure level result in effect estimates closer to 1.0. Our intention is to measure the individual's experience of chronic pain, and we therefore have to rely on the participant's own perception on this.

## **Conclusion**

The findings from our study stress the importance of the preparedness for a loved one's death, especially for younger men, and how lack of preparedness may increase risk for long-term morbidity as measured by pain related symptoms several years after loss. In addition, our results indicate an association between psychological morbidity and chronic pain. Several care related factors may influence man's preparedness for his wife's death<sup>66</sup> and should be considered, not only to decrease the risk for the bereaved's long-term psychological morbidity, but also physical. With regard to the relationship between chronic pain and psychological morbidity, the findings also suggest that the younger widowers may be at more risks and should special consideration be made to that group. This emphasizes the importance of team work between health professionals (physiotherapists, psychologists, psychiatrists) when treating musculoskeletal pain and psychological morbidity among grieving individuals.

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Table 1. Characteristics of all widowers and of widowers with and without chronic pain				
Characteristics	All widowers N=691 (%)	Widowers without pain N=562 (88%)	Widowers with pain N=76 (12%)*	p-value <sup>‡</sup>
<b>Age groups</b>				
38-61 years	228 (33)	190 (34)	31 (41)	0.25
62-80 years	459 (66)	368 (66)	45 (59)	
Not stated	4 (1)	4 (1)	0 (0)	
<b>Employment status</b>				
Employed	270 (39)	236 (42)	24 (32)	≤0.01
Retired	382 (55)	301 (54)	40 (53)	
Unemployed/at home	10 (1)	9 (2)	0 (0)	
On sick leave	26 (4)	13 (2)	12 (16)	
Not stated	3 (0)	3 (1)	0 (0)	
<b>Education</b>				
Primary school	264 (38)	209 (37)	28 (37)	0.25
Secondary school	243 (35)	199 (36)	26 (34)	
University	180 (26)	150 (27)	22 (29)	
Not stated	4 (1)	4 (1)	0 (0)	
<b>Residence</b>				
Rural	132 (19)	97 (17)	20 (26)	0.22
Small town	167 (24)	136 (24)	20 (26)	
Medium sized town	232 (34)	193 (34)	21 (28)	
City	157 (23)	133 (24)	15 (20)	
Not stated	3 (0)	3 (1)	0 (0)	
<b>Physical activity</b>				
Yes	420 (61)	345 (61)	40 (53)	0.08
No	254 (37)	203 (36)	36 (47)	
Not stated	17 (3)	14 (3)	0 (0)	
<b>Smoking</b>				
Never	289 (42)	240 (43)	26 (34)	0.30
Former	289 (42)	235 (42)	34 (45)	
Current	106 (15)	83 (15)	15 (20)	
Not stated	7 (1)	4 (1)	1 (1)	
<b>Marital status today</b>				
Married/in a relationship	333 (48)	277 (49)	33 (43)	0.23
Single	338 (49)	268 (48)	43 (57)	
Not stated	20 (3)	17 (3)	0 (0)	
<b>Previous psychological morbidity**</b>				
No	513 (74)	427 (76)	53 (70)	0.30
Yes	174 (25)	134 (24)	22 (29)	
Not stated	4 (1)	1 (0)	1 (1)	

<sup>‡</sup> p-values are based on Chi-square test, significant at p < 0.05

\*53 did not answer question on chronic pain therefore the total no is 638 (not 691)

\*\* Combined variable: Questions on having experienced previous anxiety, or depression or previously receiving medical or psychological treatment for psychological disorders

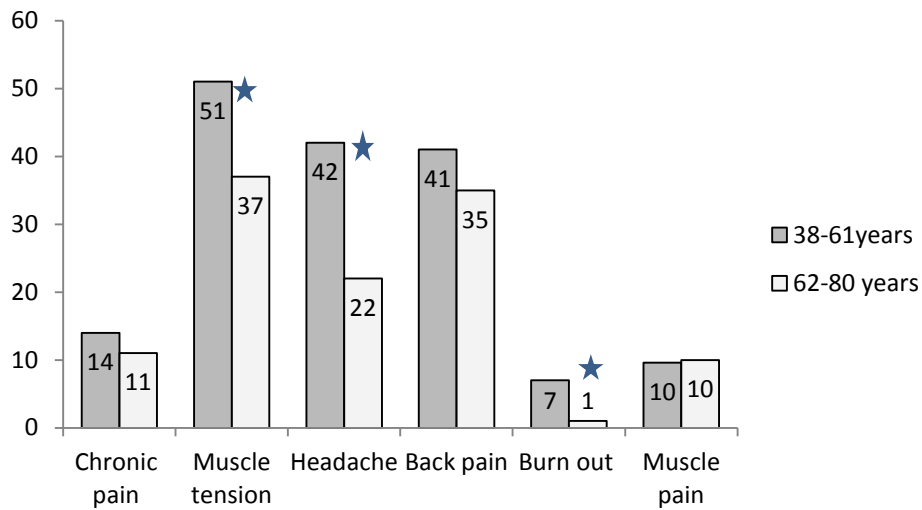


Figure 1. Pain symptoms (%) among younger and older widowers 4-5 years after loss

★  $P < 0.05$

Table 2. Logistic regression odds ratios on level of preparedness and chronic pain in widowers 4-5 years after the loss of a wife to cancer

		Crude OR	Adjusted OR*
<b>Younger widowers (38-61years)</b> N=217*			
Low preparedness	33	6.67 (2.49-17.82)	7.17 (2.23-23.13)
Medium preparedness	70	1.72 (0.65-4.57)	1.06 (0.35-3.23)
High preparedness	114	Ref 1.0	Ref 1.0
<b>Older widowers (62-80years)</b> N=407**			
Low preparedness	62	0.81 (0.32-2.05)	0.85 (0.32-2.29)
Medium preparedness	105	0.71 (0.32-1.56)	0.67 (0.28-1.61)
High preparedness	240	Ref 1.0	Ref 1.0

¥ Adjusted for age, marital status, education, physical activity, parental status and previous psychological morbidity

\* Of 221 widowers aged 38-61 years, 217 answered questions on preparedness

\*\*Of 413 widowers aged 62-80 years, 407 answered questions on preparedness

Table 3. Psychological morbidity among widowers with and without chronic pain

	Widowers without chronic pain		Widowers with chronic pain	
	No./total no.(%)	RR	No./total no.(%)	RR (95% CI)
<b>Depression HADS score above 8</b>				
38-61 years	29/190 (15.3)	1.0	6/31 (19.4)	1.27 (0.57-2.80)
62-80 years	60/368 (16.3)	1.0	18/45 (40.0)	2.45 (1.60-3.76)
<b>Depression – Are you depressed- “yes”</b>				
38-61 years	15/183 (8.2)	1.0	6/30 (20.0)	2.44 (1.03-5.79)
62-80 years	34/360 (9.4)	1.0	9/44 (20.5)	2.17 (1.11-4.21)
<b>Anxiety HADS score above 8</b>				
38-61 years	26/190 (13.7)	1.0	9/31 (29)	2.12 (1.10-4.09)
62-80 years	36/368 (9.8)	1.0	9/45 (20)	2.04 (1.05-3.96)
<b>Waking up with anxiety</b>				
38-61 years	15/190 (7.9)	1.0	10/31 (32.3)	4.09 (2.02-8.26)
62-80 years	36/364 (9.9)	1.0	5/44 (11.4)	1.15 (0.48-2.77)
<b>Low/moderate Quality of Life</b>				
38-61 years	98/187 (52.4)	1.0	28/31 (90.3)	1.72 (1.44-2.06)
62-80 years	178/361 (49.3)	1.0	33/45 (73.3)	1.49 (1.21-1.83)
<b>Low/moderate physical health</b>				
38-61 years	85/187 (45.5)	1.0	27/31 (87.1)	1.91 (1.56-2.36)
62-80 years	176/362 (48.6)	1.0	35/45 (77.8)	1.60 (1.33-1.93)
<b>Low/moderate psychological well being</b>				
38-61 years	79/188 (42.0)	1.0	22/31 (71.0)	1.69 (1.48-2.24)
62-80 years	141/362 (39.0)	1.0	22/45 (48.9)	1.25 (0.91-1.74)