Mental health of yoga practitioners in relation to exercise parameters

Abstract of PhD Thesis

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1. Introduction

Mental health problems such as distress and stress-related disorders such as anxiety and depression are the leading sources of disability among adults worldwide (Shyn and Hamilton 2010, Ventriglio et al. 2015). Anxiety is the strongest predictor of depressive symptoms (Mathew et al. 2011). Distress, anxiety and depression are closely related, exposure to chronic stress can have a cumulative effect on the body as an allostatic load (McEwen 2003), which can lead to permanent injury or disability. When chronic stress exceeds an individual's physical and mental coping capacity (Taylor et al. 2010), the sympathetic nervous system is overstimulated, which can lead to reduced coping and long-term physical and mental health. Innate sensitivity and learned coping strategies are important factors in an individual's ability to respond to chronic stressors associated with depression and to daily life stressors (Kinser et al. 2012). Dealing with distress can play an important role in maintaining the mental and physical health of modern people. Mind-body interventions are commonly used to reduce depression, with yoga being one of the most commonly used such methods (Cramer et al. 2013).

1.1. Yoga as a mind-body practice

Among the different styles of yoga, the various styles of hatha yoga have spread the most in Western societies as a modern yoga practice (Tornóczky 2013). The Sanskrit word yoga comes from the verb "yuj", which means both connection, unity (connection with our spiritual nature and the "Supreme") and yoking, which suggests that through practice the yogi can control his body and mind (Hidas et al. 2000, Tornoczky 2013, Ushaurb and Litt 1986). Practicing yoga is originally a path of spirituality (Feuerstein 1998). Yoga is not a homogeneous series of exercises, but consists of subcomponents (Birdee et al. 2008, Büssing et al. 2012), such as physical postures (asana), breathing exercises (pranayama), relaxation and meditation (dhyana), as well as lifestyle habits and spiritual teachings.

De Michelis (2004), in his article presenting the history of modern yoga, mentions yoga as a "double-faced" method, as: 1. health-preserving and fitness activity, 2. complementary and alternative medicine (CAM). Among the CAM methods, yoga is one of the mind-body interventions (MBI) (Neuendorf et al. 2015, Weber et al. 2020) along with other methods such as meditation, various relaxation techniques, Tai Chi and Qigong

(Yang et al. 2021). According to the results of the available studies, the popularity of yoga and the number of yoga practitioners are constantly increasing internationally (Ding and Stamatakis 2014, Mishra et al. 2020, Vergeer et al. 2017, Zhang et al. 2021).

1.2. The effects of yoga

Yoga as a mind-body exercise is recommended for maintaining and improving mental health, as several studies have proven its effectiveness in various fields (Field 2016, Ross and Thomas 2010). Such areas include reducing depression, anxiety and distress (Cramer et al. 2013, Kaushik et al. 2020, Wang and Szabó 2020); maintaining and improving certain areas of mental well-being (Dominiques 2018, Govindaraj et al. 2016); reducing multiple physical symptoms (Telles et al. 2012, Yoshihara et al. 2014); providing a positive coping strategy for distress (La Torre et al. 2020); improving physical function and health-related quality of life (Sivaramakrishnan et al. 2019); increasing the spiritual well-being of yoga practitioners (Büssing et al. 2012, Csala et al. 2021).

The majority of yoga practitioners (96.1%) describe themselves as having good or very good general health, and 87.7% consider that their health has improved since starting yoga (Cramer et al. 2019). According to the yoga practitioners opinions, yoga improves their general state of health (89.5%), their energy level (84.5%), the quality of their sleep (68.5%) and their body weight is optimized (57.3%). All of these observations were independent of gender and ethnicity (Ross et al. 2013).

1.3. Spiritual Health and Life-Orientation Measure (SHALOM)

The concept of spiritual well-being grew out of positive psychology research investigating the relationship between spirituality and health (Fisher et al. 2000, Moberg 2008). The self-characteristic SHALOM questionnaire was created by Fisher (1999), which consists of two parts (evaluative aspects): one measures *life orientation* (people's ideals), while the other measures *spiritual health* (lived experiences). For the sake of simplicity, we will characterize these two evaluations with the words *importance* and *realization*. The theoretical model underlying the questionnaire measures four main dimensions of spiritual well-being: *personal*, *social*, *environmental* and *transcendental* (Fisher, 2010). The SHALOM questionnaire has been successfully used in many countries (Fisher 2010, 2016, Fisher and Brumley 2008, Gomez and Fisher 2003, 2005).

During a review of questionnaires measuring spiritual well-being, de Jager Meezenbroek et al. (2012) concluded that the Spiritual Transcendence Scale (STS) and SHALOM questionnaires are the best from a psychometric point of view. Considering several comprehensive aspects, SHALOM proved to be the most reliable tool for measuring spiritual well-being, which can be used both in normative and clinical samples.

In summary, it can be said that SHALOM comprehensively measures spiritual well-being, so it can be applied to healthy and clinical samples regardless of age, cultural background, or religious affiliation.

1.4. Contradictions and gaps in research

Regarding the exercise parameters of yoga practitioners, large cross-sectional studies have unanimously shown that the weekly frequency of yoga is positively related to variables indicating health status, but at the same time, the results related to the duration of yoga (number of years) are contradictory (Cartwright et al. 2020, Cramer et al. 2019, Ross et al. et al. 2013).

Researchers draw attention to the fact that there are areas of deficiency that would need to be investigated at the international level among yoga practitioners. These include: examining spirituality (MacDonald 2013), examining physical symptoms (somatization) closely related to mental health (Yoshihara et al. 2014), and assessing health-related variables with more detailed/reliable measurement tools (Park et al. 2016). Furthermore, it would also be important to use surveys comparing yoga practitioners with other active control groups (Field 2016, Hendriks et al. 2017).

2. Objectives and hypotheses

The focus of our research is the examination of the areas of deficiency that emerged as a result of the literature analyses, as well as the adaptation of the internationally recognized measuring instrument of spiritual health into Hungarian.

In order to achieve all these goals, we divided our research into three parts. The first research examines the mental and physical health of yoga practitioner women in relation to yoga parameters at the national level. In this study, we analyzed the correlations of the time and weekly frequency of yoga - as category variables - with the values of the indicators of mental and physical health. In the second research, during the period of the

second wave of the COVID-19 pandemic, under strict restrictions, we conducted a survey among yoga practitioners in the field of general well-being and experiences related to the pandemic. During this research, we examined the relationship between the weekly frequency of yoga and the level of well-being in an environment saturated with increased distress. In the third research: on the one hand, the adaptation and psychometric analysis of the Spiritual Health and Life-Orientation Measure (SHALOM) was carried out in Hungarian, and on the other hand, we analyzed the possible changes in the values of spirituality, mental well-being and physical symptoms in students who practice yoga in university class, compared to an active control group.

Before the three study, we formulated the following hypotheses:

First study: Correlations of yoga parameters with mental health indicators and somatization

H1: According to the yoga practice time, the mental and physical health indicators of the advanced group are significantly better compared to beginners and intermediates;

H2: The mental and physical health indicators of those who practice yoga at least 3 times a week are significantly better than those who practice yoga 1-2 times a week.

Study Two: Associations of weekly frequency of yoga with mental health and the COVID-19 pandemic

H3: More than half of yoga practitioners find yoga useful in the context of the COVID-19 pandemic in terms of prevention, symptom relief and adjunct to medical treatment;

H4: There are psychosomatic, psychological and infectious diseases, the majority of yoga practitioners have positive experiences in the treatment of their symptoms, some of which also appeared during the COVID-19 pandemic;

H5: A positive relationship can be assumed between the weekly frequency of yoga and the values of mental health, as well as the perception of the usefulness of yoga in relation to the COVID-19 pandemic.

Study Three 1.: Adaptation and psychometric analysis of the Spiritual Health and Life-Orientation Measure (SHALOM) in Hungarian

The SHALOM measuring instrument has already been used in several Hungarian studies, and the first experiences were reported at the XXII. National Scientific Congress of the Hungarian Psychological Society (Rózsa et al. 2013), but the detailed psychometric examination of the measuring instrument has not yet been carried out. With our study, we want to document the psychometric characteristics of the Hungarian version of SHALOM and check the construct validation and internal reliability of the measuring instrument. With this, we want to contribute to the expansion of the toolbox of research examining spirituality in our country.

Study Three 2.: The correlation of once a week yoga practice with spirituality, well-being and physical symptoms among students

H6: Yoga practice leads to a positive, significant change in the field of spirituality;

H7: An improvement in the hedonic and eudaimonic well-being of psychology is expected during the practice of both yoga and sports;

H8: Yoga and sports activities contribute positively to the reduction of physical symptoms;

H9: Overall, there is no significant difference between the results of the yoga and sports groups of university students based on the pretest and posttest.

3. Methods

3.1. Sample and procedure

During the first and second cross-sectional research, we conducted a national-level study with the support of the Hungarian Yoga Instructors Association (MJSZ), during which we sent out e-mails to yoga instructors and yoga studios and through them invited yoga practitioners to participate. Data collection for the first survey took place between November 2015 and February 2016, and for the second survey between April 17 and May 17, 2021. Sampling was done using the snowball method until the specified deadline. During the third, follow-up research, we used a quasi-experimental test method. Students of the ELTE Faculty of Special Education and full-time students of the Faculty of Economics of the University of Debrecen participated in the study in the spring semester of 2015. Out of the total number of 617 students (the total number of participants in physical education classes), 437 filled out the questionnaires for the first time. In the

second step - after the 10th week - 318 students filled out the questionnaire repeatedly, who continuously attended all 10 PE classes. A total of 28 persons were excluded from the further analysis, 26 of whom had incomplete questionnaires, and another 2 persons showed extreme outliers.

The first study sample consisted of 457 healthy women, age: 18-74 years (M = 42.28 years, SD = 11.72 years), 72.3% of the test subjects are yoga practitioners and 27.7% are yoga instructors. In the second study, 379 yoga practitioners took part under the restrictions of the second wave of COVID-19. Most of the respondents were women, 354 (93.4%), aged between 20 and 75 (M = 44.13, SD = 10.06). The average number of years the respondents had practiced yoga was 8.14 years (SD = 6.29), which ranged from one month to thirty-one years of practice. 16.4% (62 people) of those interviewed were patients with COVID-19 among the 379 individuals participating in the study. During the third study, 437 university students filled in the questionnaires (75.8% female), the youngest person who filled in was 18, while the oldest was 31 years old (M = 21.6 years, SD = 1.8 years).

All three researches were approved by the ELTE PPK Research Ethics Committee with the following license numbers: 2015/49, 2015/224, 2021/240.

3.2. Applied methods

In all three studies, in addition to socio-demographic data, the focus of the research was the assessment of indicators of mental health and related physical symptoms. During the first examination, depression, anxiety, stress, positive and negative affectivity, subjective health status and subjective somatic symptoms were examined. In the second study, we assessed the general well-being and the experiences of yoga practitioners regarding the COVID-19 pandemic. In the first part of the third study, we performed a psychometric analysis of the Hungarian version of the Spiritual Health and Life-Orientation Measure (SHALOM), in the second part, we measured the indicators of the yoga group in the areas of spirituality, general and psychological well-being, life satisfaction and subjective physical symptoms with a follow-up quasi-examination.

During the tests, we used the following measuring instruments: WHO Well-Being Index (WBI-5; Bech et al. 1996; Hungarian version: Rózsa et al. 2003, Susánszky et al. 2006); Depression Anxiety Stress Scale-21 (DASS-21,; Lovibond and Lovibond 1995,

Henry and Crawford, 2005; Hungarian version: Szabó 2010); Satisfaction with Life Scale (SWLS; Diener et al. 1985; Hungarian version: Martos et al. 2014); Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker 1982; Hungarian version: Rózsa és Kő 2007); The Positive and Negative Affect Schedule (PANAS; Watson et al. 1988; Hungarian version: Rózsa et al. 2008); Scales of Psychological Well-Being (SPWB; Ryff and Keyes 1995; Hungarian version: Oláh 2012); Spiritual Health and Life-Orientation Measure (SHALOM; Fisher 1999; Hungarian version: Tornoczky et al. 2022); Subjective health status question: Overall, how do you rate your health status? (The question was previously part of the Hungarostudy Health Panel, Susánszky et al. 2007); Patient Health Questionnaire Somatic Symptom Severity Scale (PHQ-15; Kroenke et al. 2002; Hungarian version: Salavecz et al. 2006).

3.3. Data processing methods

The variables used in the statistical analyzes were nominal, ordinal and scale variables. To analyze the data, we first performed descriptive statistical analyses such as mean (M), standard deviation (SD) and frequency (main, %). After that, normality was checked with several methods, such as the Shapiro-Wilk test or the consideration of skewness and kurtosis on samples of different sample sizes (Kim 2013). Depending on the results obtained after the normality test, we used parametric (normal distribution) and non-parametric (violation of normality) statistical procedures to test the relationships between the groups and the measured variables.

In the statistical analyses, the fixed level of significance was $\alpha = 0.05$ (the result was considered statistically significant if $p < 0.05$). An exception to this are the Bonferroni *post hoc* analyzes (following the Kruskal-Wallis *H*-test), for which the corrected level of significance was $\alpha = 0.017$. Table 1, which presents the methodology of the studies included in the dissertation, also details the used statistical methods.

Statistical analyzes were performed using IBM SPSS Statistics for Windows v26.0 (IBM Corp. Released 2017 Armonk, NY: IBM Corp.).

Table 1. Presentation of the studies included in the dissertation

	Sample	Measured parameters (construct)	Tools	Applied statistics	Indicators
Study 1. cross-sectional	**N** = 457 (female) **Age:** 18–74 years (M = 42.3, SD = 11.7) **Education:** 72.1% higher education, 27.2% secondary education	depression, anxiety, stress; positive and negative affect; self-rated health; subjective somatic symptoms	*DASS-21* *PANAS* *SRH* *PHQ-15*	Non-parametric procedures: Kruskal–Wallis *H*-test, Mann–Whitney *U*-tests	chi-square value ($\chi 2$), eta-squared ($\eta 2$), Cohen's (*d*), significance value (*p*) Bonferroni corrected $\alpha = 0.017$
Study 2. cross-sectional	**N** = 379 (93.4% female) **Age:** 20–75 years (M = 44.1, SD = 10.1) **Education:** 75.2% have higher education, 24.3% have secondary education	general well-being; questions revealing the connection between yoga and COVID-19	*WBI-5* COVID-19 and yogis' perception s questions	Parametric procedures: ANOVA and Bonferroni post-hoc tests, cross-tab analysis and Chi-square test	chi-square value ($\chi 2$), partial eta-squared (η_p^2), significance value (*p*) $\alpha = 0.05$
Study 3.1 adaptation	**N** = 437 (75.8% female) **Age:** 18–31 years (M = 21.6, SD = 1.8) **Education:** university students	spirituality; life satisfaction; general well-being	*SHALOM* *SWLS* *WBI-5*	Non-parametric procedures: exploratory bifactor analysis, confirmatory factor analysis, internal reliability, temporal stability, construct validity	KMO-index, Cronbach-α index, chi-square ($\chi 2$), degrees of freedom (*df*), RMSEA, CFI, TLI, Kendall's correlation coefficient, significance value (*p*) $\alpha = 0.05$
Study 3.2 follow-up	**N** = 290 (81% female) **Age:** 19–29 years (M = 21.5, SD = 1.7) **Education:** university students	spirituality; general and psychological well-being; life satisfaction; physical symptoms	*SHALOM* *WBI-5* *SPWB* *SWLS* *PILL*	Non-parametric procedures: Wilcoxon signed rank test, Mann–Whitney *U*-tests	Cohen's (*d*), significance value (*p*) $\alpha = 0.05$

Note: during the 3rd study in the 3.2 quasi-study, not all respondents filled out the questionnaire a second time after 10 weeks. DASS-21 = Depression Anxiety Stress Scale, PANAS = Positive and Negative Affect Schedule, SRH = Self-rated Health, PHQ-15 = *Patient Health Questionnaire Somatic Symptom Severity Scale*, WBI-5 = WHO Well-Being Index, SWLS = Satisfaction with Life Scale, SHALOM = Spiritual Health and Life-Orientation Measure, PILL = Pennebaker Inventory of Limbic Languidness, SPWB = Scales of Psychological Well-Being, KMO = Kaiser–Meyer–Olkin test, RMSEA = root mean square error of approximation, CFI = comparative fit index, TLI = Tucker-Lewis index

4. Results

4.1. First study: Correlations of yoga practice parameters with mental health indicators and somatization

Correlations of yoga practice time with mental health and somatization

The results of the Kruskal-Wallis *H*-test: we found a statistically significant difference in depression ($\chi 2(2, n = 457) = 23.205$; $p < 0.001$), anxiety ($\chi 2(2, n = 457) = 9.489$; $p = 0.009$), stress ($\chi 2(2, n = 457) = 27.224$; $p < 0.001$), positive affect ($\chi 2(2, n = 456) = 7.689$; $p = 0.021$), negative affect ($\chi 2(2, n = 456) = 46.177$; $p < 0.001$), subjective health status ($\chi 2(2, n = 457) = 28.862$; $p < 0.001$) and scores on the Patient Health Questionnaire Somatic Symptom Severity Scale ($\chi 2(2, n = 455) = 26.022$; $p < 0.001$). A medium effect size difference was observed in the case of negative affect, and small effect size differences were observed for the other measured variables.

Post hoc Mann-Whitney *U*-tests showed a statistically significant pairwise difference between the beginner and intermediate groups in the area of stress, and between the intermediate and advanced groups in depression, stress, negative affect, subjective health status and subjective physical symptoms. Furthermore, between the beginner and the advanced group, both in terms of depression, anxiety, stress, positive and negative affect, subjective health status and subjective physical symptoms.

A medium effect size (Cohen-$d = 0.32$) difference was observed for negative affect, and small effect size differences for the other measured variables, $0.15 <$ Cohen-$d < 0.27$. Those who have practiced yoga for three or more years showed the best values in all cases.

Correlations of the weekly frequency of yoga practice with mental health and somatization

Comparisons were made using the Mann-Whitney *U*-test. Between the two groups based on the frequency of yoga (1–2 vs. 3–7 times a week), we also found a significant pairwise difference in depression ($U(1) = 19148.50$; $n1 = 161$; $n2 = 295$; $Z = –3.508$; $p < 0.001$), stress ($U(1) = 19588.50$; $n1 = 161$; $n2 = 295$; $Z = –3.107$; $p = 0.002$), positive affect ($U(1) = 18189.00$; $n1 = 161$; $n2 = 294$; $Z = –4.090$; $p < 0.001$), negative affect (U(1)

= 18456.50; n1 = 161; n2 = 294; Z = –3.894; p < 0.001), subjective health status (U(1) = 18244.00; n1 = 161; n2 = 295; Z = –4.873; p < 0.001) and the score on the Patient Health Questionnaire Somatic Symptom Severity Scale (U(1) = 19777.50; n1 = 160 ; n2 = 294; Z = –2.817; p = 0.005). A small effect was detected for all measured variables, 0.13 < *d* < 0.23. According to these results, the mental health of those who do yoga 3-7 times a week shows a better value.

4.2. Study Two: Associations of weekly frequency of yoga with mental health and the COVID-19 pandemic

The perceived usefulness of yoga as prevention, symptom relief and adjunct to medical treatment

Participants believed that yoga practice played an important role during the COVID-19 pandemic in preventing infection, alleviating symptoms, and supplementing medical treatments. Experiences related to prevention showed the most outstanding results, 92.3% of respondents considered yoga useful or very useful. Somewhat less people considered it useful and very useful to practice yoga to relieve symptoms during the pandemic (73.1%) and to supplement medical treatments (75.5%).

Perceived effects of yoga practice in the treatment of previous illnesses

Yoga practitioners indicated in the survey the extent to which they personally experienced the effects of yoga before the pandemic in relation to the following psychosomatic, psychological and infectious diseases: respiratory complaints, joint problems, flu symptoms, pain relief, depression or anxiety and other diseases. Most of the respondents reported that they experienced a definite positive effect as a result of practicing yoga, or that they did not suffer from the above-mentioned diseases at all. Pain relief (77.6%), joint problems (67.8%), and depression and anxiety (62.5%) were the leading health problems for which yoga practitioners experienced a definite positive effect from yoga.

The relationship between the weekly frequency of yoga and general well-being and the perceived usefulness of yoga in relation to the COVID-19 pandemic (prevention, symptom relief and adjunct to medical treatment)

The average value of general well-being was 9.07 ± 3.31 points. The one-way ANOVA analysis showed that there was a statistically significant difference between the yoga groups according to the weekly frequency (once a week, 2-3 times a week, 4-5 times a week, daily) in the overall total score of well-being (WBI-5), $F(3, 373) = 12.97$, $p < 0.001$, $\eta_p^2 = 0.094$. Bonferroni post hoc tests revealed significant pairwise differences between the groups practicing yoga: the group practicing yoga 2-3 times a week (M = 8.89, SD = 3.16) showed a higher well-being score than the group practicing yoga once a week (M = 7 .13, SD = 3.67); the 4-5 times a week group (M = 9.32, SD = 2.84) showed a higher level of well-being than the once-a-week yoga group; and the daily exercise group (M = 10.74, SD = 2.89) showed a higher level of well-being than the once a week, 2-3 times a week and 4-5 times a week groups. The 2-3 times a week and 4-5 times a week groups did not show a statistically significant difference in the well-being score.

The chi-square test showed that there is a significant positive correlation between the weekly frequency of yoga and the usefulness of yoga as a prevention of COVID19 cases, X^2 (9, N = 379) = 32.14, $p < 0.001$. The results also confirmed the association between the frequency of yoga practice and the alleviation of symptoms of COVID-19, X^2 (9, n = 379) = 18.05, p = 0.035. A similar positive correlation was demonstrated between the weekly frequency of yoga and the positive role of yoga in the medical complementary treatment of COVID-19 symptoms, X^2 (9, n = 379) = 18.02, p = 0.035.

4.3. Study Three 1.: Psychometric characteristics of the Hungarian version of the Spiritual Health and Life Orientation-Measure (SHALOM)

Exploratory factor analysis and examination of the reliability of SHALOM

The Kaiser-Meyer-Olkin (KMO) index used to estimate one of the important criteria of the factor analysis, the homogeneity of the data, was acceptable for both aspects (importance and realization) (KMO = 0.88). The principal component analysis indicated five dimensions with an eigenvalue greater than 1 (5.7; 3.4; 1.9; 1.1; 1.0) in the SHALOM importance version, while four in the realization version (5.9; 3.5; 2.0; 1.5). The

components capture 66.6% (importance) and 64.9% (realization) of the total variance explained by all the items. Considering the original 4-factor structure and the low eigenvalue given as fifth when analyzing the importance items, we further examined the 4-factor arrangement of the items.

In both aspects of SHALOM (importance and realization), the first factor was made up of items referring to transcendence. In the case of both aspects, the items are highly weighted on the Transcendental dimension, as expected. The items with the higher order general factor (Fg) already gave a much lower factor weight. Among the items that make up the Social dimension, in the case of the aspect assessing importance, the factor weight of 2 out of 5 items (1. "love other people" and 3. "forgiving others") is lower than 0.3, and item 3 shows a slightly closer correlation with with a transcendental dimension, like the expected Social factor. On the other hand, during the evaluation of realization, the 5 items showed a close correlation with the Social dimension, as expected. However, the relationships given with the higher-order factor are adequate for all items. From the 5 items of the Personal dimension, for both aspects, item 18 ("recognizing the meaning of life") gives a factor weight lower than 0.3, but the association with the higher-order factor is acceptable here as well. Among the items that make up the Environmental dimension in both versions, item 7 ("to experience a breathtaking moment") shows low factor weights of less than 0.3 with the primary factor, but the correlations with the higher-order general factor are acceptable here as well.

The values of the Cronbach-α indicator showed acceptable reliability in all cases.

Confirmatory factor analysis of SHALOM

The values of the Cronbach-α indicator indicated acceptable reliability in all cases. With the help of the confirmatory factor analyses, we examined which of the unidimensional and 4-factor solutions with different models best fits our empirical data.

Considering the violation to the normality of our variables and the five-level response format, we used the robust estimation procedure recommended in such cases (Weighted Least Squares Mean and Variance adjusted, WLSMV), which does not require the variables to be normally distributed, and the categorical or ordinal questionnaire items recommended method of analysis (Brown 2006). In accordance with our expectations,

the best fit index for both aspects of SHALOM (importance and realization) was given by the bifactor structure: 4 primary and 1 general factor.

Examining the validity and test-retest stability of SHALOM

During the construct validity test, the SHALOM importance and realization ratings showed a significant, positive correlation with both the WBI-5 (general well-being) and the SWLS (life satisfaction), importance was weak, and realization was of medium magnitude. The SHALOM importance Personal dimension did not have a significant relationship with the WBI-5, but showed a significant, positive, weak correlation with the SWLS. The Social, Environmental and Transcendental dimensions of importance showed a statistically significant, positive, weak correlation with both the WBI-5 and the SWLS. The SHALOM realization Personal, Social, Environmental and Transcendental dimensions had a significant, positive, weak-moderate relationship with WBI-5 and SWLS.

The test-retest correlation between the 2 main scales was 0.85 and 0.78, which indicated acceptable test-retest stability. Among the subscales, Transcendental dimension showed the most high reliability coefficients.

4.4. Study Three 2.: The correlation of once a week yoga practice with spirituality, well-being and physical symptoms among students

Changes in spirituality within the yoga and sports group

According to the results of the Wilcoxon signed rank test, a statistically significant positive change was detected after 10 weeks of yoga practice in the following areas of spirituality (SHALOM) for the yoga group (n = 87): (general factor) importance assessment, T = 1858.5, z = -2.052, p = 0.040 and (general factor) realization evaluation, T = 2197, z = -2.064, p = 0.039, Personal dimension importance evaluation, T = 959, z = -2.19, p = 0.029, Transcendent dimension realization evaluation, T = 1097, z = -2.17, p = 0.030. Effect sizes were small: $0.16 < d < 0.22$. In the case of the other dimensions (Social, Environmental, Transcendental), no statistically significant differences were observed in the yoga group according to the two evaluations.

In the sports group (n=203), there were no statistically significant changes in the four dimensions of spirituality according to the two evaluations (importance, realization) and in the general factor either.

Changes within the yoga and sports group in general and psychological well-being and life satisfaction

Based on the pre- and post-test values, according to Wilcoxon signed rank tests, there was no statistically significant change in any of the variables between the measured results in the yoga and sports groups: general (WBI-5) and psychological (SPWB) well-being, as well as life satisfaction (SWLS) after 10 weeks.

Changes within the yoga and sports group in the field of physical symptoms

In the case of physical symptoms (PILL) in the yoga group (n = 87), no statistically significant changes were observed after the university physical education classes, according to the Wilcoxon signed rank test. In the group doing sports (n = 203), on the other hand, physical symptoms (PILL) showed a statistically significant negative change after 10 weeks of practice, T = 10568.5, z = -3.158, p = 0.002, with a small effect size, d = 0.22. A reduction in physical symptoms indicated better physical health.

Differences between yoga and sports groups

The results of the Mann-Whitney-*U* tests showed that there was no statistically significant difference between the yoga group and the sports group for the majority of the measured variables, considering the 28 variables.

When comparing the pretest, there was only one statistically significant difference between the yoga group and the sport group, for physical symptoms (PILL), U (1) = 7016.00, n1 = 87, n2 = 203, z = -2.446, p = 0.014. The level of physical symptoms in the sports group was lower, and the members of this group were in better health at the beginning of the semester.

When comparing the results of the post-test, three statistically significant differences were detected between the two groups. In the evaluation of the importance of spirituality (SHALOM), the Personal dimension U (1) = 7215.00, n1 = 87, n2 = 203, z = -2.535, p = 0.011; and the values of the Environmental dimension U (1) = 7219.00, n1 =

87, n2 = 203, z = -2.011, p = 0.044 were higher for the yoga group, indicating higher spirituality. Comparing the values of the physical symptoms (PILL) post-test, the values of the sport group were more favorable, U (1) = 6633.50, n1 = 87, n2 = 203, z = -2.989, p = 0.003.

5. Conclusions

5.1. Hypothesis testing

Based on our results, we can draw the following findings and conclusions regarding the formulated hypotheses.

H1: According to the results of our present research, the value of the mental and physical health indicators of the examined yoga practicing women shows a positive correlation with the number of years spent practicing yoga, thereby confirming our first hypothesis. Advanced yoga practitioners of 3 or more years showed more favorable health values in the areas of depression, anxiety, stress, positive and negative affectivity, subjective health status, and subjective physical symptoms compared to those who practiced yoga for less time.

H2: According to the differences, individuals who do yoga exercise several times a week have more favorable mental and physical health indicators overall, thus our second hypothesis was also confirmed. Women who practiced yoga 3-7 times a week showed more favorable values in the areas of depression, stress, positive and negative affectivity, subjective health status and subjective physical symptoms than those who practiced yoga 1-2 times a week. There was no detectable difference in terms of anxiety.

H3: The results confirmed our third hypothesis, that the majority of participants find practicing yoga useful or very useful for prevention (92.3%), relief of symptoms (73.1%) and use as a complementary medical treatment (75.5%) during the COVID-19 pandemic.

H4: In terms of pain relief, joint problems, depression and anxiety, this study identifies the diseases that the majority of respondents say yoga alleviates, and these are also partially affected symptoms of COVID-19; thus, the fourth hypothesis was also confirmed.

H5: During the COVID-19 pandemic, there was a difference in the value of well-being between the different weekly yoga practice groups. Daily yoga practice showed a

higher level of well-being than less weekly practice; and practicing 2-5 days showed a higher level than practicing once a week. By showing a positive relationship between the weekly frequency of yoga and general well-being, the fifth hypothesis was confirmed. The hypothesis also assumed that the weekly frequency of yoga and the assessment of the usefulness of yoga show a positive correlation in connection with the cases of COVID-19, this hypothesis was also proven during the analyses.

H6: The results confirm the sixth hypothesis of the research; statistically significant changes occurred in the values of spirituality after yoga during regular physical education classes, but no such changes were observed in the sports group. Overall, spirituality (a general factor) changed in a positive direction in the evaluation aspect of both importance and fulfillment; furthermore, the importance evaluation Personal dimension and the realization evaluation Transcendent dimension also showed positive changes.

H7: The results of our research did not support the seventh hypothesis, that improvements in general and psychological well-being and life satisfaction can be expected as a result of both yoga and sports physical education classes. The results showed no statistically significant positive changes in these variables.

H8: The eighth hypothesis formulated before the study, according to which yoga and playing sports both contribute positively to the reduction of physical symptoms, was only partially fulfilled. No change was detectable among the yoga practitioners, while the role of exercise in alleviating physical symptoms proved to be effective among those who practiced sports. At the same time, it is worth noting that, based on the average values of the yoga group, the direction of change was the decrease, although the extent of this was not statistically significant.

H9: Regarding the results of the pre-test, there was a significant difference between the yoga and sports groups regarding a single variable (physical symptoms). According to the results of the post-test, three variables (Personal and Environmental dimensions of spirituality, physical symptoms) showed differences between the two examined groups, taking into account a total of 28 variables (pre- and post-tests). Based on the results, the hypothesis that overall there is no significant difference between the two investigated groups was confirmed.

5.2. Suggestions and recommendations

Overall, based on our results, it can be concluded that those healthy yoga women have better health indicators, those who practice yoga for a longer time and those who do this activity several times a week. Yoga can be recommended for healthy adult women to maintain their mental and physical health and to alleviate symptoms such as depression, anxiety, stress, and medically unexplained or poorly explained somatic symptoms. We also consider yoga to be an effective tool for coping with stress. Based on our results, we can conclude that long-term yoga practice (in years) or repeating the physical exercises (asana) of yoga several times a week (at least 3 times) can provide the greatest health benefits.

The results of our research conducted during the second wave of the COVID-19 pandemic suggest that yoga practitioners who practice yoga more often per week have a higher general well-being. Those who practice yoga more often a week find the yoga method more useful in relation to pandemic treatment as prevention, symptom relief and the use as complementary therapy. Daily exercise provides the most health benefits. Regarding the future, yoga may be a recommended method during the pandemic and related restrictions, as it can be easily performed in a home environment, which is cost-effective and relatively safe. Regular practice of the physical postures (asanas) of yoga can be an effective preventive or complementary practice for mental health problems related to COVID-19.

Summarizing our research, we can say that the Hungarian version of the Spiritual Health and Life-Orientation Measure (SHALOM), which we recommend for use, meets the scientific requirements, and is therefore suitable for a reliable examination of the field, despite the fact that some items do not fit the special factors (subscales). We believe that our present research is useful and significant because it supports the internal reliability and validity of the spiritual well-being captured by the SHALOM questionnaire and its four sub-dimensions (Personal, Social, Environmental and Transcendental).

According to the results of our study, the spiritual well-being of university students increased by participating in yoga classes in relation to the importance and higher level of spiritual experiences. The effect of sports classes on alleviating physical symptoms is more favorable compared to yoga classes. Our results indicate that participation in a physical education class of 1.5 hours once a week is not enough for the magnitude of the effects to be significant. Overall, we found no significant difference between the general

effects of yoga and sports among students. In Hungary, the adult population mainly performs their leisure time physical activity at home, so it would be worthwhile to introduce yoga in university classes, as it can be a future exercise that can be easily practiced at home for them.

5.3. The novelty of our research

The research we carried out contributed tot he research area with the following new results:

1. We were the first in Hungary to attempt to conduct a nationwide survey on the yoga parameters and mental health of yoga practitioners, and researchers have already referred to this (Szabó et al. 2022). It is also significant that the variables measured in our study were examined in greater detail than in similar national surveys (Cartwright et al. 2020, Cramer et al. 2019). In addition, physical symptoms that fill gaps in yoga research (Yoshihara et al. 2014) were also assessed.

2. Examining the mental health of yoga practitioners during the pandemic, in conditions full of increased distress, provided valuable data and was included in a literature review dealing with the topic of complementary medicine in the context of yoga and COVID-19 (Capela Santos et al. 2023).

3. We completed the adaptation and psychometric analysis of the Spiritual Health and Life-Orientation Measure (SHALOM) in Hungarian, thereby contributing to the expansion of tools for measuring spirituality in Hungarian.

4. We also conducted a study in which we compared yoga practitioners with an active group doing sports, and there is a shortage in this field internationally (Field 2016, Hendriks et al. 2017). In our research program, we considered it important to include the examination of rarely assessed spirituality and physical symptoms.

List of publications

Publications related to the topic of the thesis

Tornóczky GJ, Bánhidi M, Karsai I, Nagy H, Rózsa S. (2023) A jógázó nők mentális és testi egészsége a gyakorlási paraméterekkel összefüggésben. Mentálhigiéné és Pszichoszomatika, 24(1): 58-74.

Tornóczky GJ, Rózsa S, Nagy H, Bánhidi M. (2022) Perceived usefulness of yoga to maintain well-being and in relation to COVID-19 cases among Hungarian yoga practitioners. J Sports Med Phys Fitness, 62(11): 1541-1551.
IF: 1.669

Tornóczky GJ, Bánhidi M, Karsai I, Nagy H, Rózsa S. (2022) A Spirituális Egészség- és Életorientáció Kérdőív (SHALOM) magyar nyelvű adaptációja és pszichometriai elemzése. Mentálhigiéné és Pszichoszomatika, 23(4): 433-463.

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