Psychological methods in treatment of essential hypertension

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Abstract

Background: The article presents the results of research into the most commonly used methods of psychological support in the treatment of hypertensive patients, including relaxation and meditation techniques, mindfulness training, music therapy, yoga, aromatherapy and biofeedback techniques. Selected psychological aspects of adherence to the antihypertensive treatment are reviewed. Some notes about personality-oriented counselling and psychotherapy in the treatment of hypertension are raised.

Material and methods: In the search for high quality studies, mainly PubMed and EBSCO databases were used, and the journals of such publishers as Elsevier, Hindawi and the American Psychological Association.

Results: Studies on methods of psychological support in hypertensive treatment are mostly controversial due to the lack of assessment of the long-term effects of the intervention, and the complexity of the subject of the study. The most convincing is to use individually selected methods based on the development of mental self-regulation skills (Jacobson's relaxation technique, meditation, biofeedback therapy and mindfulness training). Music therapy, yoga and aromatherapy can also be helpful for patients involved in antihypertensive treatment. Using methods of psychological help, one should take into account restrictions and contraindications, as well as take some precautions. In order to increase the effectiveness of the antihypertensive therapy, it is proposed to conduct health and educational programmes for hypertensive patients, as well as short training courses on communication skills for health care workers.

Conclusion: Responsible use of individually selected assistive treatment psychological methods can be helpful for people with arterial hypertension.

Key words: arterial hypertension; methods of psychological support; self-regulation; Jacobson's relaxation technique; music therapy; meditation; biofeedback therapy; yoga; aromatherapy; mindfulness training

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Introduction

Essential hypertension (EH) belongs to the group of psychosomatic diseases and is perceived as a multifactorial disorder. It is emphasized that factors of a psychological nature play an important role in the process of development of the disease, and affects the treatment and rehabilitation of patients with EH. It should be noted that in Polish scientific literature, the importance of the psychological aspect in aetiopathogenesis of EH is underestimated. In reports devoted to non-pharmacological methods of treatment of EH, as well as the principles of management of EH, the role of stress and coping with difficult situations has been practically ignored [1, 2]. For example, in the 2019 Guidelines for the Management

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of Arterial Hypertension by the Polish Society of Hypertension, it was only mentioned that an elevation of blood pressure in young people may be related with a stressful situation, and a specific form of EH, white coat hypertension, was described [3]. However, the importance of stress, especially chronic stress, as well as mental disorders (e.g. anxiety and depression) in the development of EH, and observance of antihypertensive therapy have been specified [4–8]. The key role of dysfunctional emotion regulation in the pathogenesis of EH was emphasized in leading international cardiological journals [9–11]. In the recommendations by the British institute National Institute for Health and Clinical Excellence (NICE), in the management of EH in adults in primary health care setting it is recommended to use interventions aimed at the reduction of stress and the promotion of relaxation [12]. In the recommendations by the European Society of Cardiology/European Society of Hypertension (ESC/ESH) concerning management in arterial hypertension published in 2018, it was mentioned that psychosocial factors increase the risk of EH; however, no detailed information was provided about the way it should be considered in prevention, treatment and rehabilitation of patients with EH [13]. Unfortunately, the psychological aspect of EH has not been explained. The development of psychological support and health promotion programmes in EH in such conditions is difficult.

The most important goal of psychotherapeutic intervention adjusted to the needs of patients with EH, is the shaping and enhancing of the skills for psychical self-regulation, and increasing resistance to the stressful psychological factors. Some methods of psychological support focus on the implementation of changes in the functioning of the emotion regulation processes, and are directly associated with the shaping of psychical self-regulation habits (e.g. techniques based on biofeedback). Other methods of support by indirect mechanisms exert an effect on the psycho-emotional status and cardiovascular system of an individual (e.g. aromatherapy).

The objective of the study is to analyse studies concerning the most frequently used methods of psychological support in the treatment of patients with EH.

Material and methods

Based on reviews of systematic, randomized and original clinical studies, this study presents conclusions concerning the effectiveness of relaxation and meditation techniques, mindfulness, music therapy, yoga, aromatherapy, techniques based on biofeedback, and personality-oriented psychotherapy in the treatment of EH. Selected psychological aspects are presented of the observance of therapeutic recommendations in patients with EH. In the search for high quality studies, mainly PubMed and EBSCO databases were used, and the journals of such publishers as Elsevier, Hindawi and the American Psychological Association.

Results

Relaxation

While fully accepting the principle in medical ethics "First, do no harm", in the most optimum way, simple, safe, and reliable methods for relaxation are used. Among such methods, progressive relaxation acc. to Jacobson is distinguished, which belongs to the dynamic methods of regulation of muscle tension, and is the most universal technique suitable for most people [14, 15]. A wide review of studies concerning progressive relaxation was presented in Polish in the article by Sławińska [16]. The researcher claims that Jacobson's technique occurred to be effective in the treatment of anxiety, phobia, depression, sleeplessness, EH and other diseases [16]. Many studies have been conducted worldwide concerning the effectiveness of relaxation according to Jacobson in order to treat EH. According to conclusions from these studies and later meta-analyses [17–22], it may be presumed that Jacobson's progressive relaxation technique is an effective non-pharmacological method of supporting patients with EH. The effectiveness of the use of relaxation according to Jacobson in women during pregnancy was also noted [23]. It should be emphasized that in a report by the American Heart Association concerning non-pharmacological methods of treatment of EH, it was stated that a lack of sufficient evidence is observed for the effectiveness of relaxation techniques [24]. This results from the presence of certain methodological difficulties in conducting this type of studies; therefore, evaluation of the effectiveness of relaxation in reducing blood pressure in patients with EH may be equivocal [25].

Jacobson's relaxation technique has its advantages including simple and effective technique suitable for most people, a small number of contraindications, and ease and quickness of learning. In addition, it does not require direct emotion control (in order to reduce psycho-emotional stress it is simply enough to relax muscles); during Jacobson's training no additional equipment is used, unlike for instance in

music therapy (audio columns) and aromatherapy (aromatic body butters, inhalator); and the training may be performed at any place. Relaxation training leads to the development of the skills of automatic relaxation independent of exercises. Observation and experiencing sensations in muscles during relaxation exercises favours a better understanding of one's own organism which, in turn, contributes to better recognition of tension in their body. This allows an early detection of negative symptoms of stress, and may help to prevent its negative effects.

Music therapy

Many studies indicated that the use of music therapy exerts an effect on the reduction of blood pressure in patients with EH [26–28]. Music therapy, together with changes of life style, leads to the reduction of blood pressure in people with pre-hypertension [29]. It was confirmed that musical interventions may also be beneficial in order to reduce stress and its negative effects [30]. The Polish researchers, Tadych, Pospiech and Sielski, conducted a study among patients with a history of cerebral stroke and found that music therapy is very important in the prophylaxis of occurrence of secondary cerebral stroke by reducing high blood pressure [31]. The effectiveness of music therapy was also emphasized in the improvement of the quality of life in patients with EH [32].

Although positive effects of music therapy in persons with EH were observed, Słomiak, Wąsik and Cymerys [33] rightly noted that the available studies show methodological non-uniformity. From the psychotherapeutic point of view, the most important factors affecting the outcomes of music interventions are: quality of music, duration of listening, combination and sequence of various types of melodies, psycho-physiological characteristics of the listener, and a specified psychical status of the person while listening [34]. It is sufficiently difficult to take into account all these factors while conducting scientific studies. It is noteworthy that the use of music therapy in the treatment of patients with EH should be strictly individualized, in order not to make iatrogenic errors. The valuation of a long-term effect of music interventions requires further studies [33]. It is important to combine music interventions with other methods of support, e.g. relaxation techniques. The effectiveness of such combined interventions has been confirmed [35]. Recognition and expression of one's own feelings and emotions while listening to music may be useful for patients with EH in order to reduce alexithymic features [34], which are typical of them [36, 37]. Based on the results of studies it may be presumed that music therapy may be used as an additional effective method of support in the treatment and prevention of EH.

Meditation and mindfulness techniques

Psychical self-regulation by means of meditation consists in the management of the quality of own thoughts, fantasies, images, etc. The American Heart Association considers that only transcendental meditation may be recommended in clinical practice to patients with EH [24]. Similar results of studies were presented in meta-analyses by Rainfort et al. [38], and Bai et al. [39]. It is worth emphasizing that transcendental meditation shows a greater effectiveness among older people with initially high values of blood pressure [39]. In experimental studies, where adolescents with elevated blood pressure performed mental stress tests, it was found that transcendental meditation exerts a positive effect on the cardiovascular system [40]. However, some researchers indicate a lower effectiveness of transcendental meditation, compared to non-transcendental meditation [41]. Ooi, Giovino and Pak noted that a clear tendency is observed towards increasing evidence which confirms the effectiveness of transcendental meditation in reducing blood pressure [42]. They also found that such a form of meditation while regularly practiced shows a similar effectiveness as diet, physical exercises, and relaxation. Ooi et al. pay attention to the need for conducting studies aimed at the control of long-term effects of transcendental meditation on the reduction of blood pressure [42].

The American Heart Association does not recommend the use in clinical practice of other meditation techniques, consisting in the training of mindfulness, such as Mindfulness-Based Stress Reduction (MBSR) [24]. Nevertheless, Hughes et al. found that MBSR training leads to the reduction of elevated blood pressure in people with pre-hypertension [43]. A Polish researcher, Błaszczak, in a review concerning the effect of MBSR training on physical health, concluded that this training leads to permanent reduction of blood pressure in individuals with EH [44]. Park and Han performed a meta-analysis and confirmed that meditation is especially effective in the treatment of EH in people aged over 60 [45]. Goldstein et al. noted that transcendental meditation and MBSR may cause a clinically significant reduction of blood pressure in patients with EH, and also indicated the need for further studies [46]. Sangprasert, Palangrit, Tiyoa and Pattaraarchachai showed that mindfulness considerably improves the quality of life, increases the sense of self-efficacy, and exerts a positive effect on the undertaking of behaviours conducive to health among patients with EH [47]. However, Blom et al.

observed that MBSR does not result in the reduction of blood pressure in people with EH [48]. Ponte et al. observed that at the end of 8-week mindfulness training (2 hours a week), the intervention group of people with EH had statistically significantly lower values of blood pressure (examined using an automatic 24-hour pressure monitoring) than the control group which was not subjected to training. Despite this, 12 weeks after training it was observed that although the mean values of blood pressure were lower in the intervention group, no statistically significant differences were found [49].

Summing-up, it may be presumed that meditation techniques may be useful in the treatment of EH; however, the problem has not been solved concerning long-term stability of the effect of reduction of blood pressure after the trainings. It is noteworthy that while using these techniques, certain contraindications and limitations should be taken into account, and the process of learning is time-consuming and difficult. Meditation requires every day exercises, at best twice daily and for a minimum of 15 minutes. It may be observed that meditation techniques are "intellectualized" too much, and their use by some people may not be easy.

Yoga

According to the American Heart Association the use of yoga is not currently recommended in clinical practice in order to reduce blood pressure in patients with EH [24]. Nevertheless, this conclusion was drawn due to the lack of reliable, high quality studies concerning the potential effectiveness of blood pressure reduction in patient with EH. Some studies might not have been considered, considering the specific criteria of enrolment of studies into the review. Park and Han found that yoga is helpful in the treatment of EH, although its effect is slightly less, compared to meditation [45]. The researchers stated that yoga is most effective for people aged under 60 [45]. Based on analysis of studies concerning the effectiveness of yoga, Okonta concluded that yoga not only decreases high blood pressure, but also leads to the reduction of blood glucose, cholesterol, and body weight [50]. Important conclusions were drawn by Kobylińska, Lewczuk, Marchlewska and Pietraszek who investigated the relationship between the duration of yoga training and emotion regulation, with consideration of the moderator role of personality traits [51]. This study was conducted among healthy women. People who had practiced yoga for more than one year, compared to those who had trained for a period shorter than a year, more often used the strategy of cognitive reappraisal. It was also noted that the application of yoga may be of little use in people characterized by a high level of neuroticism [51]. It is important and prospective to carry out similar studies among patients with EH. Posadzki et al., based on a systematic review, found that the results of studies concerning the effectiveness of yoga are encouraging, although not entirely convincing [52]. Some researchers very cautiously approach yoga as a method for the treatment of EH, and claim that it is necessary to conduct further high quality studies [53–55]. It should be emphasized that a serious problem occurs with conducting studies of this type. This results from the presence of various traditions of yoga, each proposing a specific approach towards work with the body and brain. For instance, at some schools emphasis is placed on the process of respiration while performing physical exercises, whereas other schools pay more attention to meditation exercises [56]. With respect to yoga, we do not deal with a specific technique containing an established set of exercises, compared to, e.g. Jacobson's relaxation. In such conditions it is complicated to univocally investigate the effectiveness of yoga, which may lead to mixed conclusions.

Aromatherapy

In the opinion of Zdrojewicz, Minczakowska and Klepacki, aromatherapy shows a calming and antistress effect, which is especially important in the treatment of stress-related diseases, including EH [57]. These researchers state that aromatherapy should be treated as an auxiliary method [57]. Lee, Choi, Posadzki and Ernst carried out a systematic review and found that aromatherapy is not an effective method in the treatment of EH, depression and anxiety [58]. In another review focused on the analysis of the effectiveness of treatment of EH it was also observed that aromatherapy did not show any effectiveness [59]. It was emphasized that the majority of studies pertaining to the effectiveness of aromatherapy are of low methodological value [58]. Some researchers concluded that aromatherapy has no specific effect on the level of state of anxiety, and its reduction may result from spending time in a quiet, lightened and spacious room during the 10–15 minutes of conducting aromatherapeutic interventions [60].

It was found that after aromatherapeutic inhalations a decrease was observed in the level of serum cortisol and in blood pressure [61, 62]. The use of aromatherapy leads to the reduction of systolic blood pressure and activity of the sympathetic nervous system in patients with EH [63]. It was emphasized that 10-minute inhalations with the use of lavender oil

during 7 days led to the reduction of blood pressure in middle-aged individuals [64]. In other study it was confirmed that lavender oil applied in the form of inhalation leads to a decrease in both state anxiety and trait anxiety, and results in the reduction of blood pressure in patients with myocardial infarction [65]. Massage with the use of essential oils, compared to massage without oils, effectively reduces blood pressure and improves the quality of sleep in women with EH [66]. It was found that a simultaneous use of aromatherapy and music therapy is more effective in reducing blood pressure in pregnant women with EH, than using these interventions separately [67].

Summing-up it may be cautiously concluded about the effectiveness of aromatherapy which should be used as an auxiliary method in people with EH. Nevertheless, for appropriate treatment with the use of aromatherapy, it is necessary to consider the individual characteristics of the users and consultation with a doctor, because there are a number of contraindications and negative effects may occur (e.g. some oils cannot be used by pregnant women).

Techniques based on biofeedback

In a report by the American Heart Association it was noted that biofeedback may be used in clinical practice in order to reduce blood pressure due to its safety, despite certain equivocal results of studies concerning the effectiveness of this non-pharmaceutical method [24, 68]. There is some evidence of the low quality of such studies and ineffectiveness of procedures based on biofeedback in the treatment of adults with EH, compared to pharmacotherapy, fictitious biofeedback training, lack of interventions, and other behavioural methods [69]. However, in the study by Tsai, Chang, Chang, Lee and Wang, a statistically significant reduction of blood pressure was observed in a group of people with EH who used biofeedback, compared to patients with EH who applied fictitious biofeedback (placebo) [70]. The researchers presumed that the specific outcome of treatment using biofeedback might have been caused by a decrease in the body reactivity to stressors [70]. Simultaneously, the use of biofeedback training in combination with relaxation techniques (relaxation-assisted biofeedback) caused a considerable reduction of blood pressure in patients with EH [71]. It is worth emphasizing that studies on the effectiveness of biofeedback therapy in patients with difficult-to-control arterial hypertension are worth attention, due to the prevalence of this form of EH [72]. The effectiveness of biofeedback training depends on the personality traits and physiological parameters of the examined person (e.g. reactivity to stress), motivation, observance of recommendations, and shaping the habits of psychical self-regulation [73].

Summing-up, it may be cautiously concluded about the effectiveness of biofeedback training, and it must be taken into account that, similar to other methods, treatment with the use of this training should be individually adjusted, with consideration of a wide spectrum of factors of a bio-psycho-social nature, which exert an effect on the psycho-physiological functioning of an individual.

Psychological aspects of observance of therapeutic recommendations

Polish patients with EH are characterized by the lowest result with respect to the observance of therapeutic recommendations, compared to inhabitants of Austria, Belgium, England, Germany, Greece, Hungary and Wales ill with EH [74]. The effectiveness of EH treatment in Poland remains on the level of 12% [75]. According to Krzych, Jaros, Rybicki, Bochenek and Błońska-Fajfrowska, the main causes of ineffectiveness of EH treatment are: lack of patient-doctor cooperation, lack of patient's the motivation for treatment, non-systematic use of hypotensive drugs, lack of knowledge concerning the disease and goals of therapy, as well as economic aspects [76]. Factors of a patient's psychological nature (primarily patient's cognitive functioning, satisfaction with life, sense of control, and mental state), lack of engagement of a patient in establishing the plan of therapy, as well as the low quality of doctor-patient cooperation, are important aspects in the treatment of EH [77]. The researchers noted that the personality trait 'conscientiousness' in the Big-Five Personality Model (Ten Item Personality Inventory — TIPI was applied), is positively correlated with observance of the rules of management of patients with EH [78]. Kretchy, Owusu-Daaku and Danquah found that low observance of therapeutic recommendations in patient with EH was significantly related with a low internal health locus of control, side-effects of drugs and combined effect of side-effects of drugs, and the external health locus of control [79]. A negative relationship was observed between the sense of stress and the observance of medical recommendations and non-healthy life style among people with EH [5, 80]. It was noted that the spiritual beliefs of an individual exert a considerable effect on coping with negative emotions associated with EH [5]. In order to enhance the effectiveness of the therapy of patients with EH, it is proposed to undertake this problem and carry out health programmes aimed at the reduction of stress, and increasing the internal health locus of control [5, 79, 80]. In order to improve the

effectiveness of EH treatment, an important aspect is the application of an optimum scheme of dosage of hypotensive drugs and the number of pills taken [81]. According to Matthes and Albus, this is the most effective method which ensures the taking of anti-hypertensive drugs by patients with EH [82].

A prospective study was conducted in South Africa in which patients with EH, using a mobile phone, received an SMS message reminding them about the most important aspects of treatment and the necessity to report to the clinic. Such a form of assistance occurred to be effective [83]. It may be presumed that the use of automatic systems for sending messages is a promising approach. Studies show that short trainings concerning communication skills for employees of the health sector may considerably improve the effectiveness of treatment of patients with EH by increasing doctor-patient cooperation. It is proposed to introduce such programmes in educational medical institutions [84].

Discussion

Conclusions from studies concerning the effectiveness of psychological support for patients with EH are equivocal and controversial due to serious methodological problems occurring in the procedures for conducting these studies, which do not allow drawing coherent conclusions. As mentioned before, the quality of these studies is low. Confirmation of the effectiveness cannot be justified based on reports where the effectiveness of support for patients with EH was investigated according to changes in the examined parameters for assessment of effectiveness 'prior and after' intervention without control of long-term parameters. For example, investigation of the state of anxiety and trait anxiety to use meditation, and evaluation of these characteristics after an 8-week application in conditions of decreased level of anxiety, does not unequivocally evidence the effectiveness of meditation. A patient learning meditation during training sessions remains in the 'caring hands' of a therapist who devotes attention and empathy to the patient, and provides assistance from the aspects of learning and treatment. This may result in positive effects. Control of long-term effects of support methods (e.g. in medical conditions — duration of remission) is most important; however, this control is usually not carried out. It is noteworthy that the vast majority of studies are exclusively based on the model of measurement of effectiveness "prior and after intervention", which does not stand criticism. It is especially important to conduct further studies pertaining to the psychological support methods from the aspect of their effect on the cognitive-emotional functioning of people with EH (e.g. whether there occur changes in the use of adaptive and non-adaptive emotion self-regulation strategies).

While analysing results of the presented study, it may be noted that the methods based on shaping certain habits of psychical self-regulation show the greatest effectiveness. These are techniques based on biofeedback, relaxation, and meditation. The last 2 methods do not require special equipment during learning. Jacobson's relaxation is the most universal method which is also the least demanding with respect to the conditions of use. Meditation techniques are complicated to learn, require long-lasting training, and are not suitable for the majority of people. The use of any methods of support, even the safest Jacobson's relaxation technique, requires strict compliance with security procedures. For example, it is categorically prohibited to carry out relaxation training when the person undergoing training is in a state of psycho-emotional tension, with the presence of unpleasant images, thoughts and sensations in the body. The training should be performed when an individual is in a balanced, psycho-emotional state. It is worth emphasizing that individually-adjusted methods of support are the most effective.

The results of the above-presented studies demonstrate that a simultaneous use of two or more methods leads to more effective reduction of blood pressure in patients with EH. While using music therapy, it may be proposed to apply additional psychotherapeutic techniques exerting an effect on the emotional functioning of an individual. This would allow a patient with EH to more deeply recognize own intrapsychic processes and learn to regulate own emotional states [34]. Such a use would enable the shaping of habits of psychical self-regulation. In fact, a sole listening to the music looks less promising. The use of music therapy requires an exclusively individual approach to a particular patient.

Considering the variety of yoga schools and their techniques it is relatively difficult to determine the effectiveness of yoga. Being a philosophical tradition from the East, in the West, yoga is understood more as a "set of exercises for the body". Such an understanding concerns more hatha yoga, and not, for example, Raja yoga, the aim of which is learning the management of thinking. The majority of the presented studies deal with hatha yoga. Considering the fact that this form of yoga requires the performance of physical exercises, and physical activity is recommended for people with EH [3], it may be assumed that individually adjusted exercises which

result in a positive result may be applied in patients with EH.

Aromatherapy is a useful method of support for patients with EH after consideration of several aspects. Firstly, an individual selection of an essential oil should be considered which exerts a positive effect on the cardiovascular system and general well-being of the patient. Secondly, aromatherapy may be used in combination with other techniques, e.g. relaxation or meditation. Thirdly, in order to facilitate the use of aromatherapy in daily life, pendants or bracelets specially designed for this are applied which are diffusers of essential oils. The isolated use of aromatherapy is rather a symptomatic approach in the treatment of EH which, however, may be satisfactory for some time. It is known that essential oils cause changes in the human psycho-emotional state. Patients may assess these changes and recognize own feelings and emotions occurring during the process of aromatherapy. This contributes to the development of the sense of smell. It should be noted that a low capability for sensing smell or taste experiences is also characteristic of alexithymia [85] which, as emphasized above, is a specific feature of patients with EH. It may be presumed that the use of such a modified form of aromatherapy allows learning of own psycho-emotional state, and thus its regulation in the future.

Currently, within support for patients with EH, no studies have been presented concerning long-term forms of psychotherapy (e.g. existential), or short-lasting forms oriented towards a patient's personality, and the system of a patient's relations with the surrounding reality (e.g. specificity of patient's emotional functioning in situations which cause emotional tension, etc.). Studies concerning the effectiveness of such individualized psychotherapy, adjusted to a given patient, are very complicated to conduct. However, the lack of this type of studies does not exclude the effectiveness of such forms of psychotherapy for patients with EH.

Conclusion

Studies concerning the effectiveness of the methods of psychological support for patients with EH are controversial due to their low quality and the presence of methodological problems, which cannot be solved within evidence-based medicine. The most effective methods are those which, firstly, are individually selected for a given patient, and secondly, are directly related with shaping mental self-regulation skills (relaxation, meditation, techniques based on biofeedback). Primarily, it is important to pay attention to the most universal and safe methods which do not require additional equipment for training (Jacobson's relaxation). For a time, non-specific methods of support for patients with EH may be useful, which do not exert a direct effect on shaping conscious skills of psychical self-regulation (yoga, aromatherapy, music therapy). Nevertheless, the use of these methods may be very useful for patients engaged in the application of techniques individually selected for them. Modification from the aspect of their use via inclusion of psychological elements based on the methods proposed in this article creates new possibilities for using psychological support methods. Special attention should be paid to safety while applying the above-mentioned methods because, despite seeming safe, there are contraindications for their use.

Considering the above-described aspects, it may be concluded that the use of the methods of psychological support in patients with EH is the approach which possesses both medical and scientific potential.

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