Review article

Music performance anxiety: a critical review of etiological aspects, perceived causes, coping strategies and treatment

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Abstract

Background: Music performance anxiety (MPA) is understood as a sub-type of social anxiety and is characterised by fears of a musical presentation. **Objective**: To carry out a critical literature review on clinical and etiological aspects, perceived causes, coping strategies and treatment of MPA. **Methods**: Electronic databases PubMed, PsycINFO and Lilacs as well as specific periodicals were used based on the key-words symptoms, diagnosis, aetiology, perceived causes, coping strategies and treatment. **Results**: MPA is highly prevalent among musicians (> 16%), regardless of culture and formation. Cognitive, behavioural and physiological factors are associated with the aetiology of MPA, including biological and psychological predispositions. In addition, one should highlight factors related to the individual, aspects related to tasks and musical situation as perceived causes and/or predictor variables of MPA. As for the coping strategies, one can also highlight the use of breathing/relaxing techniques, increased musical practice, use of homeopathy and substances without medical prescription. **Discussion**: MPA is impacting in the musician's life. Despite the increasing interest in its study, it is necessary to better understand this complex phenomenon, mainly in the therapeutic context, in addition to the publicising and offering of services for prevention and treatment of MPA.

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Introduction

Music as a profession

The practice of music on a professional or amateur basis requires the musician to have a set of knowledge, techniques and skills which consolidate during an often long process of preparation. In addition to having a vast technical knowledge on the practice, being a musician requires high levels of skills such as motor co-ordination, attention and memorisation[1,2], speed, precision and strength[3].

Smilde[4] states that the career of musician requires that he or she performs multiple functions/roles, such as being an artist, a composer, a teacher, a mentor, a coach, a leader, among others, which demands a set of skills for a successful career. In addition to these characteristics of the musical careers, according to Kenny[5] and Galvão[1], there is a relationship between level of music knowledge, practice and successful performance, that is, the greater the knowledge and the longer the practice, the higher the possibility of success in the performance. In this sense, one can mention the so-called high-performance musicians, that is, musicians who in general have classical music formation and dedicate 4-6 hours a day to their studies, on average, aiming to improve their performance[6].

According to Ericsson *et al.*[7], these musicians intentionally make a great effort to practice the musical instrument, which may have a positive impact on the performance on the one hand, but a negative impact on the musician's general health on the other hand. Andrade and Fonseca[8] report that high-performance musicians and athletes have similarities in their practices, such as use of muscle groups for training/rehearsal and intensive dedication with long periods of practices aiming at presentations. In view of this intense dedication, the high-performance musicians often present with muscle pain (many times debilitating) related to the instrument being played. The authors also state that there is a remarkable difference between musicians and athletes in this condition, that is, the latter is often followed up by a technical health team, whereas the former is not.

Moreover, many musicians end up developing conditions which involve physical suffering, such as pain in the muscles used for playing the instrument as a result of many hours of training, repetition and extreme tiredness[9,10]. The performance-related musculoskeletal disorder is defined by pain, weakness, numbness, tingling or other symptoms which interfere with the ability to play the instrument at the level the musician is accustomed to[11]. This condition affects many musicians, mainly those of high performance. According to Kenny and Ackermann[9], about 55 to 86% of the members of the Australian Symphony Orchestra presented this condition, which impairs significantly their musical career.

In addition to the long hours of typical practice in the musical career[1,12], there is also several intrinsic requirements of the profession, such as working in shifts, being available to travel for presentations, leaving the family during tours, adjusting to the time zone, dealing with the often typical financial instability of the profession, among other factors[13].

In this sense, the psychological distress experienced by most of the musicians is extensive, involving anxiety symptoms, depressive symptoms and music performance anxiety (MPA), this latter being related to the public's and musician's demands[9,14,15]. A study by Barbar *et al.*[14] showed that 19% of a sample of 230 Brazilian professional and amateur musicians had indicators of social anxiety, 20% had indicators of depression and 24% had indicators of MPA. In a previous study, Kenny *et al.*[16] also identified a significant pattern of indicators of depression (32%), social anxiety (33%) and post-traumatic stress (22%) among the members of the Australian Symphony Orchestra, suggesting that the condition is independent of the musician's culture and musical formation.

It is still possible to highlight other clinical conditions associated with the musician's career, such as problems related to sleep and use of substances. Pereira *et al.*[17] conducted a study on the quality of sleep in classical musicians and found that 71% of the participants had a poor quality of sleep, which seems to be associated with pain and physical discomfort.

With regard to the use of substances, West[18] reports the use of licit substances such as alcohol, coffee and medications as well as of illicit substances such as cannabis and cocaine. It is known that

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many musicians rely on substances to deal with the typical demands of the career, which includes performance in public, many hours of rehearsal, travels and time zones[18].

This whole panorama seems to have a negative overall impact on the musician's quality of life, which is perceived by them[17]. Nevertheless, there is little attention to this specific population on the part of the public healthcare policies, as well as the search for alternative support and treatment measures on the part of the musicians, thus contributing to the worsening of the problem.

Therefore, the objective of this work is to present a critical literature review regarding the music performance anxiety, including aetiological aspects, perceived causes, coping strategies and treatment.

Methods

Electronic databases PubMed, PsycINFO and Lilacs, periodicals specific to the music field (*Research in Musical Behaviour,* the *Journal of Research in Music Education, Medical Problems of Performing Artists, Psychology of Music and Music Education* and the *Journal of Music Therapy*), as well the bibliographical references of the articles selected were used for this critical review, based on the keywords: symptoms, diagnosis, etiology, perceived causes, coping strategies and treatment.

Results

Music performance anxiety

Anxiety is defined as the anticipation of an upcoming event and is associated with experiencing muscle tension and vigilance as a way to prepare for future danger through avoidance behaviours[19]. It is important to emphasise that anxiety itself is not a problem. For Barlow[20], anxiety is a natural feeling which is part of the human emotions, being necessary for survival. However, when the level of anxiety increases to the point to affect negatively the individual's functioning and cause distress, then it is considered pathological.

According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders – DSM-V[19], the anxiety disorders are characterised by the presence of excessive fear and anxiety, including related dysfunctional behaviours. Although these two emotional states occur concomitantly in most cases, fear is characterised by an emotional response to an imminent or real threat and is usually accompanied by fight-or-flight behaviours.

According to the DSM-V[19], anxiety disorders differ depending on the type of object or event producing feelings of fear/anxiety, cognitive changes related to the event, or objects generating avoidance behaviours, whereas anxiety refers to the anticipation of future threat, being more associated with muscular tension and vigilance. Among the anxiety disorders, one can highlight the social anxiety disorder (SAD), whose main characteristic is the presence of fear or anxiety in situations of social interaction in which the individual becomes afraid and worried with the possibility of being evaluated by others. In SAD the feelings of fear and anxiety as well as avoidance are very strong, resulting in significant distress and impairment of social functioning[18].

Performance anxiety is associated with only the performance and can be considered a specific type of SAD in which the individuals present performance-related fears, in general affecting their professional lives as is the case of musicians, athletes and other performing artists[19]. Therefore, the term MPA refers to a performance anxiety condition specifically related to musical performance in both solo and group presentations involving any music instrument, including singing[21-23], and thus can be considered a sub-type of social anxiety. In MAP, there is a symptom intensity scale in which the feelings experienced by musicians range from stress and anxiety, considered normal in the practice of the profession, to severe and harmful symptoms, including a sensation of terror very similar to panic attacks[24-26].

MPA can impact not only the performance of musicians, but also their career and quality of life[5,27]. According to the literature, it is common that musicians with MPA also display comorbid symptoms of depression and social anxiety[14,16], which influence their quality of life and may play an important negative role in their professional development.

With regard to the prevalence of MPA in the population of musicians, there seems to be no consensus in the literature and the explanation of this fact may be related to the difficulty health practitioners and even musicians have in detecting this disorder[14]. A study conducted in Brazil[14] showed a MPA prevalence of 24% among Brazilian musicians and Brugés[28], in a literature review, reported a prevalence ranging from 16% to 70% in musicians playing in the United States and European countries in the 1980s and 1990s. According to Steptoe[29], who also performed a literature review, the prevalence of MPA among musicians ranged from 15 to 25%. As for gender, there seems to be a higher prevalence in women compared to men, as well as social anxiety and other anxiety disorders[24,25,27,30,31].

According to Fehm and Schmidt[32], there is no estimation of the MPA prevalence in children and adolescents. Kenny and Osborne[33] state that very young children rarely experience MPA in the same way as adults, quite on the contrary, they seem to like presentations and seemingly do not feel uncomfortable with possible failures in the performance.

For the latter authors, the transition of these children to adulthoods who may suffer with MPA involves a combination of several factors which may have both positive and negative results, namely: inborn temperament, anxiety trait, increased cognitive capacity, self-reflexive function, perspective taking, parent's education type, impact of other interpersonal experiences, perception and interpretation of the world, technical skills and previous experiences related to performance[33].

Anxiety can be triggered by conscious and rational preoccupations as well as by unconscious stimuli of previous anxiety experiences producing uncomfortable somatic sensations. These stimuli can be called "triggers" and may include previous aversive experiences, which in turn can underlie the development of negative cognitions and dysfunctional thinking[34]. Studies aimed at investigating more specifically young musicians[32,33], as well as research works on treatments and interventions for MPA in this population[35-37], have been performed in the recent years. Understanding that MPA can start developing early in life opens a pathway which should be better investigated in order to prevent more effectively this condition.

Music performance anxiety and stage fright

In the field of knowledge on music performance, one can note the use of the term "stage fright", which in many cases has been used as synonyms of MPA[38]. However, Kenny[5] and Steptoe[29] state that it is important to distinguish these concepts to obtain a more conceptual rigour and consequently a greater methodological rigour in studies aimed at investigating these two performance-related phenomena, since both approaches are different.

According to Steptoe[29], MPA refers to feelings experienced by musicians in various moments and contexts, and not exclusively on the stage. Stage fright involves a sudden fear or dread related to the moment of the presentation on stage, whereas MPA can gradually develop and begins a few days prior to the performance.

Kenny[5] emphasises that experiencing MPA may be related to a defensive means against the possibility of re-experiencing an intense painful emotional state or fearful anticipation related to the possibility of an upcoming threat involving shame or humiliation in a performance situation.

MPA can also have important implications on how music is played, that is, the quality of the presentation, and this issue does not seem to have the same importance when the stage fright is considered[29]. This happens because stage fright diminishes as the musicians' exposure to presentation situations increases, which may

reflect positively on the quality of the performance. Conversely, in the case of MPA, which also includes symptoms at the cognitive level, the desensitization caused by increased exposure does not occur[39].

Symptoms of music performance anxiety

The symptoms of MPA involve three main groups, namely: physiological, mental and behavioural ones[40]. In general, these symptoms are concomitantly experienced[41].

Among the physiological symptoms, one can cite the increase in heart rate, heart palpitation, shortness of breath, hyperventilation, dry mouth, sweating, nausea, diarrhoea and dizziness[42]. Sinico[43] also reports other physical symptoms, such as headache, digestive problems, excessive sweating, musculoskeletal problems, muscle tension, cold hands, fatigue, and changes in blood pressure, heart rate and respiratory rate.

The mental symptoms can be divided into two groups for a better understanding, namely: cognitive and emotional symptoms[43]. The cognitive symptoms involve difficulty of concentration, high distraction, memory-related problems, distorted thoughts, poor interpretation of the score, among others[29]. Lehman *et al.*[41] call attention to the importance of cognitive symptoms in the maintenance of MPA and quality of performance. As for the emotional symptoms, it is possible to highlight stress, apprehension, insecurity, dread and panic[29].

With regard to behavioural symptoms, one can highlight agitation, tremor, muscle stiffness and impairment of the performance (i.e. difficulty in maintaining body posture and technical failures)[29,40], which are the visible aspects made public to the audience. Therefore, these symptoms can be perceived as a sign of anxiety and thus further increase it as a result, since the musician can feel that he or she is being evaluated and this favours the start of a vicious cycle. Moreover, in many cases the behavioural symptoms end up compromising the performance as they can affect the playing of the instrument.

Etiology of music performance anxiety

With regard to the etiology of MPA, there is a consensus among researchers about the interaction of three factors in the development of such a condition, namely: cognitive, behavioural and physiological ones[5,23,32]. However, there seems to exist no study describing in detail the participation of each one of these factors in the development of MPA.

The Barlow's model of anxiety disorders is widely used for their understanding[20]. This model is intended to integrate three factors possibly involved in the development of anxiety, namely: generalised biological vulnerability (genetic inheritance), generalised psychological vulnerability, and specific psychological vulnerability, in which anxiety is correlated with certain stimuli by conditioning answers and beliefs.

According to such a model, one can suppose that anxiety can be explained by physiological processes and experiences over the individual's life course. Each of the above-mentioned factors plays a determining role in the development of anxiety. However, Rocha *et al.*[44] state that the third factor (i.e. specific psychological vulnerability) seems to be more related to the development of specific anxieties, such as specific phobia and panic disorders. It is possible that social anxieties, especially the performance anxiety, are more influenced by this factor because of the involvement of more specific psychological vulnerabilities.

Papageorgi *et al.*[22] and Kenny[5] point to the existence of both biological and psychological predispositions which are inherent to the individual. The authors believe that extrinsic factors, such as previous musical experiences and other anxiety-related experiences involved in the personal and professional histories, are also important in the development of MPA.

Valentine[40] states that MPA is influenced by three elements, namely: person, task and situation. For the author, person is a set of individual personality characteristics encompassing aspects such as perfectionism, self-esteem and anxiety trait/state; task refers to related aspects (e.g. repertoire, score interpretation, memorisation); and situation refers to the context, that is, whether it is a rehearsal or presentation, or whether it is evaluative or not, and so on. Next, we will address each one of these elements in detail.

Person-related variables associated with music performance anxiety

According to two of the main technical models cited in the present work[20,40], whose aim is to discuss the origin of MPA, there is a consensus that the focus on the person (i.e. understood as a set of aspects which form his or her personality) is key to better understand the MPA. In this sense, it is indispensable to conduct a careful analysis of socio-demographic variables, concepts of self-esteem, perfectionism, anxiety trait/state, cognition and peculiarities of cultural values.

Self-esteem, understood as the way by which the individual thinks about himself or herself, seems to be an important factor in the development of MPA. According to Mei-Yuk[45], it is suggested that high levels of anxiety may be related to low levels of self-esteem. Conceptually, self-esteem is a process, that is, it develops over time and the social relationships of the individual play an important role in the construction of this feeling[46]. For Mei-Yuk[45], anxiety may not affect directly the performance, but it is directly related to self-esteem and can distort the individual's perception of his or her performance.

Brand[47] conducted a study to compare the levels of self-esteem of music students in America, Australia and China. The results showed that cultural groups differ in the perception of themselves. Chinese music students, which belong to a collectivist culture, had low levels of self-esteem compared to their American counterparts. The results of the study demonstrate that cultural differences, understood as a set of aspects and values of each country or region, play an important role in the understanding and development of MPA, including prevention and treatment.

With regard to perfectionism, it can be characterised as a personality trait and defined as the presence of high-performance patterns accompanied with excessively critical self-evaluations[48]. Two aspects of this concept are particularly important for the understanding of MPA, namely: perfectionist efforts and perfectionist preoccupations[49]. The perfectionist efforts are related to the search for a high pattern, in general being associated with positive aspects. Kobori *et al.*[50] investigated the role of perfectionism on MPA in Japanese musicians and highlighted that it is important, in terms of self-evaluation, to meet the parent's and teacher's expectations. In this sense, perfectionism can be positive, because internalize high standards of exigency, that before were external, can favor greater training and better performance.

Perfectionist preoccupations refer to an ill-adaptive facet of the perfectionism in which there is excessive worry with mistakes, doubts about own actions and negative responses to failures and imperfections. As for this negative aspect of perfectionism, Kenny[5] states that perfectionist individuals use a high amount of energy when they become involved with evaluative behaviours and end up developing a cognitive rigidity about concepts of success, mistake or failure, often rating success dichotomically, that is, all or nothing.

Research studies on the relationship between trait-anxiety and state-anxiety have been performed in order to investigate possible associations between them and MPA[2,16]. According to Silva and Spielberg[51], state-anxiety is defined as an emotional state which happens in a given period of time and is characterised by stress, apprehension, nervousness and preoccupation. On the other hand, trait-anxiety refers to a relatively stable trend to interpret certain situations as being threatening, which intensifies the reactions of state-anxiety. The trait-anxiety, because of its trend to help the individual interpret certain situations as being aversive and threatening, to elevate the levels of state-anxiety of the individual and

to make the individual feel chronically apprehensive and worried, causes the musicians to perform poorly in situations of evaluation or fear of a possible failure compared to situations of lower levels of this type of anxiety[5]. Kenny *et al.*[2] found a strong association between trait-anxiety and MPA as well as between high level of trait-anxiety and work-related stress among musicians.

Another important aspect in the field of anxiety is the notion of susceptibility to anxiety. Conceptually, Kenny[5] states that susceptibility to anxiety is the individual's trend to perceive the own state of anxiety and interpret its symptoms as being dangerous/threatening. A study by Stephenson and Quarrier[52] shows that susceptibility to anxiety was an important predictor of MPA, especially regarding women. Another important correlation was that musicians presenting high levels of susceptibility to anxiety experience more pain and less pleasure while playing their instruments.

Gender is an important factor related to MPA. According to an extensive study by Kenny *et al.*[16], who evaluated musicians of the Australian Symphony Orchestra, found that women experienced significantly more MPA than men. These results are corroborated by previous studies[12,14,22,25,27] as they showed higher prevalence of MPA and higher intensity in women.

Age is another socio-demographic variable to be highlighted. The results of the study by Kenny *et al.*[16] show that young musicians (less than 30 years old) are more affected by MPA than the older counterparts (more than 51 years old). These findings suggest that as musicians gain more experience, the symptoms of MPA are made milder.

With regard to cognition, individuals with high levels of MPA seem to think about themselves and performance situation differently from those with low levels. For Kenny[5], among the most recurrent thoughts in individuals with high levels of MPA, one can cite the following: a) strong negative expectancies prior to the event; b) strong negative bias in self-evaluations of previous performances; c) strong expectancy that performance will be negatively evaluated by raters/audience; d) marked preoccupation with the consequences of a poor performance; e) high susceptibility to changes regarding the rater's or audience's reactions, and f) inability to feel comfortable, even through evidence that they had already dealt with previous situations skilfully[5,32].

Task-related variables associated with music performance anxiety

Task is also an important element associated with MPA, and according to Valentine[40], it comprises aspects such as repertoire to be played, competence to interpret the score and memorisation. Sinico and Winter[53] highlight that the level of anxiety experienced is directly proportional to the difficulty and complexity of the task. Therefore, for the authors[53,54], the choice of repertoire is very important when the level of requirement and technical demand are incompatible with the musician's skills, since there are risks of negative impact on the performance anxiety. In a descriptive study on the causes of anxiety in flautists, the same authors reported that musical repertoire was pointed out as the main cause of APM.

Memorisation is a related-task element which also deserves attention. Depending on the level of excitement felt during the performance, memory lapses may occur, and because in many situations it is expected that the musician plays without score, relying on the memory and running the risk of forgetfulness can favour the emergence of more symptoms of MPA during the presentation[42].

Situation-related variables associated with music performance anxiety

As mentioned above, the contextual variables in which the performance is carried out interferes with the experience of anxiety, particularly MPA. Therefore, in addition to the person-related factors, it is important to analyse the specificities of each performance situation (i.e. solo or joint presentation, music genre, rehearsal, evaluation presentation and access to musical education) and how the musicians deal with them.

According to Ryan and Andrews[21], although MPA may occur in both solo and joint presentations[21-23], the former generates more anxiety as the musician is more exposed to the risk of committing mistakes which can be perceived by the audience.

The musician's formation is also another important aspect to be analysed. A study of choral singers demonstrated that experiencing MPA was common among them. However, the participants who had access to university musical education reported less episodes of MPA, but not less severe than those reported by the non-educated counterparts. In another study, McKenzie[55] assessed six musicians who had access to university musical formation and the results showed that they experienced anxiety even when they felt prepared for presentation. In view of this, it was concluded that MPA can be experienced regardless of the musician's preparation, that is, its manifestation may be more related to the inability to deal with states of apprehension rather than with an adequate preparation.

Still, with regard to musical formation, Barbar *et al.*[14] showed evidence that professional musicians have higher rates of MPA (39%) compared to amateur ones (14%). According to the authors, this can be explained by the typical demands of the profession. With regard to music genre, data from a study by Papageorgi *et al.*[56] suggest that musicians from a variety of music genres share similar perceptions and preoccupations, although classical musicians have higher levels of MPA.

Papageorgi *et al.*[56] also demonstrates that the musician's anxiety increases as the presentation approaches, reaching a peak immediately before the performance. On the other hand, this anxiety begins to decrease as the presentation progresses. This suggests that the presentation can be divided into at least three distinctive moments, namely: a) the period preceding the presentation, with mild symptoms of MPA being already present; b) the period immediately before the presentation, with more intense symptoms of MPA being perceived; c) the most critical period, when the presentation is actually taking place, with symptoms of MPA still present, but decreasing.

The situation/context of the presentation is also an important aspect regarding the MPA. The levels of MPA can vary depending on the context of presentation, that is, whether it involves rehearsal or public presentation, whether it involves evaluation or competition, and so on. Data from a study by Yoshie *et al.*[57] suggest that musicians experienced higher levels of MPA in evaluation than in rehearsal situations. LeBlanc *et al.*[58] evaluated secondary school adolescent musicians in three situations as follows: in an empty rehearsal room, in a rehearsal room with one researcher, and in a rehearsal room with researchers, classmates and a camera recording them. The results suggest that levels of MPA and heart rate were similar in the two first situations, increasing considerably in the third one. However, in the studies by Craske and Craig[59] and Yoshie *et al.*[60], there was no significant difference in the quality of performance when the situations of rehearsal and performance were compared to that of evaluation.

Music performance anxiety: related causes perceived by musicians

Considering the importance of cognitive process in the aetiology and maintenance of MPA, it is important to understand the causes perceived by the musicians as being associated with the development of MPA. The identification of causes, as well as of whether they are internal (i.e. thoughts, feelings and sensations) or external (i.e. reactions to audience) to the musician, can contribute to a more effective intervention in pathological conditions involving MPA.

Despite this, there are still a few studies on this theme. Among them, one can highlight the study by Kenny *et al.*[16], who used a sample of 377 members of the Australian Symphony Orchestra. For those musicians, the three causes most associated with MPA were: self-pressure, excessive physical arousal before and during

the presentation and bad performance experience. According to the authors, these data suggest the presence of psychological vulnerability and ill-adaptive perfectionism traits.

The study by Sinico[43], who studied Brazilian flautists, showing that the most reported causes of MPA involved difficult repertoire, public presentation and evaluation. Further studies on this theme are important to understand the development and maintenance of MPA.

Coping strategies associated with music performance anxiety

Coping strategies refer to a set of skills that people use to deal with adverse and stressful situations[61]. In the musical context, coping strategies are behaviours and thoughts the musicians use to deal with MPA. One should highlight that the affectivity of these strategies varies depending on the situation and individual's characteristics.

According to Sinico[43], the choice of certain strategies over others is closely related to the symptoms being experienced by each musician. In other words, each symptom requires one or more strategies to ease the sensations resulting from MPA, which not always works well.

Sinico[43] proposed a classification of these strategies into cognitive, behavioural and cognitive-behavioural. According to the author, cognitive strategies are aimed at altering poor cognitive processes, such as negative or distorted thinking patterns related to the performance, by means of cognitive re-structuring, for example. The behavioural strategies are based on specific techniques aimed at altering behaviours by means of systematic desensitisation. Finally, the cognitive-behavioural strategies are aimed at altering inadequate patterns of problematic thoughts and behaviours.

Despite this classification, in general the coping strategies have an effect on both cognition and behaviours. According to Lazarus and Folkman[62], an effective coping involves changes in cognitive and behaviour efforts so that the affected individual can control internal/external demands.

Among the main coping strategies used by orchestra musicians, there are the following: deep breathing, distraction techniques, self-talk, more training, relaxing techniques, search for medical assistance, hypnosis, use of medication, and use of alcohol[16].

In another study by Zakaria *et al.*[63], it was found that the main forms of coping with MPA as reported by undergraduate musicians were: praying, use of breathing and relaxing techniques, more practice and accumulation of previous performance experiences.

Studer *et al.*[38] studied undergraduate musicians and found that the most frequently cited coping strategies were breathing techniques, self-control techniques and use of natural substances (especially homeopathic ones). As for the effectiveness of such strategies, the most effective ones were breathing exercises, use of medication and self-control techniques, On the other hand, the use of coffee was the least effective strategy.

Still, in this direction, flautists reported that familiarity with repertoire to be played, score reading skills, constant practice, musical expression and memorisation were the main coping strategies[43].

In this context, Allen[64] conducted an interesting study with pianists. The objective of author was to investigate a possible coping strategy. The results suggested that coping strategy can be a tool to reduce anxiety sensations during presentations, since it enables an action in view of a possible failure. Thus, the musician is encouraged to explore aspects (e.g. creativity) to control stress and nervousness during performance.

Other authors emphasize that the teaching-learning process by itself, can function as coping strategies of APM. In this sense, the development of techniques for studying, memorizing and solving problems, techniques for gradual and pre-performance training, and the emotional preparation of the students by the teaching staff stand out[65,66].

There are also other coping strategies employed by musicians, such as use of alcohol and illicit drugs, mainly to control the symptoms[21]. It should be emphasised that these poor adaptive strategies are commonly used, despite not always being effective, and contribute to the development of psychiatric co-morbidities.

Treatment of music performance anxiety

The research on treatment of MPA was first performed in the 1970s and has drawn attention from researchers in the recent years[67,68].

In a recent systematic review[69], the most studied intervention modalities were cognitive behavioural therapy (CBT), yoga, bio-feedback, meditation, virtual exposure, music therapy and Alexander's technique. Among the modalities, CBT is more evidenced as it has already been reported by previous studies[67,68]. Yoga has been highlighted as an innovative modality because of some favourable results, but further studies are needed in order to support its use in this context. As for the other techniques, it was not possible to draw a conclusion about their efficacies given the small number of studies and their methodological weakness[69]. The authors also emphasise that more rigorous studies are needed, including pharmacological ones.

As for studies with medication, these are more rare and generally focus on beta-blockers. Kenny[67] in a review study, found that this substance favored improvements in the control of the symptoms associated with sympathetic hyperactivity, that is, papiness, hyperventilation, tremors, sweating, among others.

However, according to Nascimento[70], pharmacological treatment turns out to be a less viable option for musicians, since anxiolytics may compromise fine motor control, and beta-blockers may impair musical performance.

Nevertheless, an important study by Fishbein *et al.*[71] with 2212 orchestral musicians who pointed out that 27% of them used beta-blockers, being the most frequent use by women. In a survey conducted in Brazil with music bachelors[70], 17.27% of the interviewees reported using this type of substance for MPA control, Especially in situations of solo performance, contests and masterclasses. According to the qualitative perception of these musicians, the use of the beta-blocker favored a decrease in fear of exposure, self-criticism and negative thoughts.

In this sense, one can highlight partial data from a clinical trail on oxytocin, a neuropeptide produced by the hypothalamus, which is currently underway by our research group. The findings point that an acute dose of oxytocin seems to decrease negative cognitions associated with MPA. If confirmed, oxytocin will have important implications for the music practice by benefiting musicians who suffer from the disorder and with minimum side effects.

Although some treatments have been studied, the attention given to this specific population on the part of public healthcare policies is still scanty, including the search for alternative support measures by the own musicians, which contributes to the lack of due treatment of MPA. According to Nascimento[70], 36% of music students reported needing help in dealing with MPA, while 73% would like to receive support from a specialist.

The exception to this is the Comprehensive Healthcare Program for Performing Artists, provided by the Brazilian Healthcare System (SUS) in conjunction with the Federal University of Minas Gerais[72]. This program was implemented in 2009 and since then 122 musicians have been treated, in the majority of the cases, for physical symptoms such as problems related to posture, tendonitis and fibromyalgia. Positive impacts have been reported by the musicians, especially regarding strategies against the risk of getting ill. Moreover, a group activity protocol involving breathing techniques, self-massage, perception of tension in the body, body awareness and MPA is currently being assessed[70].

Final considerations

MPA is a complex condition and has drawn attention from researchers in the recent decades, possibly because of its high prevalence among musicians and its impact on their career and quality of life.

One can observe that musicians, who often interpret the symptoms of MPA as being normal and inherent to the profession, have not been seeking treatment as expected. Services of healthcare and treatment for musicians are scanty and the diagnosis of MPA is frequently compromised because the healthcare practitioners have a poor knowledge on the condition as a result of lack of information.

Although there are still many gaps in the literature regarding this theme, they have been filled in the recent years. It is expected that in the near future we will have a better understanding of MPA in order to allow the spread of information on the problem, intervention techniques and prevention measures, thus contributing to the well-being of the musicians.

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