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Usefulness of controlled breathing in psychiatry. A review of recent findings. Part 1 – Eastern approach

Katarzyna Klasa, Jerzy A. Sobański, Krzysztof Rutkowski

Department of Psychotherapy, Faculty of Medicine, Jagiellonian University Medical College

Summary

The topic of this review is the clinical usefulness of techniques involving controlled breathing, based on Eastern traditions, aimed at restoring autonomic balance in psychiatry. Although these techniques have a long tradition as "relaxation methods", they gain additional meaning in the context of prolonged stress resulting from the ongoing COVID-19 pandemic. This review, however, is not limited to the pandemic; it also focuses on recent findings regarding clinical populations and provides basic information on the biological mechanisms of respiration and related markers (respiratory rate – RR and heart rate variability – HRV) and their use as effect indicators in research on the population of patients with mental disorders. On the basis of the available data from empirical studies and previous systematic and narrative reviews, it is possible to indicate the possible benefits of using techniques based on controlled breathing as a complementary method in the treatment of a number of mental health disorders. Possible side effects associated with the proposed techniques are also discussed.

Key words: HRV, controlled breathing, RR

Introduction

Controlled breathing, as a part of yoga, including Pranayama or meditation, is one of the oldest methods enabling dealing with negative emotional states and simultaneously promoting positive ones, like calmness, feelings of comfort or awareness. Those techniques are rooted in ancient Eastern cultures, especially of India [1, 2]. In Western culture, techniques connected with breath-control and influencing one's own autonomic nervous system were developed without spiritual or religious aspect, and include autogenic training, progressive muscle relaxation, and biofeedback/neurofeedback [3, 4]. They will be a topic of a separate review.

Why breathing in psychiatry?

Breathing is a key function of life, based on respiratory chest movement provided primarily by the main respiratory muscles (external and internal intercostal muscles and the diaphragm) and auxiliary respiratory muscles. It is controlled by the autonomic nervous system (ANS), but also responds to emotions and changes in the emotional state. The center responsible for metabolic breathing is the medulla oblongata and pons. Breathing can also be controlled voluntarily, due to complex connections between the brainstem and higher centers like the limbic system and frontal cortex. Emotions, not only current ones, but also anticipatory – e.g., anxiety, involve physiological changes within the entire body, including changes in respiratory patterns and respiratory rate [5]. Importantly, physiological changes reflecting ANS activation (sympathetic part) can occur unconsciously, faster than in the case of conscious cognition, so they may provide additional important information on the emotional experiences of an individual [6]. Thus, the emotional state influences respiratory pattern and vice versa, even when one is not aware of the process [7]. Negative emotions, like anxiety and fear, result in shallower, rapid breathing which may lead to decreased blood carbon dioxide levels. Unpleasant (and fearful) sensations like dyspnea or breathlessness are dependent on the emotional state of the individual [8]. It is worth reminding that the way of breathing (phase, depth) also influences the activity of the brain, which was observed both in studies with the use of animal models and in studies involving humans [4, 9].

Respiratory rate (RR) is one of the variables gaining increasing interest not only in healthcare, but also in sport and occupational contexts. When psychiatry (and psychotherapy) is considered, the role of respiratory rate as a clinical marker results from its sensitivity to changes in emotional valence and arousal. For example, it was shown to be higher in patients with panic disorder than in those with social phobia. It is also sensitive to cognitive load [10-12].

Another important biological marker, connected with breathing function, i.e., heart rate variability (HRV), refers to the variations in the time between each heartbeat and is recognized as a parameter to evaluate the sympatho-vagal balance [6, 13]. As the heart is controlled by both the parasympathetic and sympathetic part of the autonomic nervous system, HRV is linked to its mobilizing sympathetic and inhibitory parasympathetic influences. The frequency of heart rate fluctuations decreases along with an increase in sympathetic tone and inhibition of parasympathetic tone [14-16].

HRV may be measured as time differences between adjacent beat intervals ("time domain") or on the basis of power spectral analysis, detecting low (LF) and high (HF) frequency oscillation ("frequency domain"). As for the latter method, HF oscillation is believed to relate to the activity of the parasympathetic system, and LF to the activity of the sympathetic system [16].

Generally, high HRV is associated with more positive states of mind while low HRV with negative emotions, and such conditions like anxiety disorder and depression, but also e.g., cardiovascular disease and diabetes [6]. In the case of mental health

problems, ANS imbalance and especially decreased HRV was found in patients suffering from psychosis, depression, anxiety and phobias, social anxiety and somatoform disorders [12, 17-20], and alcohol dependence [21]. What is important, as Bandelow et al. [16] state in a recent review on biological markers for anxiety disorders, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD), HRV, being an easy to apply, non-invasive measure, seems to offer a degree of sensitivity (even if limited specificity) in anxiety disorders. It is also sensitive to treatment-related changes (both pharmacological and cognitive-behavioral therapy).

On the other hand, another interesting recent review, of studies on psychophysiological mechanisms underlying slow breathing techniques in healthy adults confirmed, among others, that slow breathing techniques (less than 10 breaths per minute) increased HRV and LF power [4]. They were also associated with reductions in theta and increases in alpha power in EEG readings. Of note, it seems that psychiatric medications and psychotherapy, even if effective in reducing symptoms in depression and bipolar disorder, do not improve HRV. However, adding breathing exercises to psychotherapy was shown to lead to such a change in HRV [22].

It is necessary to mention the recently published meta-analytic review by Leyro et al. [23], whose aim was to assess the clinical effectiveness of interventions directly targeting respiration abnormalities and processes, in treating trait anxiety symptoms. Their inclusion criteria encompassed manuscripts published in English, with no limitation as for the year of publication (the oldest one was from 1976 [24]), referring to a treatment with at least one component targeting respiration, with a non-respiratory control group, and an anxiety index as an outcome. The authors also screened unpublished dissertations. The initial pool of 995 publications taken into account was finally limited to 40 randomized controlled trials (RCTs). They referred to both clinical and nonclinical samples, i.e., psychiatric population, non-psychiatric patients (with chronic obstructive pulmonary disease, polycystic ovary syndrome, cancer or pregnancy) as well as various nonclinical populations (e.g., medical students). Respiratory interventions included diaphragmatic breathing (also as an element of Pranayama yoga), controlled or paced breathing, breathing retraining (induction of hyperventilation contrasted with diaphragmatic breathing), HRV biofeedback and $PaCO_2$ (blood levels of carbon dioxide) biofeedback. The most common anxiety measures were the State-Trait Anxiety Index, Hospital Anxiety and Depression Scale, Beck Anxiety Inventory, Panic Disorder Severity Scale and the Depression Anxiety and Stress Scale. The general conclusion of the review is that evidence supports the clinical utility of respiratory interventions as both independent anxiety treatment, and as an adjunct to other interventions (usually being rooted in a cognitive-behavioral approach to treatment). The authors underline the need for future research in the area of respiratory interventions in clinical practice.

Examples of clinical applications of breathing techniques

Even though before the COVID-19 pandemic different techniques involving controlled breathing were perceived as beneficial for patients with various mental health issues [1], they seem to be gaining increased attention in the context of restrictions of access to medical services during the pandemic, as well as a more pronounced need for help for those not diagnosed with a specific mental disorder but who experience acute or prolonged stress and its consequences [25-27].

For example, Lai et al. [28] plan to conduct an open-label RCT in Canada, comparing an online breath based *Sudarshan Kriya Yoga* (SKY) intervention versus an online control mind-body intervention (Health Enhancement Program, including psychoeducation on healthy active living, interactive modules including guided music therapy, mindfulness and progressive muscle relaxation) in frontline hospital and long-term care home staff managing the COVID-19 pandemic. The authors' aim is also to assess whether online versions of both interventions lead to improvement in self-rated measures of insomnia, anxiety, depression, and resilience. It is worth mentioning that the Canadian Network for Mood and Anxiety Treatments (CANMAT) in the Clinical Guidelines for the Management of Adults with Major Depressive Disorder, Section 5, Complementary and Alternative Medicine Treatments from 2016 [29], lists yoga as one of the first – or second-line treatments for mild to moderately severe depression.

Many authors notice that it is difficult to assess and compare the effectiveness of different forms of such treatment methods due to an insufficient number of RCTs, necessary to determine if a given method may be regarded as an evidence-based one. Such a task in the case of "yogic" techniques is especially challenging from the outset due to the complexity of the applied procedures and also different "doses" of practice in different studies [4, 30]. In our opinion, it is important to be able to distinguish different methods included in the practice of yoga, along with different approaches to yoga (like *Hatha* or *Vinyasa*). Yoga is a comprehensive practice, although in Western culture it is most often associated with physical activity and specific postures called asanas. But the practice of asanas is connected not only with physical exercises but also with concentration and self-reflection, and breathing is a very important aspect of it. Breathing techniques (pranayama) refer to the practice of controlling and regulating one's breath in a specific manner. There are numerous types of pranayama, described in detail, e.g., in the study by Nivethitha et al. [2]. Meditation (*dyhana*), being the third practice most frequently associated with "yoga", refers to concentrating the thought on a particular object or specific rhythms in order to reach a higher level of consciousness, and also involves concentration on breathing. In the Indian tradition, those three elements belong to the so-called eight-fold path of yoga (Ashtanga yoga) [1].

We can therefore assume that it is crucial to determine what exactly is studied in research involving "yoga" and "breathing techniques", but many works lack such a detailed description, which makes comparison of their results more difficult. At the

same time, we agree with the opinions [30, 31] that qualitative studies are also important sources of knowledge on the practice of yoga.

Pranayama

The use of the keyword "pranayama" in PubMed shows 373 results, starting with a letter to the editor of Lancet by Higashi in 1964 [32], and only 37 publications by the year 2003. However, only in the last year (Jan. 1, 2020 – Dec. 31, 2020) 36 studies were published, and 32 in the three quarters of 2021.

The systematic review published in 2020 by Jayawardena et al. [33] identified 669 articles, with 18 fulfilling inclusion criteria: all were controlled studies, of which 13 were randomized and 1 was a crossover study. The authors concluded that beneficial effects regarding both physiological and psychological benefits (improved quality of life, emotions, fatigue, sleep, reduced anxiety) of pranayama were mostly observed in patients with respiratory disorders but also in those with cancer and cardiovascular diseases. As for other groups of patients, they mentioned an interesting study by Franzblau et al. [34] who tested the short-term effects of yogic breathing techniques in 40 women abused by an intimate partner (verbally, emotionally, physically, and/or sexually) within the past two years. Participants were assigned into four groups: (a) testimony only (telling the story of trauma to an actively listening person), (b) yogic breathing only, (c) testimony and yogic breathing, and (d) control. Results showed that yogic breathing techniques alone and combined with giving testimony significantly reduced feelings of depression (measured by Beck Depression Inventory-II).

As for patients suffering from mental health problems, also in 2020 Novaes et al. [35] published results of a study (RCT) on the effects of *bhastrika pranayama* (described in detail) on anxiety, emotion processing and brain functional connectivity and activity. The study group of 30 healthy young adults was assessed at baseline and after 4 weeks of pranayama practices. The level of anxiety was measured by the State-Trait Anxiety Inventory (STAI). The authors underline that participants presented "measurable" levels of anxiety. The Positive Affect and Negative Affect Scale (PANAS) was used to assess positive affect (PANAS-P), such as well-being, enthusiasm, inspiration and determination, and negative affect (PANAS-N) like fear, nervousness, and disturbance. Two functional magnetic resonance imaging (fMRI) protocols were used – at baseline and post-intervention: an emotion task and a resting-state acquisition. Results indicated that pranayama significantly decreased states of anxiety and negative affect and that these changes were associated with the modulation of activity and connectivity in brain areas involved in emotion processing, attention, and awareness (particularly the amygdala, anterior cingulate, anterior insula, and prefrontal cortex). Resting-state fMRI revealed significantly reduced functional connectivity, particularly involving the anterior insula and lateral portions of the prefrontal cortex which participate in awareness and attention.

In 2016, Nivethitha et al. [2] published a very interesting narrative review (already mentioned above) of articles on the effects of various pranayama on cardiovascular and autonomic variables, published between 1988 and the beginning of April 2016. In that review they included studies on different types of pranayama, both slow such as *Nāḍi śuddhi*, *Mukhabhastrikā*, *Praṇava* and *Sāvitrī Prāṇāyāmas* and fast, such as *Kapālabhāti, Bhastrikā,* as well as studies involving a 2:1 yogic breathing technique (exhalation is twice of inhalation), maintaining RR of around 6 breaths/minute, specific nostril yogic breathing which includes right, left uninostril yogic breathing and alternate nostril yogic breathing (ANYB) techniques, right nostril yogic breathing, left nostril yogic breathing, *Bhrāmarī Prāṇāyāma, Praṇava Prāṇāyāma, Sukha Prāṇāyāma, Mukha bhastrikā, Slow Pace Bhastrikā Prāṇāyāma* and *Prāṇāyāma* with meditation. They were shown to produce different effects, in which the slow types of yogic breathing techniques were reported to improve cardiovascular and autonomic variables which, according to the authors and in line with the aim of the review, might be useful for the prevention and management of cardiovascular disorders. We have decided to mention their study because of two reasons: a detailed description of the types of pranayamas and the fact that a positive impact on cardiovascular and autonomic variables may be beneficial not only in the case of cardiovascular disorders but also in other states where the cardiovascular and autonomic nervous systems are burdened, such as in mental disorders.

Sudarshan Kriya Yoga (SKY)

A search including the phrase "sudarshan kriya" (SKY) in PubMed results in 62 records. The oldest study regarding SKY comes from 1998 and concerns P300 amplitude and antidepressant response to SKY in 30 drug-free depressed patients [36]. In the past year (Jan. 1, 2020 – Dec. 31, 2020) there were 10 articles recorded in PubMed on this subject and nearly the same number (9) in the three quarters of 2021.

In Kanchibhotla et al.'s study [37], 92 health care providers completed the study survey before and after the intervention consisting of a 4-day online SKY breathing technique workshop. A significant improvement was observed in the levels of self-reported stress, anxiety and depression immediately after the program, as well as in life satisfaction, resilience, and the quality of sleep.

Based on the narrative review of works published in the period 2000-2020, Zope et al. [38] emphasized the beneficial effects of SKY practice, indicating, inter alia, on its effects on the immune system, which may be of particular importance in the context of the COVID-19 pandemic. Another study published this year found that SKY practice was associated with a reduction in stress, improved self-awareness and social functioning in adolescents [39]. Walia et al. [40] took up the topic of yoga (including SKY) in the treatment of addiction.

Among the latest publications, there is one regarding PTSD [41] with results showing the usefulness of SKY in a routine psychiatric clinic for PTSD resulting from

different kinds of trauma, and another article on the association between yogic breathing practice and perceived impact of COVID-19 [42], with a big study group of 956 participants from India, out of whom 554 were SKY-practitioners. These individuals reported lower levels of anxiety and a reduced negative impact of the lockdown on their mental health (measured, among others, with the self-report Generalized Anxiety Disorder and Patient Health Questionnaires). Two studies investigated the relationship of SKY with sleep quality [43, 44].

In 2012, Katzman et al. [45] published a pilot trial in which they evaluated the efficacy and tolerability of a SKY course in outpatients suffering from generalized anxiety disorder (according to DSM-IV-TR), who after eight weeks of an appropriate dose of standard treatment (cognitive behavioral therapy or mindfulness-based therapy) with an appropriate dose of anxiolytics had not achieved remission. The study group was small, as only 31 out of 46 patients completed the program. After completion of the SKY course, participants were encouraged to practice the yoga breathing techniques at home for 20 minutes daily and were offered group practice sessions for two hours once a week. Outcomes were measured with the use of a set of scales in the week prior and one month after the SKY course: Hamilton Anxiety Scale-A (HAM-A), the Penn State Worry Questionnaire (PSWQ), Anxiety Sensitivity Index (ASI), Beck Anxiety Inventory (BAI), Coping Inventory for Stressful Situations (CISS), Beck Depression Inventory-II (BDI-II), Intolerance of Uncertainty Scale (IUS), Multidimensional Perfectionism Scale (MPS), Social Phobia Inventory (SPIN), and the self-report version of the Liebowitz Social Anxiety Scale (LSAS). Results indicated, inter alia, a significant reduction in anxiety as noted by the mean HAM-A total score.

Patients with anxiety and/or depression were participants in Doria et al.'s study [46] published in 2015. The study involved 69 adult Caucasian patients (both sexes) with mood and/or anxiety disorders (according to DSM-IV) who received SKY treatment in the form of intense workshops of 10 sessions, lasting about 2 hours, over 2 weeks, and then weekly follow-up classes for a period of 6 months. Participants were assessed at recruitment, after 2 weeks, after 3 months and after 6 months with the Hamilton Rating Scale for Anxiety (HRSA), Hamilton Rating Scale for Depression (HRSD), Zung Self-Rating Anxiety Scale (ZSAS), Zung Self-Rating Depression Scale (ZSDS) and the Symptom Checklist-90 (SCL-90). Results obtained in that study confirmed that SKY therapy significantly reduced the scores of anxiety and depression. According to the authors, participation in SKY adjunct therapy in addition to daily individual simplified practice (30 minutes), may be connected with significant reduction in levels of anxiety and depression.

A similar group of patients participated in Toschi-Dias et al.'s study [47] published two years later. The authors investigated the effects of SKY on autonomic function in patients with a diagnosis of anxiety and/or depressive disorders (according to DSM-IV criteria). Participants (n = 46) were divided into two groups: (1) conventional therapy and (2) conventional therapy associated with SKY training for 15 days. After 15 days a reduction of anxiety and depression levels was observed in the group receiving ad-

ditionally SKY. It was found that in those participants, sympathetic modulation and cardiac autonomic control were significantly lower while parasympathetic modulation and cardiorespiratory coupling were significantly higher in comparison to the treatment-as-usual (TAU) group. The authors concluded that SKY training may be a useful non-pharmacological intervention to improve symptoms and reduce cardiovascular risk in patients with anxiety or depression.

More recently, Hamilton-West et al. [48] examined potential benefits of a SKY-based breath intervention for patients with mild to moderate depression and anxiety disorders treated within the UK National Health Service (NHS). They evaluated an existing program available to NHS patients in South East England, consisting of four weekly "stress buster sessions" (one hour long), one weekend intensive workshop (2.5 days) and four weekly (1.5 hours) follow-up sessions. Analyses were conducted on existing data (Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7). Out of 991 participants with baseline data available, 169 completed the program. It turned out that statistically significant improvements in depression and anxiety were observed in all three outcome assessments; for nearly 75% of participants they were clinically meaningful. According to the authors, SKY may be a useful therapeutic option, which should be offered more widely.

Usefulness of the SKY practice was also tested in patients suffering from PTSD. Participants of the study by Seppälä et al. [49] were U.S. male veterans of the Iraq or Afghanistan war. Twenty-one veterans were randomly assigned to an active (n = 11) or waitlist control (n = 10) group. Outcome measures included laboratory measures of eye-blink startle and respiratory rate (before and after the intervention) along with self-report symptom measures which were also obtained after a month and after a year (PTSD Checklist-Military version, PCL-M, and the Mood and Anxiety Symptoms Questionnaire, MASQ). Results indicated reduced PTSD symptoms, anxiety, and respiration rate in the active group. The dropout rate was low (10%) which according to the authors, suggests high acceptability of SKY as an intervention for military veterans.

A detailed study protocol for this population is also available from an ongoing 4-year RCT on the impact of SKY practice on PTSD in veterans, in which the authors plan to recruit a total of 76 participants (taking into consideration the possible high dropout rate) [50]. The aim of this study is to compare the effects of SKY (as an example of an alternative method) and cognitive processing therapy (CPT, as the recommended, evidence-based treatment for PTSD), and to verify the validity of including SKY in the methods used in the Veteran Affairs Health Care System, as well as assess its effectiveness in the treatment of disorders that often coexist with PTSD, such as depression, chronic pain and addiction.

Meditation and yoga

Effectiveness of meditation and yoga in PTSD was the topic of a meta-analytic review of 19 RCTs, involving data on 1,173 participants [51]. In the majority of those

studies, subjects were veterans (14 RCTs), one study was based on nurses, one on refugees, one on cancer survivors, and one on women who experienced interpersonal trauma. As for the type of intervention, the studies involved meditation (its different types and the authors included SKY here), mindfulness training, different types of yoga, and a combination of mindfulness and mantra meditation. According to the results of the meta-analysis, meditation and yoga may be useful as complementary approaches to the treatment of PTSD.

A systematic review of the application of yoga in depressive patients was published by Cramer et al. [52], based on seven RCTs with 240 participants with a diagnosis of major depressive disorder according to DSM-IV (including outpatients, inpatients, women from the gynecological ward and others). The analyzed studies involved different types of interventions: in five studies these were yoga postures, breathing exercises, meditation, and relaxation, one used mindfulness-yoga, i.e., combined the DVD-delivered LifeForce yoga program with telephone counseling based on the Mindfulness-Based Stress Reduction program, one a prenatal yoga program, one used SKY breathing exercises along with yoga postures and meditation, two studies involved yoga interventions without physical postures that encompassed *Sahaja* yoga meditation or meditation in combination with breathing exercises, i.e., SKY. The interventions were delivered either individually or in group settings. The study samples in the analyzed RCTs were rather small. The authors of the review concluded that although there is "some evidence" suggesting a beneficial influence of yoga, methodological problems did not allow for clear recommendations of yoga as an adjunctive treatment in depressed patients and suggested the need for further research.

Similar conclusions resulted from another Cramer et al.'s [53] systematic review and meta-analysis of randomized controlled trials, regarding yoga for anxiety. They have identified eight RCTs, involving participants with a diagnosis of an anxiety disorder (according to DSM-III, DSM-III – R, DSM-IV, DSM-IV-TR or DSM-5 or ICD-10), but *post hoc* decided to exclude studies on individuals with a diagnosis of obsessive-compulsive disorder alone, post-traumatic stress disorder or acute stress disorder as these conditions are not recognized as anxiety disorders in DSM-5. Participants suffered from an anxiety disorder of any kind (in five studies), generalized anxiety disorder (one study), snake phobia (one study), anxiety neurosis (one study from 1991) and psychoneurosis (one study from 1973). Three RCTs included participants with unspecified or specified anxiety disorders but without a formal diagnosis of an anxiety disorder. As for interventions: one RCT solely used meditation, while the others involved multicomponent yoga interventions, including breathing techniques and/or meditation in addition to physical postures. Again, they were conducted in individual (one study) or group formats, or in some publications there was no information regarding the modality. The authors concluded that yoga might be an effective and safe intervention for subjects with elevated levels of anxiety, but the evidence for effects of yoga in anxiety disorders was unclear and underlined the need for further research.

Diaphragmatic breathing

Hamasaki [54], on the basis of a review of 10 systematic reviews and 15 RCTs regarding diaphragmatic breathing (a core procedure in meditation practices as well as traditional martial arts like tai chi, involving breathing in slowly and deeply through the nose using predominantly the diaphragm and not the chest while lying in a supine position with one hand placed on the chest and the other on the abdomen), concluded, among others, that it may be helpful in reducing stress, treating eating disorders, chronic functional constipation, hypertension, migraine, and anxiety, and also in improving the quality of life of patients with cancer and gastroesophageal reflux disease.

Conclusions

It seems that interventions based on controlled, conscious breathing and other forms of influencing autonomic balance rooted in Eastern tradition may play an important role complementing psychotherapy and pharmacotherapy in clinical work with individuals suffering from different types of emotional discomfort, including depressive and anxiety disorders or symptoms. We agree with Leyro et al.'s [23] observation that being able to control one's own physiological and thus emotional state, especially symptoms of anxiety, may significantly increase the sense of control and therefore, in our opinion, may be perceived as an additional "healing factor", resulting in higher self-efficacy and a further decrease in anxiety. At this point, it seems important to pay attention to contemporary models of emotions and the role of cognitive processes involved in the way emotions are experienced (perceived) [55].

Although many authors recognize the insufficient quality of existing studies and call for more research of higher quality, especially RCTs, there is a consensus that such techniques are promising options augmenting clinical practice, both in specialized and primary care settings.

Importantly, all interventions mentioned in the current review are regarded as generally safe, but still one should keep in mind that the instructors/teachers should be experienced and the introduction of these interventions should be preceded by providing the patient with information about a given technique and discussing potential doubts and concerns. From a clinical point of view, a good therapeutic alliance is necessary here, and in the case when controlled breathing training is carried out by a person other than the therapist/attending physician – close cooperation of the treatment team. As for yogic practice, side effects seem to be limited [56]. They may result from inconsistence in the spiritual dimension of some of the methods, not matching the belief systems of people from Western cultures [45], the amount of time needed to practice or limited physical abilities of participants [57], along with physical injuries, especially in individuals with chronic illnesses and those practicing solely without supervision, but still yoga may be regarded as safe or safer than other exercise types [58].

What is more, techniques of yoga, meditation and pranayama are connected with low costs, do not require additional equipment and are generally well perceived by participants [30, 51, 59, 60]. In the Polish literature, however, we have not found a study that allows us to determine how the discussed techniques are adopted by Polish patients today. An exception is a study on the experience of the Poznań team led by Tadeusz Paska from the 1970s [61], when an important element of the health recovery program (not: treatment) developed for patients of the Department and Clinic of Psychiatry at the Poznań University of Medical Sciences was breathing exercises.

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Address: Katarzyna Klasa
Department of Psychotherapy JUMC
31-138 Kraków, Lenartowicza Street 14
e-mail: katarzyna.klasa@uj.edu.pl