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RESEARCH PAPER

Satisfaction with Life, Big-Five Personality Traits and Posttraumatic Growth Among People Living with HIV

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Abstract The current study explored the level of posttraumatic growth (PTG), treated as the explained variable, and its relationship with the level of satisfaction with life (SWL) and the Big Five personality traits, while controlling for several socio-medical variables, among people living with HIV. Participants were 470 individuals with a confirmed diagnosis of HIV infection. Participants filled out the following questionnaires: the Posttraumatic Growth Inventory, the Satisfaction with Life Scale and the NEO Five-Factor Inventory. Additionally, sociodemographic as well as medical data were obtained. Extraversion and SWL were the most important correlates of the level of PTG among participants. Personality traits (neuroticism) and socio-medical variables (antiretroviral treatment, education, relationship status) were moderators of the relationship between the level of SWL and PTG intensity in this patient group. Taking into account significant health-related benefits associated with PTG among people living with HIV, it is important to further explore psychosocial and clinical factors contributing to this positive phenomenon in this patient group.

Keywords HIV · Posttraumatic growth · Satisfaction with life · Big Five personality traits

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1 Introduction

There is a massive body of literature showing that experiencing traumatic events may significantly deteriorate various aspects of functioning of trauma survivors, resulting in many psychological disorders, out of which posttraumatic stress disorder (PTSD) is the most prevalent (e.g. Brewin et al. 2009; Foa et al. 2007; McFarlane 2000; Ozer et al. 2003; van der Kolk and McFarlane 1996). The negative consequences of traumatic events are not only intuitively obvious, but also extremely well documented. However, relatively recently some paradoxical, positive outcomes of trauma experiences have been observed, which comprise the phenomenon of posttraumatic growth (PTG), first introduced to the literature by Tedeschi and Calhoun (1996). The term "posttraumatic growth" relates to the set of positive changes in relations with others, self-perception and existential beliefs, in the form of greater appreciation of life and openness to spirituality, which can result from attempts at dealing with an experienced traumatic or highly stressful life event (Tedeschi and Calhoun 2004). According to Tedeschi and Calhoun (2004), PTG stems from attempts to adapt to a serious adverse life event. However, it does not mean that only people who experience a traumatic event in accordance with psychiatric criteria (e.g. American Psychiatric Associations 1994, 2013) may experience such a growth after trauma. PTG appears also in the aftermath of situations that are not necessarily life-threatening, but are serious enough to require adaptation to a new and unexpected reality (e.g. the diagnosis of a serious illness). In addition, PTG may lead to the transformation of life, characterizing improved psychosocial well-being, which requires modification of the individual's current beliefs and worldview (Tedeschi and Calhoun 2004).

Numerous studies have been conducted on the relationship between PTG and well-being, but, contrary to common sense suggesting that finding benefits from the adverse life events should entail good consequences, research in this area is very ambiguous. On the one hand, indeed, some authors have observed a positive association between PTG and well-being operationalised by health-related quality of life among cancer patients, resulting in a stronger immune system and better mental functioning (Bower et al. 2005; Lechner and Antoni 2004). A positive association between the abovementioned constructs was noted especially among women with breast cancer, who, thanks to finding benefits in the aftermath of cancer, experienced less psychological distress, fewer depressive symptoms and better overall quality of life even 8 years following a breast cancer diagnosis (Carver and Antoni 2004). Moreover, Mols et al. (2009) showed that the level of satisfaction with life (SWL) predicted the intensity of PTG among women with breast cancer, a finding that was also observed among patients with myocardial infarction (Oginska-Bulik 2014; Petrie and Corter 2009). Nevertheless, other studies on women with breast cancer did not provide evidence for the relationship between PTG and well-being, operationalized as health-related quality of life (Cordova et al. 2001; Sears et al. 2003). The lack of a linkage between these two constructs was also confirmed in a meta-analytic review (Helgeson et al. 2006). Finally, several authors have observed a negative (Tomich and Helgeson 2002) or curvilinear (Kleim and Ehlers 2009) association between PTG and well-being.

According to Nolen-Hoeksema and Davis (2004), these conflicting results may be attributed to the multidimensional character of well-being, which usually consists of three components: quality of life, the level of SWL and a combination of positive and negative affect (e.g. Diener et al. 1985, 2009; Fredickson 2013; The WHOQOL Group 1995). All these components may be uniquely related to PTG, but many authors used them interchangeably, which confuses the relationship between PTG and well-being. In addition, in a meta-analytic review, Park (2004) mentioned that the link between PTG and well-being

may depend on the time from the traumatic event, i.e. this association becomes stronger the more time has elapsed after such an event. Furthermore, the aforementioned author suggested that to obtain a thorough picture of the relationship between PTG and well-being, additional moderating variables, especially personality traits, should be reconsidered (Jakšić et al. 2012; Knaevelsrud et al. 2010; Linley and Joseph 2004).

There has been a rich literature on the relationship between eudemonic well-being and PTG, since the concept of eudaimoinic well-being may serve as a primary explanation for the meaning-based changes observed in PTG (Joseph and Hefferon 2013). However, in the light of new analysis, eudaimonic well-being and hedonic well-being are correlated but also relatively independent constructs (Bojanowska and Zalewska 2016; Disabato et al. 2016; Joshanloo 2016). According to the theory (Tedeschi and Calhoun 1996), PTG should incorporate these two aspects of well-being: trauma-triggered changes have a potential to make life more meaningful but also more satisfactory. This notion has not been studied yet. To fill this gap, in our study, we focused on the link between the cognitive aspect of hedonic well-being, i.e. the level of satisfaction with life, the Big Five personality traits and the intensity of PTG among people living with HIV (PLWH). The level of satisfaction with life refers to a cognitive judgment of one's life, which reflects the degree to which an individual judges the overall quality of his or her life as a whole in a favourable way (Diener et al. 1985).

Numerous authors have indicated that being diagnosed with an HIV infection may be considered a traumatic event, which induces symptoms of PTSD (Beckerman and Auerbach 2010; Machtinger et al. 2012; Rzeszutek et al. 2012, 2015). More specifically, the rate of PTSD among this patient group ranges between 30 and 64% (Olley et al. 2005; Sherr et al. 2011). HIV-related PTSD symptoms stem mostly from an awareness of a risk of premature death, but they also result from the unpredictable course of HIV progression, side effects of treatment and social stigmatization (Breet et al. 2014; Sanjuán et al. 2013). Nevertheless, positive changes were also observed among PLWH, comprising the phenomenon of PTG, and these changes may entail important clinical as well as psychological advantages (Milam 2004, 2006; Murphy and Hevey 2013; Rzeszutek et al. 2017). Particularly, PTG among PLWH individuals predicted improvement in clinical variables (CD4 count and viral load; Milam 2006) and was associated with lower perceived social stigmatization (Murphy and Hevey 2013). However, to date no research on the link between SWL and PTG among PLWH has been conducted.

Similarly, there are no studies on the role of the Big Five personality traits and PTG among PLWH. Nevertheless, some authors found that PLWH's well-being may be influenced greatly by the Big Five traits. For example, high neuroticism and low extraversion predicted faster HIV progression, poor adherence to treatment as well as low mental functioning (Burgess et al. 2000; Erlen et al. 2009). In addition, high extraversion was positively related to health-related quality of life (Penedo et al. 2003), high conscientiousness seemed to protect against a drop in the CD4 count (O' Cleirigh et al. 2007) and high openness to experience was associated with less intense stigmatization (McCrae et al. 2007). Several authors have observed that other personality dimensions that are highly correlated with the Big Five personality traits may increase risky behaviour leading to HIV infection (Moore et al. 2005) and are associated with HIV-related trauma symptoms (Rzeszutek et al. 2012; Rzeszutek and Oniszczenko 2013).

2 Current Study

The current study explored the level of PTG, treated as the explained variable, and its relationship with the level of SWL and the Big Five personality traits, while controlling for several socio-medical variables among people living with HIV. To our knowledge, no studies have been conducted that we could use as a direct source of relevant hypotheses in reference to SWL, the Big Five personality traits and their relation to PTG in this patient group. Thus, an exploratory approach has been employed in this study. However, basing on studies similar to the aforementioned, but conducted among other patients, we expected a positive association between the level of SWL and the intensity of PTG among our participants. Second, we assumed that a lower level of neuroticism and higher levels of conscientiousness, openness to experience and extraversion would be associated with a higher level of PTG. Finally, we expected the Big Five personality traits and socio-medical variables to be potential moderators of the relationship between the level of SWL and PTG intensity in this patient group.

3 Method

3.1 Participants and Procedure

The sample consisted of 470 adults with a medical diagnosis of HIV infection. In particular, of the 650 patients eligible for the study, 470 (72%) agreed to fill out questionnaires and indicated in the Posttraumatic Growth Inventory (PTGI, see Measures) that the diagnosis of HIV infection was a traumatic event for them, 96 (15%) declined and 84 (13%) returned incomplete questionnaires (i.e. some missing data and no mention of HIV infection in the PTGI as a traumatic event), which precluded their inclusion into the statistical analysis.

The study participants completed the paper-and-pencil version of the inventories and participated in the study voluntarily; and there was no remuneration for participation. The questionnaires were distributed by the authors of this study and professional interviewers to the patients of the outpatient clinic of the state hospital of infectious diseases. Medical doctors as well as hospital psychologists assisted in the recruitment process.

The eligibility criteria were 18 years of age or older, a confirmed medical diagnosis of HIV+ and receiving care from the hospital where the study was conducted. The exclusion criteria were HIV-related cognitive disorders, which were screened by medical doctors. The study protocol was approved by the local ethics commission. Table 1 summarizes the socio-medical variables.

As shown, the sample consisted of people aged from 18 to 76 years, mostly men. A majority of participants were in stable relationships, had higher university degrees and stayed professionally active. Participants had been diagnosed with HIV for 1–32 years, and the length of antiretroviral treatment (ART) ranged between 1 and 31 years. Their CD4 count ranged from 100 to 2000, and the mean CD4 count was comparable to healthy population (EACS 2017). Finally, 16% of study subjects were in the AIDS phase.

Table 1 Socio-medical variables in the studied sample (N = 470)

Variable	N (%)
Gender	
Male	388 (82.6%)
Female	82 (17.4%)
Age in years (M ± SD)	40.02 ± 10.70
Relationship status	
Stable relationship	269 (62.8%)
Single/widowed/divorced	201 (37.2%)
Education	
Elementary	73 (15.5%)
Secondary	147 (31.3%)
University degree	250 (53.2%)
Employment	
Full employment	334 (71.1%)
Unemployment	60 (12.8%)
Retirement	21 (4.5%)
Sickness allowance	55 (11.6%)
HIV/AIDS status	
HIV+ only	394 (83.8%)
HIV/AIDS	76 (16.2%)
HIV infection duration in years (M ± SD)	7.90 ± 6.99
Antiretroviral treatment (ART) duration in years (M ± SD)	6.11 ± 5.65
CD4 count	593.12 ± 228.63

M mean, *SD* standard deviation

4 Measures

To measure the intensity of PTG, a Polish adaptation of the PTGI was used (Tedeschi and Calhoun 1996). It is important to underline the fact that although the original PTGI comprises five specific domains of PTG ("relating to others", "new possibilities", "personal strength", "spiritual change" and appreciation of life"), the Polish adaptation of the PTGI assesses only four domains of PTG. Exploratory and confirmatory factor analyses revealed a four-factor structure for the PTG, including changes in the perception of oneself ("perceiving new possibilities, feeling of personal strength"), changes in one's relationships with others ("feelings of greater connection with other people, increase in empathy, altruism"), greater appreciation for life ("changes in life philosophy and current life goals, greater appreciation for every day") and spiritual changes ("better understanding of spiritual issues, increase in religiousness"). In the PTGI, participants rate 21 positive statements that describe various changes resulting from traumatic or highly stressful events, which are mentioned at the beginning of the inventory. Participants were instructed to focus on their HIV infection as the example of a traumatic experience. A global PTG score is obtained when one calculates all items of the inventory. The Cronbach coefficient for the whole scale in the current study was .82 and for the four subscales varied between .81 and .84.

SWL was measured with a Polish adaptation of the Satisfaction with Life Scale (SWLS; Diener et al. 1985). The SWLS consists of five items; respondents evaluate each item on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Therefore, a higher total score on this scale indicates a higher level of SWL. Cronbach's alpha coefficient for the SWLS in the studied sample was .83.

Personality traits were evaluated with a Polish adaptation of the NEO Five-Factor Inventory (NEO-FFI) questionnaire by Costa and McCrae (1992). The NEO-FFI consists of 60 items (12 per each personality trait), to which participants respond on a five-point scale. Five indices were obtained: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. A higher score on each indicates a higher level of each trait. The Cronbach's alpha for the current study ranged from .74 to .81.

5 Results

The statistical analysis of the data was conducted using IBM SPSS 24 statistical software (SPSS Inc. 2016). First, a correlational matrix between all analyzed variables was calculated using the Pearson product-moment correlation procedures. Further analyses were performed only for the global PTG score, as particular subscales in the PTGI questionnaire were highly intercorrelated. The results are shown in Table 2.

To analyze the relationship between the intensity of PTG with the level of SWL and the Big Five personality traits, while controlling for several socio-medical variables among PLWH, a regression analysis was performed. PTG was treated as an explained variable. Other variables were analyzed as correlates. The analysis was performed in a hierarchical model. In the first step, sociodemographic variables (sex, age, stable relationship, higher education and professional activity) were analyzed with the use of a stepwise method. In the second step, the same method was used to analyze medical characteristics (CD4 level, HIV duration, years of treatment, AIDS). In the third step, personality traits were analyzed, and in the fourth step SWL was entered. In the final step, the stepwise method was applied to test interactions between personality traits, socio-medical variables and the level of SWL and PTG intensity in this patient group. The meaning of interactions was determined with simple effects analysis (Darlington and Hayes 2017). The significance in each test was calculated with the use of bootstrapping, as the distributions of analyzed variables significantly differed from the normal distribution (see Table 2).

The regression coefficients of the final model are presented in Table 3. There were positive associations between PTG and extraversion and SWL. Extraversion explained 4.7% of PTG variance, and SWL explained an additional 10.3%. Three interactions were observed. Neuroticism was negatively associated with PTG, but only in the group of patients with a longer period of treatment (5–31 years), $\beta = -.22$, $p < .01$; $B = -.84$; 95% CI B (− 1.30; .35), SE B = .25. It explained 4.9% of the PTG variance. The association between neuroticism and PTG in the group of patients with a shorter period of treatment (1–4 years) was not statistically significant, $\beta = .04$; $p > .05$; $B = .11$; 95% CI B (− .25; .51), SE B = .19 (see Fig. 1).

SWL was weakly positively related to PTG in the whole sample, but the association was stronger in the group of single participants, $B = 1.58$ (1.04 ÷ 2.15), SE B = .28, $\beta = .39$, $p < .01$ than in the group of participants in stable relationships, $B = .71$ (.16 ÷ 1.20), SE B = .25, $\beta = .19$, $p < .01$ (see Fig. 2). SWL explained 14.6% of the

Table 2 Descriptive statistics and Pearson's Correlations of the study variables among participants (N = 470)

Variable	M	SD	Range	Skewness	Kurtosis	Fe	Age	Rel.	H.E.	P.A.	CD4	HIV	Treat	AIDS	SWL	N	E	O	A	C
Satisfaction with life	20.43	6.41	5–35	− .40	− .39	− .02	.02	.20	.19	.20	.20	− .04	− .03	.04	1					
Neuroticism	24.05	7.60	1–47	− .46	.26	.05	− .13	− .06	− .08	− .08	− .06	− .03	.01	.02	− .33	1				
Extraversion	22.83	4.78	9–38	.02	.63	− .04	− .04	.03	.04	.13	.07	− .04	− .05	.01	.29	− .36	1			
Openness	24.01	5.32	10–42	.73	.29	− .04	− .01	− .09	.13	.04	− .03	− .01	− .04	− .05	− .01	− .30	.14	1		
Agreeableness	26.29	5.96	11–42	.29	− .40	.04	.12	− .05	.05	.01	− .01	.04	.02	− .03	.05	− .45	.09	.36	1	
Conscientiousness	27.00	5.02	7–39	− .29	.23	.01	.01	.06	.05	.01	.11	.05	.11	.09	.17	.29	.25	− .15	− .32	1
Posttraumatic growth	57.32	24.51	0–105	− .34	− .69	.12	− .06	.05	.01	.07	− .01	.08	.01	.02	.29	− .07	.22	.12	.07	.08

All the correlations of absolute values higher than .09 are significant at least at $p < .05$

Fe female, *Rel.* stable relationship, *H.E.* higher education, *P.A.* professional activity, *HIV* HIV duration, *Treat* years of treatment, *SWL* satisfaction with life, *N* neuroticism, *E* extraversion, *O* openness to experience, *A* agreeableness, *C* conscientiousness, *PTG* posttraumatic growth

Table 3 Summary of hierarchical regression analysis for post-traumatic growth as explained variable among participants (N = 470)

Predictor	Model 1			Model 2			Model 3			Model 4			Model 5		
	B 95% CI	SE B	β	B 95% CI	SE B	β	B 95% CI	SE B	β	B 95% CI	SE B	β	B 95% CI	SE B	β
Stable relationship	1.31 (− .95; 3.68)	1.18	.05	1.32 (− .93; 3.71)	1.18	.05	1.18 (− .97; 3.42)	1.14	.05	− .05 (− 2.18; 2.24)	1.12	.00	.06 (− 2.10; 2.19)	1.09	.00
Higher education	.26 (− 2.01; 2.31)	1.10	.01	.30 (2.07; 2.55)	1.12	.01	.17 (− 2.20; 2.31)	1.12	.01	− .97 (− 3.07; 1.12)	1.06	− .04	− .84 (− 2.99; 1.26)	1.06	− .03
Years of treatment				.03 (− .33; .44)	.20	.01	.08 (− .29; .46)	.19	.02	.05 (− .30; .43)	.18	.01	.04 (− .30; 43)	.19	.01
Neuroticism							.04 (− .30; .35)	.16	.01	.24 (− .09; .56)	.17	.07	.16 (− .17; .47)	.16	.05
Extraversion							1.16 (.65; 1.64)	.25	.23**	.89 (.38; 1.43)	.26	.17**	.79 (.31; 1.30)	.26	.15**
Satisfaction with life										1.04 (.65; 1.45)	.21	.27**	1.02 (.62; 1.43)	.21	.27**
Neuroticism × years of treatment													− 2.56 (− 4.96; − .24)	1.21	− .10*
Satisfaction with life × stable relationship													− 2.16 (− 4.60; .20)	1.23	− .09#
Satisfaction with life × higher education													− 3.07 (− 5.39; − .71)	1.20	− .12*
R^2	.01			.01			.05			.11			.15		
F for change in R^2	.69			.03			12.01***			31.01***			6.63***		

* $p < .05$; ** $p < .01$; *** $p < .001$; # $p < .1$. Values in brackets show 95% confidence intervals for regression coefficients acquired in bootstrapping

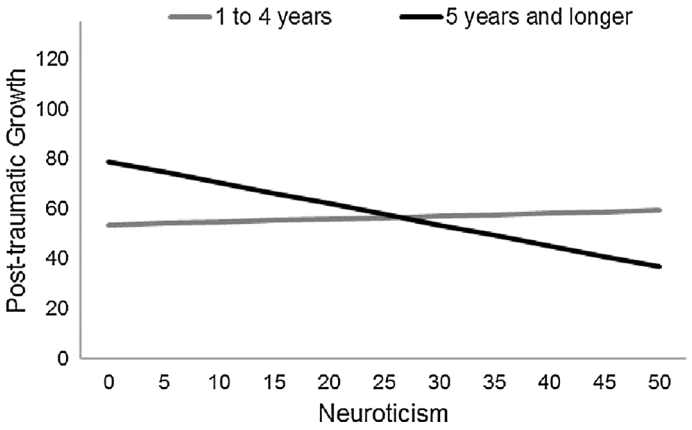

Fig. 1 Relationship between neuroticism and post traumatic growth in the group of participants treated for 1–4 years and in the group treated for 5–31 years. *Note* 1–4 years: y= .114*x + 53.606; 5–31 years: y = 0.843*x + 78.892

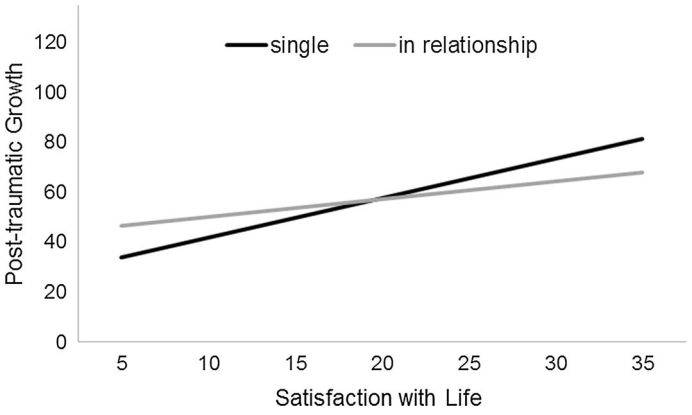

Fig. 2 Relationship between satisfaction with life and posttraumatic growth in the group of participants in stable relationship and in the group of single participants. *Note* Single: y = 1.580*x + 25,903; in stable relationship: y = 0.714*x + 43.057

PTG variance in the group of single participants, but only 3.3% in the group of participants in stable relationships.

The association between SWL and PTG was also stronger in the group of participants with less education, B = 1.66 (1.18 ÷ 2.16), SE B = .25, β = .45, $p < .001$ than in the group of participants with higher education, B = .53 (− .06 ÷ 1.10), SE B = .29, β = .13, $p < .1$ (see Fig. 3). It explained 20.1% of the PTG variance in the group of participants without higher education, but only 1.2% in the group of participants with higher education.

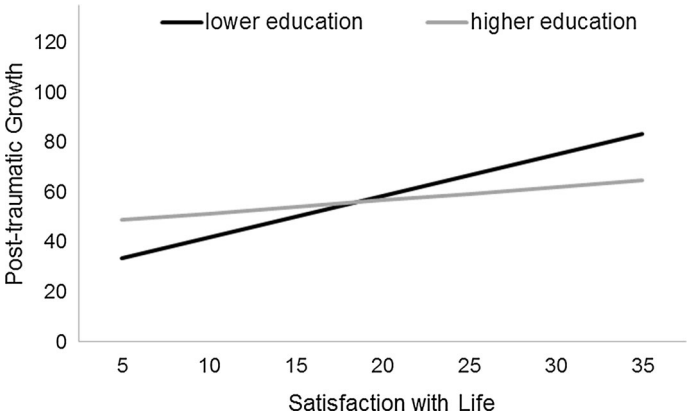

Fig. 3 Relationship between satisfaction with life and posttraumatic growth in the group of participants with higher education and in the group participants without higher education. *Note* Lower education: y = 1.665*x + 25.196; higher education: y = 0.526*x + 46.207

6 Discussion

The results of our study were partially consistent with the first hypothesis. More specifically, after controlling for sociodemographic, clinical and personality variables, SWL was positively, but weakly related to PTG in the whole sample. To date, no studies have been performed on the link between PTG and life satisfaction among PLWH. Nevertheless, some authors have proven that SWL is associated with several aspects of psychosocial functioning among PLWH, i.e. lower levels of HIV-related distress and more satisfying interpersonal relationships (Eller and Mahat 2007), as well as a lower intensity of HIV-related stigma (Greeff et al. 2010). This finding may also be discussed in relation to Diener et al. (1985) and Diener (2009) theory, i.e. the "top-down" approach to well-being, in which life satisfaction is a relatively stable feature, despite a changeable environment. In other words, people who are highly satisfied with their lives will maintain relatively high well-being despite adverse life events. Furthermore, those individuals may benefit from such events to a greater extent than people who are generally dissatisfied with their lives. In the light of these remarks, PLWH who are satisfied with their lives could experience growth despite HIV-related trauma.

However, sociodemographic factors also play an important role in the link between life satisfaction and PTG (Davis et al. 1998; Park 2004). More specifically, we found that the association between SWL and PTG was stronger in the group of single participants than in the group of participants in stable relationships. Several authors noted that for PLWH, being in a stable relationship is an important source of life satisfaction, which is additionally positively related to affective well-being (Abramowitz et al. 2009; Mavandadi et al. 2009). Therefore, perhaps the role of SWL for PTG may be not as important as for single participants, but more research is needed to verify this assumption. In addition, we also noticed that the association between SWL and PTG was stronger in the group of participants with less education than in those with higher education. It is known that PLWH with higher education usually have better social status, which is an important source of life satisfaction and helps them to cope with HIV-related distress (O'Leary et al. 2014). This may explain the weaker link between SWL for PTG among more highly

educated participants, but we should treat this hypothesis with caution, as highly educated PLWH may sometimes be especially vulnerable to HIV-related stigma and distress (Halkitis et al. 2005).

Not only SWL, but also Big Five personality traits were related to PTG among our participants. More specifically, extraversion was positively related to PTG, which was partly in accordance with our second hypothesis. This result corresponds with other studies, which proved that extraversion promotes PTG among various samples after traumatic events (Jakšić et al. 2012; Sheikk 2004). In addition, extraversion is highly correlated with optimism as personality traits, and this personality dimension happened to be one of the most significant personality variables promoting PTG in several meta-analytic reviews, independently of the type of trauma and the time elapsed from a traumatic event (e.g. Park 2004; Prati and Pietrantoni 2009). Although no studies on the Big Five and PTG among PLWH have been conducted, several authors have proved the importance of extraversion in maintaining good overall and HIV-specific quality of life, slower disease progression, as well as satisfactory social relationships, despite HIV-related stigma (Ironson and Hayward 2008; Kumar 2015; Penedo et al. 2003).

Apart from the direct link between Big Five personality and PTG, we also found a significant interaction effect for neuroticism. Namely, neuroticism was negatively associated with PTG, but only in the group of patients with a longer period of treatment. Neuroticism was negatively related to PTG across many groups of trauma survivors (Linley and Joseph 2004). In addition, neuroticism was also negatively associated with various aspects of well-being among PLWH, i.e. health-related quality of life (Burgess et al. 2000), medication adherence (Penedo et al. 2003) and mental health functioning (Lockenhoff et al. 2009). Importantly, the impact of neuroticism on the abovementioned well-being dimensions was independent of medical and sociodemographic variables. In our sample, however, the negative association between neuroticism and PTG started 5 years after the beginning of antiretroviral treatment. It seems that in the first few years of HIV infection, PLWH are trying to adapt to this new and adverse life event and during that time, social status, i.e. intimate relationships and employment, is becoming a primary concern for them. Several authors observed the positive effect of social integration on psychological health and medication adherence among recently diagnosed PLWH (Campbell et al. 2013; Garrido-Hernansaiz and Alonso-Tapia 2017). Social status is especially important for PLWH due to a constant threat of stigmatisation and social rejection (Samson et al. 2009). Perhaps after this adaptation period, when their social status has been clarified and stabilized, the effect of neuroticism is more visible, but longitudinal studies are needed to precisely depict the nature of this association.

In contrast to sociodemographic factors, we did not observe any direct relationship between medical variables and PTG among our participants. In other words, positive changes following HIV-related trauma did not depend on the HIV infection itself (e.g. CD4 count, AIDS phase), which, as assumed, was potentially their source. This result was intriguing, as previous studies proved that PTG among PLWH is related mainly to clinical variables (e.g. Milam 2004, 2006; Sherr et al. 2011). Nevertheless, this finding can be discussed in the light of great advances in antiretroviral therapy, which substantially improved the health status of PLWH (Samji et al. 2013). Currently, the majority of HIV+ individuals are not as concerned with their HIV infection and have changed their attitude towards this disease from a fatal to a chronic medical condition (Deeks et al. 2013). In the light of our findings, as well as the aforementioned studies, one may assume that objective health status is no longer as important for psychosocial functioning in this patient group. However, this finding should also be treated with caution, as several authors highlighted

that PTGI does not assess changes in the perception of somatic symptoms; thus, it may not fully capture illness-course aspects of trauma and related growth (Barskova and Oesterreich 2009; Casellas-Grau et al. 2017; Hefferon et al. 2009; Siegel et al. 2005).

7 Limitations

This study had several limitations. First, the cross-sectional design precludes causal interpretations of the associations between variables found among our participants. Second, a significant underrepresentation of HIV+ women can be observed in our study, but the gender ratio was rather typical for research conducted in this patient group (Bor et al. 2015). In addition, participants were characterized by a different length of HIV infection, which could influence the nature of the relationship between PTG and the studied variables. Moreover, the PTGI questionnaire used in this study measures PTG retrospectively, and some authors underline that this method of assessment may reflect positive illusions instead of real growth (Zoellner and Maercker 2004). Moreover, a lack of measurement of eudemonic well-being makes it impossible to verify, even after adjusting for personality dimensions, if the observed effects of SWL go above and beyond what can be concluded directly from meaning changes. Finally, in future studies it would be advisable to control for more demographic data (e.g. religious affiliation, sexual orientation) and clinical variables (e.g. HIV transmission), which may be related to PTG among PLWH.

8 Conclusions

One may conclude that not HIV infection itself and its clinical outcomes, but psychosocial variables are directly related to PTG among people living with HIV. However, this result should be treated with caution since we observed relatively weak associations between PTG, SWL and personality traits. Therefore, longitudinal studies are needed to obtain a thorough picture of the determinants of PTG in this patient group. Nevertheless, clinicians should focus more on pre-existing well-being and personality, especially neuroticism, of a person being diagnosed with HIV infection, as these psychological characteristics may be crucial for long-term trajectories of adaptation to this chronic medical condition.

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Compliance with Ethical Standards

Conflict of interest The author declares that they have no conflict of interest.

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