

WAYS OF COPING WITH STRESS IN (NO)INCREASED RISK SITUATIONS: EXAMPLES OF EFFECTIVE WAYS OF PROCEEDING

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

ABSTRACT

Background: Stress reactions are a response to any adaptive changes in everyday life, which may be caused by, for example: unexpected events, unhealthy lifestyle, achieving goals that are important to us, struggling with minor everyday challenges and even mentally dwelling on difficult moments and experiences, or negative thinking. In many cases, the occurrence of many disorders and complications of various diseases result from, among others, experiencing too much and/or chronic stress. The modern world poses so many challenges and expectations that without developing one of the key life skills – coping with stress – people are unable to maintain health resources in the long run or strengthen them to effectively meet current needs and lead a satisfactory life.

Aim of the study: The aim of the work is to present some basic and accessible methods to both reduce stress levels and strengthen the ability to react appropriately, based on a review of numerous suggestions of methods, techniques and exercises published in recent years in the literature.

Material and methods: The literature review was performed using common sources of original articles available in the PubMed database, using the following formulas: “mindfulness and stress reduction”, “meditation and stress reduction” and “polyvagal theory”, published between January 2010 and September 2022. Additionally, selected literature related to stress reduction methods available in the ResearchGate database and paper literature was analyzed.

Results: As a result of the review and synthesis of the collected data and information, the work presents basic, accessible ones and effective actions aimed at reducing the perceived level of stress as well as the strength of reaction to stressors recognized by the body, making it more flexible and strengthening the autonomic nervous system, which is the foundation for being able to access daily energy requirements and develop personal resiliency.

Conclusions: Regular use of the techniques and exercises identified here for self-care in safe and pleasant surroundings is a simple and effective intervention that may reduce stress levels and/or strengthen the autonomic nervous system. Preventive measures and systematic exercise help self-regulate the nervous system and prevent immune system dysregulation and significant weakening of one’s health potential. The methods presented in this work require further research to systematically update knowledge and obtain practical guidelines necessary for effective self-regulation and developing personal resiliency.

KEYWORDS: stress, mindfulness, meditation, self-regulation, resiliency

BACKGROUND

The word stress indicates physical and mental reaction to a stressor (external or internal stimulus),

the magnitude of which varies among individuals [1]. Stress per se is not harmful; at an optimal level, it is even necessary to function effectively in the modern world. The key is who experiences it (a child, an

adult, an elderly person), how the person's body reacts to a given stimulus, how strong this reaction is, what resources a given person has at that time and how long they experience it [1–3]. Mild or moderate stress usually helps us stay alert and attentive. However, overwhelming and/or chronic stress disturbs homeostasis and if its perceived level is not managed or reduced, it may lead to psychophysical chaos, from which numerous disorders emerge, such as high blood pressure, chronic pain, aggression, concentration problems, chronic fatigue, depression [3–5], or “anxiety diseases” ranging from irritation to serious health problems [6]. Experiencing too much stress over too long a period may exacerbate many diseases and pathological conditions, even resulting in life-threatening consequences and death [7]. To reduce both the strength and amount of perceived stress and its health effects in an increasingly unpredictable world, it is worth learning about and systematically applying effective strategies for coping with stress and developing healthy habits that “energetically charge” both our mind and body.

AIM OF THE STUDY

The aim of this work is to present some basic and accessible methods to both reduce stress levels and strengthen the ability to react appropriately, based on a review of numerous suggestions of methods, techniques and exercises published in recent years in the literature.

MATERIAL AND METHODS

For the purposes of this study, in order to collect the evidence base on methods that reduce stress levels and then synthesize this information, a two-stage literature review was conducted. First, to select techniques and exercises that reduce stress, the PubMed database was searched using the following formulas: “mindfulness and stress reduction”, and “meditation and stress reduction”. The inclusion criteria included articles published between January 2010 and April 2024 using the following filters: free full text, randomized controlled trial, systematic review, meta-analysis and clinical trial. A total of 652 records were found, of which, after further analysis of titles and abstracts, 36 records were included in the analysis, in English only. After a full text analysis, 10 articles were selected. To analyse the assumptions of the polyvagal theory, a literature review was also used using the PubMed database using the “polyvagal theory” formula, taking into account as the inclusion criterion articles published between January 2010 and April 2024, using the free full text filter. A total of 26 records were

found, of which, after further analysis of titles and abstracts, 6 records were included, and after evaluating the full text, 2 articles were selected for further examination. Additionally, selected literature was available from the ResearchGate database – in the scope of “full free text”, which is important from the perspective of the topic under consideration, or is unavailable on the PubMed database or has limited access (7 items). Ultimately, in this first stage, 18 articles on the use of specific stress reduction methods/techniques/exercises in various populations were included. Second, after selecting stress-reducing techniques and exercises based on an analysis of the above records, a search and review of the literature available in paper form was conducted to obtain full descriptions of specific techniques and exercises referred to and presented in this study. A total of 28 items of literature in Polish were obtained, including tables of contents, and 17 items were selected for further analysis – including 13 items published in the last 5 years.

RESULTS

Literature review regarding the impact of exercises and techniques on the human body in stressful situations

A meta-analysis published in 2017 based on a review of 45 studies showed that various meditation techniques – including *mindfulness exercises increasing awareness of body and mind*, *relaxation exercises*, *yoga postures*, *breathing exercises*, *guided imagery*, *gentle movement* – reduce activation of the sympathetic nervous system, as indicated by reduced physiological stress markers such as lowered blood pressure, cortisol, HR and cytokine levels [8]. These results are consistent with research on the practice of *yoga asanas* in various populations, the performance of which improves the regulation of the autonomic nervous system (ANS) and the hypothalamic-pituitary-adrenal system (HPA), and is manifested in reduced levels of cortisol, resting heart rate, and cytokines [9,10] cholesterol and LDL [10], which has an inhibitory effect on physiological stress [9,10]. Also, *mindful breathing exercises* performed using the diaphragmatic route lower cortisol levels, activate the PNS and relieve stress and anxiety [11].

Practising various meditation techniques (mindfulness, focused meditation, yoga, diaphragmatic breathing) at the level of neurobiological autoregulation and molecular control are associated with an increase in the level of secreted dopamine and melatonin and a decrease in cortisol and norepinephrine [9,12,13], which may protect against depressed mood disorders by regulating the response to stress and inflammation [9,13].

Systematic use of shorter or longer Mindfulness-Based Stress Reduction (MBSR) programs involving various mindfulness techniques and exercises used in organized groups, effectively reduces the experience and symptoms of stress [14–17], anxiety [14,15,17–21], pain [17,22] and depression [15,17,20–22] and can also generate a positive change in perspective and the ability to look at one's life experiences more objectively and react less to stressful stimuli [14–17,21].

Additionally, the research and polyvagal theory of S.W. Porges [2,23] indicate that our nervous system can undergo neuromodulation, calming the physiology and optimizing body functions by giving the body a “friendly experience” in safe conditions. Activation or increase in the tone of the ventral branch of the vagus nerve (which is an important part of the parasympathetic nervous system) is the neurophysiological basis of calming down, regeneration and rest, as well as human social development. Experiencing safety in social contacts and/or in context (positive memories and visualizations and other “actions” related to pleasant experiences) enable people to access positive feelings, which inhibits threat response and supports the homeostatic function of the body. Developing the ability to transition from an aroused “fight or flight” or “withdrawn/freeze” state to an autonomous state that supports a sense of security will develop our individual resilience [2,4,5,9,10,23]. Most people experience these states when listening to a pleasant sound, gently changing position, looking at natural objects, engaging in safe touch or thinking about a loved one, which stimulates the vagus nerve [2,4,5,9,10,24]. From the perspective of polyvagal theory, mindfulness-based movement becomes a state of being rather than doing and functions as a neural exercise in which the physiological state is manipulated through exercise and mindful, focused attention. Through repeated withdrawing of vagal inhibition in order to support movement and restoring vagal inhibition, the autonomic nervous system develops and promotes a more effective transition from a physiological state of arousal to calm [24]. Experiencing mindful movement throughout the day stimulates dopamine and other neuromodulators that serve as an antidote to fatigue and depression [24]. In turn, gentle eye movements combined with gentle touch/pressure around the occiput or engaging the body in gentle and sensitive movement help the body transition from a state of chronic activity of the sympathetic nervous system (stress) or activity of the dorsal part of the vagus nerve (freezing) to a state of social engagement by activating the ventral part of the vagus nerve and some cranial nerves (V, VII, IX and XI) [5].

The conclusions from the above studies and meta-analyses and the assumptions of the polyvagal theory indicate that the practice of mindfulness techniques

and “exercises” providing safe and pleasant experiences and emotions increases the activation of the parasympathetic nervous system (its abdominal part), and their independent use may lead to the observed improvement in some aspects of mental functioning, especially alleviating the level of stress, anxiety and depression [2,4,5,9,10,17,24] and in the long run increase resistance to stressful stimuli.

From stress reactions to reducing tension, relaxation, rest and regeneration.

After exposure to stressors, when we decide that a situation is no longer overwhelming or dangerous, if we have a flexible, harmoniously functioning autonomic nervous system, our “fight or flight” reaction should cease after 3 minutes [25]. However, chronic or persistent stress caused by long-term, unrelenting exposure to stressors or their constant repetition may impair the extinction of the “fight or flight” response, maintaining high tension and thus preventing rest and regeneration, and in extreme cases, by activating the dorsal part of the vagus nerve, it can cause slowing down and freezing, as well as the manifestation of depressive behaviours [2,5,26]. Considering that any real or imaginary stressor can cause a stress reaction, it is important to know that the same mechanism that causes the stress reaction can also turn it off through the relaxation reaction [2–5]. The following examples of exercises increase the tension of the ventral part of the vagus nerve, thanks to which the person practising them has the opportunity to access relaxation, regeneration, social involvement and development through self-regulation [2–5,25–27].

Developing body and mind awareness

This skill is crucial for the self-regulation of the nervous system, i.e. reducing or reversing the stress response. This is the first step towards being able to notice and reduce tension that may cause discomfort or painful symptoms. The body provides the most valuable set of information about one's own needs and the boundaries within which it can optimally function, because it is an “intermediary” between the external world and our conscious structures as well as the deeper unconscious [25,28,29]. The we are attentive to our body and can pick up on any disturbing signals it gives, the more we are able to take proper care of ourselves. “Listening” to the body is necessary for us to notice and understand the interconnections between external stressors and our thoughts, emotions and tensions [28–30], which is an inherent condition for building resiliency manifested in flexible coping with all everyday difficulties [31].

Recommended exercises [28,30]:

- a mindful meal
- mindful body and breathing
- body scanning
- mindful movement (*gentle yoga, stretching*)
- mindful sounds and thoughts
- a diary of pleasant and unpleasant experiences

Mindful breathing

Simply focusing on your breathing slows down its flow, reduces emotional arousal and mental anxiety, and helps you anchor yourself in the present moment, i.e. “here and now”. The proposed breathing exercises, performing inhalation and exhalation through the nose, increase awareness of one’s own internal sensations and reduce tension and promote relaxation [4,26,27,32–35]. Consciously practising diaphragmatic breathing makes breathing deeper, more rhythmic and relaxing. Counting breaths increases heart rate variability while reducing sympathetic stimulation [32] and slowing it down to six breaths per minute (5 seconds of symmetrical inhalation and exhalation) seems to be the most effective and simplest way to improve physical and mental well-being [34].

Recommended exercises:

- observation of natural breathing [25,27]
- diaphragmatic breathing [5,25,35]
- careful counting of breaths [25,26]
- square/box breathing [36,37]

Pleasant and conscious movement

Forms of exercise that are accessible to a given person and during which he or she feels pleasure in the body, effectively engage the abdominal part of the vagus nerve [4]. Gentle and mindful stretching can significantly help restore calm in the body-mind system, relieve stiffness, release tension [5,38] and “break the stillness” that often accompanies stress reactivity [4]. However, the simple somatic exercises proposed by S. Rosenberg [5] can be helpful in moving from the state of arousal “fight and flight” or “freeze” to a state of relaxation and rest and regeneration, as well as be effective measures in preventing problems with the functioning of the autonomic nervous system and maintaining well-being.

Recommended exercises:

- walking and experiencing the pleasant sensations of a given moment [4]
- simple and undemanding stretching, lengthening and gentle rotation of the spine (e.g. in the cervical, thoracic and/or lumbar section or its entirety) [4,5]

- walking, dancing, yoga, cycling, swimming, etc. with an awareness of pleasant sensations and emotions in the body [4]

- basic eye movement exercise improving the range of motion of the neck and entire spine [5]
- salamander exercise with eye movement improving the flexibility of the thoracic spine, increasing its range of motion and respiratory capacity [5]
- exercises to rotate the torso to the right and left with the arms placed at three different heights, performed in the following order: arms in adduction to the body, hands placed on opposite elbows, then with arms raised horizontally and with arms raised up [5]

Seeing/tasting/listening/touching and feeling

Numerous short breaks to watch pleasant views, enjoy favourite tastes, sounds or textures and enjoy the pleasant bodily sensations they trigger, with a beneficial effect on the functioning of the nervous system, as a means of reducing or reversing stress responses [4,25–27].

Recommended exercises:

- briefly directing our eyes at an object that is pleasant to us (nature, a loved one, a beautiful painting, etc.) and enjoying the pleasant sensory experiences [4]
- carefully tasting your favourite products, dishes (e.g. tangerines, chocolate cubes) [28]
- making contact with trusted people, with a friendly animal (when you are with them, talk, hug or pet them) [26,27]
- listening to favourite sounds, music, tender voices [25,26]
- performing activities from which we derive joy and satisfaction

Visualizations

We can intentionally focus on positive, healing images, content and memories, which constitute a kind of neural exercise [25,26]. Then we create mental sensory impressions that enable us to feel pleasant emotions and sensations in the body, and thus change the emotional landscape [4]. Research indicates that positive autobiographical memories evoke positive emotions, thus constituting an effective means of self-regulation of the nervous system [38,39].

Recommended exercises:

- enjoying positive experiences (remembering tastes, sounds, events, activities and enriching them with positive aspects according to individual needs) [4,25,26]
- creating an image of a special, safe place [25].

DISCUSSION

This work reviews the literature on both standard interventions based on various mindfulness and meditation techniques, as well as self-regulation techniques and exercises based on the polyvagal theory in relation to stress reduction.

Numerous studies indicate that various techniques and exercises based on mindfulness and/or meditation used in organized groups in shorter and longer time perspectives, bring beneficial effects in reducing stress [40,41]. In turn, techniques and exercises based on the polyvagal theory, by focusing on the experience of pleasant emotions and feelings without connecting them with thoughts or behaviours, support homeostasis – i.e. health, growth and regeneration (by increasing the tone of the abdominal part of the vagus nerve) as well as its recovery after temporary challenges [23,24]. The techniques and exercises identified in this work for self-care in safe and pleasant conditions seem to constitute a set of simple and effective interventions that reduce stress and/or strengthen the functioning of the autonomic nervous system. However, it should be noted that the polyvagal theory is young and has also been the subject of criticism [42]. Yet its author, S.W. Porges [2,23,24], provides scientific grounds for testing the hypotheses formulated within it and customer experience and therapists in clinical practice indicate its practical usefulness [5,26,27]. Some studies mention that the use of “polyvagal” techniques and exercises are potentially effective interventions that help treat various disorders and chronic diseases [43,44], along with various mindfulness interventions (MBSR) [45,46]. The techniques and exercises presented here seem effective in coping with stress. They are relatively simple and accessible to the average person and their systematic use according to individual needs helps effectively take care of both mind and body as part of a daily self-care routine. However, they must be chosen in accordance with individual preference and used with caution, because when developing awareness of the body and mind and acquiring resistance to stress, slower and less can mean more [4]. Of particular importance among the proposed techniques are breathing exercises (especially those that slow down breathing and focus on exhalation), which, compared to mindfulness meditation, bring more beneficial effects in improving mood [47]. It is important to use selected techniques systematically, because even after longer MBSR interventions, after discontinuing their use, their beneficial effects they disappear over time [48]. We should bear in mind that if we observe any disturbing signals from the body and/or disorders or diseases, it is always recommended to consult a doctor and, if recommended, gently use the exercises and methods of action presented here.

From a methodological point of view, future research should indicate to what extent the respondents’ independent use of techniques and exercises reduces stress, as well as examine the differences in their effects, depending on their duration and frequency of use during the day and week. Another aspect worth examining are the effects of combining several methods (selected exercises involving various senses) contracted with interventions using only one method, as well as the duration of their adherence. Another important question is how long the selected techniques should be used and for what duration to achieve a significant increase in psychophysical resistance. Conducting research on a larger scale – i.e. among different age groups, taking gender, current health status and previous disease experiences into consideration, while also assessing selected physiological indicators combined with self-assessment of well-being – would allow for a comprehensive analysis of the results and provide information on the effectiveness of using simple self-regulation exercises and building psychophysical resilience as part of everyday self-care.

Limitations of the study

This work has some limitations. First, the literature review was performed within one database, PubMed, and included only articles published in English, so there is a limitation and exclusion of some valuable research published in other databases and in other languages. Secondly, the articles examined show differences in methodology, patient population, volume and frequency of method use, and duration of intervention, as well as in outcome measures, which may impact study results. The accessible methods of coping with stress (self-regulation) presented in this work require further research with an integrated system of measurements (both objective and subjective), which would allow for a better understanding of the effects of interventions undertaken as part of everyday, systematic self-care.

CONCLUSIONS

The more different methods of dealing with stress are learned and used on a daily basis to alleviate or reverse its symptoms, the more effectively they will be applied in various stressful situations. Then, sometimes only 2 or 3 minutes may be enough to alleviate the stress reaction with the help of short exercises. Preventive actions and the variety of the above-mentioned methods used as part of self-care/self-regulation of the nervous system help prevent immune system dysregulation and significant weakening

of health potential, and in the event of even severe damage, they can help regain the desired homeostasis and develop personal resiliency. Please remember that resiliency may be developed and strengthened provided that areas related to the functioning of cognitive processes and mood are also cared for – i.e.,

social bonds, physical exercises, cognitive challenges, rational diet and regenerative sleep [3] – because when they are systematically neglected, we significantly weaken the health potential and the flexibility of reaction and response to stimuli, both external and internal.

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