
# Resilience in Men with Prostate Cancer: Relationship between Resilience, Social Support, and Distress

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## Abstract

Prostate cancer (PCA) is the most frequently diagnosed cancer among men in Iceland. While heightened levels of distress have been reported among PCA patients there is a group of patients that show low levels of distress. Therefore, it is important to find out what protects those men that show less distress, which would give suggestion for intervention. In this research we examined if resilience and social support were protective factors for distress, and if resilience mediated the relationship between social support and distress. Participants were comprised of 44 PCA patients. Baseline questionnaire assessing resilience, social support and distress was administered around the time of their diagnosis, and distress was assessed again three and six months later. Repeated measures ANCOVA (controlling for baseline distress) showed that PCA patients higher in resilience reported less distress at both the three and then six months follow-up assessments. High social support was not associated with distress; therefore it was not tested if resilience mediated the relationship between social support and distress. Result suggests that resilience is protective factor for distress among PCA patients. This finding raise the possibility that intervention aimed at increasing resilience might improve the mental health of PCA patients.



## Útdráttur

Blöðruhálskirtilskrabbamein (BKK) er algengasta krabbamein í karlmönnum á Íslandi. Á meðan sumir karlmenn með BKK greina frá lítilli streitu í kjölfar greiningar, greina aðrir menn frá mikilli streitu. Vegna þessa er mikilvægt að finna út hvaða forspárþættir aðgreina þá sem sýna litla streitu frá þeim sem sýna mikla streitu, til að hægt sé að þróa íhlutunarúrræði fyrir þessa menn. Í rannsókninni var skoðað hvort þrautseigja og félagslegur stuðningur væru verndandi þættir fyrir streitu hjá mönnum með BKK og hvort þrautseigja stjórnaði sambandinu á milli félagsstuðnings og streitu. Þátttakendur voru 44 nýgreindir menn með BKK. Grunnlínu spurningarlisti, sem mældi þrautseigju, félagslegan stuðning og streitu var lagður fyrir fljótlega eftir krabbameinsgreiningu, því fylgt eftir með öðrum spurningalista þremur og sex mánuðum síðar. Niðurstöður marghliða dreifigreiningar (stjórnað var fyrir streitu á grunnlínu) leiddu í ljós að BKK sjúklingar sem voru hærri í þrautseigju, sýndu lægri streitu bæði eftir þrjá og sex mánuði. Sambandið á milli félagslegs stuðnings og streitu var ekki marktækt og því var ekki prófað að stjórna fyrir sambandinu á milli félagsstuðnings og streitu með þrautseigju. Þessar niðurstöður sýna fram á möguleika á íhlutun sem ætlað er að auka þrautseigju, gæti bætt geðheilsu manna sem greinast með BKK.

**Foreword and Acknowledgements**

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Prostate cancer is the most frequently diagnosed cancer in men worldwide, including Iceland (American Cancer Society, 2011; Icelandic Cancer Registry, 2008). Each year, approximately 220 men are diagnosed in Iceland and around 50 men die of the disease (Icelandic Cancer Registry, 2008). Prostate cancer is primary diagnosed in older men (M = 71 year), with about 74% of men diagnosed, with the disease, over the age of 65 (Bracarda et al., 2005; American Cancer Society, 2011).

Prostate cancer diagnosis can be a major life stressor (Eton & Lepore 2002; Bloch et al. 2007). However, a great variability in distress has been observed both between and within studies, with some studies reporting low levels of distress and other high levels of distress (Hinz et al., 2006; Korfage, Essink-Bot, Janssens, Schroder & de Koning, 2006; Namiki et al., 2007; Pirl, Siegel, Goode & Smith, 2002). For example, Sharpley, Bitsika & Christie (2010) examined general distress among prostate cancer patients, diagnosed within eight years, found that 24% reported anxiety symptoms and 26% reported depressive symptoms. On the other hand, Bisson et al. (2002), reported that in their sample of newly diagnosed prostate cancer patients none reached clinical levels of depression and only 8% reached clinical levels of anxiety.

A great variability in cancer specific distress has also been reported among prostate cancer patients. A prospective study conducted by Steginga, Occhipinti, Gardiner, Yaxley and Heathcote (2004) found that before treatment 65% of the men reported high or moderate levels of avoidance and 59% of the men reported high or moderate levels of intrusive thought about the cancer. At the two-month follow-up, reported scores had reduced to 48% for avoidance and 32% for intrusion. However, Bisson et al. (2002) evaluated men newly diagnosed with localized prostate cancer within a 2-week period close to diagnosis and found that 14% of them reported symptoms of intrusive thoughts and avoidance. It is clear from the above studies that while

prostate cancer can have adverse effects on emotional well-being, there is a subsample of patients that seems unaffected by the cancer diagnosis. Increasing interest has been in identifying modifiable factors that may protect these patients as it might provide valuable information for designing interventions to diminish the detrimental effects of cancer diagnosis on emotional well-being. As discussed below, resilience and social support could be part of those protective factors.

Although no universal definition of resilience has yet been established, resilience is understood as referring to a positive outcome, or the ability to preserve or recover mental health, despite experiencing difficulty (Charney, 2004; Connor and Davidson, 2003). Resilience is not a single personality trait, but related to the results of interactions among a range of person-environmental factors that contribute to the development of resilience (Kumpfer, 1999), characteristics, behaviors, and thoughts of resilience, all of which can be acquired (Luthar, Cicchetti & Becker, 2000; Newman, 2005). Through the years, most research on resilience have examined individuals and children in adverse conditions such as socioeconomic disadvantage (Flouri, Tzavidis, & Kallis, 2010), parental mental illness (Fraser & Pakenham, 2009), maltreatment (Afifi & MacMillan, 2010), urban poverty (Sanders, Lim & Sohn, 2008) and chronic illness (Insook et al.,2004). The concept of resilience has only recently captured the interest of people studying psychological adjustment in cancer patients (Aspinwall & MacNamara, 2005; Coughlin, 2008). For example, a study carried out by Gotay, Isaacs and Pagano (2004) on survivors of breast-, stomach-, and lung cancer, showed that resilience was associated with better quality of life and lower levels of depression. Other study that examined fatigue in cancer patients undergoing radiation therapy, showed that resilience was an important psychological predictor of quality of life and coping (Strauss et al., 2007). The majority of

studies that examine cancer and resilience are cross-sectional which limits causal inferences, thus it is not clear weather resilience makes people less distress or if less distress makes people more resilient in face of adversity. Another limitation of previous studies is that they have relied on measure, such as hope and optimism, which are proxy for resilience rather than measures that were developed to assess resilience (see Stewart & Yuen, 2011).

Social support has also been found to protect cancer patients from the adverse psychological effects of cancer. Social support has been found to be related to mental health in cancer patients and to act as a buffer against distress and cancer-related worries (Baider, Ever-Hadani, Goldzweig, Wygoda, & Peretz, 2003; Helgeson & Cohen,1996; Northouse et al.,2007 ;Roberts et al., 2006; Trunzo & Pinto, 2003). For example, a study conduced by Baider et al. (2003), which examined patients with breast cancer or prostate cancer, showed that those patients who experienced higher levels of social support reported lower levels of psychological distress than patients that experienced lower levels of social support.

Recently it has been hypothesized that social support might be related to resilience and that the relationship between social support and distress may be mediated by resilience (Catalano, Chan, Wilson, Chiu & Muller, 2011). Supporting this hypothesis Pietrzak and Southwick (2011), which assessed resilience distress and social support in OEF–OIF veterans, found that social support was associated with lower distress and this relationship was fully mediated by the association between social support and post-traumatic stress disorder (PTSD).

The above studies suggest that resilience and social support may protect cancer patients from the adverse effects of prostate cancer diagnosis on general- and cancer specific distress, and raise the possibility that the relationship between social support and distress among prostate cancer patients may be mediated by resilience. To the knowledge of the author, no studies have

examined this relationship prospectively. The purpose of the proposed study is to address this missing component: the impact of social support and resilience, measured around the time of prostate cancer diagnosis, on general and cancer specific distress assessed three and six months after diagnosis. Based on the above literature it was hypothesized that: 1) Men with prostate cancer with high levels of resilience will report less levels of distress than those men with low levels of resilience. 2) Men with prostate cancer with high levels of social support will report less distress than those men with low levels of social support. 3) Resilience will mediate the relationship between social support and distress. Evidence to confirm at least either the first hypothesis or the second hypothesis would lend initial verification to the hypothesis that social support and resilience are protective factors for men with prostate cancer. Verification of the third hypothesis would indicate that social support enhances resilience and that resilience acts as a mediator between social support and distress.

## Method

### Participants

Participants were men newly diagnosed with prostate cancer. To-date 123 patients have been referred to the study with 18 patients declining participations. There were two follow-up assessments (see below) and to date, 74 and 55 men have, respectively, completed the first and second follow-up assessment. Eleven participants were excluded from the analyses as they had incomplete data on one or more of the main study variables, resulting in 44 participants with complete data on all assessments.

### Procedure

Newly diagnosed prostate cancer patients were referred to the study by their primary urologists. Each urologist briefly described the study to their patients and obtained permission

for the research team to contact them. A member of the research team then contacted the patients, explained the study procedure, and scheduled an in-person meeting with the patient. At the meeting, a research team member explained the study in detail, answered questions and obtained a signed consent form from the prospective participant. Afterwards the questionnaire was administered. While answering the questionnaire the participant was left alone, with a brief check-in from a research team member from time to time. Three months (follow-up 1) and six months (follow-up 2) after the baseline questionnaire was administered, a follow-up questionnaire was sent by mail to the participant, which was after completion returned by mail, in a pre-stamped envelope, by the participant.

**Measures**

This study is part of a larger ongoing research project in which all of the participants were asked to complete sixteen questionnaires as well as details about their demographic and medical variables. In this study, four of these questionnaires will be examined: The Hospital Anxiety and Depression scale; the Impact of Events scale; The Social Constrain scale; and The Connor–Davidson Resilience scale as well as the demographic information.

*Demographic Questionnaire*

Subjects completed a standard questionnaire about their age, education, work information and marital status, using a standard self–report format.

*General Distress*

To measure general distress the Hospital Anxiety and Depression Scale (HADS) was used (Zigmond & Snaith, 1983). HADS consists of fourteen questions, seven of which assess depression (e.g. “I still enjoy the things I used to enjoy”, “I have lost interest in my appearance”) and seven of which assess anxiety (e.g. “I feel tense or wound up”, “I can sit at ease and feel

relaxed"). Subjects were asked to rate their feelings over the past week on a four-point Likert scale from 0 (*never*) to 3 (*always*). The mean score was computed for both subscales, with a possible range of 0-3. HADS has proven to be a reliable and valid measure of both depression and anxiety, with the internal consistency varying between .68 and .93 for anxiety and from .67 to .90 for depression (Bjelland, Dahl, Haug og Neckelmann, 2002). The HADS was translated into Icelandic by Högni Óskarsson (Schaaber, Smari & Oskarsson, 1990). In the present study, the internal consistency for anxiety was at baseline, α=.84 and ,α=.74 for depression. At follow-up 1, internal consistency was α=.79 for anxiety and ,α=.74 for depression. At follow-up 2, it was α=.71 for anxiety and ,α=.75 for depression

*Cancer specific Distress*

To measure cancer specific distress the Impact of Event Scale-Revised (IES-R) was used (Weiss & Marmar , 1997). IES-R is intended to measure distress related to a specific stressor, in this case the stressor was the diagnosis of prostate cancer. It consists of sixteen questions, eight of which measure signs of avoidance (e.g. "I felt as if it hadn't happened or wasn't real" ) and eight of which assess signs of intrusive thoughts (e.g. "Any reminder brought back feelings about it"). Each item is rated on a five-point Likert scale ranging from 0 (*not at all*) to 4 (*often*). Mean scores were computed for each subscale, with a possible range of 0-4, where higher scores indicates higher levels of intrusive thoughts or avoidance. The IES-R scale was translated to Icelandic by Sjöfn Ágústdóttir and translated back to English by Jakob Smára .The internal consistency for the present study was α=.91 for intrusion and α=.87 for avoidance at baseline. At follow-up 1, internal consistency was, α=.84 for intrusion and α=.87 for avoidance and at follow-up 2, it was α=.87 for intrusion and α=.83 for avoidance.

*Resilience*

Resilience was measured with the Connor–Davidson Resilience Scale (CD-RISC-10; Campbell-Sills and Stein, 2007). The CD-RISC-10 is a 10-item scale that measures paitients capability to cope with adversity (e.g.,"I work to attain goals.", "I am able to adapt to change" ). The questions are scored on a five-point Likert scale, from 0 (*not true at all*) to 4 (*true nearly all the time*). Mean score was computed, with a possible range of 0-4, where higher scores reflect higher levels of resilience. The CD-RISC-10, which is unidimensional, has been found to display good internal consistency, convergent and discriminant validity, and construct validity (Campbell-Sills and Stein, 2007). The CD-RISC-10 was translated to Icelandic by Sjöfn Ágústsdóttir and translated back to English by Jakob Smári. The internal consistency in the present study was good, or $\alpha$=.79. CD-RISC-10 was administered at the baseline assessment.

*Social Support*

To measure social support a 15-item Social Constrain Scale (SCS) for cancer patient was administered (Lepore, Silver, Worthman & Wayment,1996; Lepore & Ituarte, 1999). Social constraints refer to any negative social interaction that may result in a cancer patient feeling that they have inadequate social support. Participants were asked to indicate how often they feel constrained in discussing their cancer (e.g. "How often did your spouse change the subject of the conversation when you wanted to talk about the prostate cancer?") on a four-point Likert scale of 1 (*never*) to 4 (*always*), either in the domain of spouse or partner; or a friend or relative. In this study each item was revised such that higher scores indicate greater social support. Each subscale score was divided by the number of questions to derive mean score. In this study the mean score for both subscales was computed (range 1-4), and only responses with both subscales were included. The SCS was translated to Icelandic by Áslaug Kristinsdóttir and translated back

to English by Jakob Smári. The internal consistency of the total scale, for the present study was computed to be α=.83. SCS was administered at baseline.

**Design**

This was a longitudinal study with the questionnaire administered around the time of diagnosis and again three and then six months later. In testing the main hypothesis, two predictor variables (resilience and social support) and two outcome variables (general distress and cancer-specific distress) were used.

**Data analysis**

Repeated measures ANCOVA on a software package, SPSS 19.0, were used to analyze the data. A median split was used to classify individuals as high resilience and low resilience. To examine the effects of resilience on distress a two (Resilience: high or low) by two (time: follow-up 1 and follow-up 2) ANCOVA (controlling for baseline distress) was computed for each of the dependent variables. Identical analyses were computed to examine the effects of social support on distress.

Results indicating difference with a probability of less than or equal to 0.05 were accepted as significant.

## Results

*Sample Characteristics*

The age of participants ranged from 51 – 85 years of age, with a mean age of 68 years (SD = 7.83). The majority of the participants or 78.4% were married and 15.1% were widower. For the educational attainment, 16.4% of men had completed only primary school education, 61.8% had completed secondary school education, and 21.8% had completed university studies. Approximately half, or 46.3% of the participants were currently retired; 46.3% were working and 7.4% where looking for a job or did not reveal their job situations. At recruitment, participants' mean time since diagnosis was three to four weeks (SD = .90).

*Preliminary Analyses*

To check for potential background covariates, we examined the relationship between the demographic variables and the outcome and predictor variables. There was only a significant relationship between age and anxiety (e.g. not depression) ($r = -.43$, $p < .05$), and cancer specific distress (e.g. intrusion and avoidance)($r = -.34$, $p < .05$; $r = -.28$, $p < .05$). Since age and distress at baseline were significantly related with intrusion, avoidance and anxiety at follow-up assessments, we included age and intrusion, avoidance and anxiety at baseline as covariates in all the analyses. Entering age, as a covariate did not alter the results. Thus, results are reported without age as a covariate.

Finally, the general distress (e.g. depression and anxiety) was significantly correlated with general distress at follow-up 1 ($r = .48$, $p < .001$; $r = .32$, $p < .05$) and follow-up 2 assessments ($r = .41$, $p < .01$; $r = .54$, $p < .001$). And cancer specific distress (e.g. intrusion and avoidance) was significantly correlated with cancer – specific distress at follow-up 1 ($r = .48$, $p <$

.001; r = .41, p < .001) and follow-up 2 assessments (r = .49, p < .001; r = .59, p < .001). Thus, results are reported using general distress and cancer –specific distress as covariates.

*Descriptive Statistic*

Descriptive statistics for distress outcomes appear in Table 1. Repeated measures ANOVA using scores on intrusion yielded a non-significant main effect for time ($F$ (2, 84) = 1.44, $p > .05$). Similar results were found for avoidance ($F$ (2, 82) = 2.01, $p > .05$), depression ($F$ (2, 84) = .52, $p > .05$) and anxiety ($F$ (1, 82) = 2.93, $p > .05$). However, men showed certain variability in distress as can been seen from the standard deviation (SD). Furthermore, as can be seen in Table 1, men were relatively high both in resilience (M=2.93) and social support (M= 3.74) at the baseline.

Table 1

*Descriptive Statistics for Distress Outcomes, Resilience, and Social Support*

| | Baseline | | Follow–up 1 | | Follow-up 2 | |
|---|---|---|---|---|---|---|
| | *M (SD)* | AR | *M (SD)* | AR | *M (SD)* | AR |
| Total (HADS) | .52 (.43) | 0-1.57 | .44 (.42) | 0-1.86 | .51(.52) | 0-2.29 |
| Depression | .21(.22) | 0-.86 | .24 (.24) | 0-.86 | .25 (.26) | 0-1.29 |
| Anxiety | .30 (.30) | 0-1.00 | .19 (.24) | 0-1.00 | .26 (.30) | 0-1.00 |
| Total (IES) | 1.65 (1.56) | 0-4.50 | 1.40 (1.19) | 0-4.13 | 1.32 (1.32) | 0-4.54 |
| Intrusion | .61 (.56) | 0-1.88 | .51 (.44) | 0-1.50 | .50 (.50) | 0-1.75 |
| Avoidance | .65 (.65) | 0-2.25 | .57 (.52) | 0-1.75 | .49 (.53) | 0-1.75 |
| Resilience | 2.93 (.45) | 2.10-3.90 | | | | |
| Social support | 3.74 (.27) | 2.90-4.00 | | | | |

*Note.* AR = actual range

* p < .05; ** p < .01

*Relationship between Distress and Resilience*

We first examined the relationship between different levels of resilience and the two measures of cancer specific distress (i.e. intrusive thoughts and avoidance). For intrusive thoughts about cancer the two (high vs. low resilience) by two (time: Follow-ups 1 and 2) repeated measures ANCOVA yielded a significant main effect of resilience ($F$ (1, 40) = 4.62, $p$ < .05), but the main effect for time ($F$ (1, 40) = .32, $p$ > .05) and the interaction between time and resilience was non-significant ($F$ (1, 40) = .43, $p$ > .05). As can been seen in Figure 1, individual higher in resilience at baseline reported lower levels of intrusive thoughts about their cancer at both follow up assessments compared to those lower in resilience. Similar findings were found for avoidances, with a significant main effect of resilience ($F$ (1, 39) = 8.57, $p$ < .01) and non-

significant main effect for time and non-significant ($F$ (1, 39) = 2.80, $p > .05$) interaction ($F$ (1, 39) = 3.13, $p > .05$) between time and resilience.

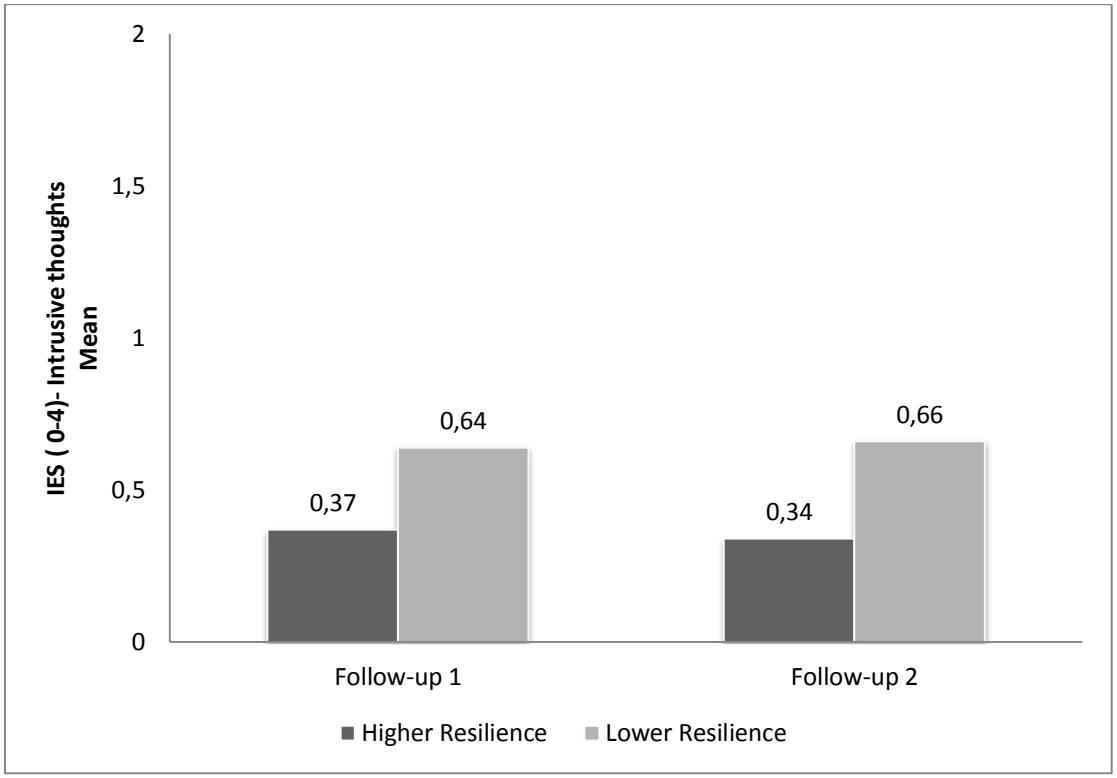


Figure 1

*Resilience (high or low) and intrusive thoughts in men with prostate cancer at follow-up assessments.*

Then we examined the relationship between different levels of resilience and general distress (i.e., depression and anxiety). Repeated measures ANCOVA, using anxiety scores from follow-up assessments yielded a significant main effect of resilience ($F$ (1, 40) = 4.62, $p < .05$) but the main effect for time was not significant ($F$ (1, 40) = 4.62, $p < .05$) and the interaction between time and resilience was not significant ($F$ (1, 39) = 1.77, $p < .05$). As can been seen in Figure 2, individuals higher in resilience had lower levels of anxiety at both follow-up assessments. Similar findings were found for depression with a significant main effect of

resilience ($F$ (1, 40) = 7.32, $p < .05$) and non-significant main effect for time ($F$ (1, 40) = .31, $p > .05$) and non-significant interaction ($F$ (1, 40) = .20, $p > .05$).

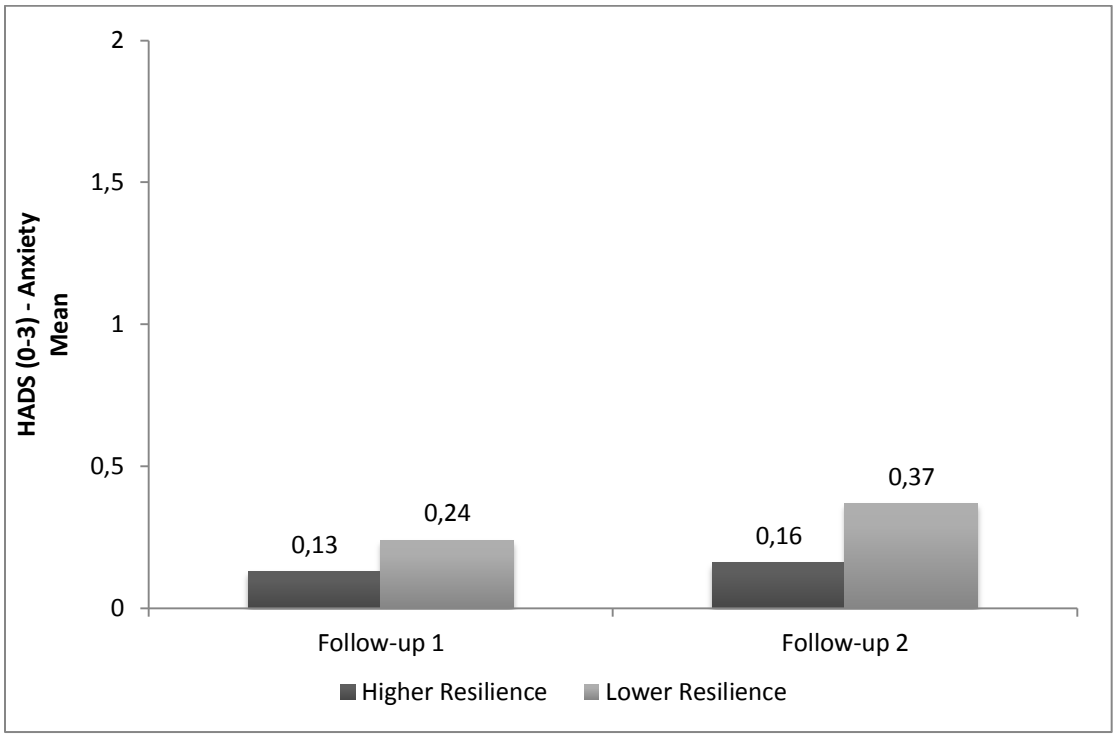


Figure 2

*Resilience (high or low) and anxiety in men with prostate cancer at follow-up assessments.*

*Relationship between Distress and Social Support*

A two (social support: above and below the median) by two (Time: Follow-up assessments 1 and 2) ANCOVA (controlling for baseline levels) for intrusive thoughts about prostate cancer indicated that the main effects for social support ($F$ (1, 32) = .00, $p > .05$) and time ($F$ (1, 32) = .34, $p > .05$) were not significant and the interaction between social support and time was not significant ($F$ (1, 25) = .49, $p > .05$). Similar findings were found for avoidance, as the main effects of social support ($F$ (1, 32) = 1.63, $p > .05$) time ($F$ (1, 32) = .98, $p > .05$) and the interaction ($F$ (1, 32) = .01, $p > .05$) were not significant.

Finally, we examined the relationship between social support and depression and anxiety. Repeated measures ANCOVA using depression scores on follow-up assessments yielded un-significant main effect of social support ($F$ (1, 32) = .09, $p > .05$) , time ($F$ (1, 32) = .22, $p > .05$) and interaction between time and social support ($F$ (1, 32) = 1.45, $p > .05$). Similar findings were found for anxiety, as the main effect of social support ($F$ (1, 32) = .23, $p > .05$) and the interaction ($F$ (1, 32) = 2.93, $p > .05$) were not significant, but main effect for time was significant ($F$ (1, 32) = 4.50, $p < .05$).

*Resilience, Social Support and Distress*

Our hypothesis, that the relationship between social support and distress would be mediated by resilience could not be tested as one of the main criteria for assessing mediation is that the relationship between the independent variable (i.e., social support) and the dependent variables (i.e., general and cancer specific distress) is significant (Baron & Kenny, 1986), but as discussed above social support was not related to any of the distress outcomes.

## Discussion

The main goals of the present study were to examine if higher levels of resilience and social support were associated with lower levels of distress among prostate cancer patients and to determine if resilience mediated the relationship between social support and distress. The findings supported the hypothesis that resilience around the time of diagnosis predicted lower levels of distress three and six months later but the hypothesis that social support would predict lower levels of distress was not supported. The mediation hypothesis could not be examined, as there was no relationship between social support and distress.

The finding that resilience was associated with lower levels of distress is consistent with

previous findings that resilience can buffer the impact of major life stressors, such as cancer, on emotional well-being (Catalano et al.,2011; Gotay, Isaacs & Pagano, 2004; Hjemdal, Vogel, Solem, Hagen & Stiles, 2011). Prior studies have mostly been cross-sectional, which limits causal inferences. For example, it is not clear from those studies if high resilience causes lower levels of distress or if lower level of distress causes higher resilience. This present study strengthen the hypothesis that it is resilience that caused lower distress and not the other way, as the findings showed that resilience around the time of diagnosis was related to distress three and six months later, even after controlling for distress assessed around the time of diagnosis. These finding suggests that interventions aimed at increasing resilience at the time of diagnosis might improve psychological adjustment to cancer diagnosis. To date, we are not aware of any intervention study that has focused in increasing resilience among cancer patients. However, a study by Steinhardt and Dolbier (2008), which had the purpose of assessing effectiveness of an intervention, designed to enhance college students resilience, reviled that 4-week resilience intervention program, enhanced the students resilience and lower their score on depression, negative affect and stress. These results suggest that interventions designed to enhance resilience might assist prostate cancer patients with adjusting to their cancer diagnosis.

Our correlational analyses showed that distress around the time of diagnosis correlated strongly with distress assessed three and six months later. This is consistent with other studies that have showed that baseline distress predicts future distress, both in the general population (Grabe, Baumeister, John, Freyberger & Völzke, 2009) and among cancer patients (Nordi & Glimelius, 1999). This finding suggests that it might be important to assess distress at the time of cancer diagnosis and to provide psychosocial interventions to distressed patients as it might help them adjust to their cancer diagnosis.

We were not able to confirm the hypothesis that higher levels of social support around the time of diagnosis would be associated with lower levels of distress three and 6 months later. This finding is inconsistent with previous findings, which have found that social support protects cancer patients from the adverse psychological effects of cancer (Helgeson & Cohen 1996; Baider et al. 2003; Trunzo & Pinto 2003; Roberts et al. 2006; Northouse et al.2007). There are several reasons for these discrepant findings. Firstly, in the present study social support was assessed with the social constraint scale rather than social support scale. Although there is evidence that perceived social support and social constrain are correlated, received social support and social constrain are not correlated (Dzwonkowska 2007). It is possible that received social support might be better predictor of distress among prostate cancer patients a possibility that future studies should address. Secondly, the samples size were small as we had social support information on only 32 patients thus we might not have enough statistical power to test the hypothesis that social constraints assessed at the time of diagnosis predicted subsequent distress.

Finally, we could not test the hypothesis that that resilience mediated the effects of social support and distress as the relationship between social support and distress was not significant a prerequisite for testing the mediation effect.

The above findings should be interpreted with cautions due to several limitations of the study. Firstly, at this time point we only had 44 men who had finish all three assessments, which might explain way we failed to support some of the hypotheses. Secondly, we have no record of those who refuse to participate on baseline. Thus, we do not know if they are any different from those who did or didn't participate. It is possible that those who declined participation were more distress than those who did participate in the study. Thirdly, in the follow-up assessments we send men the questionnaire by mail, which increases the risk of missing values on the

questionnaires. Finally, we relayed exclusively on self-reported rating scales, which raises the issue of systematic positive or negative response tendencies.

Despite the above limitations the finding indicated that resilience plays a role as a protective factor for distress among prostate cancer patients. The findings indicate that there is a need to develop and test interventions aimed at enhancing resilience among individuals with prostate cancer as such interventions might reduce, or perverting long term distress among these patients. Interventions based on research findings are more likely to be effective because a reasonable explanation can be offered as to how specific factors are expected to interact.

## References

Afifi, T., & MacMillan, H. L. (2011). Resilience Following Child Maltreatment: A Review of Protective Factors. *Canadian Journal Of Psychiatry, 56*(5), 266-272.

American Cancer Society. (2011). *Cancer facts and figures 2011.* Atlanta: American Cancer Society.

Aspinwall, L. G., & MacNamara, A. (2005). Taking positive changes seriously: Toward a positive psychology of cancer survivorship and resilience. *Cancer, 104,* 2549–2556.

Baider, L., Ever-Hadani, P., Goldzweig, G., Wygoda, M. R., & Peretz, T. (2003). Is perceived family support a relevant variable in psychological distress?: A sample of prostate and breast cancer couples. *Journal Of Psychosomatic Research, 55*(5), 453. doi:10.1016/S0022-3999(03)00502-6.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal Of Personality And Social Psychology, 51*(6), 1173-1182. doi:10.1037/0022-3514.51.6.1173.

Bisson, J. I., Chubb, H. L., Bennett, S. S., Mason, M. M., Jones, D. D., & Kynaston, H. H. (2002). The prevalence and predictors of psychological distress in patients with early localized prostate cancer. *BJU International, 90*(1), 56-61. doi:10.1046/j.1464-410X.2002.02806.x.

Bjelland, I., Dahl, A. A., Haug, T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal Of Psychosomatic Research, 52*(2), 69.

Bloch, S., Love, A., Macvean, M., Duchesne, G., Couper, J. & Kissane, D. (2007). Psychological adjustment of men with prostate cancer: a review of the literature. *BioPsychoSocial Medicine, 1*, 2.

Bracarda, S., Cobelli, O., Greco, C., Prayer-Galetti, T., Valdagni, R., Gatta, G., de Braud, F. og Bartsch G. (2005). Cancer of the prostate. *Critical Reviews in Oncology/Hematology, 56*, 379-396.

Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the connor–davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal Of Traumatic Stress, 20*(6), 1019-1028.

Catalano, D., Chan, F., Wilson, L., Chiu, C., & Muller, V. R. (2011). The buffering effect of resilience on depression among individuals with spinal cord injury: A structural equation model. *Rehabilitation Psychology, 56*(3), 200-211. doi:10.1037/a0024571.

Charney, D. S. (2004). Psychobiological Mechanisms of Resilience and vulnerability: Implications for Successful Adaptation to Extreme Stress. *American Journal Of Psychiatry, 161*(2), 195-216.

Connor, K.M., & Davidson, J.R.(2003). Development of a new resilience scale: The Connor–Davidson Resilience Scale (CD-RISC). *Depression and Anxiety.18* (2), 76–82.

Coughlin, S. S. (2008). Surviving cancer or other serious illness: A review of individual and community resources. *A Cancer Journal for Clinicians, 58*, 60–64.

Dzwonkowska, I. (2007). When people in close relationships are not prepared to listen to emotional disclosures. *The role of social constraints in shy people's functioning. Interpersona ,1*(2), 173-190.

Eton, D.T. & Lepore, S.J. (2002). Prostate cancer and health-related quality of life: A review of the literature. *Psycho-oncology, 11,* 307-326.

Flouri, E., Tzavidis, N., & Kallis, C. (2010). Adverse life events, area socioeconomic disadvantage, and psychopathology and resilience in young children: the importance of risk factors' accumulation and protective factors' specificity. *European Child & Adolescent Psychiatry, 19*(6), 535-546. doi:10.1007/s00787-009-0068-x.

Fraser, E., & Pakenham, K. (2009). Resilience in children of parents with mental illness: Relations between mental health literacy, social connectedness and coping, and both adjustment and caregiving. Psychology, *Health & Medicine, 14*(5), 573-584. doi:10.1080/13548500903193820.

Gotay, C., Isaacs, P., & Pagano, I. (2004). Quality of life in patients who survive a dire prognosis compared to control cancer survivors.*Psycho-Oncology, 13*(12), 882-892. doi:10.1002/pon.808.

Grabe, H., Baumeister, S. E., John, U., Freyberger, H. J., & Völzke, H. (2009). Association of mental distress with health care utilization and costs: a 5-year observation in a general population. *Social Psychiatry & Psychiatric Epidemiology, 44*(10), 835-844. doi:10.1007/s00127-009-0005-9.

Helgeson, V. S., & Cohen, S. (1996). Social support and adjustment to cancer: Reconciling descriptive, correlational, and intervention research. *Health Psychology, 15*(2), 135-148. doi:10.1037/0278-6133.15.2.135.

Hinz, A., Krauss, O., Stolzenburg, J., Schwalenberg, T., Michalski, D., & Schwarz, R. (2009). Anxiety and depression in patients with prostate cancer and other urogenital cancer: A longitudinal study. *Urologic Oncology, 27*(4), 367-372. doi:10.1016/j.urolonc.2008.02.003.

Hjemdal, O., Vogel, P. A., Solem, S., Hagen, K., & Stiles, T. C. (2011). The relationship between resilience and levels of anxiety, depression, and obsessive-compulsive symptoms in adolescents. *Clinical Psychology & Psychotherapy, 18*(4), 314-321. doi:10.1002/cpp.719.

Icelandic Cancer Registry (2011). Retrieved 1 November 2011, from http://www.krabbameinsskra.is.

Korfage I.J., Essink-Bot M.L., Janssens A.C., Schroder F.H. & de Koning H.J. (2006) Anxiety and depression after prostate cancer diagnosis and treatment: 5-year follow-up. *British Journal of Cancer, 94,* 1093–1098.

Kumpfer, K. (1999). Factors and processes contributing to resilience: The Resilience Framework. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 179–224). New York: Kluwer Academic/Plenum Press Publishers.

Lepore, S. J., & Ituarte, P. H. G. (1999). Optimism about cancer enhances mood by reducing negative social interactions. *Cancer Research, Therapy and Control, 8*, 165-174.

Lepore, S.J., Silver, R.C., Wortman, C.B. og Wayment, H.A. (1996). Social constraints, intrusive thougths and depressive symptoms among bereaved mothers. *Journal of Personality and Social Psychology, 79*, 271-282.

Luthar, S.S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: a critical evaluation and guidelines for future work. *Childhood Development. 71* (3), 543–562.

Namiki, S., Saito, S., Tochigi, T., Numata, I., Ioritani, N., & Arai, Y. (2007). Psychological distress in Japanese men with localized prostate cancer. *International Journal Of Urology, 14*(10), 924-929. doi:10.1111/j.1442-2042.2007.01746.x .

Newman, R. (2005). APA's resilience initiative. *Professional Psychology,Research and Practice, 36,* 227–229.

Nordin, K., & Glimelius, B. (1999). Predicting delayed anxiety and depression in patients with gastrointestinal cancer. *British Journal Of Cancer, 79*(3/4), 525.

Northouse L.L., Mood D.W., Montie J.E., Sandler H.M., Forman J.D., Hussain M., Pienta K.J., Smith D.C., Sanda M.G. &Kershaw T. (2007) Living with prostate cancer: patients' and spouses' psychosocial status and quality of life. *Journal of Clinical Oncology 25*, 4171–4177.

Pietrzak, R. H., & Southwick, S. M. (2011). Psychological resilience in OEF–OIF Veterans: Application of a novel classification approach and examination of demographic and psychosocial correlates. *Journal Of Affective Disorders, 133*(3), 560-568. doi:10.1016/j.jad.2011.04.028.

Pirl, W. F., Siegel, G. I., Goode, M. J., & Smith, M. R. (2002). Depression in Men Receiving Androgen Deprivation Therapy for Prostate Cancer: A Pilot Study. *Psycho-Oncology, 11*(6), 518-523. doi:10.1 002/pon.592.

Purnell, J. Q., Palesh, O. G., Heckler, C. E., Adams, M., Chin, N., Mohile, S., & ... Morrow, G. R. (2011). Racial disparities in traumatic stress in prostate cancer patients: secondary analysis of a National URCC CCOP Study of 317 men. *Supportive Care In Cancer,19*(7), 899-907. doi:10.1007/s00520-010-0880-3.

Roberts, K. J., Lepore, S. J., & Helgeson, V. (2006). Social-cognitive correlates of adjustment to prostate cancer. *Psycho-Oncology, 15*(3), 183-192. doi:10.1002/pon.934.

Sanders, A. E., Lim, S., & Sohn, W. (2008). Resilience to Urban Poverty: Theoretical and Empirical Considerations for Population Health. *American Journal Of Public Health, 98*(6), 1101-1106.

Schaaber, U., Smari, J. & Oskarsson, H. (1990). Comparison of the hospital anxiety and depression rating scale with other anxiety and depression rating scales. *Nordic Psychiatry, 44*, 507-512.

Sharpley, C. F., Bitsika, V., & Christie, D. H. (2010). 'Why I feel bad': refinement of the Effects of Prostate Cancer Upon Lifestyle Questionnaire and an initial exploration of its links with anxiety and depression among prostate cancer patients. *Psycho-Oncology, 19*(8), 839-846. doi:10.1002/pon.1623.

Steginga, S. K., Occhipinti, S., Gardiner, R. A. F., Yaxley, J., & Heathcote, P. (2004). Prospective study of men's psychological and decision-related adjustment after treatment for localized prostate cancer. *Urology, 63*(4), 751-756. doi:10.1016/j.urology.2003.11.017.

Steinhardt, M., & Dolbier, C. (2008). Evaluation of a Resilience Intervention to Enhance Coping Strategies and Protective Factors and Decrease Symptomatology. Journal Of American *College Health, 56*(4), 445-453.

Steward, D.E., & Yuen, T. (2011). A Systematic Review of Resilience in the Physically Ill. *Psychosomatics. 52,* 199-209.

Strauss, B., Brix, C., Fischer, S., Leppert, K., Füller, J., Roehrig, B., & ... Wendt, T. (2007). The influence of resilience on fatigue in cancer patients undergoing radiation therapy (RT). Journal Of Cancer Research & Clinical Oncology, 133(8), 511-518. doi:10.1007/s00432-007-0195-z

Trunzo, J. J., & Pinto, B. M. (2003). Social support as a mediator of optimism and distress in breast cancer survivors. *Journal Of Consulting And Clinical Psychology, 71*(4), 805-811. doi:10.1037/0022-006X.71.4.805.

Weiss, D.S. & Marmar, C.R. (1997). The Impact of Event Scale-Revised. In J.P. Wilson, & T.M. Keane (Eds.). *Assessing Psychological Trauma and PTSD: A Practitioner's Handbook* (pp. 399-411). New York: Guilford Press.

Zigmond, A. S. & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica, 67,* 361-370.

Informational websites

The American Cancer Society, Atlanta, Georgia. http://www.cancer.org

The Icelandic Cancer Society: Krabbameinsfélagið: http://www.krabb.is