

Satisfaction with life and posttraumatic growth in persons after myocardial infarction

The aim of the study was to investigate the relationship between the level of satisfaction with life and posttraumatic growth as a consequence of experiencing the traumatic event of myocardial infarction. The study group consisted of 86 persons (62 men and 24 women), aged 36-87 ($M = 60.50$, $SD = 10.05$), who experienced myocardial infarction. Half of them participated in a rehabilitation program. Two methods were used in the study: the Satisfaction with Life Questionnaire and the Posttraumatic Growth Inventory. One in four of the participants revealed a high level of posttraumatic growth. Gender, age and time since the occurrence of myocardial infarction did not have an impact on the level of posttraumatic changes, while participation in a rehabilitation program was a factor which increased

the level of benefits from trauma. The results revealed a poor relationship between satisfaction with life and positive changes after trauma. The overall score of the Satisfaction with Life Questionnaire correlates only with positive changes in relations to others. The most important dimension of satisfaction with life was found to be satisfaction with leisure time, which was positively related to changes in three areas: changes in relations to others, appreciation of life and spiritual changes.

KEY WORDS

satisfaction with life; posttraumatic growth; myocardial infarction

ORGANIZATIONS – Institute of Psychology, University of Lodz, Lodz, Poland

AUTHORS' CONTRIBUTION – A: Study design · B: Data collection · C: Statistical analysis · D: Data interpretation · E: Manuscript preparation · F: Literature search · G: Funds collection

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BACKGROUND

THE PHENOMENON OF POSTTRAUMATIC GROWTH

In recent years, an increasing number of researchers and practitioners have been focusing on positive changes resulting from negative life experiences. These positive changes, which often accompany negative results of the experienced trauma, are called 'posttraumatic growth/development'¹.

Nina
Ogińska-Bulik

The term 'posttraumatic growth' was introduced to the literature by R. Tedeschi and L. Calhoun. This phenomenon is related to a set of positive changes which can result from attempts at dealing with an experienced traumatic event (Tedeschi & Calhoun, 1996, 2004). These changes encompass perception of oneself, relations with others and spirituality (a more detailed description is available in: Ogińska-Bulik, 2013). It means that due to the trauma, people may establish closer relations with others, discover a higher sensitivity and compassion for others, and be more open with others. Moreover, many people who experience traumatic events start to appreciate small, everyday situations, and seem to belittle important life issues. Family, friends, and small, everyday pleasures may be perceived as more important than things which used to be given priority. As a result of the critical event, an individual may also display an increased sense of strength, their own effectiveness, greater confidence in themselves and their capabilities, as well as faith in future events. Such individuals discern their increased survival skills in challenging conditions, recognize their competences and set new goals. Experiencing trauma can also lead to changes in existential (religious) beliefs. Those who went through a traumatic situation are more likely to appreciate life and live it more consciously, while their life philosophy becomes more mature, meaningful and satisfying.

It must be, however, noted that these positive changes do not mean that the trauma is a good or desirable phenomenon for any individual. Posttraumatic growth does not mean carefreeness, good mood or a sense of happiness. A traumatic event – though it can lead to certain benefits – is stained (especially at its initial stage) with distress, negative emotions, as well as depletion or loss of individual resources. Nevertheless, Tedeschi and Calhoun (2004) highlight that apart from loss, pain and suffering, a person can gain positive results from a traumatic experience. In other words, posttraumatic growth is a chance for – perhaps not happier – but possibly a good and more meaningful life.

In Poland, posttraumatic growth/development has been discussed by many researchers who concentrated mostly on seeking factors which determine

positive posttraumatic changes (Felcyn-Koczevska & Ogińska-Bulik, 2011, 2012; Izdebski & Suprynowicz, 2011; Merecz & Waszkowska, 2011; Ogińska-Bulik, 2010, 2012; Ogińska-Bulik & Juczyński, 2010a, 2010b; Zdankiewicz-Ścigala, 2009; Zięba, Czarnecka-van Luijken, Wawrzyniak, 2010; Zięba, Wawrzyniak, Świrkula, 2010). Among conditions for posttraumatic growth, one can find: type and intensity of the trauma, social support, methods of dealing with it and individual features, including personal resources (a more detailed description can be found in Ogińska-Bulik, 2012, 2013; Ogińska-Bulik & Juczyński, 2010a).

SENSE OF WELL-BEING VERSUS POSTTRAUMATIC GROWTH

Psychological literature describes the sense of well-being with interchangeable terms such as 'quality of life' or 'life satisfaction' (Oleś, 2010; Ogińska-Bulik & Juczyński, 2010a; Rostowska, 2009; Trzebińska, 2008; Zalewska, 2003). A person's well-being consists of three elements, namely cognitive assessment of life satisfaction, presence of positive affect and a relative lack of negative affect (Diener & Lucas, 1999; Ogińska-Bulik & Juczyński, 2010a). The quality of life in terms of psychology takes into account a subjective evaluation of well-being; it is, therefore, perceived from an individual standpoint. According to Veenhoven's classification (as in: Zalewska, 2003), these subjective assessments express either general life satisfaction or satisfaction with various spheres of life, such as marriage, work or health. Fahrenberg et al. understand it similarly; they believe life satisfaction to be a subjective cognitive opinion about past and current life conditions, as well as one's own future possibilities (Fahrenberg et al., as in: Chodkiewicz, 2009).

Although much research into the relation between well-being and positive posttraumatic changes has been conducted, it does not present a clear image of relations between these variables. The majority of the research is based on the correlation model, which can only prove the existence (or lack thereof) of a relation between them. It does not, however, allow us to determine whether quality of life favors posttraumatic growth, or perhaps finding benefits in the trauma leads to the improved quality of life.

Nolen-Hoeksema and Davis (2004) state that individuals who have experienced posttraumatic growth present a higher level of psychological (especially emotional) well-being as well as better indicators of physical health. It has been shown in a group of people suffering from rheumatoid arthritis that the perceived benefits from an illness, especially improved relations with others, correlated with better adaptation. This resulted in less intense pain and a lower stress level. Moreover, the perceived benefits allowed

prediction of the adjustment to the disease 12 months later (Danoff-Burg & Revenson, 2005).

A high level of well-being (both physical and mental) and presence of posttraumatic growth, which results mainly in an increased sense of one's strength and better relations with others, were found in oncological patients 9 years after a bone marrow transplant (Tallman, Shaw, Schultz & Altmaier, 2010).

A positive relation between the sense of well-being and posttraumatic growth was also found in people living in poverty and suffering chronic disease (Abraido-Lanza, Guier & Colon, 1998). A strong positive correlation between posttraumatic growth and mental well-being, especially acceptance, autonomy, controlling the surroundings, having an aim in life, as well as sense of self-esteem, sense of life and subjective assessment of health, was proved by Australian research (Jackson, 2007). A positive correlation between posttraumatic growth and life satisfaction was reported by Triplett, Tedeschi, Cann, Calhoun and Reeve (2012). Norwegian research after the bomb attack in Oslo in 2011 also showed a positive relation between posttraumatic growth and life satisfaction (Blix Bang Hansen, Skogbrott Birkeland, Nissen & Heir, 2013). A positive correlation between posttraumatic growth and positive affect was also proved by a research review made by Stanton, Bower and Low (2006).

A positive correlation between well-being and perception of benefits of an oncological disease was found in research by Carver and Antoni (2004). Higher quality of life resulting from positive changes which were initiated by a traumatic event was also shown in other research among women with breast cancer (Tomich & Helgeson, 2004; Urcuyo, Boyers, Carver & Antoni, 2005), and people who suffered from various stressful life events (Cann, Calhoun, Tedeschi & Solomon, 2010). Similar research conducted in Holland (Mols, Vingerhoets, Coebergh & van de Poll-Franse, 2009) among women recovering from breast cancer showed a positive correlation between posttraumatic growth related to their illness and life satisfaction. What is more, the level of life satisfaction of women who had fought cancer was higher compared to norms for the control group. A positive relation between life satisfaction and presence of positive posttraumatic changes was also observed among patients with myocardial infarction (Petrie & Corter, 2009).

It must, however, be noted that other research, e.g. conducted in a group of women suffering from cancer, showed a negative correlation between growth and quality of life (Tomich & Helgeson, 2002). Linley and Joseph (2004) as well as Stanton et al. (2006) found, however, in their research, no correlation between these variables. Similarly, a meta-analysis of the research (Helgeson, Reynolds & Tomich, 2006) points to the fact that quality of life (both physical and mental) is not significantly related to the inten-

sity of positive posttraumatic changes. This issue requires further study.

PARTICIPANTS AND PROCEDURE

According to the 'top-down' approach (Czapiński, 2004, cf. Ogińska-Bulik & Juczyński, 2010a), life satisfaction can be treated as a relatively constant personality feature resulting from genes, the upbringing process or other factors not related to the current situation. Such a viewpoint, as indicated by Czapiński (2004, p. 540), "assumes a certain homeostasis which guarantees stability of the overall well-being in a changeable environment". According to this approach, people have an overall high (or low) life satisfaction and it is not prone to changes when faced by changes experienced in life. It can be, therefore, predicted that people with a high level of life satisfaction will maintain their sense of well-being despite unfortunate life events. Moreover, such individuals will benefit from these experiences, contrary to those who have lower life satisfaction. So far, this issue has not been analyzed in the Polish psychological literature.

The research was aimed at determining the correlation between level of life satisfaction (treated as an explanatory variable) and posttraumatic growth (response variable) which resulted from a traumatic event – myocardial infarction.

Answers to the following questions were sought:

1. What is the level of life satisfaction in people who had suffered from myocardial infarction?
2. Do people who have suffered from myocardial infarction display positive posttraumatic changes? If so, to what extent?
3. Do gender, age, time since the myocardial infarction and participation in the rehabilitation process impact the intensity of posttraumatic changes?
4. Is the level of life satisfaction related to posttraumatic growth?
5. Which aspects of life satisfaction have a predictive role for posttraumatic growth?

The research was conducted among patients who had suffered from myocardial infarction and were under constant care of a cardiological clinic. Experiencing myocardial infarction was treated as a traumatic experience because it was a direct threat to life. All in all, 90 people were surveyed, and 86 of them were included in the analysis (four individuals were rejected due to incomplete data). Among the subjects, there were 62 men (72.10%) and 24 women (27.90%). The age range was between 36 and 87 years old ($M = 60.50$, $SD = 10.05$). Half of the subjects (43 persons) partook in a rehabilitation program run by an early cardiological rehabilitation centre. It was a stage III rehabilitation, which started no sooner than 8-12 weeks after myocardial infarction and consisted of physical exercises, psychological influence

through group and individual therapy, social and occupational rehabilitation, pharmacological treatments, dietary changes and prevention of recurring ischaemic heart disease.

Life satisfaction was measured with the Satisfaction with Life Questionnaire by Fahrenberg et al. in the Polish adaptation by Chodkiewicz (2009). The questionnaire had 10 subscales, which measured the following aspects of life: 1) health, 2) work and occupation, 3) financial situation, 4) leisure time, 5) relations with children, 6) oneself, 7) friends/family, 8) home, 9) marriage/partnership, 10) sexuality. Answers were given on a 7-grade scale (where 1 = very dissatisfied, 7 = very satisfied). The overall indicator was calculated by adding raw results of 7 subscales, i.e. 3 subscales were omitted, which were not completed by all the subjects (work and occupation, marriage/partnership, relations with children). The higher the score, the higher is the level of life satisfaction. The questionnaire has good psychometric value; Cronbach's α ranged from .80 (satisfaction with oneself) to .96 (health).

Positive posttraumatic changes were measured by Inwentarz Potraumatycznego Rozwoju (IPR), which is a Polish adaptation (Ogińska-Bulik & Juczyński, 2010a) of the Posttraumatic Growth Inventory (PTGI) developed by Tedeschi and Calhoun (1996). The inventory consists of 21 positive statements which describe various changes resulting from traumatic events. The factor analysis of the principal components with varimax rotation of the IPR revealed 4 factors: 1) changes on perception of oneself, 2) changes in relations with others, 3) greater appreciation for life, and 4) spiritual changes. All four factors explained 57.7% of the overall variance. The reliability of the IPR was assessed on the basis of its internal consistency. The obtained Cronbach's α coefficient equaled .93 for the whole scale and was slightly higher than in its original version. The internal reliability coefficient for individual factors should be considered high as well, since they fall into the range .63-.87. Absolute stability, measured by test-retest, was calculated in 2 tests (after 2 months) and equals .74, which is a satisfactory result.

RESULTS

Before commencing the statistical analysis, which was aimed at finding answers to the research questions, normal distribution of the analyzed variables and homogeneity of variances for the response variable, i.e. posttraumatic growth, were checked. The differences between the averages were verified with Student's *t*-test. The correlation between the variables was determined with Pearson's correlation coefficient, and posttraumatic growth predictors were determined with regression analysis (stepwise forward regression).

LEVEL OF LIFE SATISFACTION AND POSTTRAUMATIC CHANGES

Average values of life satisfaction in the researched group of individuals who had suffered from myocardial infarction are presented in Table 1. They are lower than values from normalization tests which included healthy individuals (cf. Chodkiewicz, 2009).

Statistically significant changes were noted for the Satisfaction with Life Questionnaire ($M = 242.78$, $SD = 30.33$, $p < .001$) and five aspects, i.e. Satisfaction with one's health ($p < .001$), job and profession ($p < .05$), relations with one's children ($p < .001$), marriage/relationship ($p < .001$) and sexuality ($p < .001$). Comparing individual aspects of life satisfaction, one can notice that in the researched group there is a slightly higher life satisfaction level concerning relations with friends and relatives, and lower level of satisfaction with one's health and financial situation.

Thus, the average for posttraumatic growth equals 5 in standard ten and is similar to the result obtained by cardiologically ill patients in normalization studies ($M = 60.73$) (Ogińska-Bulik & Juczyński, 2010b). 26.70% of subjects displayed a low level of posttraumatic growth or lack thereof (one person did not observe any positive changes), 47.70% displayed average positive changes, and 25.60% of them showed a high level.

It was also verified whether there were differences in intensity of changes which constitute various aspects of posttraumatic growth. More changes occurred in the sphere of life appreciation ($M = 3.69$) and relations with others ($M = 3.18$), contrary to changes in perception of oneself ($M = 2.57$) and the spiritual sphere ($M = 2.51$) ($p < .01$).

Average values of posttraumatic growth were also calculated among subjects who had suffered from myocardial infarction, which considered gender, age and time since the event, as well as participation (or lack thereof) in a rehabilitation program². Gender does not differentiate the level of posttraumatic growth in a statistically significant way (men: $M = 59.90$, $SD = 18.31$, women: $M = 65.79$, $SD = 11.02$), or any of the factors; women, however, scored a higher result in the Posttraumatic Growth Inventory. Age was not significantly related to the level of posttraumatic growth (younger subjects, i.e. below 60, $n = 44$, $M = 61.13$, 18.21; older subjects, i.e. 60 and more, $n = 42$, $M = 61.97$; $SD = 15.28$).

Subjects had experienced a traumatic situation in their lives, which was a myocardial infarction, in various time ranges: 1) less than a year before the research – 20 people, 2) 1-2 years before – 14 people, 3) 2-5 years before – 17 people, 4) more than 5 years before the study – 35 people. Average time since the event was 2.81 years ($SD = 2.62$) and it does not differentiate posttraumatic growth ($F = 0.07$), whose average values were, respectively: for 1. $M = 60.55$ ($SD = 15.21$), 2. $M = 62.28$ ($SD = 21.32$), 3. $M = 62.88$ ($SD = 12.12$), and 4. $M = 61.17$ ($SD = 18.09$).

Table 1

Average values of the analyzed variables

	<i>M</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>
Life satisfaction – overall result	229.63	33.77	146	287
1. Health	29.02	6.74	12	46
2. Work and profession	32.53	7.35	17	49
3. Financial situation	29.62	8.61	13	46
4. Leisure	34.40	6.96	11	46
5. Contacts with one's children	33.41	14.54	0	49
6. Oneself	35.70	6.58	15	49
7. Friends and family	35.39	6.46	16	48
8. Home	34.62	7.13	17	47
9. Marriage/partnership	32.54	15.36	0	49
10. Sexuality	31.37	9.87	7	49
Posttraumatic growth – overall	61.54	16.75	0	92
Factor 1. Changes in perception of oneself	23.15	8.90	0	41
Factor 2. Changes in relations with others	22.29	5.87	0	35
Factor 3. Appreciating life	11.08	3.14	0	15
Factor 4. Spiritual changes	5.02	3.05	0	10

Satisfaction
with life after
myocardial
infarction

Note. *M* – average; *SD* – standard deviation; *Min.* – minimum value; *Max.* – maximum value

As for participation (or lack thereof) in a rehabilitation program, it did differentiate results of posttraumatic growth in a statistically significant way. Individuals in rehabilitation programs, compared to those who weren't, displayed significantly greater changes in posttraumatic growth in almost every aspect (except for changes in relations with others). Greater differences were observed in relation to life appreciation and the spiritual sphere, and slightly smaller changes were noted in perception of oneself. The obtained results were: for posttraumatic growth (overall) $M = 67.04$ ($SD = 9.73$) and $M = 56.04$ ($SD = 20.28$, $t = 3.20$, $p < .010$); for perception of oneself $M = 25.41$ ($SD = 5.68$) and $M = 20.88$ ($SD = 10.84$, $t = 2.42$, $p < .050$); for changes in relations with others: $M = 22.95$ ($SD = 4.04$) and $M = 21.62$ ($SD = 7.25$, $t = 1.04$); for life appreciation $M = 12.48$ ($SD = 1.69$) and $M = 9.67$ ($SD = 3.62$, $t = 4.61$, $p < .001$); and for spiritual changes $M = 6.18$ ($SD = 2.68$) and $M = 3.86$ ($SD = 2.98$, $t = 3.79$, $p < .001$).

CORRELATION BETWEEN LIFE SATISFACTION AND POSTTRAUMATIC GROWTH

The relation between satisfaction with life and presence of positive changes resulting from a traumatic experience were determined by Pearson's correlation coefficients. They are presented in Table 2.

The results show a slight correlation between life satisfaction and positive changes resulting from the experienced trauma. The overall result of the Satisfaction with Life Questionnaire correlates positively only with factor 2, which is 'changes in relations with others'. Among various aspects of life satisfaction, posttraumatic growth is connected mostly with satisfaction with leisure time, which positively correlates with changes in three spheres, i.e. relations with others, life appreciation and spiritual sphere. Posttraumatic growth, expressed mostly as positive changes in relations with others, is linked to satisfaction with oneself and friends/family. However, for the majority of aspects of life satisfaction under analysis, their correlation with posttraumatic growth proved to be statistically insignificant.

The relation between life satisfaction and posttraumatic growth based upon participation in a rehabilitation process was also verified. Amongst patients exposed to rehabilitation actions, there were more links between variables than among those subjects who did not partake in such actions (for the latter, only two connections were observed and they concerned satisfaction with leisure time and friends/family, and positive changes in relations with others). In the rehabilitated group, overall life satisfaction correlated with posttraumatic growth ($r = .32$, $p < .050$) and one of its aspects – changes in relations with others ($r = .40$, $p < .010$). The analysis of individ-

Table 2

Correlation coefficient for life satisfaction and posttraumatic growth

	IPR	Factor 1	Factor 2	Factor 3	Factor 4
Life satisfaction – overall result	0.16	0.13	0.25*	0.02	0.00
1. Health	0.18	0.20	0.16	0.08	0.04
2. Work and profession	-0.11	-0.19	0.09	-0.15	-0.05
3. Financial situation	-0.00	-0.05	0.02	0.08	0.01
4. Leisure	0.27*	0.09	0.39**	0.25*	0.24*
5. Contacts with one's children	-0.01	-0.08	0.13	-0.08	-0.00
6. Oneself	0.17	0.14	0.26*	-0.04	0.06
7. Friends and family	0.18	0.11	0.34*	-0.00	0.03
8. Home	-0.04	-0.01	0.01	-0.16	-0.01
9. Marriage/partnership	-0.07	-0.07	0.03	-0.08	-0.15
10. Sexuality	0.02	0.12	0.05	-0.09	-0.26

Nina
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Note. IPR – overall result of Posttraumatic Growth Inventory; Factor 1. Changes in perception of oneself; Factor 2. Changes in relations with others; Factor 3. Appreciating life; Factor 4. Spiritual changes

ual aspects of life satisfaction revealed a significant correlation between posttraumatic growth (overall) and satisfaction with oneself ($r = .39, p < .010$), friends ($r = .31, p < .050$) and home ($r = .31, p < .050$). Significant correlations pertaining to individual aspects of posttraumatic growth were also noted (most of them linked to relations with others).

The correlation between life satisfaction and intensity of positive posttraumatic changes was checked by an analysis of level of posttraumatic growth and its aspects in a group with low and high levels of life satisfaction (division based on the average and $\frac{1}{2}$ standard deviation). The data are presented in Table 3.

Data presented in Table 3 confirm a relation between level of life satisfaction and posttraumatic growth; it is seen mostly as positive changes in relations with others. More of these changes were observed in the group of individuals with a high level of life satisfaction.

PREDICTORS OF POSTTRAUMATIC GROWTH

In order to answer the question which aspects of life satisfaction let us predict positive posttraumatic changes, regression analysis (stepwise forward regression) was used. A final summary of predictors for the overall result of the Posttraumatic Growth Inventory is presented in Table 4.

Two aspects of life satisfaction proved to be predictors of posttraumatic growth among the group of individuals who had suffered from myocardial infarction. Their role in prediction of positive posttraumatic changes is not, however, significant. Satisfaction with leisure time favors these changes, explaining 9% of variation of response variable, and satisfaction with job position and professional successes seems to hinder these changes (explaining 5%).

Predictors for individual aspects of posttraumatic growth were also sought among aspects of life satis-

Table 3

Intensity of posttraumatic changes dependent on level of life satisfaction

	Life satisfaction				<i>t</i>	<i>p</i>
	Low (<i>n</i> = 24)		High (<i>n</i> = 26)			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Posttraumatic growth – overall	59.37	7.71	64.85	19.94	-1.27	n.i.
Factor 1. Changes in perception of oneself	22.08	5.83	24.15	9.66	-0.90	n.i.
Factor 2. Changes in relations with others	20.62	3.58	23.81	6.57	-2.09	.010
Factor 3. Appreciating life	11.37	2.24	11.53	3.52	-0.19	n.i.
Factor 4. Spiritual changes	5.29	2.61	5.34	3.05	-0.06	n.i.

Note. *M* – average; *SD* – standard deviation; *t* – Student's *t*-distribution; *p* – level of significance of differences; *n.i.* – result statistically insignificant

Table 4

Predictors of posttraumatic growth

	β	<i>B</i>	<i>B</i> error	<i>T</i>	<i>p</i>
Leisure	0.29	.69	.27	2.60	.010
Work/Profession	-0.28	-.64	.26	-2.46	.050
Constant value		35.80	11.67	3.07	.010

Note. $R = .43$; $R^2 = .14$; β – standardized regression coefficient; *B* – regression coefficient; *B* error – error of standard estimation; *R* – value of multiple correlation coefficient; R^2 – multiple correlation coefficient

Satisfaction with life after myocardial infarction

faction. There are two predictors identified for perception of oneself: satisfaction with work – a negative relation ($\beta = -0.34$); and satisfaction with oneself ($\beta = 0.31$). Both variables explain 12% of variance of the response variable ($R = .40$, $R^2 = .12$) – the former explains 7%, the latter 5%.

For factor 2 (changes in relations with others), two aspects of life satisfaction turned out to be predictors: satisfaction with leisure time ($\beta = 0.32$) and satisfaction with friends and family ($\beta = 0.31$). These variables explain 20% of variance of the response variable ($R = .46$, $R^2 = .20$). Satisfaction with leisure time plays a bigger role in prediction of positive changes – it explains 15% of the dependent variable.

Among predictors of factor 3 of posttraumatic growth, namely appreciating life, one can list satisfaction with leisure ($\beta = 0.35$), with work (a negative relation; $\beta = -0.25$) and finances ($\beta = 0.30$). These variables explain 19% of the variance of the dependent variable ($R = .46$, $R^2 = .19$), and more specifically, satisfaction with leisure 9%, and the other two 5% each.

Changes in the spiritual sphere (factor 4) are explained by satisfaction with one's sexuality, negatively ($\beta = -0.44$), and satisfaction with leisure time, positively ($\beta = 0.29$). These variables explain 16% of variance (8% each) ($R = .46$, $R^2 = .16$).

DISCUSSION

Satisfaction with life in individuals who had suffered from myocardial infarction was lower than that in a group of healthy individuals who took part in normalization tests; the differences are most noticeable in terms of health, job, relations with children, marriage and sexuality. The subjects, despite an illness and myocardial infarction, which was a life-threatening situation, perceived benefits of their experience, i.e. positive posttraumatic changes. The obtained results indicate that 25.6% of subjects displayed a high level of posttraumatic growth (47.7% average and 25.6% low). It is a slightly higher percentage than seen in a group of cardiologically ill patients (who had undergone cardiac surgery, such as heart transplantation, bypasses or artificial heart valves), where positive posttraumatic changes

were observed in 30% of subjects (Ogińska-Bulik & Juczyński, 2012). It must be noted that the results obtained among patients who had suffered from myocardial infarction were significantly lower than in a group of oncological patients after breast resection, where as many as 50% of patients described their level of posttraumatic changes as 'high' (Ogińska-Bulik & Juczyński, 2010b).

Gender, age and the time since myocardial infarction did not impact the intensity of posttraumatic changes in a significant way. A factor with a very significant impact was, however, participation in a rehabilitation program. Individuals who took part in such programs noticed significantly more positive changes than those who did not. Participation in rehabilitation also resulted in a stronger link between life satisfaction and posttraumatic changes.

Overall, life satisfaction of people who have suffered from a traumatic event, such as myocardial infarction, has a weak correlation with the level of posttraumatic growth. An aspect which significantly correlated with presence of positive posttraumatic changes was satisfaction with leisure time. This aspect proved to be a predictor of posttraumatic growth, resulting in positive changes in relations with others. The other predictor was a sense of satisfaction with one's job/profession; its role, however, limited the posttraumatic growth, expressed as positive changes in self-perception and appreciating life.

A beneficial role in posttraumatic growth was played by satisfaction with oneself, which understandably favors mainly positive changes in self-perception. A common source of the variance cannot be excluded. As for satisfaction with friends and family, it increases the likelihood of positive changes in relations with others. As for the satisfaction with one's sexuality, it does not favor positive changes in the spiritual sphere.

One may wonder why satisfaction with leisure time proved to be the main aspect related to life satisfaction instead of, for example, satisfaction with children, marriage and partnership. It may suggest that satisfaction with leisure time is a factor which provokes self-reflection, giving meaning to the experienced event and, as a result, re-evaluation of the trau-

ma. It must be noted that satisfaction with children and marriage/relationship among myocardial infarction patients was significantly lower than in a group of healthy individuals in normalization tests, which may have affected the level of correlation between life satisfaction and presence of posttraumatic growth. The type of trauma and age of subjects seem to play a certain role as well. Most of the patients were at least middle aged and the rest were elderly. Such people tend to look at life with a certain reserve and are less likely to benefit from traumatic experiences. More relations between quality of life (measured by the Kid-screen questionnaire) and posttraumatic growth (assessed by the Personal Growth Questionnaire) were observed among teenagers who experienced various negative life situations (Ogińska-Bulik, 2013). Personal growth (overall result) significantly correlated with six (among ten researched) aspects of life – especially with quality of life related to peers and social support.

It should also be noted that satisfaction with job/profession seems to hinder posttraumatic growth. Despite the fact that the role of this aspect in prediction of posttraumatic changes is slight, it does suggest that posttraumatic growth may require changing one's life priorities, including less concentration on work and more attention paid to e.g. family, friends or issues that used to be treated as of secondary importance. It seems to partially confirm Tedeschi and Calhoun's concepts, but confirming this thesis would require further studies.

The obtained results correspond to some extent to data presented in the literature. A positive relation between life quality and benefiting from trauma was observed in research by Abraido-Lanza et al. (1998); Jackson (2007); Mols et al. (2009); Tomich and Helgeson (2004) or Urcuyo et al. (2005). However, there are available research results which indicate a negative relation (Tomich & Helgeson, 2002), or no relation between the variables at all (Linley & Joseph, 2004; Stanton et al., 2006). It shows how complicated the relations between quality/satisfaction with life and posttraumatic growth are. It can be presumed that the correlation between life quality and positive posttraumatic changes is moderated by other factors. This has been pointed out by Davis et al. (1998) and Park (2004), who suggested that the relation between an individual's well-being and benefiting from trauma can depend on that individual's personal resources, especially the level of optimism.

The conducted research had its limitations. The research was cross-sectional, which did not allow for determining cause-and-effect relations. Level of life satisfaction before the trauma (myocardial infarction) was not analyzed. Additionally, it was assumed that myocardial infarction was a traumatic experience. This assumption was not, however, verified by the subjects. Diagnosis of posttraumatic stress disorder

(PTSD) was not conducted, which could confirm whether subjects' experiences were truly traumatic.

It is, however, in keeping with the authors of the construct (Tedeschi & Calhoun, 2004), who use the term 'posttraumatic growth' in its broad sense, not limiting it to the truly traumatic situations defined as 'health and life-threatening'. Tedeschi and Calhoun assume that posttraumatic growth may be a result of events not related to traumatic experiences, but those which require adaptation. Among these one can find facing a grave illness, taking care of a terminally ill child, job loss and even financial difficulties. They use the terms 'trauma', 'crisis', and 'highly stressful events' interchangeably.

It must also be noted that the measurement tools used in the research, based on self-description, especially the Posttraumatic Growth Inventory, do not guarantee that positive changes had truly occurred. It cannot, therefore, be excluded that they are an instance of illusion or wishful thinking. Additionally, the subjective assessment of the analyzed variables suggests that we do not discuss life satisfaction or posttraumatic growth, but rather sense of satisfaction and sense of growth.

In order to confirm the relation between life satisfaction and positive posttraumatic changes, further studies among those who have suffered trauma are advised. As for determination whether life satisfaction is a factor influencing the posttraumatic growth, more complex statistical analysis would need to be employed, which would include structural modeling. It is also advisable to verify whether positive posttraumatic changes observed by the subjects were maintained over time, which – in turn – would require long-term research.

The importance of these analyses in terms of practical application must be noted. The role of psychological rehabilitation should not be underestimated, as it brings improvement of quality of life to those who have suffered myocardial infarction (Ogińska-Bulik, 2014) and triggers positive posttraumatic changes. It may be, therefore, expected that an increase in life satisfaction will favor benefits from a traumatic experience. On the other hand, encouraging people who have faced a trauma to work it through should increase the likelihood of positive changes, which in turn improves life quality.

ENDNOTES

- 1 The term 'development' is used interchangeably with 'growth'.
- 2 Because life satisfaction is treated as an explanatory variable (not a response variable), the correlation between life satisfaction and gender, age and participation in the rehabilitation process was not analyzed.

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