Neuroendocrinology Letters Volume 44 No. 6 2023
ISSN: 0172-780X; ISSN-L: 0172-780X; Electronic/Online ISSN: 2354-4716
Web of Knowledge / Web of Science: Neuroendocrinol Lett
Pub Med / Medline: Neuro Endocrinol Lett

Cancer's aftermath: posttraumatic growth as an intermediate step to perceived benefits.

Lucia Ráczová[1], Jana Turzáková[2], Tomáš Sollár[1]

1 Department of Psychological Sciences, Faculty of Social Sciences and Health Care, Constantine the Philosopher University in Nitra, Slovakia
2 Institute of Applied Psychology, Faculty of Social Sciences and Health Care, Constantine the Philosopher University in Nitra, Slovakia.

Correspondence to: Lucia Ráczová
Department of Psychological Sciences, Faculty of Social Sciences and Health Care,
Constantine the Philosopher University in Nitra, Kraskova 1, 949 01, Slovakia
e-mail: lucia.raczova@ukf.sk

Submitted: 2023-06-03 *Accepted: 2023-06-29* *Published online: 2023-06-29*

Key words: **PTG; cancer survivors; persistence in consequences; PTG model; cancer**

Neuroendocrinol Lett 2023; **44**(6):391–398 **PMID:** 37776556 NEL440623A04 © 2023 Neuroendocrinology Letters • **www.nel.edu**

ORIGINAL ARTICLE

Abstract

BACKGROUND: The need to develop understanding of the posttraumatic growth (PTG) in the population of cancer survivors has increased in recent years. The daily functioning of cancer survivors involves factors that affect the development of PTG and the process by which it arises.
OBJECTIVES: The main objective was to explore PTG process and its influencing factors in cancer survivors.
METHODS: Using qualitative research design, the study applied in-depth interviews and the method of life-line drawing with seven female cancer survivors, aged between 49 and 73. Data were analyzed using grounded theory methodology.
RESULTS: The main category in the process is persistence in consequences associated with two categories of triggers, external and internal. The various outcomes (PTG, acceptance, uncertainty) depend on perceived possibility of taking control over consequences in cancer survivors. PTG is a result of individual accommodation of illness consequences in which taking control and accommodation lead to self-regulation of pain, self-confidence, and positive self-image.
CONCLUSION: Possibility of taking control over the disease consequences and active approach to acquiring new skills are central explanatory variables modifying the process of persistence in consequences of illness and the reasons of PTG. The PTG model has the potential to be adapted to other cancer-related outcomes that are relevant to the daily lives of cancer survivors.

INTRODUCTION

While breast cancer is one of the most commonly diagnosed forms of cancer (Nardin *et al.* 2020; DeSantis *et al.* 2019), there is a lack of research on the impact of cancer on the daily lives of cancer survivors. Receiving a cancer diagnosis can be a traumatic experience, defined as an unpredictable and threatening event that can have lasting consequences for a person's life (Calhoun & Tedeschi, 1999). However, cancer survivors may not only encounter adverse effects but also experience positive transformations and new opportunities (Tedeschi & Calhoun, 2004). Posttraumatic growth (PTG) differs from resilience in finding positive change of thinking, reorienting values and in strengthening of previous capability (Muldoon *et al.* 2019). Based on a meta-analysis conducted by Wu and colleagues (2019), it was found that approximately 50% of individuals may undergo a process of PTG following a traumatic event, while still experiencing its negative effects. Nevertheless, only some studies (Seiler & Jenewein, 2019; Tedeschi & Calhoun, 2004) put the possibility of PTG into the context of exploring influencing factors and the process it follows. By considering both the negative and positive outcomes of traumatic experiences, we can gain a better understanding of how to provide support to cancer survivors (Koutroli *et al.* 2012).

PTG model in cancer survivors

Tedeschi and Calhoun (2004) developed the PTG model, which identifies several variables that contribute to positive change following a traumatic event, including the individual's personality prior to the trauma. The PTG model spans from the individual's pre-trauma state to the positive changes that result from coping with life crises. The PTG phenomenon is typically observed across five domains, including increased self-reliance or strength, changed relationships, finding a new path in life, greater appreciation for life, and spiritual and existential changes that may lead to a deeper understanding of philosophical questions. In contrast to Calhoun and Tedeschi's perspective, Janoff-Bulman's (2004) model emphasizes significant personality changes following trauma, including gaining inner strength, existential reassessment of life, and psychological readiness for negative events. In the PTG model, increasing resilience plays an important role in remodeling one's worldview, which is called accommodation. Alternatively, when new experiences can be incorporated into an existing worldview, this is known as assimilation. Trauma can lead to both positive and negative changes in individuals (Taku *et al.* 2021; Cann *et al.* 2010; Tedeschi & Calhoun, 2004). To better understand the phenomenon of PTG in clinical research, it is important to examine various aspects of PTG, including potential distress and well-being, as well as other areas of mental health. Studies have indicated that PTG following breast cancer is linked with a greater sense of well-being (Lelorain *et al.* 2012). Thus, it has been recommended that research should also emphasize the importance of examining PTG and psychological well-being in addition to mitigating distress among cancer survivors (Pat-Horenczyk *et al.* 2015). Some authors, such as Johnson *et al.* (2007), literally emphasize that PTG should not be universally viewed as a positive contribution to well-being and suggest that individual action may be a missing component in other models. For survivors who have overcome a cancer diagnosis, a specifically oriented PTG model should be developed that offers implications for clinical practice (Morris *et al.* 2012). Furthermore, Casellas-Grau *et al.* (2018) have suggested the need to explore PTG from a broader perspective that considers various factors such as coping strategies in order to develop more effective interventions for cancer survivors.

The aim of this grounded theory study is to qualitatively explore the process and entering factors enabling PTG in women who have overcome the cancer. Research approach is consistent with the salutogenic framework that emphasizes the potential benefits of trauma. Due to the complexity of the PTG, the research objectives were set as: What is the process of PTG in women after overcoming cancer? What factors support the development of PTG in women after overcoming cancer? What are the potential benefits for women after overcoming cancer?

METHODS

Sample and inclusion criteria

The participants were selected voluntarily by addressing three patients´ organizations all around the country. If the participants were interested in taking part, they sent us e-mail, and the meeting was arranged. Two inclusion criteria were set. The first was a diagnose of breast or ovarian cancer without recurrence and not currently receiving chemotherapy or radiotherapy during the time of the research. Participants could use the long-term hormonal treatment. The second inclusion criterion was the participants´ willingness to meet personally. The appointment was proposed by their choice of the safe place and the researchers travelled after them with the intention of creating a secure relationship by active participation of interviewed women. Seven women participants aged 49 - 73 years (M_{age} = 58; SD=7.6; time since diagnosis in years M=8, SD=4.8)) were decided to take a part in a study, their names were anonymized and changed. Informed consent was a part of the contract about withdrawal options. Information about available psychological support services was provided. The detailed description of participants involved in a study is in the Table 1 below.

Procedure and measures

All participants were informed about the context of the qualitative study in advance. The qualitative research design consisted of short survey oriented at descriptive information about participant, life-line drawing method followed by short inquiry (Tyl, 1985) and semi structured in-depth interview. The purpose of life-line drawing method was to grasp the background of the trauma, anchoring important life experiences in time and to gain a comprehensive insight into the life of a participant. This method was similarly used by Čermák (2004), who also employed the life-line and described it as stimulating for the therapist-client dialogue. We also used the method with the instruction for women to draw a life-line and mark significant moments and subsequent important events in their lives. Čermák (2004) continued with the narrative holistic formal analysis of life-lines. In our study, we specifically focused on whether the line displays trauma from cancer and potentially other traumas as

Tab. 1. Description of participants: Education: HS - High school, U - University; Disease: C50 - Malignant neoplasm of breast; C56 - Malignant neoplasm of ovary; Underwent the treatment: 1 - lumpectomy, 2 - mastectomy, 3 - chemotherapy intravenously, 4 - radiotherapy, 5 - hormonal medication, 6 - chemotherapy pills, 7 – hystheroctomy.

Name	Age	Status	Education	Diagnose	Time since dg.	Time since acute treatm.	Underwent the treatm.	Support group
Jane	73	Widow	HS	C50	11 y.	1 y.	2,3,5,7	No
Andrea	49	Married	HS	C50	2 y.	2 y.	2,3,4,5	Yes
Sophie	63	Married	U	C50	15 y.	14 y.	1,4,5,6,7	Yes
Eve	57	Divorced	U	C50	8 y.	6 y.	2,3,4,5	Yes
Claudia	50	Widow	U	C50	1 y.	1 m.	2,4,5,6	Yes
Kate	56	Single	U	C50	12 y.	4 y.	1,4,6	Yes
Anne	55	Married	U	C56	9 y.	4 y.	3,7	Yes

well. Semi structured interview was carried out and recorded. Inspired by Horgan *et al.* (2011) the structure of the interview included open-ended questions and reflected the topics about (1) important moments in life, (2) previous negative experiences, (3) the breast/ovarian cancer diagnosis associated with reactions to diagnosis, (4) other important people, (5) experiences of surgery and treatment, (6) perceived feelings, thoughts, needs, (7) changes in everyday life, (8) healthcare system and other institutions, (9) relationships, (10) attitude to health, and (11) own essential reminder in this topic nowadays. As it is usual in grounded theory methodology, the questions were further refined during the interview to explore the consequences of illness on everyday life and surviving the consequences still. The process of collecting data was carried out simultaneously with data analysis until the point of theoretical saturation was reached during the seventh interview, meaning that no new significant issues emerged from the data collection process (Corbin & Strauss, 1990). The interview length ranged from 73 to 167 minutes (M=110.6 SD=38.1). Nobody withdrew from the study, on the contrary, positive feedback about subjective importance of the research was given to researchers.

Data analysis

A point on the life-line that represented a significant negative life experience was evaluated as an indication of the presence of trauma. In our analysis, we noticed that a number of women had already experienced trauma prior to the illness (e.g. divorce). Interview data were analysed according to grounded theory methodology (Corbin & Strauss, 1990) and triangulated by life-line method. Two independent assessors (LR, JT) coded the text into open codes. The codes were labelled by the researchers, and were classified according to the distribution, understanding, and meaning in the process of constant comparison suggested by Glaser (1999). The codes have been summarized by their connections and they were placed into axial codes. The meaning of the data was evaluated continuously after each stage of the coding and in the case of various coding the third researcher (TS) was called for review. Finally, by looking at the meanings and items together the core, grounded categories were exempt including the connections pointing to the main topic.

RESULTS

The analysis highlighted the central phenomenon labelled as persistence in the consequences of the disease followed by two various forms based on the centralization, inner (for example: pain) or external (for example: preventive checkup). External consequences (preventive doctor´s checkup, cancer recurrence statistics, death of another patient) do not provide the opportunity to take control over the situations. Impossibility to accommodate the situation can lead to acceptance or to uncertainty, not PTG. On the other side, inner consequences (pain, impaired memory, hair quality, removed tissue - organ) provide the possibility to take control and find benefits in the accommodation process. None of the women used just one adaptation strategy, but variety ways of coping mechanisms were used in everyday lives depending on persistence of the disease consequences.

Although the research question prioritized PTG as a process, the analysis of the data showed that PTG is rather the possible result of an active ongoing accommodation process. Internal consequences of illness, as opposed to external consequences, provide women with possibilities of assimilation and passivity, but also add active coping option through accommodation of situations. The model is shown in Figure 1.

The resulting PTG model was consistent with the drawings of the life-lines with varying commentary reflecting the current experience of the consequences of the illness. The trauma was clearly visible as a steep downward drop of the line with varying depth in five out of seven women – Eve, Anne, Andrea, Claudia and Sophie. Significant depth of trauma was depicted in

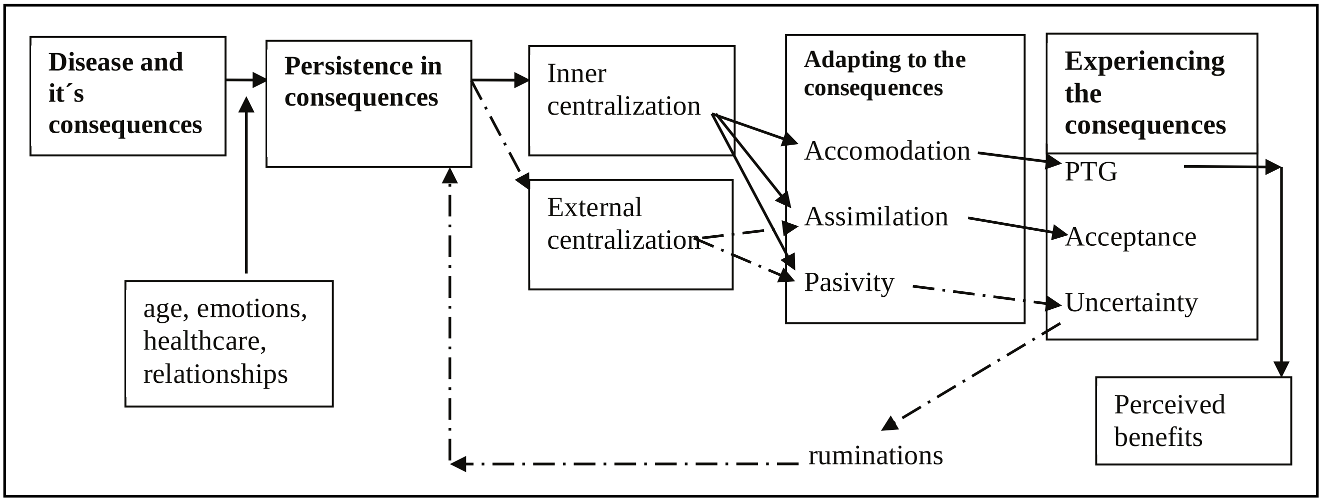

Fig. 1. Model of persistence in consequences in cancer survivors, PTG: posttraumatic growth

the drawings of Andrea, Eve, and Anne. Kate. Katka captured trauma as a gentle downward arc as part of the line. In a completely opposite manner, Jane conceptualized trauma by representing it as a point from which a line directed upwards, paradoxically. Jane understood the representation of her growing curve as a "progressive accumulation of problems". The lifeline drawing method ensured a better anchoring of the researcher and the participant during the interview in time; provided a faster orientation of the researcher in the holistic perspective about the participant´s life and the character of this method provides the opportunity to express oneself.

Inner centralization of consequences: "That hair was growing from the roots as a new person grew with me"

According to our model, the consequences of the disease, such are impaired memory, removed tissue, new hair quality, pain, or even a missing organ, represent internal consequences. The change of hair quality, missing tissue, even the whole organ was mentioned by all women. Examples of individual statements for all three types of experiencing the consequences (PTG, acceptance, uncertainty) are given below.

PTG

It seems that if a woman actively accommodates the consequence, the result can be understood as a PTG. Some women felt that hair is thicker or has changed its structure. These were younger women under the age of 70. In case their hair started to tingle, they have chosen a shorter hairstyle. All of them mentioned they did not have the courage to do it in the previous life period before the disease. Only one participant, Eve, underwent the reconstruction of breast to replace the missing organ. The decision was supported by her doctor, and after the surgery she put the tattoo on the new breast, what was her creative expression of self-confidence and self-image experienced as benefits triggered by active approach. Exercise and breathing techniques led to active self-regulation of pain and were developed further to become the transferable experience when other problems occurred. Women perceived this result as a benefit applied to other areas of life.

Anne: …My back hurts, so I visit specialist Pilates trainer, I'm so happy now. But I also learned meditations, calming down, visualizations...Working with that head. I have already tried several techniques. It's very important, that's what the therapist also taught me, and by working with the breath I can reduce the pain by myself, I'll calm down. I use it even when I go to bed, I say it to myself and, for example, I calm down my thoughts.
Eve: That hair was growing from the roots as a new person grew with me. They are thicker, better quality, so when I have them cut to the shoulders, you can see that they are so bulkier. And I'm glad I have such a cool hairstyle.
Andrea: That hair, it was like ... When they started to grow. They started squeaking, everywhere, to the side, I already had such a head, such rings, they started to curl after chemotherapy... I go to the hairdresser to let it go down. But in the end, even now, I always wanted to have them shorter because I liked it, but I idn't have the courage to have a hairstyle like I have now.

Women mentioned the higher self-confidence and positive self-image as the PTG results of accommodation including many benefits like new interests, opportunities, active lifestyle and strengthened relationships.

Andrea: I was so shy. I would not go to coffee like this with you in my life. Now me and my friend get used to sitting in a cafe, and that's something fascinating. Sit down for coffee and watch people, cars. To enjoy what is now. That fascinates me, how stupid I was. That I could have started earlier... I disregarded myself.
Eve: I do ice baths. I went there alone, I posted photos and now there are already seven of us, we are mating. By wanting to take care of myself I am now examining my limits where I can over-

come my fears. I want to open champagne on ice and I want such a photo, just me, champagne and ice.

Acceptance

On the contrary with accommodation, assimilation of persisting in the consequences of the disease triggers the acceptance. Women mentioned everyday use of medical aids. The entering variables such as negative experience of a friend or fear of surgery influenced their decisions. They continue to accept their decision.

Claudia: And the doctor told me about the reconstruction, but I thought I had big breasts, not that an epithesis was enough, I wouldn't complicate it unnecessarily. Because when a friend who had it told me how they did it, they would put you to sleep once, the other time, then no. I didn't want that, I'd rather not.
Kate: I heard that one friend from support group had been operated on five times to make it look better. I wouldn't want to have surgery so many times because of this. If someone needs it, let them do it and feel more feminine, let them do it, but I don't want it, this filling, epithesis, is enough for me.

Uncertainty

Another form of adapting to the consequences, pasivity, rather than accommodation or assimilation, may lead to experiencing of uncertainty. If the women were perceiving a lack of interest from the conversation partner, they simply passively listen to the conversation and adapt to the nature of the conversation, although they realize that they do not remember many things during the conversation because of the impaired memory. They do not feel comfortable in conversation and are uncertain about telling the person about the consequence of the disease or treatment, and the uncertainness triggers thinking about that. By rumination about this consequence of the disease, the woman again realizes how the consequences affect her life and her relationships.

Anne: And even though he tells me something, I don't even remember a lot of what he says, because I don't remember much during conversations, that's how my memory is destroyed, I don't even feel like trying and asking what he said. I just listen, he can talk to me about anything, but I don't know ... It doesn't give me anything, only that I'm like... I think about how the disease has changed my everyday life.

External centralization of consequences: "It is a part of me but hidden. For me, it is such a skeleton in the closet"

Doctor's checkups, statistics about the probability of recurrence of the disease, or the death of another patient were found as external consequences of disease. These consequences reflected the subjective understanding of the perceived impossibility of taking control. The situations do not affect women's bodies daily but occur as external part of lives and are perceived as consequences of disease.

Acceptance

A doctor's checkup is a mandatory matter for women after overcoming breast or ovarian cancer. Due to the monitoring of their condition according to the specific diagnosis and according to the extent and treatment, the frequency of these checkups varies. Women associate checkups with the fact they have to deal with the consequences of their illness again. Overall, the hospital environment is associated with an unpleasant experience of detecting a disease that has traumatically stuck in women's memory. As soon as the period of checkup occurs, women experience it by short term avoidance of everyday matters and are focused on information from doctor, that everything is fine. After the assimilation process of short-term avoidance, women are calm again.

Sophie: The fact that you don't have to deal with the disease usually, just when it's sometimes reminded of what you're used to ... but the week when you go for a checkup ... Sometimes it comes back especially during those check ups... It's annoying. That day is unpleasant. What a day, a week, what I don't know again ... the nurse gives me an appointment, I go to sono, they take my blood, such a comprehensive examination. And it's annoying, so I'll wait for the results, but then I'll find out that everything is fine and it will work for me.

Uncertainty

Women thus adapt to control by trying to remember information from the doctor, but it has the exact opposite effect, although they assimilate to the process and the result is forgetfulness. This puts women in uncertainty, even though the doctor provided them the information and explained everything to them. Women then leave the checkup in uncertainty and as soon as the fear subsides, they return to the idea associated with the past disease, because they do not remember the information and feel uncertain thinking about consequence of the disease.

Kate: I cannot sleep a week before the checkup, I'm scared, it's absolutely terrible and especially I always shatter myself at the sono, because first they do mammography and then sonography, and those doctors always say we'll see ...I try terribly to remember everything they tell me, but as soon as the doctor starts explaining it to me, I get the facts out of my head, I go out and I don't know anything. Then he tells me it's okay…but I don't know…

A different situation in which women sometimes find themselves after overcoming the disease is when the diagnose reappears to their friends. The fact women's friend has died is very uncomfortable and is associated with many emotions. Some women cope with the loss during the support group encounter which provides them a shelter where they can talk and cry. Friendships that are based on illness, with the accompanying emotion of grief, result directly in fears of a potential recurrence of the disease in themselves. The uncertainty triggers the rumination about the disease.

Eve: ... these friendships they are something completely different. I perceive warmer relationships and the death of group members as such my own losses. It´s a reminder that you can never be absolutely sure what will happen…And then, you think about it."
Claudia: Even the doctor warned me, be careful, these are fragile friendships. You don't know who will die. Even now, with those fragile friendships in the group, I see that even after years it can happen… We cry, we talk about it in a group ...Uncertainty about what will happen? Like that…
Kate: I was explicitly looking for the culprit, I needed an explanation of what had happened, whether the fortune teller, the doctor, she, who should I blame? I could not get out of it and I still do not know. And maybe it's morbid but I have a folder in computer with her photos. I don't want to open it, I opened it once three years ago and I don't want to do it again. I have said to myself, delete it, but I just... It's part of it, me, but so hidden. For me, it's such a skeleton in the closet. She was there in those photos and she didn't look good anymore... and for me it´s like: I will look like this once I die? How will it be with me?

DISCUSSION

Findings suggest the PTG cannot be understood as a uniform pattern applied generally to all circumstances. On the contrary, PTG was one of the possible outcomes of the constant active adaptation process to changes in women lives affected by the consequences of the disease. The persistence in the disease consequences distinguishes malignant breast and ovarian cancer from other traumas. It is not only the trauma of the disease itself that has already subsided, but its everyday consequences. External factors, related to perceived impossibility to take active control, do not give women real experience to control such situations as doctor's checkups, confrontation with statistical information about mortality, and the loss of a friend, another cancer survivor, who dies. The possibility of taking control appears to be crucial part from the perspective of PTG development. Similarly to our study, Řiháček *et al.* (2013) also describe the assumption of control as a significant, even central category in their study, emphasizing patients' activity, empathetic communication with doctors, and emphasizing the importance of healthcare provision. The positive changes described by cancer patients can be associated with a greater sense of perceived control over their lives and selves according to Komura and Hegarty (2006). This perception is a typical characteristic of traumas associated with illness (Sumalla *et al.* 2009). In complexity of PTG including personality traits, cognitive processing of cancer, coping strategies, social support and perceived threat of cancer recurrence (Kolokotroni *et al.* 2014), specific situations that we described in our model clearly pointed out the impossibility of PTG involvement in the external consequences of the disease.

According to our findings, PTG is a resulting phenomenon in reaction to active adaptation to the consequences of the disease strategy called accommodation (similarly to Joseph & Linley, 2005) by women after overcoming the disease. PTG is then a consequence of adaptation and it refers to the positive experience of consequences that include insight, pain regulation as own ability, increased self-confidence and positive self-image. By applying elements of development to other areas in life the profits arise, and women can define importance of benefits in everyday life. Such an understanding of PTG agrees with the concept of Tedeschi and Calhoun (2004), who defined PTG in the sense of the emergence of positive psychological changes as a result of the struggle with demanding events, and also with activity mentioned by Johnson *et al.* (2007). Distinction in adaptation strategies is interpreted similarly to Joseph and Linley organismic valuing theory of growth through adversity (Joseph & Linley, 2005) theory based on assimilation and accommodation in women 1) who change their interpretation of consequences experience which fits into their existing view of world – assimilation; 2) who integrate their experience into new perceived world – accommodation. The active potential of accommodation is not negligible, and it can´t be understood as mainly cognitive, but very active strategy connected to perceived possibility of taking control.

The internal consequences associated with a possible takeover of control can be predictors of PTG. In this context, it is worth mentioning the takeover of Julian Rotter's locus of control concept, based on distinguishing the individual's belief in possible environmental control. Rather, internalists believe that circumstances can affect themselves, while externalists believe that the situation will be resolved without their intervention (Rotter, 1966). From our point of view, the internal consequences of the disease rather provide possibilities to take internal control and can activate a personality trait (internalism), while the external ones tend to externalize in the form of overcoming, comparing with others, avoiding, finding the culprit. Active accommodation techniques like doing exercise, using breathing techniques, memorization, hairstyle choice or plastic reconstruction may be associated with active positive attitude, which was found as a mediator in the study of Gori *et al.* (2021). We therefore believe that the consequences of the disease, especially the internal ones, provide possibility to accommodate these consequences in everyday life. Tedeschi and Calhoun (2004) also emphasize the localization of control and management in the topic of PTG and findings have shown a relationship between internal locus of control and PTG, which was stronger than in people with external locus of control (Cummings & Swickert, 2010). Accommodation could therefore also be a certain dispositional characteristic of the personality, associated with the strategy of managing the internal consequences of the disease, if the centralization of the consequence is internal and the individual perceives the opportunity to cope with the situation. Intervening conditions involving health care in the sense of professionals, trainers, rehabilitation workers and psychologists appear to be supportive factors, for example in pain adjustment, where a woman does not only passively receive medication but she regulates pain as a result of exercise, creating the ability to self-regulate pain actively. These input factors are in line with the understanding of the emergence of PTG in the field of health as a result that depends on the social context and individual characteristics of the individual (Jayawickreme *et al.* 2021). Also, the results underline the importance of a proactive approach and support from the helping professionals. In our results, it has been shown that in the aftermath of trauma, such as pain, doctors' health care, on the other hand, has an impact on assimilation, by alleviating the pain with medication. Alternative treatment, in turn, is used to receive advice from former co-patients, which also leads to accommodation to that advice, but not to PTG, but rather to accepting the consequences. Uncertainty which triggers the ruminations about the consequences of the disease and about probability of cancer recurrence can be very stressful and resembles secondary trauma in its nature.

In conclusion, our findings support Joseph's (2021) insight into the topic of PTG, that perceived changes cannot be dichotomously positively or negatively valued. People are doing their best to learn from their experiences and the consequences of the disease are challenging them in everyday life. It therefore seems important to include the topic of possibility of taking control and self-regulation as a topic of psychological intervention because of its impact on wellbeing (Gori *et al.* 2021; Angenendt *et al.* 2010).

Limitations

The study aimed to explore PTG in female cancer survivors by a means of grounded theory. The framework and the process of grounded theory were respected to explore the phenomenon, however, the presented study has some limitations. First of them refers to the basic assumption of theoretical saturation. Guest *et al.* (2006) suggest that saturation typically occurs within the first twelve interviews and basic elements for metathemes are present as early as six interviews. We lean towards the view that it was already possible to identify individual components of the identified theory as early as the sixth story, but we also recommend to other researchers that it would be appropriate to involve additional participants. All participants were shortly interviewed to determine their motivation to participate in the study. Those women who reported willingnes/readiness were included (e.g. I want to share how I felt, I am over it now, It is OK for me to talk about it). Those who were rather vulnerable, seeking social support, were not included to prevent them from experiencing unpleasant feelings during the interview. Participants who were not sure about their participation and rather seemed to seek social support were not included and were provided with contact information for experts offering psychosocial support. This strict inclusion criterion resulted in low number of participants (seven). In recognition of this issue we attempted to support the validity of the results by employing various sources of data (interview and life-line drawing) and two independent researchers who conducted the analysis. In case of discrepancy between two coders another one was asked to discuss the issue. Women in this study were recruited from all areas of Slovakia in order to help address the diversity of the sample. The socioeconomic status and sexual orientation were not determined and recorded. The future research should also include women who represent race and ethnical minorities to expand our understanding of how the PTG is experienced.

CONCLUSIONS

This qualitative study based on grounded theory methodology explores the possibility of PTG in cancer survivors. Using life-line drawing method in combination with in-depth interviews coded by professional experts the study suggests that PTG is one of the outcomes based on the internal centralization of disease consequences. The study has important implications in comprehensively understanding that taking control is important factor influencing the quality of life in women who have experienced cancer and are daily challenged by disease consequences. Our research is therefore particularly suitable for theoretical research application of the findings, but we also perceive its importance for practice, especially as an aid in creating a psychological intervention. The psychological intervention may be systematically focused on persistence in the consequences of the disease, such as doctor´s checkups, statistics on the probability of disease recurrence and death of co-patients. The participants also considered that it is necessary to continue in research field as one of the participants, Eve, has stated in her feedback: "The oncological disease is demonized. We talk about the flu, we talk about a heart attack, about the coronavirus... but still not about cancer. It is a disease that affects everyone, whole families, directly or indirectly, and that is why it is necessary to do such research. In this topic, the healthy people need to be educated more than survivors."

ACKNOWLEDGMENTS

The authors express their gratitude to the women who participated in the study and generously shared their experiences.

AUTHORS' CONTRIBUTIONS

The manuscript was written and edited by all three authors. LR and JT developed the study design, while LR was responsible for data collection and all authors contributed to data analysis. The final version of the manuscript was discussed, reviewed, and approved by all three authors, who have taken responsibility for all aspects of the work and its publication. The dataset for this manuscript is not publicly available because of the sensitive information it contains regarding participants' anonymity.

REFERENCES

1 Angenendt G, Schütze-Kreilkamp U, Tschuschke V. (2010). Praxis Psychoonkologie: Psychoedukation, Beratung und Therapie. Stuttgart: Georg Thieme Verlag.

2 Calhoun L.G, Tedeschi R.G. (1999). Facilitating Posttraumatic Growth: A Clinician's Guide (1st ed.). London: Routledge.

3 Cann A, Calhoun LG, Tedeschi RG, Solomon DT. (2010). Posttraumatic growth and depreciation as independent experiences and predictors of well-being. J Loss Trauma. **15**(3): 151–166.

4 Casellas-Grau A, Ochoa C, Ruini C. (2017). Psychological and clinical correlates of posttraumatic growth in cancer: A systematic and

5 critical review. Psycho-Oncol. **26**(12): 2007–2018.

6 Corbin JM, Strauss A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. Qual Sociol. **13**(1): 3–21.

7 Cummings J, Swickert R. (2010). Relationship between locus of control and posttraumatic growth. Individ Differ Res. **8**(3): 198–204.

8 Čermák I. (2004). „Genres" of Life –Stories. In: D. Robinson Ch. Horrocks N. Kelly B. Roberts (Eds), Narrative, Memory and Identity. Theoretical and methodological Issues. University of Huddersfield Press, 211–221.

9 DeSantis CE, Ma J, Gaudet MM, Newman LA, Miller KD, Goding S, et al. (2019). Breast cancer statistics. CA Cancer J Clin. **69**: 1.

10 Glaser BG. (1999). The Future of Grounded Theory. Qual Health Res. **9**(6): 836–845.

11 Gori A, Topino E, Sette A, Cramer H. (2021). Pathways to posttraumatic growth in cancer patients: moderated mediation and single mediation analyses with resilience, personality, and coping strategies. J Affect Disord. **279**: 692–700.

12 Guest G, Bunce A, Johnson L. (2006). How many interviews are enough? An experiment with data saturation and variability. Field Method. **18**: 59–82. doi: 10.1177/1525822X05279903

13 Horgan O, Holcombe C, Salmon P. (2011). Experiencing positive change after a diagnosis of breast cancer: A grounded theory analysis. Psycho-Oncol. **20**(10): 1116–1125.

14 Janoff-Bulman R. (2004). Posttraumatic growth: Three explanatory models. Psychol Inq. **15**(1): 30–34.

15 Jayawickreme E, Infurna FJ, Alajak K, Blackie L, Chopik W, Chung J. et al. (2021). Post-traumatic growth as positive personality change: Challenges, opportunities, and recommendations. J Pers. **89**(1): 145–165.

16 Johnson RJ, Hobfoll SE, Hall BJ, Canetti-Nisim D, Galea S. and Palmieri PA. (2007). Posttraumatic Growth: Action and Reaction. Appl Psychol. **56**(3): 428–436.

17 Joseph S, Linley PA. (2005). Positive Adjustment to Threatening Events: An Organismic Valuing Theory of Growth through Adversity. Rev Gen Psychol. **9**(3): 262–280.

18 Joseph S. (2021). Posttraumatic growth as a process and an outcome: Vexing problems and paradoxes seen from the perspective of humanistic psychology. Humanist. Psychol. **49**(2): 219–239.

19 Kolokotroni P, Anagnostopoulos F, Tsikkinis A. (2014). Psychosocial factors related to posttraumatic growth in breast cancer survivors: A review. Women Health. **54**(6): 569–592.

20 Komura K, Hegarty JR. (2006). The appraisal of positive life changes following cancer diagnosis: An interview study. Palliat Support Care. **4**(1): 3–12.

21 Koutroli N, Anagnostopoulos F, Potamianos G. (2012). Posttraumatic stress disorder and posttraumatic growth in breast cancer patients: a systematic review. Women Health. **52**(5): 503–516.

22 Lelorain S, Tessier P, Florin A, Bonnaud-Antignac A. (2012). Posttraumatic growth in long term breast cancer survivors: relation to coping, social support and cognitive processing. J Health Psychol. **17**(5): 627–639.

23 Muldoon OT, Haslam SA, Haslam C, Cruwys T, Kearns M, Jetten J. (2019). The social psychology of responses to trauma: social identity pathways associated with divergent traumatic responses. Eur. Rev. Soc. Psychol. **30**(1):311-348.

24 Morris BA, Shakespeare-Finch J, Scott JL. (2012). Posttraumatic growth after cancer: the importance of health-related benefits and newfound compassion for others. Support Care Cancer. **20**(4): 749–756

25 Nardin S, Mora E, Varughese F.M, D'Avanzo F, Vachanaram A. R, Rossi V, et al. (2020). Breast Cancer Survivorship, Quality of Life, and Late Toxicities. Front. Oncol. **10**: 864.

26 Pat-Horenczyk R, Perry S, Hamama-Raz Y, Ziv Y, Schramm-Yavin S, Stemmer SM. (2015). Posttraumatic growth in breast cancer survivors: Constructive and illusory aspects. J Trauma Stress. **28**(3): 214–222.

27 Rotter JB. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological monographs: General and applied. **80**(1): 1–28.

28 Řiháček T, Čermák I, Hytych R. (2013). Kvalitativní analýza textů: čtyři přístupy [The qualitative analysis of texts: four approaches], Brno, Masarykova Univerzita.

29 Seiler A, Jenewein J. (2019). Resilience in cancer patients. Front Psychiatry. **10**: 208.

30 Sumalla E. C, Ochoa C, Blanco I. (2009). Posttraumatic growth in cancer: reality or illusion? Clin Psychol Rev. **29**(1): 24–33.

31 Taku K, Tedeschi RG, Shakespeare-Finch J, Krosch D, David G, Kehl D, et al. (2021). Posttraumatic growth (PTG) and posttraumatic depreciation (PTD) across ten countries: Global validation of the PTG-PTD theoretical model. Pers Individ Differ, 169.110222.

32 Tedeschi RG, Calhoun LG. (1995). Trauma & transformation: Growing in the aftermath of suffering. London: Sage Publications.

33 Tedeschi RG, Calhoun LG. (2004). Posttraumatic growth: conceptual foundations and empirical evidence. Psychol Inq. **15**(1): 1–18.

34 Tyl J. (1985). Časové horizonty. Příspěvek k problematice pojmu životního času a metodám jeho zkoumání. [Time horizons. Contribution to the concept of life time and methods of its research. Unpublished doctoral thesis, Faculty of Arts, Charles University].

35 Wu X Kaminga AC Dai W Deng J Wang Z Pan X Liu A. (2019). The prevalence of moderate-to-high posttraumatic growth: A systematic review and meta-analysis. J Affect Disord. **15**: 243.