Moderating the effects of post-traumatic stress on depression and anxiety: The experience of post-traumatic growth following a cancer diagnosis

A longitudinal study among men with prostate cancer

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Heilbrigðisvísindasvið

HÁSKÓLI ÍSLANDS

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Ég vil þakka leiðbeinanda mínum Heiðdísi B. Valdimarsdóttur fyrir frábæra leiðsögn og fyrir að vera ávallt til staðar þegar ég þurfti á að halda. Fanneyju Þórsdóttur vil ég þakka fyrir tölfræðilega aðstoð, góðar ábendingar og endalaust jákvætt viðmót. Þá vil ég minnast Jakobs Smára, fyrrverandi prófessors við sálfræðideild, sem bauð mér að taka þátt í þessu verkefni og var ávallt reiðubúinn að veita aðstoð og góð ráð. Síðast en ekki síst vil ég þakka manninum mínum fyrir þolinmæði og veittan stuðning og foreldrum mínum fyrir að vera til staðar fyrir dætur mínar á meðan ég vann að verkefninu.

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Abstract

Cancer diagnosis can be a major life stressor causing negative outcomes, such as post-traumatic stress disorder (PTSD), which can increase the probability of developing depression and anxiety. However, cancer diagnosis can also lead to positive outcomes, such as post-traumatic growth (PTG), which has been defined as „positive psychological change experienced as a result of the struggle with highly challenging life circumstances“. The aim of the present study was to examine if post-traumatic growth would act as a buffer and moderate the negative impact of post-traumatic stress on depression and anxiety among prostate cancer patients. Around the time of their cancer diagnosis 61 men completed a baseline questionnaire assessing depression, anxiety and post-traumatic stress symptoms. Three months later they completed a follow-up questionnaire assessing depression, anxiety and post-traumatic growth. Results of a multiple linear regression (when controlling for anxiety and depression at baseline) revealed that there was a significant interaction between post-traumatic stress and post-traumatic growth when predicting both anxiety and depression ($p < 0,05$), the higher the level of post-traumatic growth the lower the effect of post-traumatic stress on depression and anxiety. These findings extend the growing body of knowledge on post-traumatic growth, especially on its stress-buffering role and suggest that prostate cancer patients might benefit from interventions aimed at increasing post-traumatic growth.

Útdráttur

Það er algengt að fólk upplifi áfallatengd streitueinkenni í kjölfar krabbameinsgreiningar og áfallatengd streitueinkenni geta jafnframt aukið líkur á þunglyndi og kvíða. En margir upplifa einnig jákvæðar breytingar í kjölfar áfalls *(e. post-traumatic growth-PTG)*, líkt og nánari tengsl við fjölskyldu og vini og að sjá ný tækifæri í framtíðinni. Þessi rannsókn kannaði hvort áfallatengd streitueinkenni hefðu minni áhrif á þunglyndi og kvíða hjá þeim einstaklingum sem upplifðu meiri jákvæðar breytingar í kjölfar krabbameinsgreiningar. Þátttakendur voru 60 karlmenn sem höfðu nýlega greinst með blöðruhálskirtilskrabbamein. Flestir þátttakendur svöruðu grunnlínu spurningalista innan við tveimur mánuðum eftir að hafa hlotið greiningu, sem mældi áfallatengd streitueinkenni, þunglyndi og kvíða. Þá svöruðu þátttakendur eftirfylgni spurningalista þremur mánuðum síðar sem mældi þunglyndi, kvíða og jákvæðar breytingar í kjölfar áfalls. Niðurstöður marghliða aðfallsgreiningar (þar sem stjórnað var fyrir kvíða og þunglyndi á grunnlínu) leiddi í ljós að samvirkni á milli áfallatengdra streitueinkenna og jákvæðra breytinga spáðu marktækt fyrir um þunglyndi og kvíða ($p < 0,05$). Þeim mun meiri jákvæðar breytingar sem þátttakendur upplifðu, þeim mun minni áhrif höfðu áfallatengd streitueinkenni á þunglyndi og kvíða. Niðurstöður rannsóknarinnar eru mikilvæg viðbót við fyrri rannsóknir á jákvæðum breytingum í kjölfar áfalls, sérstaklega þar sem litið er á jákvæðar breytingar sem verndandi þátt *(e. stress buffer)*. Niðurstöðurnar benda einnig til þess að íhlutun sem felur í sér að finna jákvæðar afleiðingar áfalla (*e. post-traumatic growth*) geti verið gagnleg fyrir karlmenn sem greinst hafa með blöðruhálskirtilskrabbamein.

Prostate Cancer

Prevalence and prognosis

Worldwide, prostate cancer is the second most frequently diagnosed cancer in men, and the sixth leading cause of death due to cancer. Rate of diagnosis is highest among men in developed countries of Europe, North America and Oceania and lowest among men in many parts of Asia. The difference in rate of diagnosis is thought to be largely because of the different rate of using prostate specific antigen (PSA) to detect the cancer (American Cancer Society, 2008). Death rates due to prostate cancer have been decreasing in Western European and North American countries, while rising in Asian and Eastern European countries. The decrease in death rate can be traced to improved treatment, while the increase possibly reflects westernization (with increased consumption of fast food, increased rate of obesity and lack of physical activity) (American Cancer Society, 2008).

In Iceland, prostate cancer is the most frequently diagnosed cancer in men. Every year approximately 220 men are diagnosed with prostate cancer, and around 51 men die of the illness each year. The average age at diagnosis is about 70 years, and around 74% of the men diagnosed are more than 65 years old (Jónsson and Ingimarsson, 2009; Krabbameinsskrá Krabbameinsfélags Íslands, n.d.).

Symptoms and diagnosis

Prostate cancer usually has no symptoms in its early stages but if the tumour reaches a certain size it can start to cause some symptoms. Common symptoms of prostate cancer are a need to urinate frequently, painful urination, difficulties with starting or stopping urinating and a weak flow of urine, all of which are caused by the tumour pressing on

the bladder. Symptoms of a more advanced disease can be blood in urine or semen, erectile dysfunction and painful ejaculation. Finally if the cancer spreads to the bones, symptoms can include constant fatigue, loss of appetite and weight loss, along with pain in the lower back, hips and upper thighs (American Cancer Society, 2012; Félag Íslenskra Þvagfæraskurðlækna, 2006).

Primary diagnosis of prostate cancer most often consists of measuring amounts of the prostate-specific antigen (PSA) in a blood test or a digital rectal exam. Prostate cancer can cause the PSA level in the blood to rise, and men who have elevated levels need to be examined further. With a digital rectal exam the doctor examines the patient´s rectum to look for bumps or irregularities that could indicate cancer (American Cancer Society, 2012; Félag Íslenskra Þvagfæraskurðlækna, 2006). These methods can only suggest that a cancer diagnosis is likely, but the only way to confirm it is with a biopsy, where tissue from the prostate is removed and examined for cancer cells. If cancer in the prostate is confirmed, then further tests have to be done to see if the cancer has spread. The final diagnosis can be one of three stages of prostate cancer. The first stage being localized cancer, when the cancer is found only within the prostate. The second stage being locally advanced cancer, when the cancer has started to spread to the closest parts outside the prostate. Finally the third stage being metastatic cancer, when the cancer has spread to other parts of the body (American Cancer Society, 2012).

Treatment options and side effects

There are many different treatment options available for men with prostate cancer. The choice of treatment depends on numerous factors, including disease stage, life expectancy, other health problems and side effects of treatment. As detailed below treatment options include surgery, radiation therapy, hormone manipulation treatment,

chemotherapy and watchful waiting (American Cancer Society, 2012; Félag Íslenskra Þvagfæraskurðlækna, 2006).

Surgery. Surgery is a treatment option for men with localized prostate cancer, with a life expectancy of more than 10 years. The most common type of surgery performed is radical prostatectomy, where the whole prostate gland is removed, along with nearby tissue. Side effects can include problems with sexual function and insufficient bladder control. Some men are able to regain sexual function and bladder control with time, but it is not always the case (American Cancer Society, 2012).

Radiation therapy. As with surgery, radiation therapy is a treatment option for men with localized prostate cancer, and with a life expectancy of more than 10 years. Radiation therapy can also be used along with surgery, when the cancer has not been fully removed with surgery or when cancer has returned after surgery. Side effects can be problems with bladder control, bowel problems, and sexual dysfunction. These problems usually go away with time, but in some instances they can become long-term problems (American Cancer Society, 2012).

Hormone manipulation treatment. This treatment option may be used for all stages of the cancer. The aim of hormone manipulation treatment is to lower the level of androgens (male hormones) in the body. Androgens encourage the growth of cancer cells, so lowering their levels may retard the growth of cancer. Since this treatment option is not a cure for cancer, it is usually used alongside with other treatment options or when the other options are not applicable. Side effects may be loss of sexual desire, impotence, hot flashes, loss of muscle mass, growth of breast tissue, breast tenderness, weakening of the bones, tiredness, weight gain and depression (American Cancer Society, 2012).

Watchful waiting. Watchful waiting is a treatment option when the cancer is localized, slow growing, and not causing any symptoms. This option is often recommended for older men, who have a life expectancy of less than 10 years, or to men who have other health problems that shorten their life expectancy. If this option is chosen, PSA levels are monitored regularly and sometimes digital rectal exams are conducted as well. Should the cancer start to spread then a more invasive treatment is usually chosen (American Cancer Society, 2012).

Psychological Consequences of Cancer

Cancer diagnosis, including prostate cancer, can be a major life stressor causing negative outcomes, such as depression, anxiety symptoms and post-traumatic stress disorder (PTSD) (Carlson et. al., 2004). Depression is the most common mental disorder and symptoms include a lack of interest in daily activities and a lack of pleasure in activities that used to be pleasurable for the person, lack of energy, a change in sleeping pattern, a change in appetite, concentration problems, feelings of worthlessness and thoughts of death and suicide (American Psychiatric Association, 2000). Symptoms of anxiety include constant worrying, constantly feeling tense, a fear of losing control, sleep problems, chest pain, heart palpitations and elevated blood-pressure. If the symptoms of anxiety are so intense that they disrupt daily life, a person may be diagnosed with an anxiety disorder. Common anxiety disorders are generalized anxiety disorder, panic disorder, social phobia, specific phobia, obsessive compulsive disorder and post-traumatic stress disorder (PTSD) (American Psychiatric Association, 2000). PTSD is an anxiety disorder that can occur following a traumatic event and symptoms include

intrusive thoughts about the trauma, avoidance of trauma reminders and hyperarousal (American Psychiatric Association, 2000).

In one large study of cancer patients the prevalence of depression was found to be 36,3% and the prevalence of significant levels of anxiety was found to be 30,3%. The participants that reported the highest levels of distress had a diagnosis of cancer in the pancreas, lungs, brain, head and neck, or a diagnosis of leukemia or lymphoma (Carlson et. al., 2004). The prevalence of cancer-related PTSD diagnoses has been found to range from 0% to 32% and the prevalence of individual post-traumatic stress symptoms in the first four weeks following a diagnosis ranges from 15% to 80% (Kangas, Henry and Briant, 2002), where intrusive thoughts are the most common symptom (Jim and Jacobsen, 2008). Furthermore, post-traumatic stress symptoms have been found to be associated with depression and anxiety in cancer studies (Cordova et. al., 1995; Green, Rowland and Krupnick, 1998; Widows, Jacobsen and Fields, 2000; Mehnert and Koch, 2007).

Prostate cancer survivors have been found to have higher levels of clinically significant anxiety and depression than people in the general community. Clinically significant levels of anxiety have been found to range from 10% to 36%, and clinically significant levels of depression have been found to range from 13% to 27% (Dale, Bilir, Han and Meltzer, 2005; Korfage, Essink-Bot, Janssens, Schröder and Koning, 2006). Most of the studies on cancer-related PTSD have focused on women with breast cancer but one recent study showed that men with prostate cancer are more likely to seek psychiatric treatment for PTSD compared to controls (Bill-Axelson et. al., 2011). Prostate cancer patients with a more advanced cancer have been found to experience higher levels of distress (Bloch, 2007), and younger patients have been found to have higher levels of anxiety (Mehnert, Lehmann, Schulte and Koch, 2007).

Post Traumatic Growth

Although the prevalence of negative outcomes following a cancer diagnosis is high, the prevalence of positive outcomes, such as post-traumatic growth (PTG) is also high (Linley and Joseph, 2004; Jim and Jacobsen, 2008; Morrill et. al., 2008), with 60-90% of cancer survivors experiencing some positive changes (Mystakidou et. al., 2007). Before discussing post-traumatic growth and cancer an overview of post-traumatic growth will be provided.

What is post-traumatic growth?

According to Tedeschi and Calhoun (2004), the term post-traumatic growth refers to „positive psychological change experienced as a result of the struggle with highly challenging life circumstances". Dimensions of post-traumatic growth include „greater appreciation of life and a changed sense of priorities; warmer, more intimate relationships with others; a greater sense of personal strength; recognition of new possibilities or paths for one´s life; and spiritual development" (Tedeschi and Calhoun, 1996).

There is overwhelming evidence that people experience changes in their lives that they consider highly positive, after facing trauma or highly challenging life circumstances. Many different crises can lead to post-traumatic growth of some kind, for example bereavement, HIV infection, heart attacks, cancer, coping with the medical problems of children, rheumatoid arthritis, combat, being taken hostage, sexual assault and sexual abuse (Tedeschi and Calhoun, 2004).

Post-traumatic growth can coexist with psychological distress, thus individuals can experience post-traumatic growth and significant psychological stress at the same time. When a person experiences post-traumatic growth it does not mean that the person

has again reached the same level of well-being as before the trauma, it is the experience of improvement beyond what was before the trauma (Tedeschi and Calhoun, 2004).

The process of post-traumatic growth

We all have assumptions and a general set of beliefs about the world. These beliefs and assumptions guide our actions and can provide us with a sense of purpose and meaning. People can for example have assumptions about predictability and controllability of events, and about benevolence. According to Tedeschi and Calhoun (2004) major trauma or life crises can severely challenge our understanding of the world, when the trauma is not in accord with our beliefs and assumptions. In the aftermath of trauma people struggle with this new reality which may lead to significant levels of psychological stress, but it is also crucial for post-traumatic growth to occur. If people take the changed reality of their life into account in the cognitive rebuilding of assumptions and beliefs, then the new assumptions will be more resistant to being broken. In that way post-traumatic growth will have occurred. Persons usually do not consciously or systematically intend to benefit from trauma, post-traumatic growth is rather a consequence of attempts to cope or survive. The trauma most often remains a distressing event but growth can coexist with this distress (Tedeschi and Calhoun, 2004).

Tedeschi and Calhoun (2004) put forward a model of how processing trauma leads to post-traumatic growth. Their work is based on empirical work in the area as well as their own experiences as practicing psychologists. According to the model, post-traumatic growth involves a variety of elements. These elements include personality characteristics; managing distressing emotions; support and disclosure; and cognitive processing of the trauma.

Personality characteristics: Tedeschi and Calhoun (2004) examined the correlation between the five posttraumatic growth factors on the Posttraumatic Growth Inventory (PTGI) and the personality traits on the NEO Personality Inventory, in their original validation of the PTGI. The results showed that extroversion and openness to experience are two personality characteristics that may affect the likelihood of post-traumatic growth taking place, whereas other BIG five personality dimensions do not seem to be related to post-traumatic growth. Extroversion had a correlation with all of the five post-traumatic growth factors, correlation ranging from .15 (personal strength) to .28 (relating to others). Openness to experience had a correlation with two of the post-traumatic growth factors, a correlation of .25 for both new possibilities and for personal strength. Since this was not a prospective, longitudinal research design no conclusions of causality can be drawn.

Managing distressing emotions: After a trauma the person must find ways to manage the distress, so that cognitive processing can occur and new schemas can be formed. The person must be able to mourn and eventually accept the trauma.

Disclosure and support: It is important for persons to engage in self-disclosure regarding their emotions and their perspective on the trauma. The self-disclosure can involve either talking about the crisis or writing about it. It is clear that support from others can be helpful and can offer different perspectives that can be useful in the making of new schemas.

Cognitive processing and support: How persons cognitively process the trauma plays a fundamental role in the process of growth. What seems to be important in this context is ruminative thought. Although rumination has often been correlated with negative emotions and depression, it seems that rumination does not necessarily have to be negative. In the research of Nolen-Hoeksema and Davis (1999), results showed that

people with a ruminative coping style that had support from others to talk about their ruminations, were less likely to become depressed. In a research on post-traumatic growth among women with breast cancer there was a clear relationship between social support and post-traumatic growth (Cordova, 1999; Cordova et. al., 2001). This research showed that cognitive processing was inhibited, when relatives and friends did not care to hear about the cancer. Furthermore, the less cognitive processing that took place the less post-traumatic growth was reported by the women who survived.

Post-traumatic growth and cancer

Most of the research on cancer-related post-traumatic growth has focused on breast cancer. Bellizzi and Blank (2006) studied post-traumatic growth among 224 breast cancer survivors, who had been diagnosed 1-4 years previously. This was a cross-sectional study and no relationship was found between post-traumatic growth and hope, nor between post-traumatic growth and optimism. However, there was a significant relationship between coping strategies and post-traumatic growth, and coping strategies explained the largest amount of variance in post-traumatic growth. The coping strategy that seemed to facilitate post-traumatic growth the most was to engage in "active adaptive coping". Finally, emotional intensity was significantly positively related to reports of post-traumatic growth, that is the more emotional intensity, the higher levels of post-traumatic growth. The finding that hope and optimism were not related to post-traumatic growth goes against the theoretical statement put forward by Tedeschi and Calhoun (1995). However, the study of Sears et. al. (2003) found the same results, that is no relationship between optimism and post-traumatic growth, nor hope and post-traumatic growth (Bellizzi & Blank, 2006). Other results of the study of Bellizzi and Blank (2006) were that younger women reported higher levels of post-traumatic growth,

and higher levels were also reported from women who were in a relationship, employed or had lower levels of education.

Lelorain et. al. (2010) studied the prevalence of long term post-traumatic growth, 5-15 years after the diagnosis of breast cancer. This was a retrospective and cross-sectional study with 307 participants. The results showed that the average level of post-traumatic growth was high (M = 59,9, SD = 20, possible range: 0-105), and it was independent of the time that had passed since the cancer diagnosis. This mean score is comparable to other studies on post-traumatic growth of women with breast cancer, performed 5 years or less post-diagnosis. Significant positive correlations were found between happiness and all dimensions of post-traumatic growth (correlations ranging from 0.17-0,28; $p < 0,05$), except for the factor "spiritual changes". Significant positive correlations were also found between vitality and all dimensions of the post-traumatic growth (correlations ranging from 0,15-0,23; $p < 0,05$), except for "spiritual changes". Finally significant, but small correlations were found between mental health and "relations to others" (correlation of 0,14; $p < 0,05$), as well as "appreciation of life (correlation of 0,15; $p < 0,05$). These results are in accordance with some prior studies, for example the studies of Linley and Joseph (2004) and Helgeson et. al. (2006). Still, other researchers have found no relationship between post-traumatic growth and well-being, as for example in the study of Schulz and Mohamed (2004).

Morris and Shakespeare-Finch (2011) studied post-traumatic growth among a heterogeneous cancer group, 1,5-4 years post-diagnosis. This was a cross-sectional study and results showed that post-traumatic growth was not related to distress. However, social support and deliberately ruminating on benefits were positively associated with post-traumatic growth. Schmidt, Blank, Bellizzi and Crystal (2011) examined post-traumatic growth among people with different types of cancer, who were on average 4,5

years post-diagnosis. This was a cross-sectional study and results showed that post-traumatic growth was positively associated with secure attachment, active coping, positive reframing and religion.

Most studies of post-traumatic growth among cancer patients have been cross-sectional, like the studies described above, limiting the causal inferences to be drawn from them. Different results can also be obtained because of different types of cancer, different types of treatment and difference in time since diagnosis. In a longitudinal study by Moore et. al. (2011) on survivors of hepatopiliary carcinoma, participants were first assessed 1-4 weeks after diagnosis, then at 3- and 6-month follow-up. Post-traumatic growth was found to be positively associated with optimism, but no relationship was found between post-traumatic growth and depression and quality of life. In another longitudinal study, Salsman et. al. (2009) studied post-traumatic growth among 55 colorectal cancer patients at baseline (on average 13 months post-diagnosis) and follow-up three months later. The results showed that post-traumatic growth was unrelated to post-traumatic stress symptoms, anxiety, depression and positive affectivity.

To the best of our knowledge, only one study has been published that examined post-traumatic growth among men with prostate cancer. Thornton and Perez (2006) examined predictors of post-traumatic growth among men who had been treated for prostate cancer one year previously and associations between post-traumatic growth and cancer specific-stress, positive and negative affect and quality of life. The participants in the study were 82 men who had all undergone radical prostatectomy and were married or in a relationship. Results revealed lower mean scores of post-traumatic growth (with total PTGI M = 46,60; SD = 25,56; range: 0-105) than normally reported in studies of breast cancer survivors. A preliminary analysis showed that the demographic and medical variables in the study were not related to the men´s reports of post-traumatic

growth. The results of the multiple regression analysis showed that "coping by using positive reframing" was a significant predictor of post-traumatic growth (p< 0,001), and emotional support was also a significant predictor (p = 0,01). Then negative affect was a marginally significant predictor of post-traumatic growth (p = 0,08) (Thornton & Perez,2006).

In testing the correlation between post-traumatic growth and quality of life, there was a small negative correlation between post-traumatic growth and emotional well-being at pre-surgery (r = -0,22; p< 0,05). Otherwise quality of life was largely unrelated to post-traumatic growth (Thornton and Perez, 2006). The finding that post-traumatic growth is negatively correlated with emotional well-being is in contrast with the notion that post-traumatic growth is beneficial. Other studies however, have found the same results, that is no correlation or negative correlation between post-traumatic growth and psychological adaptation (Tomich and Helgeson, 2004). Thornton and Perez (2006) propose a number of possible explanations for this inconsistency, for example issues of measurement and methodology, or the nature of the construct of post-traumatic growth. Another reason could be that the quality of life does not adequately capture the breadth of the benefits reported by cancer survivors. Finally Thornton and Perez (2006) report the limitations of their study being that the participants were primarily highly educated Caucasians. Furthermore, the men were all in a relationship and all had radical prostatectomy and so the results cannot be representative of men of other cultures or men who chose watchful waiting or other treatment options.

Is post-traumatic growth among cancer patients beneficial?

Some research results have shown that higher levels of post-traumatic growth are associated with lower levels of psychological distress (Ho, Chan and Ho, 2004;

Mystakidou et. al., 2008; Schroevers and Teo, 2008), but it is not a clear relationship since other studies have found no such associations (Tomich and Helgeson, 2004; Thornton and Perez, 2006; Helgeson, Reynolds and Tomich, 2006; Salsman, Segerstrom, Brechting, Carlson and Andrykowski, 2009), and yet others have found that post-traumatic growth is associated with more distress (Tomich and Helgeson, 2004; Lynley and Joseph, 2004; Helgeson et. al., 2006; Mystakidou et. al., 2006).

Some studies have found a positive association between post-traumatic growth and post-traumatic stress symptoms, especially for intrusive thoughts. To explain this finding, it has been suggested that post-traumatic stress symptoms, in particular intrusive thoughts are necessary for cognitive processing to occur, which in turn can result in post-traumatic growth (Lynley and Joseph, 2004; Helgeson et. al., 2006; Mystakidou et. al., 2007).

Post-traumatic growth as a buffer

Most researchers have only considered the independent effect of post-traumatic stress and post-traumatic growth on psychological distress. But post-traumatic growth might influence psychological distress through a stress-buffering mechanism, by moderating the negative impact of post-traumatic stress on psychological distress. In that way, post-traumatic growth would only be beneficial for those who experienced high levels of stress following a cancer diagnosis, and not for those who experienced low levels of stress (Pakenham, 2005). The results of a few studies have supported this assertion and will be discussed shortly below.

Morrill et. al. (2008) studied post-traumatic stress, post-traumatic growth, depression and quality of life among 161 breast cancer survivors. This was a cross-sectional study and the participants were on average 4 years post-diagnosis. Results

revealed that post-traumatic stress symptoms were positively associated with post-traumatic growth and the interaction between post-traumatic stress and post-traumatic growth significantly predicted both depression and quality of life. That is, post-traumatic growth minimised the adverse relationship between post-traumatic stress symptoms and depression and quality of life. The authors speculated that for those who experience high levels of traumatic stress following a cancer diagnosis, post-traumatic growth might reflect a process of cognitive adaptation, allowing the survivors to view the experience of cancer diagnosis as a transition with the potential for positive consequences.

Park, Chmielewski and Blank (2010) studied intrusive thoughts, post-traumatic growth, positive and negative affect, life satisfaction, mental and physical health-related quality of life and spiritual well-being among 167 young to middle aged cancer survivors. This was a cross-sectional study and participants had been diagnosed with different types of cancer 1-3 years prior to assessment. Results showed that the interaction between intrusive thoughts and post-traumatic growth predicted levels of positive affect, negative affect, satisfaction with life and spiritual well-being. For those who experienced high levels of post-traumatic growth, intrusive thoughts were related to higher levels of positive affect, lower levels of negative affect, and higher levels of satisfaction with life and spiritual well-being. The authors suggested that the positive effects of post-traumatic growth are most apparent when considered in interaction with intrusive thoughts.

Silva et. al. (2011) studied perceived impact of cancer, post-traumatic growth, emotional distress and quality of life among 78 breast cancer survivors. This was a cross-sectional study and the results showed that perceived negative impact of cancer was not associated with post-traumatic growth, but the interaction between the variables significantly predicted levels of psychological and social quality of life and depression.

Post-traumatic growth weakened the adverse effect of the perceived negative impact of cancer on depression and psychological and social quality of life, but did not have buffering effects on depression and physical quality of life. The authors speculated that post-traumatic growth seemed to act similar to social support, as a resource for adjustment, and that it may reflect a process of cognitively adapting to a cancer diagnosis.

Limitations of previous studies

One of the limitations of previous studies on the relationship between post-traumatic growth and distress lies in the fact that almost all of them have been cross-sectional, limiting causal inferences. For example in the study of Morrill et. al. (2008) it is impossible to know if post-traumatic stress symptoms and post-traumatic growth affect depression and quality of life, or if it is the other way around with depression and quality of life affecting post-traumatic stress and growth. Second, typically participants are not contacted until long after their cancer diagnosis (most studies are conducted more than one year post-diagnosis), thus little is known about the impact of post-traumatic growth and distress early in the cancer trajectory. Another limitation lies in the type of cancer addressed, because most of the literature relies on women with breast cancer. The results of breast cancer studies have some limitations, the first one being that the subjects are only women and thus do not tell us anything about the experience of post-traumatic growth in men. In fact, results of a study of post-traumatic growth among college students showed that men reported less post-traumatic growth than did women (Tedeschi and Calhoun, 1996). The second limitation being that survivors of breast cancer are usually somewhat younger than the average cancer survivor. Some studies have found

that post-traumatic growth is higher among young people, although other studies have found no relation between age and post-traumatic growth.

The present study sought to address these limitations by assessing the buffering role of post-traumatic growth in a sample of newly diagnosed men with prostate cancer. By using a longitudinal study design, causal inferences may be drawn and by contacting the men very shortly after their diagnosis (within 2 months) it is possible to gain information early in the cancer trajectory. Furthermore, the sample of men with prostate cancer can provide information about the extent of post-traumatic growth reports of older, male cancer survivors (Thornton & Perez, 2006), but men with prostate cancer have received very little attention even though prostate cancer is the most prevalent cancer diagnosis in men in the Western world (Bill-Axelson et. al., 2011).

Summary

Prostate cancer is the most frequently diagnosed cancer in men in Iceland. Cancer diagnosis can be a major life stressor causing negative outcomes, such as depression and anxiety disorders, including post-traumatic stress disorder. But a cancer diagnosis can also cause positive outcomes, such as post-traumatic growth, and in fact people seem to be able to experience both negative and positive consequences at the same time. The relationship between post-traumatic growth and psychological distress has been found to be inconsistent, as some studies have found post-traumatic growth to be associated with lower levels of psychological distress, but others have failed to find such a relationship. Recently it has been suggested that post-traumatic growth may act as a moderating variable by buffering the effect of cancer-related stress on well-being. The main

shortcoming of previous research lies in the fact that almost all of them were cross-sectional, limiting causal inferences to be drawn from the findings.

Study aim and hypothesis

The current study sought to examine post-traumatic growth among newly diagnosed men with prostate cancer and to see if post-traumatic growth buffered the negative impact of post-traumatic stress on depression and anxiety. Based on the above literature and theory it was hypothesized that post-traumatic stress symptoms at the baseline assessment would be positively associated with depression and anxiety at baseline. Furthermore, it was hypothesized that post-traumatic stress symptoms at baseline would be associated with higher levels of depression and anxiety at follow-up, after controlling for baseline levels, but only for those who experience low levels of post-traumatic growth.

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Moderating the effects of post-traumatic stress on depression and anxiety: The experience of post-traumatic growth following a cancer diagnosis

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Abstract

Objective: The aim was to examine if post-traumatic growth (PTG) (positive change following a trauma experience) would act as a buffer and moderate the negative impact of post-traumatic stress on depression and anxiety among prostate cancer patients.

Methods: This was a longitudinal study, where participants answered baseline questionnaires shortly after cancer diagnosis and follow-up questionnaires three months later. Depression and anxiety symptoms were assessed with the Hospital Anxiety and Depression Scale (HADS) (both at baseline and follow-up), post-traumatic stress symptoms were assessed with the Impact of Event Scale Revised (IES-R) (at baseline), and post-traumatic growth was assessed with the Post-traumatic Growth Inventory (PTGI) (at follow-up).

Results: Results of a multiple linear regression (when controlling for anxiety and depression at baseline) revealed that there was a significant interaction between post-traumatic stress and post-traumatic growth when predicting both anxiety and depression ($p < 0,05$), the higher the level of post-traumatic growth the lower the effect of post-traumatic stress on depression and anxiety.

Conclusions: These findings extend the growing body of knowledge on post-traumatic growth, especially on its stress-buffering role and suggest that prostate cancer patients might benefit from interventions aimed at increasing post-traumatic growth.

1.Introduction

Cancer diagnosis can be a major life stressor causing negative outcomes, such as post-traumatic stress disorder (PTSD). PTSD is a psychiatric disorder that can occur following a traumatic event and symptoms include intrusive thoughts about the trauma, avoidance of trauma reminders, and hyperarousal (American Psychiatric Association, 2000). The prevalence of cancer-related PTSD diagnoses ranges from 0% to 32% and the prevalence of individual post-traumatic stress symptoms in the first four weeks following a diagnosis ranges from 15% to 80% (Kangas, Henry and Briant., 2002). Clinically significant levels of depression and anxiety are also more common in cancer patients than in the general population (Clarke and Currie, 2009; Korfage, Essink-Bot, Janssens, Schröder and Koning, 2006). Furthermore, post-traumatic stress symptoms have been found to be associated with higher levels of depression and anxiety in the cancer literature (Cordova et. al., 1995; Green, Rowland and Krupnick, 1998; Widows, Jacobsen and Fields, 2000; Mehnert and Koch., 2007; Salsman, Segerstrom, Brechting, Carlson, and Andrykowski, 2009). It has been proposed that the reason for this association could be that ruminative and intrusive thoughts increase people´s vulnerability to psychological distress (Morrill et. al., 2008).

Although the prevalence of negative outcomes following a cancer diagnosis is high, the prevalence of positive outcomes, such as post-traumatic growth (PTG), which has been defined as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi and Calhoun, 2004), is also high (Linley and Joseph, 2004; Jim and Jacobsen, 2008; Morrill et. al., 2008), with 60-90% of cancer survivors experiencing some positive changes (Mystakidou et. al., 2007). In fact people seem to be able to experience both negative and positive consequences at the

same time and might have to experience some degree of distress for post-traumatic growth to occur (Tedeschi and Calhoun, 2004).

There has been a growing interest in examining whether post-traumatic growth is beneficial and associated with well-being and less distress. The findings have been mixed with some studies showing that post-traumatic growth is associated with less distress (Ho, Chan and Ho, 2004; Mystakidou et. al., 2008; Schroevers and Teo, 2008), while others have found no relationship (Tomich and Helgeson, 2004; Thornton and Perez, 2006; Helgeson, Reynolds and Tomich, 2006; Salsman, et. al., 2009; Jim and Jacobsen, 2008; Schroevers and Teo, 2008; Morris, Shakespeare-Finch, and Scott, 2011; Moore et. al., 2011), or that post-traumatic growth is associated with more distress (Tomich and Helgeson, 2004; Lynley and Joseph, 2004; Helgeson et. al., 2006; Mystakidou et. al., 2006).

Recently, researchers have theorized that post-traumatic growth may buffer the negative impact of disease-related stress on well-being and that therefore the benefits of post-traumatic growth might only be evident at high levels of stress (Silva, Moreina and Canavarro, 2011; Pakenham, 2005). To explain why post-traumatic growth would work as a buffer, it has been suggested that growth may act as a coping resource (Silva et. al., 2011; Morrill et. al.; 2008), similar to social support which has repeatedly been found to buffer the negative impact of stress on other psychological outcomes (Cohen and Hoperman, 1983; Ringdal, Ringdal, Jodhoy and Kaasa; 2007). More specifically, under high levels of stress individuals may try to cope with their situation by searching for positive changes which can lead to a positive reinterpretation of the cancer experience (Morrill et. al., 2008; Silva et. al., 2011). The suggestion that post-traumatic growth could act as a coping recourse is in accordance with the notion that post-traumatic growth may not only be conceptualized as an outcome of coping with a stressful event,

but also as a coping process (Tedeschi and Calhoun, 2004; Zoellner and Maercker, 2006).

In support of a potential stress-buffering role of post-traumatic growth, Morrill et. al. (2008) found that post-traumatic growth moderated the negative effect of post-traumatic stress symptoms on depression and quality of life amongst 161 breast cancer survivors. This was a cross-sectional study and the participants were on average 4 years post-diagnosis. Post-traumatic growth was assessed with the Post-traumatic Growth Inventory, post-traumatic stress symptoms with the PTSD Checklist, depressive symptoms with the CES-D and quality of life with the FACT-B. In another more recent study, Silva et. al. (2011) found that post-traumatic growth moderated the negative effect of the impact of breast cancer on depression, and psychological and social quality of life amongst 78 women receiving therapy, but did not have buffering effects on anxiety and physical quality of life. This was a cross-sectional study and the women were on average 6 months post-diagnosis. Furthermore, another cross-sectional study found that post-traumatic growth moderated the negative effects of intrusive thoughts on satisfaction with life, positive affect and spiritual well-being amongst young to middle-aged adults diagnosed with cancer 1-3 years previously (Park, Chmielewski, and Blank, 2010).

One of the limitations of previous studies on the relationship between post-traumatic growth and distress lies in the fact that almost all of them have been cross-sectional, limiting causal inferences. For example in the study of Morrill et. al. (2008) it is impossible to know if post-traumatic stress symptoms and post-traumatic growth affect depression and quality of life, or if it is the other way around with depression and quality of life affecting post-traumatic stress and growth. Second, typically participants are not contacted until long after their cancer diagnosis (most studies were conducted more than one year post-diagnosis), thus little is known about the impact of post-traumatic growth

and distress early in the cancer trajectory. Another limitation of previous studies lies in the type of cancer addressed, because most of the literature relies on women with breast cancer it is not clear if findings generalize to men with cancer or to people with other types of cancer.

The present study sought to address these limitations by assessing the buffering role of post-traumatic growth in a sample of newly diagnosed men with prostate cancer. By using a longitudinal study design, causal inferences may be drawn and by contacting the men very shortly after their diagnosis (within 2 months) it is possible to gain information early in the cancer trajectory. Another important element in the present study lies in the examination of men with prostate cancer, who have received very little attention even though prostate cancer is the most prevalent cancer diagnosed in men in the Western world (Bill-Axelson et. al., 2011). To the best of our knowledge, only one research has examined post-traumatic growth among men with prostate cancer (Thornton and Perez, 2006) and none have examined post-traumatic growth as a stress-buffer.

Based on the above literature it was hypothesized that post-traumatic stress symptoms at baseline would be associated with higher levels of depression and anxiety at follow-up, after controlling for baseline levels, but only for those who experience low levels of post-traumatic growth.

2. Methods

2.1. Participants

The participants were newly diagnosed men with localized prostate cancer. To-date 117 patients have been approached and asked to participate in the research, 25 declined participation and 74 had completed all assessments of which 13 had missing values and

were thus not included in the data analysis. Hence the final number of participants was 61.

2.2. Procedure

The study was approved by the National Biothetics Committee and the Icelandic Data Protection Authority. Participants were referred to the study by their primary urologists. The urologists briefly described the study and asked their patients if a research member could contact them and describe the study further. If a patient agreed, the urologist gave the patient‘s name and telephone number to a research member. The patient was then contacted within a few days by a research member, who explained the study‘s procedure and objectives and scheduled a meeting with those that were interested in further participation. During the meeting, the research member explained the study in more detail, answered questions about the study and obtained a signed consent form. Then a questionnaire (i.e. baseline) was administered which the participant completed in a private room with the research member checking in from time to time to address any questions. Follow-up questionnaires were sent by mail to participants, three months after the administration of the baseline questionnaires. Participants returned the follow-up questionnaires, after completion, in a pre-addressed and stamped envelope.

2.3. Measures

Participants completed self-report assessments regarding demographic and medical variables, general distress, post-traumatic stress like symptoms and post-traumatic growth.

2.3.1. Demographic and medical variables

Participants answered questions regarding their age, marital status, educational level, employment status, time since diagnosis and type of treatment.

2.3.2. General distress

General distress was assessed with the Icelandic translation of the Hospital Anxiety and Depression Scale (HADS) (Schaaber, Smari, and Oskarsson, 1990). This is a 14-item, 4-point scale with scores for each item ranging from 0 (not at all/ very seldom / only occasionally) to 3 (most of the time/ definitely as much/ very often), where responses are based on symptoms during the past week. HADS has two sub-scales, one measuring anxiety (7 items) and one measuring depression (7 items). Summary scores for each subscale range from 0 (no distress) to 21 (maximum distress) (Zigmond and Snaith, 1983). HADS was administered at baseline and at the three month follow-up. Cronbach´s alpha for the anxiety subscale was 0,85 at baseline and 0,80 at follow-up, and Cronbach´s alpha for the depression subscale was 0,80 at baseline and 0,75 at follow-up.

2.3.3. Post-traumatic stress-like symptoms

Post-traumatic stress-like symptoms were measured with the Icelandic translation of the Impact of Events Scale Revised (IES-R) (Arnadottir, 1995). This is a 22-item, 5-point scale with scores ranging from 0 (not at all) to 4 (often) for each item, where respondents answer how well each item applies to them when considering the past 7 days. The IES has three subscales: *Intrusion* (8 items), *Avoidance* (8 items) and *Hyperarousal* (6 items). The average score is found for each subscale and then summed to arrive at a total IES score, thus scores for each subscale range from 0-4 and total IES scores range from 0-12 (Weiss and Marmar, 1997). The IES was administered at baseline and Cronbach´s alpha for the total IES score was 0,95.

2.3.4. Post-traumatic growth

Post-traumatic growth was measured with an Icelandic translation of the Posttraumatic Growth Inventory (PTGI), which was translated, back-translated and revised by

Icelandic psychologists. This is a 21-item, 6-point scale with five subscales: *Relating to others*, *New Possibilities*, *Personal Strength*, *Appreciation of Life* and *Spiritual Change*. The PTGI measures positive changes experienced following a traumatic event, with scores from 0 (*I did not experience this change*) to 5 (*I experienced this change to a very great degree*). The PTGI total score is a sum of the scores for the five factors, hence the total score ranges from 0 to 105 (Tedeschi and Calhoun, 1996). The PTGI was administered at three month follow-up in the present study, and Cronbach´s alpha for the total score was 0,94.

2.4. Data analysis

SPSS version 19 was used for data analysis. First we checked if the primary predictor or outcome variables were correlated with any of the demographic or medical variables. Two regression analyses were conducted, with the outcome variables anxiety and depression (at three month follow-up). Each regression model had the predictor variables post-traumatic stress symptoms, post-traumatic growth and their interaction. Anxiety and depression at baseline, as well as age, were included in the model as covariates, since they were significantly associated with the outcome variables. To further explore the interaction effects of post-traumatic stress symptoms and post-traumatic growth on anxiety and depression at follow-up, coefficients were computed for post-traumatic stress symptoms at three different levels of post traumatic growth (at 1,5 standard deviation above the mean, at the mean and at 1,5 standard deviation below the mean).

3. Results

3.1. Sample Characteristics

Participants mean age was 66,8 years (SD = 7,73, range = 51-85). Most of the participants were married or in a relationship (84%). Approximately half of the

participants were working (46%) or retired (41%) and only a few were on sick leave (8%). The participants were on average well-educated, with almost half having finished more than high-school (41%), about a third having finished high-school (28%) and one fifth having finished only obligatory schooling (20%).

With regard to time since diagnosis, 16% of participants had received a cancer diagnosis less than two weeks prior to the baseline measurement, 38% had received a diagnosis between two and four weeks and 20% had received the diagnosis between one and two months before baseline assessment. With regard to treatment type, 39% of participants had surgery, 28% received other types of treatment (radiotherapy, pharmaceuticals or hormone replacement) and 26% opted for watchful waiting.

The only demographic or medical variable that had a significant correlation with predictor or outcome variables was age (which correlated with anxiety at baseline at the $p<0,01$ level and with post-traumatic stress symptoms at baseline at the $p<0,05$ level), thus age was entered as a covariate for the analyses described below.

3.2. Descriptive statistics for predictor and outcome variables

Table 1. Means, standard deviations, possible range and actual range for predictor and outcome variables

Predictor variables	Means (SD)	Possible range	Actual range
IES-BL-Total (PTSS)	13,59 (12,96)	0-88	0-55
PTGI-FU-Total	43,51 (21,10)	0-105	0-97
Outcome variables			
HADS-FU-Anxiety	1,61 (2,14)	0-21	0-9
HADS-FU-Depression	2,00 (2,17)	0-21	0-10

N = 61. BL: Baseline assessment; FU: Follow-up assessment; IES: The Impact of Event Scale; PTGI: Post Traumatic Growth Inventory; HADS: Hospital Anxiety and Depression Scale.

Means and standard deviations for predictor and outcome variables are depicted in Table 1. Even though the average score for post-traumatic stress symptoms was low (IES scores), there was a great variability in the scores. The average post-traumatic growth scores were moderately high and scores ranged from the lowest possible score to almost the highest possible score. The average anxiety and depression scores were low but with a high variability.

Table 2. Bivariate correlations for study variables

	Anx-BL[1]	Dep-BL[1]	PTSS[3]-BL[1]	PTG[4]-FU[2]	Anx-FU[2]	Dep-FU[2]
Anxiety-BL[1]	-	0,74*	0,85**	0,24	0,32*	0,17
Depression-BL[1]	0,74**	-	0,71**	0,10	0,43**	0,49**
PTSS[3]-BL[1]	0,85**	0,71**	-	0,32*	0,35**	0,27*
PTG[4]-FU[2]	0,24	0,10	0,32*	-	-0,12	-0,24
Anxiety-FU[2]	0,32*	0,43**	0,35**	-0,12	-	0,70**
Depression-FU[2]	0,17	0,49**	0,27*	-0,24	0,70**	-

*p<0,05; **p<0,01.
[1]BL = Baseline assessment.
[2]FU = Follow-up assessment.
[3]PTSS = post-traumatic stress symptoms.
[4]PTG = post-traumatic growth.

Significant correlations were found between study variables. Post-traumatic stress symptoms were positively associated with anxiety and depression, at baseline and follow-up. There was also a significant positive association between post-traumatic stress symptoms at baseline and post-traumatic growth at follow-up, which was the only significant association for post-traumatic growth. Post-traumatic growth was unrelated to depression and anxiety.

3.3. Multivariate Results

Linear regression was used to examine the hypothesis that post-traumatic growth moderated the adverse effects of post traumatic stress like symptoms on depression and anxiety. For control the variables anxiety and depression at baseline were included in the regression models, along with the demographic variable age.

Table 3. Predictors of anxiety and depression at follow-up

	Anxiety-FU[2]		Depression-FU[2]	
Control / predictor variable	b	St.err.	B	St.err.
Age	0,031	0,035	0,004	0,031
Anxiety-BL[1]	0,251	0,190	-	-
Depression-BL[1]	-	-	0,568**	0,147
PTSS[3]-BL[1]	0,039	0,038	-0,004	0,028
PTG[4]-FU[2]	-0,027*	0,012	-0,028*	0,012
PTSS-BL*PTG-FU	-0,002*	0,001	-0,002*	0,001

Note: all variables are centered.
*p<0,05; **p<0,01.
[1]BL = Baseline assessment.
[2]FU = Follow-up assessment.
[3]PTSS = post traumatic stress symptoms.
[4]PTG = post traumatic growth.

Results of the linear regression models predicting anxiety and depression at follow-up can be seen in Table 3. The interaction of post-traumatic stress and post-traumatic growth was a significant predictor of levels of anxiety at follow-up. Interestingly, anxiety at baseline was not a significant predictor of anxiety at follow-up. The interaction of post-traumatic stress and post-traumatic growth was also a significant predictor of levels of depression at follow-up. Furthermore, depression at baseline was a significant predictor of depression at follow-up. The model accounted for 40,2% of the

variance in depression (F = 7,399, p<0,001) and for 26,7% of the variance in anxiety (F = 4,009, p < 0,01).

Table 4. Coefficients for PTSS at 3 different levels of PTG

	Anxiety				Depression			
Level of PTG	b	St.err.	β	Sig.	b	St.err.	β	Sig.
Low PTG	0,095	0,040	0,575	0,021	0,053	0,034	0,317	0,123
Medium PTG	0,039	0,038	0,236	0,303	-0,004	0,028	-0,024	0,886
High PTG	-0,017	0,050	-0,102	0,739	-0,061	0,037	-0,365	0,100

To see how the interaction of post traumatic stress symptoms and post traumatic growth affects anxiety and depression at follow-up, coefficients were calculated for post-traumatic stress symptoms at three different levels of post traumatic growth (at 1,5 standard deviation above the mean, at the mean and at 1,5 standard deviation below the mean). As can be seen in Table 3, the coefficients are positive for low levels of post-traumatic growth (both for anxiety and depression) and negative for high levels of post-traumatic growth. The only significant post-traumatic stress coefficient is for low-levels of post-traumatic growth when predicting anxiety. This signifies that there is a significant positive association between post-traumatic stress symptoms at baseline and anxiety at follow-up, but only for those with low levels of post-traumatic growth.

In Figure 1 it is possible to better visualize how the interaction between post-traumatic stress symptoms and post traumatic growth affects anxiety at follow-up. For low levels of post-traumatic growth the association between post traumatic stress symptoms and anxiety is positive and quite strong (β = 0,575). For medium levels of post-traumatic growth the association between post-traumatic stress symptoms and anxiety is also

positive but not statistically significant. For high levels of post-traumatic growth the association between post traumatic stress symptoms and anxiety is almost zero.

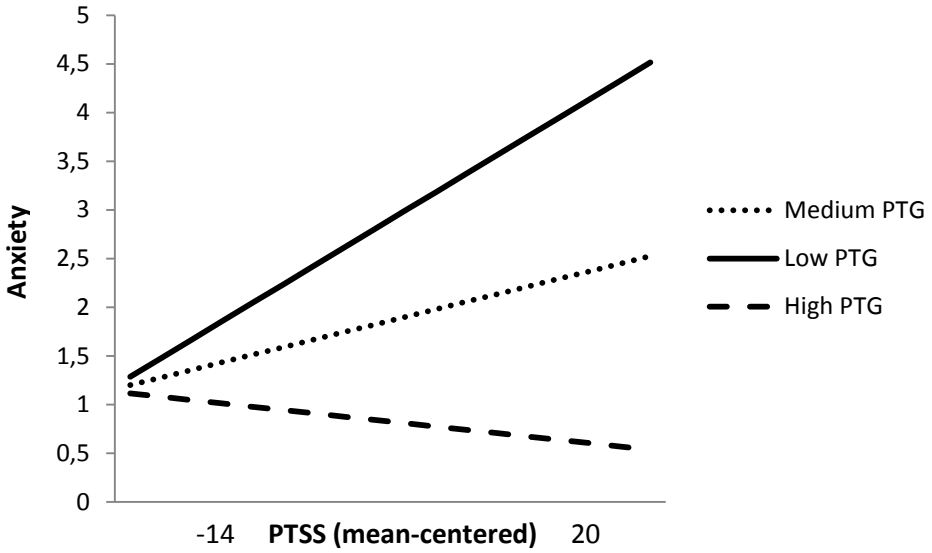

Figure 1. Relationship between post traumatic stress symptoms (PTSS), post traumatic growth (PTG) and anxiety[1]

In Figure 2 it is possible to better visualize how the interaction between post-traumatic stress symptoms and post-traumatic growth affects depression at follow-up. For low levels of post-traumatic growth the association between post-traumatic stress symptoms and depression is positive but not statistically significant. For medium levels of post-traumatic growth the association between post-traumatic stress symptoms and depression is zero. For high levels of post-traumatic growth the association between post-traumatic stress symptoms and depression is negative but not statistically significant.

[1] Predictor variable (PTSS) and control variables (age and anxiety at baseline) are centered

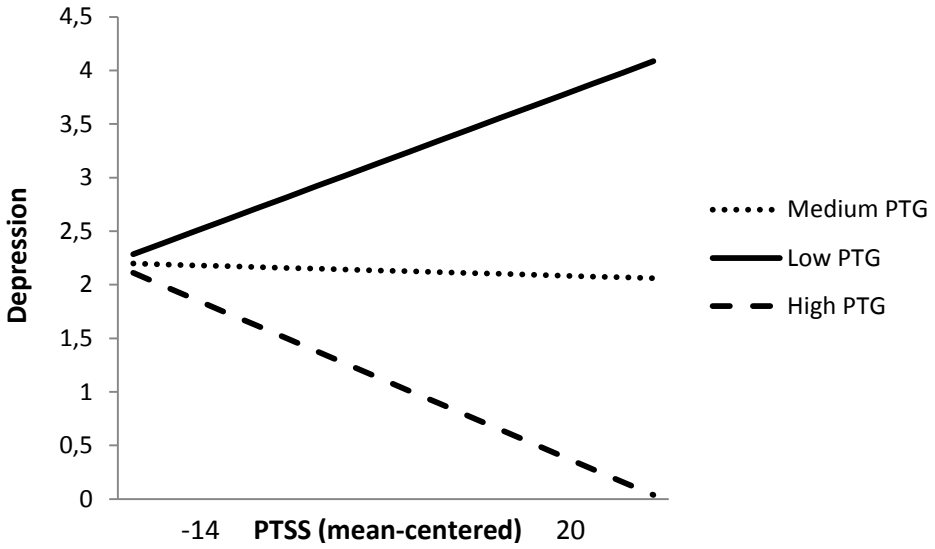

Figure 2. Relationship between post traumatic stress symptoms (PTSS), post traumatic growth (PTG) and depression[2]

4. Discussion

The study´s purpose was to examine post-traumatic stress, post-traumatic growth, depression and anxiety among newly diagnosed men with prostate cancer and to see if the experience of post-traumatic growth would act as a buffer, and moderate the negative impact of post-traumatic stress on depression and anxiety. As hypothesized, the interaction between post-traumatic stress and post-traumatic growth was a significant predictor of both anxiety and depression, the higher the level of post-traumatic growth the lower the effect of post-traumatic stress on depression and anxiety.

For anxiety, the men who had higher levels of post-traumatic stress symptoms shortly after diagnosis were more likely to have higher levels of anxiety three months later, but only if they reported low levels of post-traumatic growth. To our knowledge, this is the first study to show that post-traumatic growth can buffer the effect of post-traumatic stress on anxiety in the cancer literature. These results are counter to the results of Silva et. al. (2011), who found that post-traumatic growth did not moderate the

[2] Predictor variable (PTSS) and control variables (age and depression at baseline) are centered.

effects of perceived severity of diagnosis on anxiety. The reason for this discrepancy could lie in the fact that the study of Silva et. al. (2011) was cross-sectional or in the fact that they were examining the impact of perceived severity of cancer diagnosis on distress and not post-traumatic stress symptoms as in the present study, or it could be the difference in the study sample.

Post-traumatic stress symptoms did not predict levels of depression to the same degree as it did anxiety, although the interaction between post-traumatic stress and post-traumatic growth did indeed predict depression. The association between post-traumatic stress and depression was positive and fairly strong for low levels of post-traumatic growth but it did not reach significance, thus limiting the stress-buffering effect of post-traumatic growth. Others who have found that the interaction of post-traumatic stress and post-traumatic growth significantly predict depression, have found post-traumatic growth to have significant buffering effects (Morrill et. al., 2008), suggesting that our failure to find stress-buffering effects of post-traumatic growth might be due to a lack of power as the number of participants was only 61.

The above findings contribute to the literature on the stress-buffering role of post-traumatic growth. Post-traumatic growth may act as a coping resource in itself, or it could be the outcome of successful coping with high levels of stress (Tedeschi and Calhoun, 2004; Zoellner and Maercker, 2006). Either way, the adaptive functioning of post-traumatic growth is likely to lie in the reinterpretation of the cancer experience as not only negative. The experience of some positive outcomes, as for example more intimate relationships with friends and family, greater personal strength and a better appreciation for life is likely to help people deal with high levels of stress and may reflect a cognitive adaptation process (Helgeson and Reynolds, 2006; Morrill et. al., 2008; Silva et. al., 2011).

Average post-traumatic growth scores in this study were lower than the scores normally reported in breast cancer studies (Cordova, Cunningham, Carlson and Andrykowski, 2001; Morrill et. al., 2008; Silva et. al., 2011), but similar to the scores amongst prostate cancer survivors in the study of Thornton and Perez (2006), and not much lower than the scores found in a study of colorectal cancer survivors (Salsman et. al., 2009), and in a study of patients with heterogeneous terminal cancer (Mystakidou et. al., 2007). There can be several reasons for the scores being lower in this study than normally in breast cancer studies, the first one being that men might experience lower levels of post-traumatic growth than do women, and in fact at least one study has found this to be the case (Morris, Shakespeare-Finch and Scott, 2007). Another reason could be that younger people experience higher levels of post-traumatic growth than older people, since men with prostate cancer are on average older than women with breast cancer, and this has in fact been the result of a number of studies (Widows, Jacobsen, Booth-Jones, and Fields, 2005; Bellizzi and Blank, 2006; Jim and Jacobsen; 2008; Salsman et. al., 2009).

There was a positive association between post-traumatic stress symptoms at baseline and depression at baseline and follow up, as well as between post-traumatic stress symptoms at baseline and anxiety at baseline and follow up. This is in accordance with prior cancer research (Cordova et. al., 1995; Green, Rowland and Krupnick, 1998; Widows, Jacobsen and Fields, 2000; Mehnert and Koch, 2007). There was also a positive association between post-traumatic stress symptoms at baseline and post-traumatic growth at follow-up, which is in line with the notion of Tedeschi and Calhoun (2004), that some level of distress may be needed for post-traumatic growth to occur and in line with the notion that post-traumatic stress symptoms, in particular intrusive thoughts, are necessary for cognitive processing to occur, which in turn can result in

post-traumatic growth (Lynley and Joseph, 2004; Helgeson et. al., 2006; Mystakidou et. al., 2007). There was not a direct association between post-traumatic growth and depression and anxiety. This is in accordance with many studies that found no significant associations between post-traumatic growth and psychological distress (Tomich and Helgeson, 2004; Thornton and Perez, 2006; Helgeson, Reynolds, and Tomich, 2006; Salsman et. al., 2009; Jim and Jacobsen, 2008; Schroevers and Teo, 2008; Morris, Shakespeare-Finch and Scott, 2011; Moore et. al., 2011).

This study has several limitations. The number of participants was small and the time period of the study was relatively short. Future studies might want to examine the long term stress-buffering impact of post-traumatic growth on distress. The present study did not examine the mechanism whereby post-traumatic growth might buffer the impact of post-traumatic stress on distress. It would be of interest to assess cognitive processing, since it has been associated with post-traumatic growth (Jim and Jacobsen, 2008; Salsman et. al., 2009), and could possibly be a mediating variable between post-traumatic stress symptoms and post-traumatic growth, so that men who experience high levels of post-traumatic stress would develop high levels of post-traumatic growth, but only if they cognitively process the experience of the cancer diagnosis (Lynley and Joseph, 2004; Helgeson et. al., 2006; Mystakidou et. al., 2007). This would be in line with the work of Tedeschi and Calhoun (2004) who note that how persons cognitively process the trauma plays a fundamental role in the process of growth. Future studies should also consider including measures of coping strategies that have been found to be associated with post-traumatic growth (Schmidt, Blank, Bellizzi and Crystal, 2011; Rajandram, Jenewein, McGrath and Zwahlen, 2011; Lelorain et.al., 2010; Thombre, Sherman and Simonton, 2009; Schroevers and Teo, 2008; Morris, Shakespeare-Finch and Scott, 2007; Bellizzi and Blank, 2006; Thornton and Perez, 2006; Widows, Jacobsen

et. al., 2005), as well as social support (Jim and Jacobsen, 2008; Morris and Shakespeare-Finch, 2011).

Despite the limitations, this study extends the growing body of knowledge on post-traumatic growth, especially on its stress-buffering role. Because there has been controversy over whether post-traumatic growth is beneficial, little has been done in designing interventions aimed at increasing levels of post-traumatic growth (Joseph and Linley, 2006; Lechner and Antoni, 2004). The present findings suggest that interventions aimed at increasing post-traumatic growth might be effective in diminishing the adverse effects of post-traumatic stress, following a cancer diagnosis, on subsequent distress and quality of life.

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Viðauki 1: Upplýst samþykki

Kynning og upplýst samþykki fyrir þátttöku í vísindarannsókninni:

„Áhrif skriflegrar tjáningar á líðan karla sem greinst hafa með krabbamein í blöðruhálskirtli“

Rannsókn þessi er liður í doktorsverkefni Sigríðar Sjafnar Ágústsdóttur sálfræðings (sími: 898-3725, netfang: sigriag@hi.is) við Háskóla Íslands.

Það getur verið áfall og valdið miklu uppnámi að fá greiningu um krabbamein og það getur einnig verið erfitt að standa frammi fyrir því að þurfa að vega og meta ýmsa meðferðarkosti í kjölfar greiningar. Þess vegna er mikilvægt að komast að því hvaða aðferðir gefast best til að lina vanlíðan og aðstoða þá sem nýlega hafa greinst með krabbamein í blöðruhálskirtli. Erlendar rannsóknir sýna að skrifleg tjáning er aðferð sem gefst vel til að vinna úr ýmissi áfallareynslu, hvort sem menn eru vanir að skrifa eða ekki og óháð því hvort þeir telja sig góða penna eður ei. Rannsóknir sem byggja á skriflegri tjáningu hafa ekki áður verið gerðar hérlendis og er því um að ræða fyrstu íslensku rannsóknina. Í ljósi erlendra rannsókna teljum við að skrifleg tjáning geti hjálpað íslenskum körlum sem hafa greinst með krabbamein í blöðruhálskirtli.

Þátttakendur í þessari rannsókn eru karlmenn sem nýlega hafa fengið greiningu um krabbamein í blöðruhálskirtli. Við fengum nafn þitt frá lækninum þínum og þú samþykktir að við hefðum samband vegna rannsóknarinnar.

Þátttaka þín felst í eftirfarandi:

1. Að svara spurningalistum á þessum fundi í dag. Það tekur innan við klukkustund að svara spurningalistunum.
2. Að svara stuttum spurningalistum í þrígang (tekur um 5 mínútur í hvert sinn) og skrifa í 20 mínútur eftir ákveðnum fyrirmælum í einrúmi heima hjá þér.
3. Að svara nokkrum spurningalistum í fjórgang og póstleggja þá, eftir um það bil 3 mánuði, eftir 6 mánuði, 12 mánuði og 24 mánuði. Það tekur innan við klukkustund að svara spurningalistunum í hvert sinn.

Þér ber engin skylda til þess að taka þátt í þessari rannsókn. Þú getur hætt þátttöku hvenær sem er eða neitað að svara ákveðnum spurningum án eftirmála og það hefur ekki áhrif á þá heilbrigðisþjónustu sem þú færð.

Þátttöku þinni í rannsókninni fylgir að síðar í ferlinu þarf að afla upplýsinga úr sjúkraskrá um stigun krabbameinsins. Með því að undirrita þetta bréf lýsirðu jafnframt yfir vitund og samþykki fyrir að það verði gert. Upplýsingar um stigun verða einungis notaðar við gagnaúrvinnslu og þær verður ekki hægt að tengja við nafn þitt.

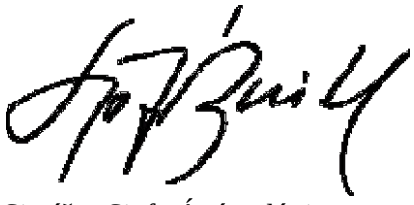
Þú gætir upplifað óþægilegar tilfinningar við það að skrifa. Ef þú upplifir mikla vanlíðan geturðu leitað til sálfræðiþjónustu Landspítalans í síma **543-9950** eða hringt í Sigríði Sjöfn Ágústsdóttur sálfræðing og doktorsnema í síma **898-3725** og hún mun vísa þér áfram.

Við metum mikils þátttöku þína í rannsókninni. Ekki er hægt að tryggja að þú hafir beinan hag af þátttöku, en erlendar rannsóknir benda til þess að skrifleg tjáning geti haft jákvæð áhrif á bæði sálræna og líkamlega líðan í kjölfar greiningar og meðferðar krabbameins. Ekki verður greitt fyrir þátttöku í rannsókninni.

Meðferð allra gagna og upplýsinga sem aflað verður í rannsókninni verður samkvæmt ströngum reglum um trúnað. Enginn utan rannsóknateymis mun hafa aðgang að rannsóknargögnum. Rannsóknargögn verða varðveitt á öruggum stað hjá ábyrgðarmanni rannsóknarinnar á meðan á rannsókn stendur. Rannsóknargögnum verður eytt að lokinni rannsókn. Gögnin verða ekki notuð í markaðsskyni, né af þriðja aðila, eingöngu rannsakendur munu nýta þau. Niðurstöður rannsóknarinnar verða birtar í ritrýndum tímaritum en þær verða að engu leyti persónugreinanlegar.

Ábyrgðarmaður rannsóknarinnar er Daníel Þór Ólason, prófessor við Sálfræðideild Háskóla Íslands, sími 525-5265, netfang: dto@hi.is.

Rannsóknin hefur hlotið leyfi Vísindasiðanefndar og verið tilkynnt til Persónuverndar. Þetta bréf er í tvíriti og heldur þú eftir öðru eintakinu.



Sigríður Sjöfn Ágústsdóttir
Sálfræðingur og doktorsnemi

Daníel Þór Ólason
Ábyrgðarmaður og leiðbeinandi

Mér hefur verið kynntur tilgangur þessarar vísindarannsóknar og í hverju þátttaka mín er fólgin. Ég er samþykkur þátttöku.

Dags. _____ Undirskrift þátttakanda _____

___ Merktu við ef þú hefur ekki áhuga á að taka þátt í rannsókninni

Nánari upplýsingar veitir Sigríður Sjöfn Ágústsdótttir s. 898 3725 eða sigriag@hi.is
Bestu þakkir fyrir að gefa þér tíma til að kynna þér rannsókn okkar.

Viðauki 2: Kvíði og þunglyndi- HADS

Kvíði og þunglyndi - HADS

Vinsamlegast merktu við þann svarreit sem á við hverja staðhæfingu.
*Spurt er um líðan þína síðastliðna **VIKU**.*

1 Ég er uppspenntur og taugatrekktur:

0 ☐ Alls ekki
1 ☐ Öðru hvoru, stundum
2 ☐ Oft
3 ☐ Næstum alltaf

2 Ég nýt þess sem ég var vanur að gera:

0 ☐ Ábyggilega eins mikið
1 ☐ Ekki alveg eins mikið
2 ☐ Aðeins að litlu leyti
3 ☐ Varla nokkuð

3 Ég fæ einhvers konar hræðslutilfinningu eins og eitthvað hræðilegt sé að fara að gerast:

0 ☐ Alls ekki
1 ☐ Að litlu leyti, en ég hef ekki áhyggjur af því
2 ☐ Já, en ekki svo slæma
3 ☐ Alveg örugglega og oft slæma

4 Ég get hlegið og séð það skoplega í kringum mig:

0 ☐ Eins mikið og áður
1 ☐ Ekki alveg eins mikið núna
2 ☐ Ábyggilega ekki eins mikið núna
3 ☐ Alls ekki

5 Áhyggjur fara í gegnum hugann:

0 ☐ Aðeins stöku sinnum
1 ☐ Öðru hvoru, en ekki svo oft
2 ☐ Mjög oft
3 ☐ Svo til stöðugt

6 Ég er kátur:

0 ☐ Svo til alltaf
1 ☐ Stundum
2 ☐ Ekki oft
3 ☐ Alls ekki

7 Ég get setið rólegur og slappað af:

0 ☐ Alltaf
1 ☐ Yfirleitt
2 ☐ Ekki oft
3 ☐ Alls ekki

8 Ég er seinni til hugsana og verka:

0 ☐ Alls ekki
1 ☐ Stundum
2 ☐ Mjög oft
3 ☐ Næstum alltaf

9 Ég finn til hræðslukenndar, fæ óróleikatilfinningu í magann:

0 ☐ Alls ekki
1 ☐ Öðru hvoru
2 ☐ Nokkuð oft
3 ☐ Mjög oft

10 Ég hef misst áhugann á því hvernig ég lít út:

0 ☐ Ég hirði jafn vel um mig og áður
1 ☐ Kannski hirði ég ekki um mig eins og ég ætti að gera
2 ☐ Ég hirði ekki um mig eins og ég ætti að gera
3 ☐ Alveg örugglega

11 Ég er órólegur, eins og ég þurfi alltaf að vera að aðhafast eitthvað:

0 ☐ Alls ekki
1 ☐ Ekki svo mjög
2 ☐ Þó nokkuð mikið
3 ☐ Mjög mikið

12 Ég hlakka til þess sem framundan er:

0 ☐ Eins mikið og áður
1 ☐ Eitthvað minna en áður
2 ☐ Örugglega minna en áður
3 ☐ Eiginlega alls ekki

13 Ég fæ skyndileg ofsahræðsluköst:

0 ☐ Alls ekki
1 ☐ Ekki mjög oft
2 ☐ Nokkuð oft
3 ☐ Mjög oft

14 Ég get notið góðrar bókar eða skemmtilegs efnis í útvarpi eða sjónvarpi:

0 ☐ Oft
1 ☐ Stundum
2 ☐ Ekki oft
3 ☐ Mjög sjaldan

Viðauki 3: Áhrif streituvaldandi atburða- IES

Áhrif streituvaldandi atburða - IES

Eftirfarandi er listi yfir umsagnir fólks um streituvaldandi atburði.
Skoðaðu hvert og eitt atriði og merktu við hve oft þessar umsagnir hafa átt við þig
hvað varðar blöðruhálskirtilskrabbamein ***síðustu FJÓRAR VIKUR***

1 Allt sem minnti mig á það kom tilfinningunum aftur af stað.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

2 Ég átti erfitt með að sofa.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

3 Aðrir hlutir komu mér til að hugsa um það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

4 Ég var pirraður og reiður

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

5 Ég reyndi að taka ekki nærri mér þegar ég hugsaði um eða var minntur á það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

6 Ég hugsaði um það þó það hafi ekki verið ætlunin.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

7 Mér leið eins og það hefði ekki gerst eða það væri ekki raunverulegt.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

8 Ég forðaðist allt sem minnti mig á það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

9 Myndir af því skutust upp í huga minn.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

10 Ég var uppstökkur og mér brá auðveldlega.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

11 Ég reyndi að hugsa ekki um það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

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12 Ég vissi að ég hafði miklar tilfinningar tengdar því en ég tókst ekki á við þær.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

13 Það var eins og tilfinningar mínar tengdar því væru dofnar.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

14 Ég lét stundum eða leið eins og ég væri kominn aftur til þess tíma þegar það gerðist.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

15 Ég átti erfitt með að sofna.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

16 Sterkar tilfinningar helltust yfir mig annað slagið.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

17 Ég reyndi að þurrka það út úr minningunni.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

18 Ég átti erfitt með að einbeita mér.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

19 Þegar ég var minntur á það fékk ég líkamleg einkenni eins og svitaköst, öndunarerfiðleika, ógleði eða mikinn hjartslátt.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

20 Mig dreymdi um það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

21 Ég var aðgætinn og á verði.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

22 Ég reyndi að tala ekki um það.

0 ☐ Aldrei 1 ☐ Sjaldan 2 ☐ Stundum 3 ☐ Oft 4 ☐ Mjög oft

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Viðauki 4: Jákvæðar afleiðingar áfalla- PTGI

Jákvæðar afleiðingar áfalla (PTGI)

Hér fyrir neðan eru staðhæfingar sem lýsa breytingum sem orðið geta í lífi fólks. Vinsamlegast merktu við, hversu mikil breyting varð á þínu lífi vegna greiningar á krabbameini og meðferðar við því. Merktu við þann valmöguleika sem á best við hverja staðhæfingu eftir því hversu mikil breyting varð vegna greiningar og meðferðar krabbameins

Merktu við að hve miklu leyti þú finnur fyrir eftirfarandi breytingum á lífi þínu vegna blöðruhálskirtilskrabbameins og meðferðar við því...

1 Ég forgangsraða því sem mér finnst mikilvægt í lífinu öðruvísi en áður

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

2 Ég reyni frekar að breyta því sem þarf að breyta

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

3 Ég met lífið meira en áður

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

4 Ég finn fyrir auknu sjálfstrausti

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

5 Ég hef betri skilning á andlegum málefnum

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

6 Ég veit að ég get treyst á fólk þegar erfiðleikar steðja að

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

7 Mér finnst ég nánari öðrum

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

8 Ég veit að ég get tekist á við erfiðleika

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

9 Ég vil tjá mig um tilfinningar mínar

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

10 Ég sætti mig betur við hvernig aðstæður þróast

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

11 Ég finn fyrir þakklæti á hverjum degi

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

12 Ég hef meiri samúð með öðrum

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

13 Ég get látið meira gott af mér leiða

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

14 Ég sé ný tækifæri sem hefðu annars ekki verið til staðar

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

15 Ég legg meiri rækt við samband mitt við aðra

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

16 Ég hef sterkari trú en áður

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

17 Ég hef uppgötvað að ég er sterkari en ég hélt að ég væri

Að engu leyti 1 2 3 4 5 6 Að mjög miklu leyti

18 Ég hef lært mikið um það hversu dásamlegt fólk er

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

19 Ég hef fundið ný áhugamál

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

20 Ég sætti mig við að þurfa á öðrum að halda

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti

21 Ég hef fundið nýjar leiðir í lífinu

Að engu leyti	1	2	3	4	5	6	Að mjög miklu leyti