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Posttraumatic Growth in the Context of Spirituality and Religion in Cancer Survivors

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Posttraumatic growth, spirituality, religion, cancer survivors

The study is focused on the level of posttraumatic growth and its relation to the importance of spirituality and practicing of religious belief in cancer survivors. The level of posttraumatic growth was measured using PTGI (*Posttraumatic Growth Inventory*; Tedeschi and Calhoun 1996); the spirituality was measured by two simple items: 1) Spirituality is important in my life; 2) Practicing of spirituality is important in my life. Results of the study showed positive correlations between the importance of spirituality in lives of cancer survivors and the overall posttraumatic growth. Strong positive correlations between spirituality and the dimension of spiritual change were confirmed. Cancer survivors practicing Christian faith achieved higher levels of posttraumatic growth as opposed to unbelieving cancer survivors. Christian cancer survivors achieved higher levels of posttraumatic development in the domain of relating to others as opposed to patients professing other religions.

1 Introduction

Cancer is a common disease throughout the world, and, since a treatment is required for it, special attention and social support are also necessary. Cancer patients show typical behavior that makes it possible to identify how they adapt to cancer (Czerw, Marek and Deptala 2015, 415). After the treatment, there are several late consequences in patients, including the increased occurrence of a mild cognitive impairment (Mikulajová, Boleková and Surová 2017, 446) as well as cognitive distortions in everyday life (Boleková and Chlebcová 2020, 635).

Experiencing a traumatic event, such as cancer, can also lead to positive changes, which were describes as posttraumatic growth by Tedeschi and Calhoun (1996). The posttraumatic growth is a positive experience, a change occurring as a result of a fight with particularly difficult life crises. It can be manifested in various ways, including increased appreciation of life as such, more meaningful interpersonal relationships, feeling of personal strength, changed priorities and richer existential and spiritual life. It has also been proposed that the posttraumatic growth has impact on life wisdom and development of life narrative, which presents an ongoing process, not a static result (Tanriverd, Savas and Can 2012, 4311).

Cancer patients show various levels of posttraumatic growth, depending on social-demographic factors. Younger cancer patients dispose of higher levels of posttraumatic growth (Barskova and Oesterreich 2009; Danhauer *et al.* 2013); females show higher levels of posttraumatic development than males (Cormio *et al.* 2017; Zoellner and Maercker 2006). Patients who have been ill for shorter period show the strongest fighting spirit (Czerw, Marek and Deptala 2015, 414).

Numerous factors, which contribute to posttraumatic growth, have been studied in psychological literature. Dimensions of social support represent one of the factors influencing the posttraumatic growth. It has been shown that the perception of social support correlated positively with the fighting spirit and negatively with feelings of helplessness, hopelessness, and fatalism (Yagmur and Duman 2016, 208). Talking to people, provision of financial aid and information on the disease can facilitate cognitive processing and adaptation to the disease, which can, in turn, result in increased posttraumatic growth (Rahimi, Heidarzadeh and Shoaee 2016, 23). Important role is played by emotional support in the period following the diagnosis of cancer and in the context of and experience with positive consequences of the disease in form of posttraumatic growth, 8 years after the diagnosis (Schroevers 2010, 46). Cancer survivors are significantly positively influenced by optimism (Hodges and Winstanley 2012, 2049), feelings of hope (Abdullah *et al.* 2019), affectivity and level of emotional distress that belong among important factors related to posttraumatic growth (Lelorain *et al.* 2010).

Spirituality has a status of multidimensional theoretical construct referring to a non-specific area of human activity. The essence of spirituality is transcendence of actually experienced ego (Heszen and Gruszczyńska 2004, 15), with spirituality being able to increase the level of posttraumatic growth (Calhoun *et al.* 2000).

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Experiencing of spirituality moderately predicts positive changes after one year of being ill. The spirituality is seemingly able to support posttraumatic growth, since it provides the community with a meaning or supports the community and faith, which support the meaning-making process (Prati and Pietrantoni 2009).

Religious coping represents one of the ways of coping with traumatic events (Pargament, Koenig and Perez 2000). Several studies support the correlation between health and religious practice, such as prayer, attending services (Pargament *et al.* 2004), faith maturity, and posttraumatic growth (Galea 2014, 1068). Although situational factors and personality play an important role, the significance of faith maturity and posttraumatic growth in relation with the development of subjective well-being in people affected by trauma have been emphasized. Spirituality helps when facing hopelessness and presents an important buffer in difficult situations (Galea 2014, 1068). Results of a study by Rzesutek, Oniszczenko, and Kwiatkowska (2017, 1083) showed positive correlation between specific coping strategies focused on meaning (return to religion and acceptance) and posttraumatic growth. It has also been found that experiencing of spirituality correlates positively with the level of posttraumatic growth and it also mediates a relationship between return to religion and posttraumatic growth.

The aim of the study was to search for the relations between the importance of spirituality and posttraumatic growth in cancer survivors, as well as to explore whether there were any differences in the levels of posttraumatic growth with respect to practicing of spirituality in cancer survivors. The study also aimed to find any differences in the levels of posttraumatic growth with respect to religious identity of cancer survivors.

2 Method

2.1 Sample and Procedure

The questionnaires were administered to cancer survivors in four hospitals and five different cancer support groups in the different regions of Slovakia from July 2019 to July 2020. Ethical approvals were granted by the University Ethical Committee, National Cancer Institute and management of the hospitals. The research was conducted following the Declaration of Helsinki. Participation in the study was voluntary and patients could stop participation at any stage without any consequences. Patients confirmed their participation in the study by giving informed consent. The questionnaire did not include any mandatory questions and patients did not have to provide response, if they did not want to. The questionnaires were administered individually or in groups. Data collection was mostly carried out in person, or in form of online data collection in case around 100 patients participated in the study. Three different version of the questionnaire with three different random orders of questionnaire parts (measures) were administered with the aim to reduce bias, which might occur due to the effect of order of questionnaire parts on participants' responses (e.g., Chan 1991; Krosnick and Alwin 1987). After completing the questionnaires, the participants were provided with a short debriefing. Inclusion criteria were as follows: Age of 18 or older, cancer diagnosis, without severe mental health or physical condition, and not being terminally ill – data collection was not carried out in a palliative care unit.

2.2 Selection of Cancer Survivors

Cancer survivorship is defined as a process that begins at the moment of diagnosis and continues throughout life (Marzorati *et al.* 2016). National Coalition for Cancer Survivorship (2014) defines cancer survivorship as cancer continuum – living with, through, and beyond a cancer diagnosis. On this continuum, three phases of survivorship can be identified: acute, which refers to the diagnosis and treatment of cancer; extended, related to the period following treatment; and permanent; survivorship as equivalent to complete recovery (Mullan 1985). Due to our effort to reduce selection bias (range restriction) (Pedhazur and Schmelkin 1991), we included patients into data collection regardless of the fact, whether their treatment had been finished or not. From the same reasons and with the aim to capture natural heterogeneity of cancer diagnosis present in Slovakia.

2.3 Measures

Religious identity of cancer survivors was determined through an open question "*What is your religion?*" Spirituality was measured by two simple items – 1) *Spirituality is important in my life*; 2) *Practicing of spirituality is important in my life* – with Seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). By asking these two questions we want-

ed to inspect perceived importance of spirituality and perceived importance of practicing of spirituality.

Posttraumatic growth was measured by PTGI (*Posttraumatic Growth Inventory*; Tedeschi and Calhoun 1996), which consists of 21 items. In this research, the PTGI was used to measure the level of positive changes experienced after exposure to a traumatic event. In other words, this questionnaire examines whether a traumatic event can also cause a positive change in sense of positive growth (as some benefit of this negative event). PTGI comprises five subscales as follows: Relating to others (7 items; Ω_{total} =.94), new possibilities (5 items; Ω_{total} =.87), personal strength (4 items; Ω_{total} =.86), spiritual change (2 items; r_s =.74), appreciation of life (3 items; Ω_{total} =.83). The items are formulated as statements that find out how a person who has overcome a traumatic situation has changed. For this work, the instruction was specified for one situation – cancer. Using a 6-point Likert scale from 0 – 5, the respondent evaluates to what extent they did not survive the change due to this traumatic event (0 – I did not experience this change as a result of this crisis; 1 – I experienced this change to a very small degree as a result of this crisis; 2 – I experienced this change to a small degree as a result of this crisis; 3 – I experienced this change to a moderate degree as a result of this crisis; 4 – I experienced this change to a great degree as a result of this crisis; 5 – I experienced this change to a very great degree as a result of this crisis. PTGI has good psychometric properties such as reliability and validity. Even if there are mentioned subscales of this questionnaire, it is possible to work with PTGI as with a unidimensional measure (Ω_{total} =.96).

2.4 Data Analysis

From the total of N = 756 patients, 56 patients were excluded due to missingness higher than 80% and 4 patients reported they were less than 18 years old. In effective sample, N = 696 patients, 1.4% missingness was found (missingness was inspected in measured variables). Missing data were imputed by multiple imputation (Van Burren and Groothuis-Oudshoorn 2011) by MICE package. Missing sociodemographic variables, variables related to cancer and cancer treatment, and other categorical variables were not imputed [1]. In the items, which were targeted as items that are necessary to impute, the highest missingness was 6.18% (fourth item from the Multidimensional Social Support Scale). For the imputation, 7 imputations with 10 interaction were chosen and PMM (Predictive Mean Matching) method was used. Descriptive analysis, reliability analysis, correlations, analysis of differences were computed on multiple imputed objects.

For the correlations between spirituality, posttraumatic growth, and its domains, Bayes factor for correlation was also computed, using BayesFactor package (Morey *et al.* 2018). For the comparison reasons, the religion type variable was recoded to two groups: Cancer survivors with faith (Christianity, Reformed, and Other religions), and without faith (Atheism), with the comparison being focused on the faith factor. In case differences were found in these compared groups, the analyses from the perspective of different types of religions were also conducted by the ANOVA test with the goal of inspecting the differences based on different types of religion. After differences were found by the ANOVA test, Tukey post hoc test for detailed group comparison was used. In the Tukey post hoc test, the p value was adjusted for multiple comparison. Figures were plotted from the average dataset from 7 imputed datasets. For plotting figures, the YaRrr package was used (Phillips 2017).

3 Results

3.1 Sample

From the whole effective sample (N = 696), 463 patients with cancer were females. Most of the patients were married (57.6%) and had a high school education (52.5%). The mean age of the cancer survivors was 53 (SD = 15.44) (ranged from 18 to 93). The sample was heterogeneous with respect to the type of cancer (21 different types of cancer). The most prevalent diagnosis was breast cancer (211 cases), followed by colon cancer (61 cases), leukemia (48 cases), and lymphoma (47 cases). About 5% (36 cases) of cancers survivors had combination of two and/or more types of cancer. Average time since being diagnosed with cancer was 6.48 (SD = 7.19) years (ranged from 0 to 58 years). Most cancer survivors (70%) had completed cancer treatment. As regards religion, most cancer survivors were Christians (74.7%), followed by Atheists (17.3%), Reformed Christians (6.9%), and 7 cancer survivors stated other religions (6 cases were Buddhists, 1 case Muslim). For more details, see the sample characteristics tables in the supplementary materials [2].

3.2 Descriptive Analysis

The descriptive statistics of spirituality and posttraumatic growth are shown in Table 1.

Tab. 1
Descriptive Statistics of Spirituality and Posttraumatic Growth in Cancer Survivors (N = 696)

Variable	M	SD	S.E.	min	max
Spirituality Importance (n = 680)	4.88	2.13	0.08	1	7
Spirituality Practice (n = 679)	4.22	2.32	0.09	7	7
Posttraumatic Growth (PTG)	61.70	23.70	0.90	0	105
Relating to Others (PTG)	21.42	8.74	0.33	0	35
New Possibilities (PTG)	12.74	6.42	0.24	0	25
Personal Strength (PTG)	11.84	5.15	0.20	0	20
Spiritual Changes (PTG)	5.04	3.42	0.13	0	10
Appreciation of Life (PTG)	10.67	3.84	0.15	0	15

Note: *M*, *SD*, *S.E.* stand for mean, standard deviation, and standard error respectively.

3.3 Correlations

Table 2 shows a correlation between posttraumatic growth, its domains and perceived importance of spirituality, and practicing of spirituality. Small positive correlations between spirituality and overall posttraumatic growth, relating to others, new possibilities, personal strength, and appreciation of life were found. Out of these, the weakest correlation was found between spirituality factors and appreciation of life. Large positive correlation was found between spirituality and spiritual change. According to Bayes factor (BF_{10}), the extreme evidence was found for the correlations between posttraumatic growth, its domains and importance of spirituality and practicing of spirituality, except for the correlation between spirituality factors and appreciation of life where strong evidence was found.

3.4 Analysis of Differences

Table 3 shows comparison between spirituality and posttraumatic growth, and its domains in cancers survivors with faith and without faith. Differences were found in the perception of the importance of spirituality with very large effect size and in the practicing of spirituality with huge effect size. Cancer survivors without faith significantly showed significantly lower perception of the importance of spirituality as well as the importance of practicing of spirituality. Cancer survivors with faith reported significantly higher (with large effect size) spiritual changes and relating to others as opposed to cancer survivors without faith. With a small effect size, cancer survivors with faith reported significantly higher overall posttraumatic growth (see Fig. 1).

Tab. 2
Correlations with Confidence Intervals and Reliability

Variable	1	2	3	4	5	6	7	8
1. Posttraumatic Growth (PTG)	.77	-	-	-	-	-	8.885079e7	2.3780919e7
2. Relating to Others (PTG)	.91***	.90	-	-	-	-	350.4162	114.5519
	[.90, .93]							
3. New Possibilities (PTG)	.90***	.74***	.83	-	-	-	1925.398	1026.116
	[.89, .92]	[.70, .77]						
4. Personal Strength (PTG)	.87***	.74***	.78***	.81	-	-	7594.11	273.9829
	[.86, .89]	[.70, .77]	[.75, .80]					
5. Spiritual Changes (PTG)	.69***	.54***	.58***	.50***	.74	-	6.420335e56	2.086606e63
	[.65, .72]	[.49, .59]	[.53, .63]	[.44, .55]				
6. Appreciation of Life (PTG)	.80***	.67***	.67***	.63***	.48***	.76	13.21986	14.60758
	[.77, .82]	[.62, .71]	[.63, .71]	[.59, .68]	[.43, .54]			
7. Spirituality Importance	.24***	.16***	.17***	.18***	.57***	.12**	-	5.908221e146
	[.17, .32]	[.08, .23]	[.10, .24]	[.11, .25]	[.52, .62]	[.05, .20]		
8. Spirituality Practice	.24***	.14***	.17***	.15***	.60***	.12**	.80***	-
	[.16, .30]	[.07, .22]	[.09, .24]	[.08, .23]	[.55, .64]	[.05, .20]	[.77, .83]	

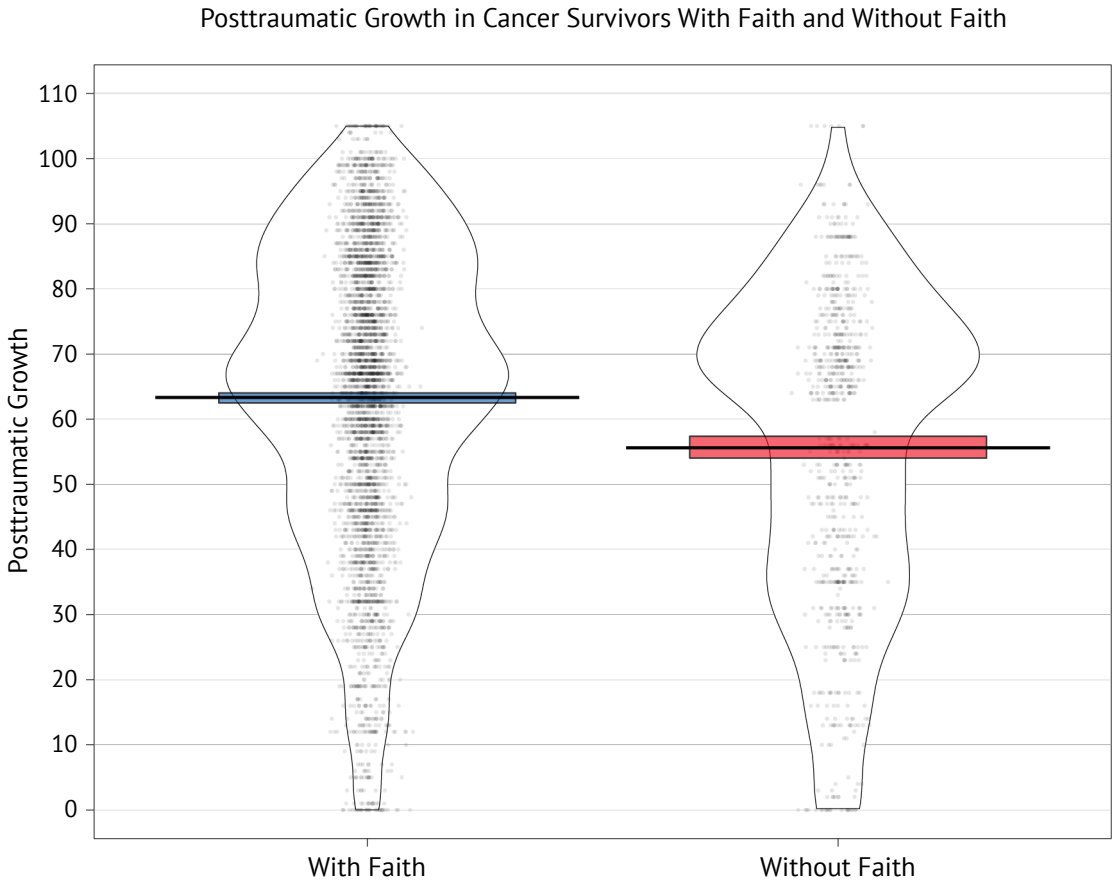
Note: The values in square brackets indicate the 95% confidence interval for each correlation. ** indicates p <.01. *** p <.001. In the diagonal are values for reliability – Guttman's Lambda (λ^2). In the Upper diagonal are Bayes factors (BF_{10}) for correlation between spirituality importance, spirituality practice, and PTG and its domain.

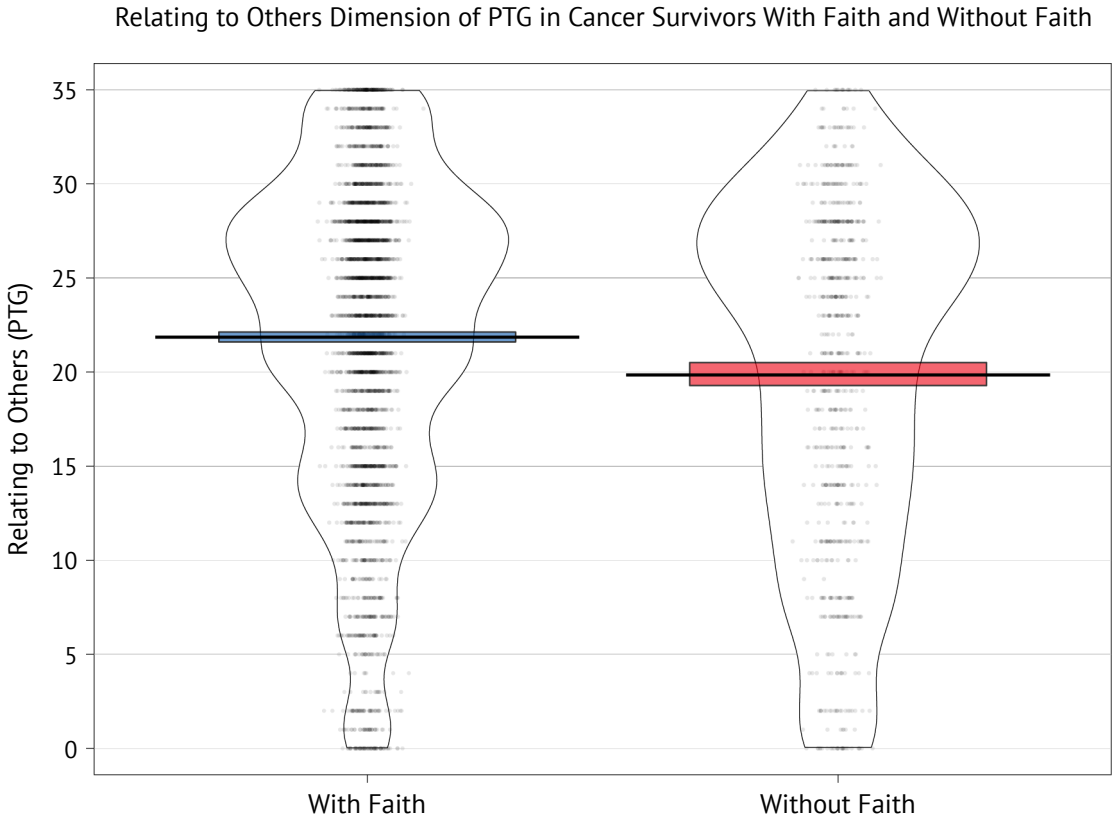
Tab. 3
Differences in Spirituality, Posttraumatic Growth and its Domains in Cancer Survivors Based on Their Faith (Welch t-test)

Variable	n	M	SD	95% CI	t	df	d
Spirituality Importance							
With Faith	550	5.40	1.79	[2.31, 3.13]	13.087***	146.45	1.41
Without Faith	115	2.68	2.04				
Spirituality Practice							
With Faith	550	4.88	2.05	[3.25, 3.75]	27.891***	356.31	2.19
Without Faith	115	1.38	0.94				
Posttraumatic Growth (PTG)							
With Faith	550	63.34	23.45	[2.81, 12.67]	3.101**	158.21	0.32
Without Faith	115	55.60	24.53				
Relating to Others (PTG)							
With Faith	550	27.86	8.57	[0.12, 3.89]	2.104*	153.11	0.89
Without Faith	115	19.85	9.45				
New Possibilities (PTG)							
With Faith	550	12.93	6.46	[-0.42, 2.18]	1.338	162.69	0.14
Without Faith	115	12.04	6.42				
Personal Strength (PTG)							
With Faith	550	12.06	4.99	[-0.28, 1.99]	1.493	150.47	0.16
Without Faith	115	11.20	5.71				
Spiritual Changes (PTG)							
With Faith	550	5.71	3.26	[2.86, 4.00]	11.889***	186.83	1.14
Without Faith	115	2.28	2.72				
Appreciation of Life (PTG)							
With Faith	550	10.79	3.79	[-0.26, 1.39]	1.345	153.99	0.14
Without Faith	115	10.23	4.15				

Note: d – Cohen's d (effect size). * indicates p <.05. ** p <.01. *** p <.001.

Fig. 1
Differences in Overall Posttraumatic Growth, Relating to Other, and Spiritual Changes in Cancer Survivors With and Without Faith





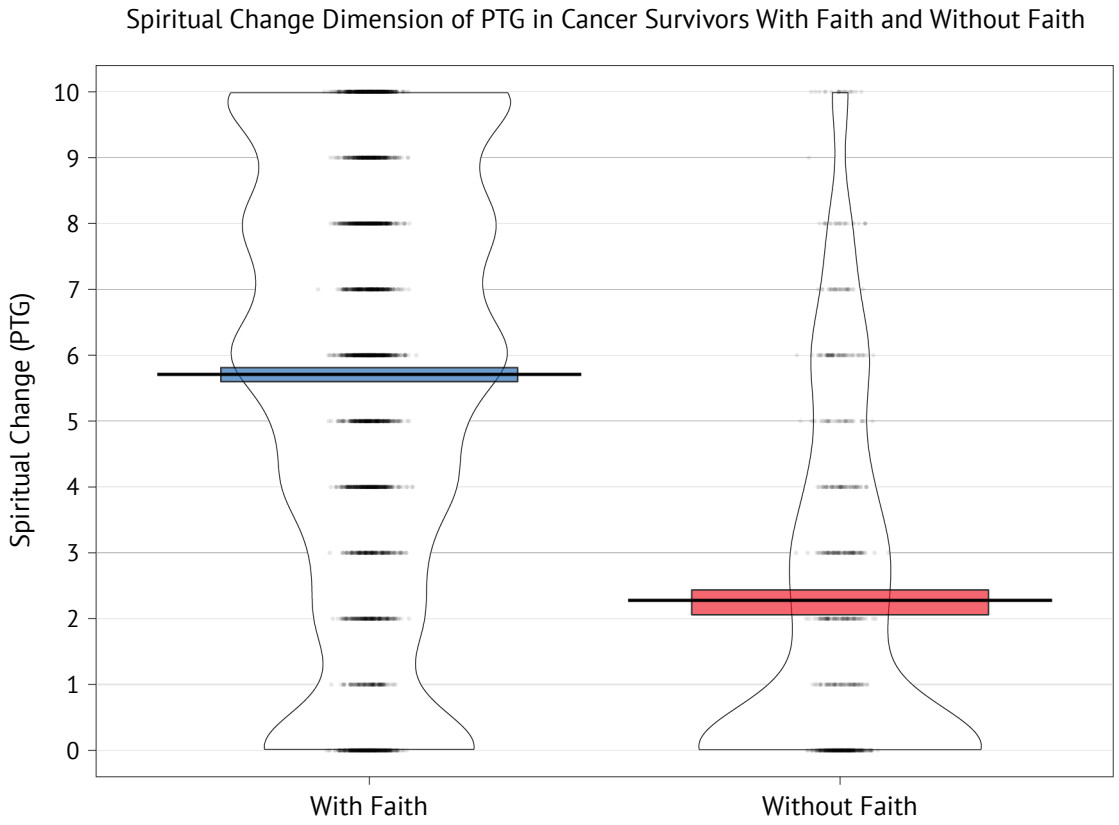


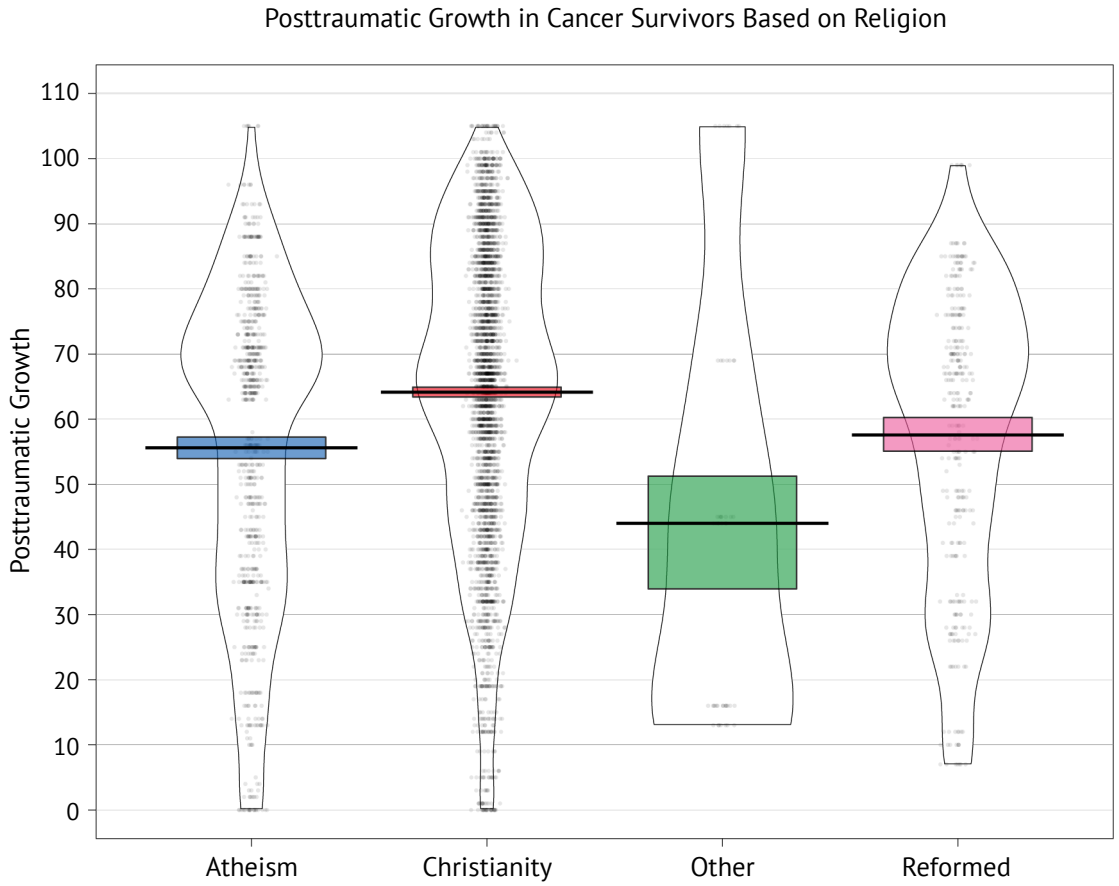
Table 4 shows differences in perceived importance of spirituality, practicing of spirituality, posttraumatic growth, relating to others, and spiritual change in cancer survivors based on different religion types. Cancer survivors with Christianity, Reformed Christianity, and Other religions perceived significantly higher importance of spirituality as well as practicing of spirituality as opposed to cancer survivors with Atheism. Cancer survivors with Christianity, Reformed Christianity, and Other religions did not differ in these spirituality variables. Cancer survivors with Christianity reported a significantly higher level of posttraumatic growth than cancer survivors with Atheism. In the context of comparison of other religious groups, no significant differences were found. Cancer survivors with Christianity had higher levels of relating to other than cancer survivors with Other religions. Other comparisons in this PTG domain were not significant. Cancer survivors with Christianity and Reformed Christianity reported significantly higher levels of spiritual change than cancer survivors with Atheism (see Fig. 2).

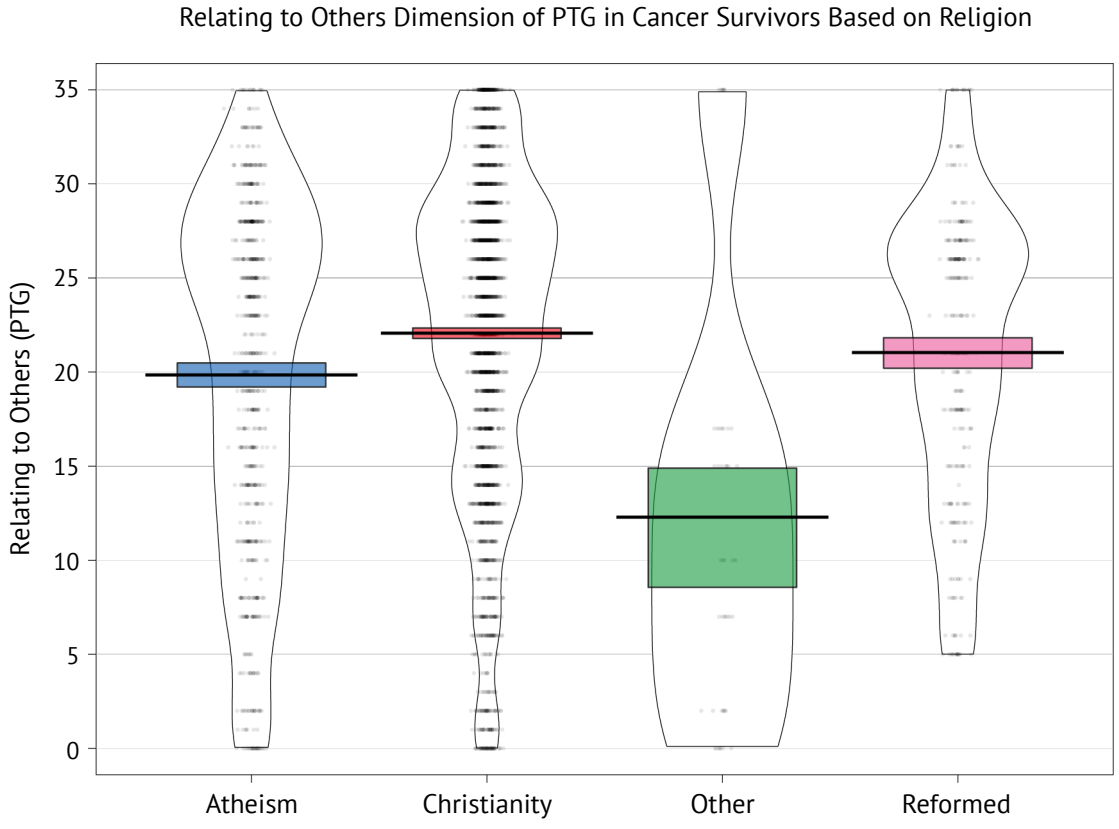
Tab. 4
Differences in Spirituality, Posttraumatic Growth, Relating to Others, and Spiritual Change Domains of PTG Based on Different Religions (ANOVA)

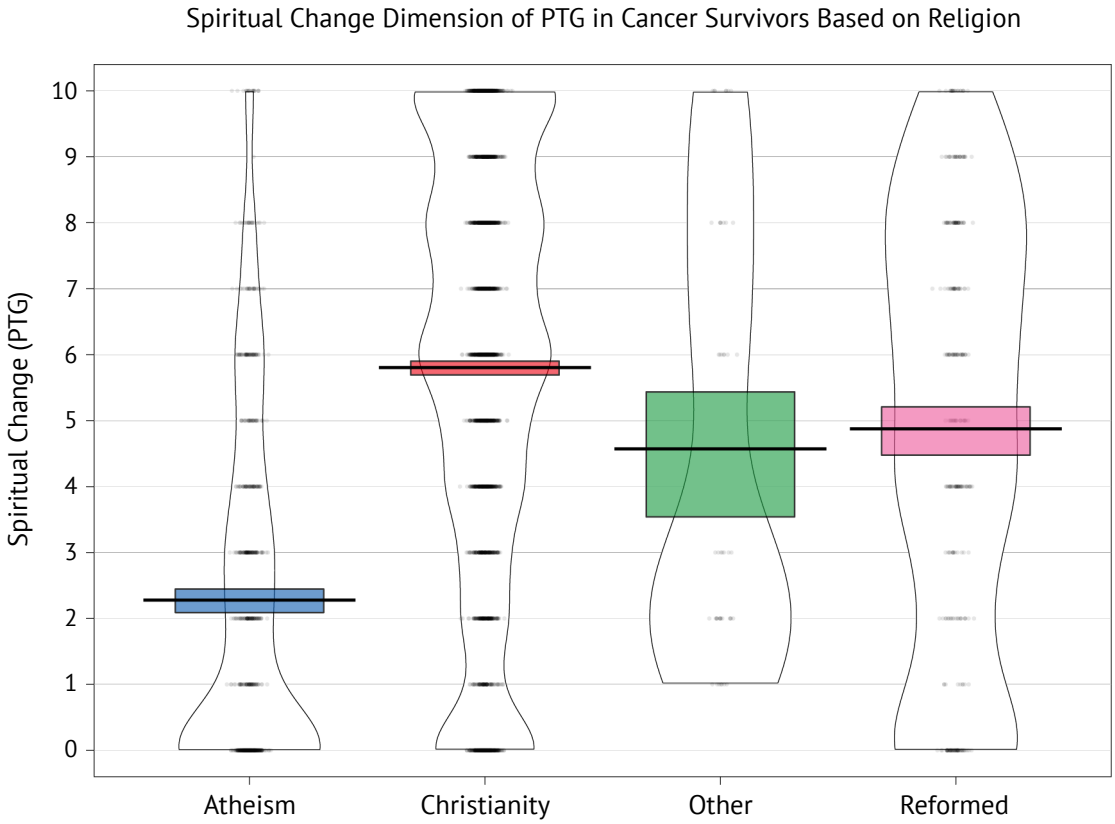
Spirituality Importance	**Sum of squares**	**df**	**F**	**p value**	**partial Eta²**
Religion Type	684.537	3	67.711	<.001	0.237
TukeyHSD post hoc Comparison		M(difference)	95% CI		adjusted p value
Other–Atheism		2.467	[0.62, 4.31]		.003
Reformed–Atheism		2.590	[1.76, 3.43]		<.001
Christianity–Atheism		2.736	[2.24, 3.23]		<.001
Reformed–Other		0.124	[-1.80, 2.04]		.998
Christianity–Other		0.269	[-1.53, 2.07]		.980
Christianity–Reformed		0.145	[-0.59, 0.88]		.957
Spirituality Practice	**Sum of squares**	**df**	**F**	**p value**	**partial Eta²**
Religion Type	1141.602	3	104.488	<.001	0.325
TukeyHSD post hoc Comparison		M(difference)	95% CI		adjusted p value
Other–Atheism		2.479	[0.56, 4.39]		<.001
Reformed–Atheism		3.222	[2.35, 4.09]		<.001
Christianity–Atheism		3.540	[3.02, 4.06]		<.001
Reformed–Other		0.743	[-1.25, 2.74]		.773
Christianity–Other		1.062	[-0.08, 2.93]		.461
Christianity–Reformed		0.319	[-0.45, 1.08]		.706
Posttraumatic Growth	**Sum of squares**	**df**	**F**	**p value**	**partial Eta²**
Religion Type	10165.73	3	6.126	<.001	0.027
TukeyHSD post hoc Comparison		M(difference)	95% CI		adjusted p value
Other–Atheism		11.626	[-11.92, 35.17]		.581
Reformed–Atheism		1.961	[-8.59, 12.51]		.964
Christianity–Atheism		8.515	[2.26, 14.77]		.003
Reformed–Other		13.587	[-10.95, 38.13]		.483
Christianity–Other		20.141	[-2.88, 43.16]		.110
Christianity–Reformed		6.554	[-2.77, 15.88]		.269
Relating to Others (PTG)	**Sum of squares**	**df**	**F**	**p value**	**partial Eta²**
Religion Type	1078.563	3	4.771	.003	0.021
TukeyHSD post hoc Comparison		M(difference)	95% CI		adjusted p value
Other–Atheism		7.566	[-1.12, 16.25]		.113
Reformed–Atheism		1.170	[-2.72, 5.06]		.063
Christianity–Atheism		2.218	[-0.09, 4.53]		.065
Reformed–Other		8.736	[-0.32, 17.79]		.063
Christianity–Other		9.785	[1.29, 18.28]		.016
Christianity–Reformed		1.049	[-2.39, 4.49]		.861
Spiritual Change (PTG)	**Sum of squares**	**df**	**F**	**p value**	**partial Eta²**
Religion Type	1165.059	3	38.634	<.001	0.150
TukeyHSD post hoc Comparison		M(difference)	95% CI		adjusted p value
Other–Atheism		2.293	[-0.87, 5.46]		.244
Reformed–Atheism		2.591	[1.17, 4.01]		<.001
Christianity–Atheism		3.525	[2.68, 4.37]		<.001
Reformed–Other		0.298	[-3.00, 3.60]		.996
Christianity–Other		1.231	[-1.86, 4.33]		.734
Christianity–Reformed		0.933	[-0.32, 2.19]		.221

Note: Christianity (n = 497), Atheism (n = 115), Reformed (n = 46), Other (n = 7).

Fig. 2
Differences in Overall Posttraumatic Growth, Relating to Others, and Spiritual Changes in Cancer Survivors with Different Religions







4 Discussion

Posttraumatic growth is experience of positive changes occurring as a result of a fight with very difficult life crises. It can be shown in various ways, including increased appreciation for life, more meaningful interpersonal relationships, increased feeling of personal strength, changes in priorities and richer existential and spiritual life. Personality characteristics, social support, coping mechanisms and cognitive structures, which contribute to the processing of traumatic events play important role in the process of posttraumatic growth. It is an ongoing process, not a static result (Tedeschi and Calhoun 2004, 6).

Experiencing of spirituality is one of the factors associated with posttraumatic growth. Results of the present study showed positive correlations between the importance of spirituality in lives of cancer survivors and overall posttraumatic growth, specifically relating to others, new possibilities, personal strength, and appreciation of life. Strong positive correlations were confirmed between the importance of spirituality and the dimension of spiritual change.

The comparison of individual religious groups showed that Christian cancer survivors achieved higher levels of posttraumatic development as opposed to atheist patients. In this context, support of religious community (Lopez and Snyder 2011), attending services, spending time together with people with the same religious belief can play in important role in the support of posttraumatic growth. Experiencing of spirituality together with problem-oriented coping, positive reinterpretation, and optimism play an important role in the process of posttraumatic growth (Linley and Joseph 2004, 11).

Christian cancer survivors achieved higher levels of posttraumatic growth in the domain of relating to others as

opposed to patients of different religions. Other domains of posttraumatic growth were not significant in the context of individual religions. It was shown that cancer survivors professing Christianity and Reformed Christianity reported significantly higher levels of spiritual changes related to posttraumatic growth that unbelieving patients. When experiencing stressful events, such as an oncological disease, people often turn to spirituality. Religious coping that can also include the experiencing of spirituality was significant in the context of experiencing of difficult situations. It was confirmed that positive forms of religious coping correlated with positive psychological adaptation to stress (Ano and Vasconcelles 2005, 11). Better adaptation is related to several coping methods, such as benevolent religious reappraisals, religious forgiveness/purification, and seeking religious support. Poorer adjustment was associated with reappraisals of God's powers, spiritual discontent, and punishing God reappraisals (Pargament, Koenig and Perez 2000, 519).

Cancer survivors professing Christianity, Reformed Christianity and other religions showed significantly higher perception of the importance of spirituality and practicing of spirituality as opposed to atheist cancer survivors. Unbelieving cancer survivors showed significantly lower perception of the importance of spirituality as well as practicing of spirituality. People who survived cancer with religious faith reported significantly higher spiritual changes as opposed to patients who survived cancer without it. In their study, Boleková and Chlebcová (2019, 34) pointed out that cancer survivors assessed the importance of spiritual aspect of life as very high (median of 6.5 on the scale from 1 to 7), while practicing of religious faith was assessed as less important (median of 4 on the scale from 1 to 7).

Experiencing of spirituality represents significant changes in physical and mental health, experiencing of emotionality as well as in religious practices (Pargament, Koenig and Perez 2000, 519), gives meaning to negative events and provides consolation through the members of a community.

5 Conclusion

It can be concluded that the importance and practicing of spirituality have positive impact on posttraumatic growth in cancer survivors. Therefore, it is necessary to include practicing of faith and spiritual aspect of life in the treatment of oncological patients. Patients should be supported in spiritual activities. It is recommended to adopt and develop interventions, which would include the spiritual aspect, thus contributing to posttraumatic growth with the aim of coping with an oncological disease.

There are several limitations to this study. Firstly, cross-sectional design limits full comprehension of mutual relations between the posttraumatic growth and experiencing of spirituality in cancer survivors. Secondly, deeper exploration of spirituality and religiousness would provide better insight in their mutual relations with posttraumatic growth and contribute to deeper comprehension in this area.

Notes

[1] In the description of sample, N are shown, taking into account missing data in categorical variables.

[2] Supplementary materials to the study including data, analytical code, and additional materials are available at osf.io/59zmp.

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