

Modified body – symbol of risk or resources?

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Summary

Aim. Tattooing and body piercing are becoming more and more popular. The psychological approach to body modifications remains heterogeneous. The purpose of this replication was to assess the level of life satisfaction and self-esteem, as well as to reveal subjectively experienced symptoms of mental health disorders in people who reported having a tattoo and/or piercing during the coronavirus epidemic.

Method. The research was conducted in the period from April to June 2020 in an on-line form. Participants ($N = 557$) were 15–68 years old.

Results: There were no significant differences in perceived life satisfaction, self-esteem and mental health assessment between people with and without body modifications. The revealed differences in the dimensions of self-esteem and the number of subjective depressive symptoms turned out to be accidental.

Conclusions. All participants in the study (regardless of having body modification) were aware of having and the ability to use personal resources to deal with the COVID-19 pandemic. Body modifications should not be considered a risk factor. Especially among tattooed people, the self-assessment of psychological functioning increased with the increase in life satisfaction.

Key words: mental health, self-assessment, body modifications

Introduction

Practices such as tattooing, intended to intentionally transform one's own body, are becoming increasingly popular. Their social prevalence has been revealed by the Harris Poll [1, 2]. In this study, non-medical practices, such as tattooing and piercing, which were characterized by a varying degree of intentional interference with the skin and the permanence of the ornament, were adopted as body modifications.

Nowadays, the approach of psychologists to the function and nature of body modifications has become heterogeneous. By some researchers they are considered as non-suicidal self-injuries (NSSI) [3], direct self-destructive behaviors related to psychopathology: mental illness [4], personality disorders [5], including identity prob-

lems [6]. Other scientists perceive them as normative or semi-normative behaviors, methods of expression one's personal identity (often depicting the feeling of belonging to a group), an intentional form of transforming the concept of self [7, 8]. It was pointed out that, especially in the psychiatric population, tattoos can be the basis in the process of getting to know another person – not only at the cognitive level, by analyzing not only the personal meaning of individual body modifications but also their emotional aspect [9].

Furthermore, research has revealed positive aspects of body modification. More and more scientists have revealed that, as a consequence, tattooing increases self-esteem [10], and the effect remains sustained over time [11]. The tattooed women in particular were characterized by a lower self-esteem of their own body than women without such modifications [12, 13]. A tattooed body is perceived as stronger and more independent, although at the same time negatively assessed in terms of other attributes [14]. Weeks after tattooing, women reported anxiety related to the perceived evaluation of their own physical Self [11]. Thus, despite the initially positive effects of tattooing, especially women declare a sense of mismatch with social expectations regarding the traditional appearance of a female body.

Tattooed people more often show higher scores on the scale of extroversion and experience seeking as well as more strongly declare the need to be unique in comparison to people without body modifications [15]. Women with tattoos express a greater willingness to engage in casual sexual intercourse as well as greater support for egalitarianism and sensation-seeking compared to women without a tattoo [16]. People modifying the body are more prone to engaging in risky behavior than people without body modifications [17], but they are also more often involved in social and health behaviors [18]. Tattooed adults are characterized by rebelliousness, anger and verbal aggression [19]. However, in their analyzes, researchers more and more often reveal small effects of the observed differences, which do not necessarily prove the dysfunctional nature of these features, let alone the pathology of tattooed persons [15].

Naturally, situations perceived as difficult trigger specific, defensive reactions of the psychophysical system of the human body. Certainly, the COVID-19 pandemic has fulfilled these conditions by being a new, and sometimes even overburdening, situation for people. The circumstances generated unique conditions (impossible to create as an experiment) for the anxiety-generating nature of the situation to potentially reveal and/or sharpen differences in the functioning of people with and without body modifications. It was revealed that the level of anxiety was high – as many as 80% of the participants of the study on the severity of anxiety and the occurrence of anxiety and depressive disorders/symptoms during the SARS-CoV-2 virus threat were preoccupied with thoughts about the pandemic [20], which was a burden for their mental health [21]. It is also known that people with body modifications presented a higher severity of psychological stress [5] as well as trait anxiety and reported more symptoms of depression [22] than people without such modifications.

Aim

The project was an attempt to replicate the original research conducted by Anna J. Pajor, Grażyna Broniarczyk-Dyła and Julita Świtalska [23]. The aim of this study was to assess the level of life satisfaction and self-esteem, as well as to reveal subjectively experienced symptoms of mental health disorders in people who reported having a tattoo and/or piercing. Referring to the original research [23], the following hypotheses were formulated:

- People with tattoos and/or piercings have a lower level of satisfaction with life compared to people without body modifications;
- Body modifications (tattoos and/or piercings) are associated with lower self-esteem;
- People with body modifications (tattoos and/or piercings) differ in their mental health assessment, especially in terms of the occurrence of somatic symptoms, anxiety/insomnia, functional disorders and symptoms of depression.

The basic assumption for the replication of the study in the conditions of the coronavirus epidemic in Poland was to demonstrate possible reactive changes in self-assessment of selected aspects of functioning. The intensification of anxiety as a typical reaction to a new, difficult situation may lower the self-esteem and the perceived quality of life and increase the number of the declared symptoms of deteriorating mental functioning. The subjective judgments of people with body modifications can reveal potential differences in the perception of resources (or the lack of resources) for dealing with a difficult, anxiety-generating situation.

Methods

The research was conducted on-line, due to the ongoing coronavirus epidemic in Poland, in the period from April to June 2020.

Using the G*Power 3.1 software, the minimum total sample number ($n = 416$) was determined, *a priori* for the tests family: χ^2 (degrees of freedom, $df = 3$), t (Mann-Whitney) and z (Pearson's r) was the average (~ 0.25) effect size [24]. The calculations assumed the α -level of 95–99% expecting the satisfactory power of statistical tests ($1 - \beta = 0.8$).

The study participants were 557 people aged 15–68 years. The mean age of the respondents was 25.87 years (standard deviation, $SD = 9.36$). The study group consisted of 289 people who had body modifications, such as: tattoo(s) ($n = 133$), body piercing ($n = 60$), which is earrings in a place other than the ear lobe, as well as tattoo(s) and body piercing ($n = 96$). The control group consisted of 268 people without such modifications. The research has been conducted in accordance with the *Declaration of Helsinki*, and the project was approved by the Ethics Committee (consent no 40/2020).

The intention was to replicate the original research procedure as accurately as possible. Initially, a survey was conducted to obtain socio-demographic information and data on participants' body modifications. Then, the following research tools were used.

The Satisfaction with Life Scale (SWLS)

The scale by E. Diener, R.A. Emmons, R.J. Larson, and S. Griffin in the Polish adaptation of Z. Juczyński [25] is used to measure life satisfaction. It consists of five items, and the answers are given on a seven-point Likert scale. The range of results is 5–35 points. A higher score is associated with a higher life satisfaction. The reliability index (Cronbach's alpha) is 0.81.

Multidimensional Self-Esteem Inventory (MSEI)

The questionnaire by E.J. O'Brien and S. Epstein in the Polish adaptation by D. Fecenec [26] measures self-esteem. The tool consists of 116 questions rated on a five-point scale. In addition, it includes the *Identity integration scale* for assessment of self-concept consistency, and *Defensive self-enhancement scale* used to measure the level of need for social approval. The reliability of the tool (Cronbach's alpha) ranges between 0.70 and 0.90.

General Health Questionnaire (GHQ)

The General Health Questionnaires by D. Goldberg in the Polish adaptation of Z. Makowska and D. Merez [27] is a popular screening test for adults used to assess mental health. The questionnaire was created to identify temporary or long-term mental breakdown in response to experienced difficulties, problems or mental illness. The version with 28 questions was used, the answers are given on a four-point scale. The questionnaire enables the description of individuals on four scales: "Somatic symptoms", "Anxiety and insomnia", "Dysfunction", and "Depression". The tool is characterized by a high reliability coefficients

The COVID-19 pandemic is a condition that did not appear in the original study. The effect caused by this situation would be impossible to obtain by manipulation during a laboratory experiment.

Statistical analyzes

The normality of the distribution of variables was assessed using the Shapiro-Wilk test. The dispersion of the results did not assume a normal distribution, hence the assumption-free tests were applied. Data analyses were performed with the Mann-Whitney *U* test and the Kruskal-Wallis test to verify intergroup differences, which were then analyzed using the Mann-Whitney *post-hoc* test. The qualitative data were analyzed using the Chi-square test. The strongest relationships between the variables were tested using the Spearman correlation, and variables were selected for mediation analyses. The maximum permissible type I error ($\alpha = 0.05$) was allowed in the calculations, the results were considered statistically significant at $p \leq 0.05$. The calculations were made using the SPSS v. 26 with the Process v. 3.5 macro for Mac.

Results

Sociodemographic data

The age of the study participants ($N = 557$) ranged between 15 and 68 years, the mean age was 25.87 ($SD = 9.36$). Age differences using binary grouping were not identified. However, significant differences in age were revealed due to the type of modification among the respondents (Table 2). When significant results were obtained, multiple comparisons were performed [28]. Mann-Whitney *post-hoc* tests showed significant age differences between groups: people without body modifications were older than participants with body piercings ($U(N_{\text{non-modified}} = 268, N_{\text{pierced}} = 60) = 58.61$; $z = 2.03$; $p = 0.01$) and with tattoos and body piercings ($U(N_{\text{non-modified}} = 268, N_{\text{pierced \& tattooed}} = 96) = 38.68$; $z = 2.03$; $p = 0.04$). The tattooed individuals were older than those with body piercings ($U(N_{\text{tattooed}} = 133, N_{\text{pierced}} = 60) = 72.49$; $z = 2.92$; $p = 0.004$) as well as those with tattoos and body piercings ($U(N_{\text{tattooed}} = 133, N_{\text{pierced \& tattooed}} = 96) = 52.56$; $z = 2.46$; $p = 0.01$). 3.4% of the respondents had primary education, 3.1% had vocational education, 62.1% – secondary education, 15.8% – Bachelor's/Engineer's degree, and 15.6% – Master's degree. No significant differences were found in the comparison of the level of education between the study and control group. In the study, 56% of women and 37.8% of men had tattoos and/or body piercings. The percentage of participants with body modifications was significantly differentiated by gender ($\chi^2(6, N = 557) = 24.71$; $p < 0.01$; $\omega = 0.21$). Among women ($n = 427$), 44% had no body modifications, 23% had at least one tattoo, 13.3% had body piercing(s), and 19.4% had tattoo(s) and body piercing(s). Among men ($n = 127$), 62.2% had no body modifications, 26% had tattoo(s), 2.4% had body piercing(s), and 9.4% had tattoo(s) and body piercing(s). In the study, three people declared a non-binary gender identity, one of them had no body modifications, the others had tattoos and/or body piercings.

Satisfaction with life

No significant differences were found in the results of the *Satisfaction with Life Scale* between the control and the study group. Life satisfaction of participants with body modifications ($Mdn = 24$) was slightly higher than that of people without such modifications ($Mdn = 23$). The type of body modification also did not differentiate life satisfaction of the respondents. Life satisfaction of the tattooed participants ($Mdn = 25$) was insignificantly higher than among pierced individuals ($Mdn = 23.5$) or people with tattoos and body piercings ($Mdn = 24$).

Self-esteem

The Mann-Whitney *U* test showed significant differences between the groups in the following scales: “Moral self-approval”, “Defensive self-enhancement” and “Personal power”.

Table 1. Differences in self-esteem scales of people with and without body modifications

	Control group n = 268		Study group n = 278		U	z	p	r _g
	Mdn	IQR	Mdn	IQR				
Moral self-approval	36.00	6	36.00	7	34,809.50	-2.07	0.039	0.10
Defensive self-enhancement	49.00	13	47.00	15	34,287.00	-2.34	0.019	0.11
Personal power	32.00	10	34.00	12	43,960.00	2.76	0.006	-0.14

Mdn – median; IQR – interquartile range; U – test value; p – significance; r_g – Glass rank biserial correlation coefficient;

In the scales “Moral self – approval” and “Defensive self-enhancement”, participants in the control group obtained higher scores than people with body modifications. On the “Personal power” scale, individuals with body modifications scored higher than individuals in the control group.

The Kruskal-Wallis test revealed significant differences due to the type of modification in the scales: “Defensive self-enhancement”, “Personal power” and “Body functioning” (Table 2). The classic Bonferroni correction was applied to control the occurrence of a type I error in *post-hoc* tests [29]. After adjustment of significance level ($\alpha/4 = 0.012$), the analyzes confirmed the significance of the differences in “Defensive self-enhancement” scale between the results of participants with body piercing(s) and individuals with no body modifications ($U(N_{\text{pierced}} = 60, N_{\text{non-modified}} = 268) = 77.29$; $z = 3.36$; $p = 0.005$).

Table 2. Differences revealed due to the possession and type of body modification

	Control group n = 268		Tattoo/s n = 133		Body piercing/s n = 60		Tattoo/s & Body piercing/s n = 96		H	df	p	E ² _R
	Mdn	IQR	Mdn	IQR	Mdn	IQR	Mdn	IQR				
Age	22.00	8	23.00	7	22.00	4	22.00	3	12.65	3	0.005	0.02
Defensive self-enhancement	49.00	13	48.00	13	43.00	15	47.00	17	11.95	3	0.008	0.02
Personal power	32.00	10	35.00	10	31.50	11	35.00	12	13.07	3	0.004	0.02
Body functioning	30.50	12	32.00	14	31.00	12	28.00	14	11.61	3	0.009	0.02
Depression	10.00	6	10.00	8	12.00	9	11.00	9	10.163	3	0.017	0.02

Mdn – median; IQR – interquartile range; H – test value; p – significance; E²_R – Epsilon-squared

In the “Personal power” scale, the *post-hoc* tests with Bonferroni adjustment showed that tattooed people scored significantly higher than those without body modifications ($U(N_{\text{non-modified}} = 268, N_{\text{tattooed}} = 133) = -58.58$; $z = -3.44$; $p = 0.004$).

Adjusted *post-hoc* tests confirmed that people with tattoo(s) obtained higher scores on the “Body functioning” scale compared to participants with tattoo(s) and body piercing(s) ($U(N_{\text{pierced \& tattooed}} = 96, N_{\text{tattooed}} = 133) = 70.49; z = 3.27; p = 0.006$).

General health status

It was shown that the type of body modification was related to the number of depressive symptoms presented. *Post-hoc* tests revealed that people with body piercing presented higher results in this regard than those without body modifications ($U(N_{\text{non-modified}} = 268, N_{\text{pierced}} = 60) = -68.65; z = -3.01; p = 0.003$) and also than tattooed participants ($U(N_{\text{tattooed}} = 133, N_{\text{pierced}} = 60) = -66.17; z = -2.67; p = 0.008$). However, after the application of Bonferroni correction, the significance of these differences was not confirmed ($ps > 0.016$).

Mediation analyzes

Due to the failure to meet the assumptions for the classic Sobel test, the mediation analysis were performed using the Process v. 3.5 overlay for SPSS v. 26 [30]. The calculations were made using the bootstrap method with 5,000 iterations, at least 95% confidence interval was adopted. In most cases mediation analyzes were carried out using the model number 4, the model number 6 was used in one case.

Based on the correlation matrix, the most closely related variables were selected in order to try to identify modeling factors, and thus maximize the probability of observing the revealed effects. Models which revealed the process that directly mediates between the independent and dependent variables are presented below [30]. The effects were considered significant when the limits of the confidence intervals of the mediators did not cross zero [31].

The relationship between the lack of body modifications and moral self-approval was related to the age of the participants, all standardized coefficients were statistically significant ($p < 0.01$). The total effect was $B = 0.23, p < 0.01$; direct effect $B = 0.18, p < 0.05$, and indirect effect $B = 0.06$, in which 95% confidence remained in the range of 0.02–0.1

The relationship between the tattoo(s) and personal power was mediated by satisfaction with life ($p < 0.05$). The total effect of the model was $B = 0.31, p < 0.01$; direct effect $B = 0.26, p < 0.01$, and the direct effect of the variable $B = 0.05$, the confidence interval was between 0.01 and 0.11.

For the variables “body piercing(s)” and “tattoo(s) and body piercing(s)” the effect of intermediary variables on the relationship between individual body modifications and selected self-assessment scales was presented in a graphical form (see Figure 1 and 2).

Body piercing was associated with lower results on the “Defensive self-enhancement” scale, this process was moderated by lower age and symptoms of depression (Figure 1). Among participants with body piercing, the presented symptoms of depression decreased with age, but the defensive self-enhancement increased.

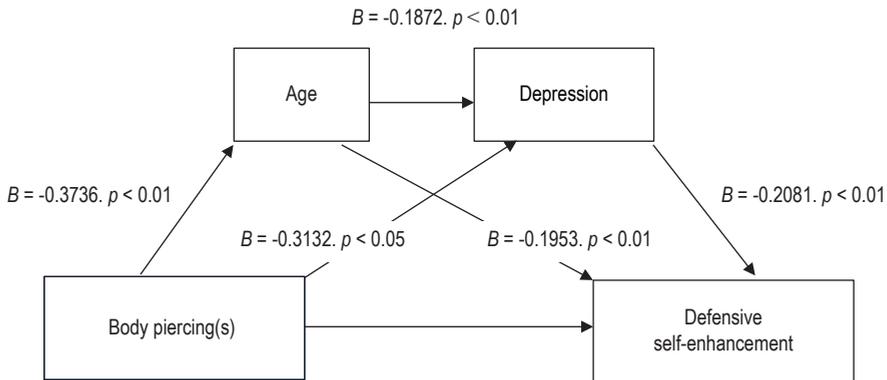


Figure 1. The effect of body piercing on the Defensive Self-Enhancement scale

Total effect: $B = -0.4245$, $p < 0.01$.

Direct effect: $B = -0.2718$, $p < 0.05$.

Indirect effect: $B = -0.1527$. Lower CI: -0.2416 . Upper CI: -0.0752 .

Tattoo(s) and body piercing(s) were associated with a lower result on the “Body functioning” scale, which was moderated by a lower level of moral self-approval. The indicated body modifications were associated with a lower level of moral self-acceptance, the higher result of which was related to better body functioning (Figure 2).

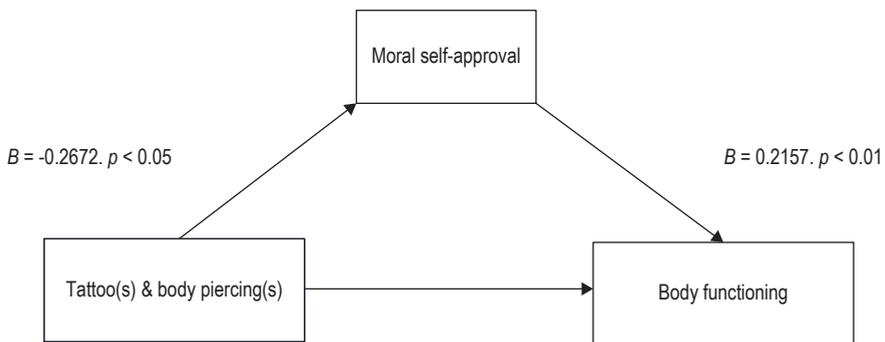


Figure 2. The effect of tattoo(s) and body piercing(s) on the body functioning

Total effect: $B = -0.3646$, $p < 0.01$.

Direct effect: $B = -0.2157$, $p < 0.01$.

Indirect effect: $B = -0.0576$. Lower CI: -0.1225 . Upper CI: -0.0046 .

In conclusion, the results presented above revealed differences between the study group and the control group, as well as within the study group – due to the type of modification, in selected scales of self-esteem and depression. The mechanisms of the

observed processes were also revealed. However, all disclosed effect sizes were less than small [32, 33].

Discussion

The replication results provided additional data, which did not confirm the assumed hypotheses of the original study [23] despite the ongoing COVID-19 pandemic. All study participants, regardless of the declaration of having a body modification, assessed their own resources as sufficient to cope with the difficult situation of the coronavirus epidemic.

All study participants (regardless of the declaration of having a body modification) declared life satisfaction during the pandemic. The effect was related to the sense of gratitude, and the perceived social support mediated this relationship [34]. Seeking and/or perceived receipt of emotional-cognitive or material support was a significant resource among the respondents as a factor protecting against dissatisfaction with life during an epidemic.

People with body modifications did not differ significantly from persons without such modifications in terms of self-esteem [15, 35], which was confirmed by the data obtained in this study. It is highly probable that, due to the large size of the groups and the high statistical power of the used tests, the intergroup differences in the self-assessment of their own functioning were random [32]. The original study revealed that people with body modifications assessed their own leadership abilities and competences better than people without such modifications. Having a tattoo in particular has been associated with higher self-esteem [23]. The replication provided data that the higher the satisfaction with life was declared by the tattooed participants of the study, the higher their assessment of their own functioning was. Increased self-esteem occurred in connection with the tattooing procedure [11]. However, the durability of the demonstrated effect is unknown.

Pierced (especially younger) individuals declared little need for social approval. They assessed themselves as independent and non-conformist, but they communicated a greater number of subjectively experienced depressive symptoms during the coronavirus epidemic than the rest of the study participants. It is possible that the perceived deterioration of mental state was related to a pandemic situation, which was probably temporary. It seems that this group of people may be more sensitive to anxiety-generating situations, and the symptoms of experiencing such situations probably took the form of somatization.

People who reported having tattoos and body piercing(s) rated themselves the lowest in terms of body functioning, especially when they reported a discrepancy between personal values and their own conduct. It seems that tattooed and pierced women tended to negatively assess their own body appearance and have low self-esteem [12]. They reported anxiety about the appearance of their body related to the socio-cultural expectations related to the body [11].

Fear of COVID-19 was associated with psychological distress and lower life satisfaction [36]. Declarations of the study participants indicate that self-esteem correctly

performed its function of preventing anxiety [26]. Younger people who reported having body piercing seemed more reactive than other participants to respond with lower moods to the situation of the coronavirus epidemic. The observed tendency should most probably be associated with the fact that younger people most often declared having body piercing. During the epidemic, it was the younger age that was revealed as a significant risk factor for clinical exacerbation of depressive symptoms [37]. However, the level of the declared subjective symptoms of a mental state disorder did not indicate an abnormal reaction to a difficult situation. It seems that the awareness of the personal resources declared by all study participants and the skills in using them constituted a sufficient protective factor for mental health during the coronavirus epidemic. Especially the higher level of meaning in life and life satisfaction, the intensity of which remained relatively stable, owing to basic hope, were associated with reduced anxiety and stress during the pandemic [38, 39].

The COVID-19 pandemic has revealed difficulties in maintaining mental hygiene. Psychoeducation, crisis interventions as well as psychological and psychiatric help can alleviate or remove the potential effects and consequences of acute mental distress associated with a perceived difficult situation. At the same time, it is worth trying to combat infodemicism in public health situations. It was revealed that exposure to social media was associated with a high probability of anxiety [40].

A simple answer to the title question – whether body modifications are a symbol of resources or rather risk, is practically impossible. Certainly, however, the fact of having tattoos and body piercing should not be equated as a significant risk factor deviating from the norm of mental functioning. It is possible that different, deviant forms of body modification would reveal real differences in self-esteem, life satisfaction and self-assessment of mental health.

Conclusions

1. Participants who claimed to have body modifications were aware of having and ability to use personal resources to cope with the difficult situation of the coronavirus epidemic to the same extent as people without body modifications.
2. Body modifications should not be treated as a risk factors and identified with low self-esteem, dissatisfaction with life and worse mental functioning.
3. Especially among tattooed people, self-esteem in terms of functioning increases with the increase in declared satisfaction with life.
4. Pierced, younger participants were the most non-conformist. They reported the highest number of subjectively perceived symptoms of depression, the severity of which remained within the normal range. Only age appeared to be a potential risk factor for clinical severity of depressive symptoms.
5. It is worth considering the analysis of functions and motives for making body modifications in the future.

References

1. Kluger N. *Epidemiology of tattoos in industrialized countries*. In: Serup J, Kluger N, Bäumlner W, editors. *Tattooed skin and health*. Basel: Karger Publishers; 2015. P. 6–20.
2. Shannon-Missal L. *Tattoo takeover: Three in ten Americans have tattoos, and most don't stop at just one*. The Harris Poll. 2016; 12. <https://theharrispoll.com/tattoos-can-take-any-number-of-forms-from-animals-to-quotes-to-cryptic-symbols-and-appear-in-all-sorts-of-spots-on-our-bodies-some-visible-in-everyday-life-others-not-so-much-but-one-thi/> (retrieved: 31.08.2020).
3. Solís-Bravo MA, Flores-Rodríguez Y, Tapia-Guillen LG, Gatica-Hernández A, Guzmán – Reséndiz M, Salinas-Torres LA et al. *Are tattoos an indicator of severity of non-suicidal self-injury behavior in adolescents?* *Psychiatr. Investing* 2019; 16(7): 504–512.
4. Birmingham L, Mason D, Grubin D. *The psychiatric implications of visible tattoos in an adult male prison population*. *J. Forensic Psychiatr.* 1999; 10(3): 687–695.
5. D'Ambrosio A, Casillo N, Martini V. *Piercings and tattoos: Psychopathological aspects*. *Act. Nerv. Super. Rediviva* 2013; 55(4): 143–148.
6. Vizgaitis AL, Lenzenweger MF. *Pierced identities: Body modification, borderline personality features, identity, and self-concept disturbances*. *Personal. Disord.* 2019; 10(2): 154–162.
7. Doss K, Ebesu Hubbard AS. *The communicative value of tattoos: The role of public self-consciousness on tattoo visibility*. *Commun. Res. Rep.* 2009; 26(1): 62–74.
8. Mun JM, Janigo KA, Johnson KK. *Tattoo and the Self*. *Cloth. Text. Res. J.* 2012; 30(2): 134–148.
9. Roggenkamp H, Nicholls A, Pierre JM. *Tattoos as a window to the psyche: How talking about skin art can inform psychiatric practice*. *World J. Psychiatr.* 2017; 7(3): 148–158.
10. Ball J, Elsner R. *Tattoos increase Self-esteem among college students*. *Coll. Student J.* 2019; 53(3): 293–300.
11. Swami V. *Marked for life? A prospective study of tattoos on appearance anxiety and dissatisfaction, perceptions of uniqueness, and self-esteem*. *Body Image* 2011; 8(3): 237–244.
12. Hill BM, Ogletree SM, McCrary KM. *Body modifications in college students: Considering gender, self-esteem, body appreciation, and reasons for tattoos*. *Coll. Student J.* 2016; 50(2): 246–252.
13. Kertzman S, Kagan A, Hegedish O, Lapidus R, Weizman A. *Do young women with tattoos have lower self-esteem and body image than their peers without tattoos? A non-verbal repertory grid technique approach*. *PLoS One* 2019; 14(1): e0206411.
14. Broussard KA, Harton HC. *Tattoo or taboo? Tattoo stigma and negative attitudes toward tattooed individuals*. *J. Soc. Psychol.* 2018; 158(5): 521–540.
15. Swami V, Pietschnig J, Bertl B, Nader IW, Stieger S, Voracek M. *Personality differences between tattooed and non-tattooed individuals*. *Psychol. Rep.* 2012; 111(1): 97–106.
16. Skoda K, Oswald F, Brown K, Hesse C, Pedersen CL. *Showing skin: Tattoo visibility status, egalitarianism, and personality are predictors of sexual openness among women*. *Sex. Cult.* 2020; 24: 1–22.
17. King KA, Vidourek RA. *Getting inked: Tattoo and risky behavioral involvement among university students*. *Soc. Sci. J.* 2013; 50(4): 540–546.
18. Giles-Gorniak AN, Vandehey MA, Stiles BL. *Understanding differences in mental health history and behavioral choices in a community sample of individuals with and without body modifications*. *Deviant Behav.* 2016; 37(8): 852–860.
19. Swami V, Gaughan H, Tran US, Kuhlmann T, Stieger S, Voracek M. *Are tattooed adults really more aggressive and rebellious than those without tattoos?* *Body Image* 2015; 15: 149–152.

20. Roy D, Tripathy S, Kar SK, Sharma N, Verma SK, Kaushal V. *Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic*. Asian J. Psychiatr. 2013; 51: 102083.
21. Huang Y, Zhao N. *Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: A web-based cross-sectional survey*. Psychiatry Res. 2020; 288: 112954.
22. Roberti JW, Storch EA. *Psychosocial adjustment of college students with tattoos and piercings*. J. Coll. Couns. 2005; 8(1): 14–19.
23. Pajor AJ, Broniarczyk-Dyła G, Świtalska J. *Satisfaction with life, self-esteem and evaluation of mental health in people with tattoos or piercings*. Psychiatr. Pol. 2015; 49(3): 559–573.
24. Faul F, Erdfelder E, Lang AG, Buchner A. *G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences*. Behav. Res. Methods 2007; 39(2): 175–191.
25. Juczyński Z. *Narzędzia pomiaru w promocji i psychologii zdrowia*. Warsaw: Psychological Test Laboratory of the Polish Psychological Association; 2001. P. 167–174.
26. Fecenec D. *Wielowymiarowy Kwestionariusz Samooceny MSEI. Polska adaptacja. Podręcznik*. Warsaw: Polish Psychological Association; 2016.
27. Makowska Z, Merecz D. *Ocena Zdrowia Psychicznego na podstawie badań Kwestionariuszami Davida Goldberga. Podręcznik dla użytkowników Kwestionariuszy GHQ-12 i GHQ-28*. Lodz: Nofer Institute of Occupational Medicine; 2001.
28. Dunn OJ. *Multiple comparisons using rank sums*. Technometrics 1964; 6(3): 241–252.
29. Bland JM, Altman DG. *Multiple significance tests: The Bonferroni method*. Brit. Med. J. 1995; 310(6973): 170.
30. Hayes AF. *Introduction to mediation: A regression-based approach*. New York: Guilford Press; 2013.
31. Preacher KJ, Hayes AF. *Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models*. Behav. Res. Methods 2008; 40(3): 879–891.
32. Coe R. *It's the effect size, stupid*. Paper presented at the British Educational Research Association annual conference, Exeter, 12–14 September, 2002. <https://f.hubspotusercontent30.net/hubfs/5191137/attachments/ebe/ESguide.pdf> (retrieved: 1.01.2022).
33. Cohen J. *Statistical power analysis for the behavioral sciences (2nd edition)*. New York: Lawrence Erlbaum Associates; 1988.
34. Kong F, Ding K, Zhao J. *The relationships among gratitude, self-esteem, social support and life satisfaction among undergraduate students*. J. Happiness Stud. 2015; 16(2): 477–489.
35. Hong BK, Lee HY. *Self-esteem, propensity for sensation seeking, and risk behaviour among adults with tattoos and piercings*. J. Public Health Res. 2017; 6(3): 1107.
36. Satici B, Gocet-Tekin E, Deniz ME, Satici SA. *Adaptation of the fear of COVID-19 Scale: Its association with psychological distress and life satisfaction in Turkey*. Int. J. Ment. Health Addict. 2021; 19(6): 1980–1988.
37. Gambin M, Sękowski M, Woźniak-Prus M, Wnuk A, Oleksy T, Cudo A et al. *Generalized anxiety and depressive symptoms in various age groups during the COVID-19 lockdown in Poland. Specific predictors and differences in symptoms severity*. Compr. Psychiatry 2021; 105: 152222.
38. Trzebiński J, Cabański M, Czarnecka JZ. *Reaction to the COVID-19 pandemic: The influence of meaning in life, life satisfaction, and assumptions on world orderliness and positivity*. J. Loss Trauma 2020; 25: 544–557.

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39. Wang C, Pan R, Wan X, Tan Y, Xu L, McIntyre RS et al. *A longitudinal study on the mental health of general population during the COVID-19 epidemic in China*. *Brain Behav. Immunity* 2020; 87: 40–48.
 40. Gao J, Zheng P, Jia Y, Chen H, Mao Y, Chen S et al. *Mental health problems and social media exposure during COVID-19 outbreak*. *Plos One* 2020; 15(4): e0231924.

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