Chinese Music Therapy to Alleviate Anxiety and Depressive Traits in Breast Cancer Patients. The Shanghai Model

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ABSTRACT

Introduction/Background: Cancer is the leading cause of death in China and the rate of breast cancer in females is nearly 20%, that is, more than other cancer types. Anxiety and depressive traits are common in Chinese breast cancer patients, hence the purpose of this study to provide an efficient and clinically practicable music therapeutic model and thus to contribute to Chinese psycho-oncology. **Materials/Patients:** Given that, music therapy is a culturally sensitive approach and application of models from other cultures of limited value, the Shanghai 10th People's Hospital (affiliated to Tongji University) conducted a non-randomized control group pilot study (intervention $n = 22$, control $n = 156$) to develop and evaluate Chinese music therapy for breast cancer patients. The intervention was tailored to the patients' individual features and sociocultural backgrounds and involved favorite Chinese songs, creative interactions, and elements of Chinese martial arts. **Methods:** Application of the Chinese version of the Hospital Anxiety and Depression Scale yielded quantitative data. Qualitative data were derived from interviews, body language, and musical performance and processed using Mayring's content analysis and Mastnak's qualitative factor analysis. **Results:** Quantitative parameters show significant reduction of anxiety/depression (Glass' $\Delta = 3.38/4.1$; Cohen's d = 3.39/4.43, and statistical power = 1/1) and qualitative analysis suggests positive effects on mental and emotional relief, obsessive-compulsive conditions, self-esteem, empowerment, self-regulation skills, life energy, discovery of the "musical self," and life quality. **Conclusion:** Chinese oncological music therapy is promising and further research is needed. This also involves ethnic minorities and methods such as Guqin music therapy.

MICRO ABSTRACT

Cancer is the leading cause of death in China, and related anxiety and depression are a huge burden. The Shanghai 10th People's Hospital's music therapeutic model was tailored to Chinese breast cancer patients' individual features and sociocultural backgrounds, and it contributes to Chinese psycho-oncology. Qualitative and quantitative research showed relevant benefits, but further research is needed to substantiate robustness.

Key words: Breast cancer, Chinese music therapy, clinical music education, mixed methods research, psycho-oncology, supportive care

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BACKGROUND

Music therapy substantially involves cultural features, and the notion of culturally sensitive music therapy is increasing in importance. The China Conservatory of Music in Beijing 中国音乐学院 has importantly contributed to genuine Chinese music therapy and approaches such as the Five Elements Music Therapy, which also comprises treatment of depression in cancer patients,[1] provide techniques that go hand in hand with Chinese medicine and traditional Chinese culture.

About 5 years ago, the School of Arts and Communication of Beijing Normal University (BNU) 北京师范大学 艺术与传媒学院 decided to go in for music therapy, and some years later, the Research Centre for Arts Therapies of BNU 北京师范大学 艺术治疗研究中心 was founded. Its purpose and mission is to promote and establish a Chinese School of Arts Therapies, which is based on Chinese cultures and designed to satisfy Western and Chinese medical standards of research and clinical practice.

In light of traditional Chinese culture, the arts, that is, to say music, dance, drama, poetry, visual arts, and calligraphy, have to be viewed as an esthetic entity; hence, the notion "arts therapies." Moreover, Chinese arts therapies take the broad spectrum of Chinese cultures into consideration. This encompasses the Han 汉族, who are the main population of China and often regarded as the "genuine Chinese," as well as the cultural wealth of China's ethnic minorities, the 少数民族. Today, the People's Republic of China acknowledges 55 ethnicities living on the territory of mainland China, for example, the Uighurs 维吾尔族, the Hmong 苗族 and the Manchu 满族. Their English and Chinese names, however, differ from how they call themselves in their native languages.

With regard to cultural sensitivity, this research center particularly focuses on (i) traditional forms of healing arts in China, (ii) novel arts therapeutic models which are based on China's cultures, (iii) comparative research on traditional and modern ways to explain arts therapeutic mechanisms, (iv) interdisciplinary research involving Western medicine, Traditional Chinese Medicine (TCM), ethno-medicine, psychology, neurosciences, anthropology and ethnology, sinology, and philosophy, (v) the ratio between culturally dependent features of arts therapies (e.g., healing dance rituals) and invariable properties (e.g., the connection between sound and neuroplasticity), (vi) the importance of cultural and spiritual backgrounds of patients (e.g., the Buddhist belief in reincarnation), (vii) Chinese epidemiology and the role of arts therapies within the Chinese public health system, and (viii) Asia-Pacific music and arts therapies and related networking in research, as well as the national implementation of culturally sensitive programs.

The Shanghai 10th People's Hospital, which is affiliated to Tongji University, is a key institution of clinical music therapy in China, and research concerns system compatibility with medical and clinical standards, clinical feasibility and genuine Chinese models of music therapy. Due to their similar scientific and clinical orientation, the BNU Research Centre for Arts Therapies and the Shanghai 10th People's Hospital collaborate in various fields, music therapy in breast cancer included.

Referring to Chinese cancer statistics, China Daily[1] stated that "there was an average number of over 10,000 Chinese people diagnosed with cancer per day in 2015," and the Cancer Atlas[2] headlined "Cancer in China: More Than 7500 Deaths Per Day Estimated." Chinese epidemiological studies[2] showed a significant difference between urban and rural mortality-to-incidence ratio in cancer, and a research group[3,4] from Guangzhou in South China pointed out that.

Cancer is the leading cause of death in China... reasons for the higher mortality in China may be the low rate of early-stage cancers at diagnosis and non-uniformed clinical cancer treatment strategies performed by different regions... with a rapidly increase cancer burden of colorectal, prostate, female breast cancers in addition to a high occurrence of infection-related, and digestive cancers... Comprehensive prevention and control strategies in China should include... recommendations for healthier lifestyles, along with enlarging the coverage of effective screening, educating, and vaccination programs to better sensitize greater awareness control to the general public.

In light of these challenges, BNU is vigorously going in for comprehensive health education comprising (i) teacher trainings and specific educational support throughout China, (ii) knowledge and awareness of healthy life styles, (iii) cardiovascular and mental health, (iv) prevention of cancer and infectious diseases, and (v) school subjects with key relevance to public health, for example, physical education, school sports, literature, and arts. Proceedings also involve the integration of music education and music therapy, as well as relevant curricular standards.

With a rate of 19.2% breast cancer is the most common type of cancer in female patients in China[33] and a main concern of public health.[5] In this context, a study from Guangdong province showed that the detection of platelet parameters may facilitate early diagnosis,[6] and miR-141 and miR-195-5p are involved in the occurrence and development of breast cancer and closely related to the proliferation and migration of breast cancer cells, ergo their clinical significance for the early diagnosis.[7] Reviewing the Chinese medical literature on breast cancer makes clear that microbiological studies

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1 http://www.chinadaily.com.cn/a/201902/15/WS5c663581a3106c65c34e9904.html

2 https://canceratlas.cancer.org/news/cancer-in-china-more-than-7500-deaths-per-day-estimated/

play an outstandingly important role. In contrast, psycho-oncological and arts therapeutic research is rare.

Although breast cancer screening can reduce female mortality, it also may result in overtreatment and socio-economic stress. For that reason, clinicians suggest more individualized screening methods and a breast cancer screening system that is tailored to national public health conditions. These require standardization so that Chinese women throughout China can greatly benefit from these facilities.[8] Improved breast cancer screening also has to explore novel methods and requires pertinent evidence based studies for optimized preventive, therapeutic, and rehabilitative care.[9]

In addition to improved screening and early diagnosis of breast cancer, there is high need of psycho-oncological support in China.[10] "Breast cancer patients are in high risk for developing psychiatric disorders such as depression and anxiety"[11] and recent studies[12] emphasized the relatively high prevalence of psychiatric sequelae of breast cancer, hence, the importance of adequate supportive care. This demand is in complete accordance with the purpose of the present study: To provide culturally sensitive music therapy to tackle this issue and to improve the quality of life (QoL) of Chinese breast cancer patients.

A systematic review about the capacity of music therapy to reduce psychological issues in cancer patients was full of statements in the subjunctive insinuating there were no further evidence of positive effects of music therapy in oncology[13] "music interventions may have beneficial effects on anxiety, pain, fatigue, and QoL in people with cancer. Furthermore, music may have a small effect on heart rate, respiratory rate, and blood pressure." In contrast, a more recent review on music therapy in cancer[14] concluded that a positive effect of music-based interventions (MI) on the outcomes measured was supported. Greater reductions of anxiety and depression were observed in breast cancer patients... The increasing evidence about MI effectiveness, tolerability, feasibility, and appreciation, supports the need of MI implementation in Oncology, Radiotherapy and Surgery wards, and promotion of knowledge among health operators.

There is increasing evidence that[15] "cancer care can be improved through offering music-based resources/services, which give cancer patients and carers opportunities to extend music usage for personal support and, for carers, to support patients," and various studies cover a wide range of relevant music therapeutic and oncological issues. In addition to cancer-related anxieties, they also focus on music to reduce anxieties in patients undergoing radiation therapy[16] and breast surgery.[17]

Coinciding with the present article, studies on music therapy in cancer patients[18] also suggest that "treatment benefits may depend on patient characteristics such as outlook on life and readiness to explore emotions related to the cancer experience," and they discuss a broad spectrum of benefits such as the music-based reduction of fatigue in women with breast cancer during radiotherapy, as well as impacts on self-esteem, social activities, and QoL.[19]

Comparable to our approach, which encompasses elements of Tai Chi 太极卷 and Qi Gong 气功, a research group from Dalian Medical University[20] advocated a complex model comprising acupuncture, Tuina, Tai Chi, Qigong, and TCM Five-Element Music Therapy, and the authors spoke of "beneficial adjunctive therapies." As mentioned above, Chinese music therapy as promoted by BNU is not only hallmarked by its clear focus on Chinese cultures but also by its distinct interdisciplinary approach, and along with psycho-oncological perspectives the influence of arts on malignant neoplasm and relevant mechanisms such as changes in gene expression are taken into account.[21]

Depending on where research had been carried out, there is a wealth of knowledge about music and the arts in cancer therapy published in other languages, for example, in Chinese, Russian, German, or Czech. To cite an instance, a Chinese study on factors which determine the compliance of cancer patients in group music therapy cast light on the complexity of the issue, and the authors stated that, when it comes to multidimensional oncological therapy, higher levels of education facilitate the interaction between patients and therapists and enhance reliability and compliance.[22] Moreover, music therapy can reduce state and trait anxiety in cancer patients and is widely considered an appropriate adjuvant therapy.[23]

Having taken (i) the broad spectrum of research outcomes that are germane to breast cancer music therapy, (ii) Chinese oncological epidemiology and the multifaceted conditions of breast cancer patients in China, and (iii) the clear-cut arts therapeutic paradigms of BNU and Shanghai 10th People's Hospital into account, the overall aim of the present study is to improve music therapeutic techniques and models to prevent, control, and alleviate relevant psychiatric sequelae of breast cancer – in particular anxieties and depressive traits – in Chinese patients. For this purpose, the study provides quantitative and qualitative data; data interpretation shall facilitate clinical implementation and inspire further research. It goes without saying that our study is not only designed to match Chinese issues but also shall encourage individualized and culturally sensitive music therapy on an international level, and cross-cultural exchange is welcome.

FRAME AND TYPE OF THE STUDY

The Research Centre for Arts Therapies at BNU suggests that clinical research in music and arts therapies shall comply with five key requirements, videlicet (i) quantitative research to estimate effect sizes and statistical power, (ii) qualitative research to elucidate subjective benefits and meaningful

reactions, (iii) interdisciplinary research to discover underlying mechanisms, for example, in psychoanalytic or neuroscientific areas, (iv) arts-related research to explore the nature and essence of therapeutic media, for example, with regard to esthetics and philosophy of arts, and (v) cultural anthropological and ethnological research to discuss both the patients' and the therapies' social and cultural embedment. In this context, China (BNU) and Russia (Moscow State Pedagogical University) are about to develop new standards for music- and arts-therapeutic research and education.

Some decades ago there was a rather ideological, sometimes even hostile, separation between qualitative and quantitative research in medical domains. Nowadays, so-called "mixed methods research"[24] is rapidly gaining ground. While some researchers consider that typical pitfalls in quantitative research are first and foremost interconnected with deficient compliance with empirical standards,[25] other scientists basically refer to epistemological and meta-theoretical considerations.[26] "Randomized clinical trials have their place, but critics argue that researchers would get better results if they also embraced other methodologies."

From the BNU research center's point of view, randomized controlled trials are a modern version of the black box model of early behaviorism and an excellent tool to estimate input-outcome-based effect sizes, but they are neither able to cast light on the participants' subjective conditions nor can they track down underlying mechanisms. Particularly in the domain of arts therapies, there is also a high risk of (ignored) systemic errors that stem from specific sample distributions such as esthetic preferences causing disjoint sets with empty intersections. Therein lies most probably a main reason for many a significant gap between clinical observations and Randomized Controlled Trials (RCTs), as well as for arguments about therapeutic effects. In a nutshell: While the quantitative arm of our research should help to assess effect sizes, the qualitative one is designed to explore patients' experiences and estimations.

According to the Oxford Centre for Evidence-Based Medicine (CEBM) "2011 Levels of Evidence," the quantitative part of our research is a non-randomized controlled cohort study of evidence level 3. Although the CEBM categorization implies a hierarchical difference between the levels, that is, level 2 is considered better than level 3, the present study agrees with Song and Chung[27] that well-designed observational studies have been shown to provide results similar to those of RCTs, challenging the belief that observational studies are second rate. Cohort studies and case–control studies are two primary types of observational studies that aid in evaluating associations between diseases and exposures.

The present research was conducted at the 同济大学附属第十人民医院 (上海市第十人民医院), that is, Shanghai Tenth People's Hospital affiliated to Tongji University.

Tongji University was established in 1907 by the German government together with German physicians in Shanghai and is one of the oldest and most prestigious universities in China. The Tenth People's Hospital, located at 301 Yanchang Road in Shanghai, was established in 1910 and became the first "three-level" (i.e., highest ranking) general hospital of the Ministry of Health in 1993. The chief physician of the hospital, Lihong Fan, professor of pulmonology, emphatically supports a broad spectrum of clinical research in music therapy, which also includes oncology and breast cancer in particular.

On February 24, 2018, the ethics committee in charge 上海市第十人民医院涉及人体科研项目伦理委员会 (City of Shanghai Tenth People's Hospital Ethics Committee for Scientific Research Projects Involving the Human Body) approved research on "music therapy research concerning interventions to the lower depression and further adverse psychological conditions in breast cancer patients" and gave the approval number SHSY-IEC-KY-4.0/18-56/01.

PARTICIPANTS

The study comprised two samples, a larger reference group (n = 156) for quantitative analysis and a smaller intervention group. The multi-center reference group was composed of patients of the Shanghai 10th People's Hospital, the Shanghai Breast Cancer Association and "Pink Ribbon," a breast cancer support institution in Shanghai. Inclusion criteria were (i) at least one breast operation in the past, (ii) signs of cancer-related anxiety and/or depression, (iii) no manifest primary psychiatric disorder, (iv) positive attitude towards music therapy, and (v) infra-structural facilities to participate in music therapy at the 10th People's Hospital.

Seventy patients out of the reference group attended the first music therapeutic session to get an idea of music therapy and to receive detailed information about the project's research characteristics. A total of 22 patients remained to form the intervention group and delivered informed consent. Due to personal and/or health issues, some of these patients did not participate regularly though.

The music therapeutic interventions were performed by the second author of this paper who is familiar with both Western und Chinese cultures and does her PhD in music education and music therapy.

MUSIC THERAPEUTIC INTERVENTION

Referring to Kenneth Aigen, Wheeler (n.y.)[28] highlighted five international models of music therapeutic practice: Analytical Music Therapy (AMT), Guided Imagery and Music (GIM), Nordoff-Robbins Music Therapy (NRMT), Behavioral Music

Therapy (BehMT), and Benenzon Music Therapy (BenMT). Although there are numerous positions that do not agree with this limitation, the five examples mirror typical features of Western music therapy. Broadly speaking, they either are inspired by psychological schools of thought, namely, (to use Eugen Bleuler's terminology) depth-psychology (AMT, GIM, and BenMT) and behaviorism (BehMT), or stem from creative thought such as NRMT; and this to an extent that some music therapists even consider GIM a music-based form of psychoanalysis and not a true model of music therapy.

And yet, looking more profoundly into the matter reveals the true wealth of many music therapeutic approaches[29] and taking traditions of healing music and arts into consideration witnesses the endless breadth of world music therapy and various conceptualizations of how health, esthetics, and creative expression are inextricably intertwined.

Moreover, in international music therapy, we also find research-based development of novel music therapeutic frameworks and techniques. The Shanghai model of music therapy for breast cancer patients meets both: It respects Chinese culture and is based on a variation of action research[30,31] to optimize individualized programs.

The Shanghai model of breast cancer music therapy is based on interactive music processes joining patients and therapist, as well as among the patients themselves. Vocal experiments and singing are key media of musical expression, creative interaction, biographical remembrance and reconstruction, holistic self-experience, and emotional self-regulation. With regard to the previous qualitative studies, musical achievement, acquisition of singing techniques and awareness of the beauty of one's own voice are considered a momentous experience, and this helps patients regain positive labeling of thoracic regions, which are often – also in a psychoanalytic sense – blamed for the current detrimental health issues.

The song repertoire is tailored to the patients' esthetic preference, biographical significance, and self-estimated value. In the reference group (*n* = 156), 61% appreciated Chinese pop songs 流行歌曲 and 28.9% political and communist songs – in Chinese language 红歌 (literally "red songs") and 民歌 (literally "the people's song"); ex aequo with 28.9% Chinese film music and music from TV series 影视歌曲, and slightly lower – at 20.5% – music from traditional Chinese music drama 戏剧. 19.3% liked so-called "light music" 轻音乐, a Chinese genre of harmonious music that now and again reminds of "esoteric" music. Only 10.8% liked western classical music and just 7.2% enjoyed traditional Chinese music 中国民乐, a ratio that most probably cannot be generalized and calls for further research on the impact of regions, ages and educational backgrounds on the patients' musical self; 4.8% had a penchant for Chinese children's songs and 1.2% were partial to other genres such as old Chinese songs 老歌.

Embracing elements of Chinese martial arts such as Qi Gong 气功 and Tai Chi 太极拳, group music activities are also included cognitive training, as well as activation and relaxation techniques. In line with recent trends in psychiatry empowerment and mindfulness are core principles of the Shanghai music therapy model, and guidelines define the therapist's behavior.

QUANTITATIVE RESULTS

The study used the Chinese version of the Hospital Anxiety and Depression Scale /医院焦虑抑郁量表 (HAD) to gain numerical data. This inventory is considered a self-assessment scale and was designed[25] "to provide a simple yet reliable tool for use in medical practice." Although "many studies conducted throughout the world have confirmed that it is (also) valid when used in community settings and primary care medical practice," three qualifying arguments have to be mentioned.

Numerous studies on depression and anxiety in breast cancer patients[11] have shown their multifaceted and dynamic features; hence, the question whether or not we can assume content validity. In other words: Are there key properties of depression and anxiety in breast cancer patients that are not mirrored by HAD-measurements?

Moreover, we have to ask whether they HAD is also valid in Chinese patients. The inventory was developed by Zigmond[32] and Snaith for Western patients and first published in 1983. Since that time it has been widely applied[33,34] in international clinical domains, but there are still unsolved questions about cross-cultural interferences. Even if the translation of a psychological test is labeled as "validated," the BNU Research Centre for Arts Therapies suggests to critically discuss possible semantic and cultural pitfalls. To cite an instance, "feeling like "butterflies" in the stomach" (HAD item 9) and the Chinese translation "好像某个内脏器官变坏了" – literally "as if a certain inner organ is turning bad" – is idiomatically not at all the same, and misinterpretation is likely.

The HAD uses a four-point calibration and verbal descriptions, which can be regarded as a Likert scale. However, a methodological study[35,36] suggested that only 11-point-Likert scales or higher satisfy interval scale criteria, while 4-point-scales only yield ordinal scale data, ergo the question whether both the English and the Chinese versions actually satisfy interval scale criteria – or not. This issue also involves psychological, linguistic, and mathematical perspectives.

In spite of these weighty limitations, we used the HAD for three main reasons: (i) In music therapy, breast cancer patients may feel reluctant to be thoroughly investigated, and this

could weaken or harm the music therapeutic benefits, (ii) the HAD is widely used in China, which facilitates comparative research, and (iii) from an epistemological and mathematical perspective, quantitative outcomes in psychopathological fields suggest a certain estimation, but are not as precise as attributions like "robust evidence" connote. Broadly speaking, the characteristics of psychiatric and music therapeutic data are different to numbers in descriptive statistics, for example, about mortality in virology and epidemiology. In a nutshell: In music and arts therapies, we have to take broader zones of variation into account. By way of illustration: The relieving effect of music cannot be as clearly defined as a fatal coronary artery event, ergo, the HAD rather seems to be an appropriate means to estimate tendencies.

In this context, we bring Hedges and Olkin's[13] term "maximum likelihood estimator" into play and emphatically suggest that, when dealing with statistics in empirical research, we take the nature of probabilities into account. With regard to mostly undiscovered or unmentioned shortcomings in quantitative empirical research, the first author of this paper coined the terms "coherence size" and "confidence range." These novel parameters shed light on frequent systemic frailties in quantitative empirical research and qualify overestimated accuracy.

Both the original and the Chinese version of the HAD are composed of two halves, each comprising seven items; the first block assesses features and extents of anxiety, the second one of depression. Numeric values are directly proportional to psychopathological severity, that is, the lower the figure the better the mental health status.

Based on psychiatric and psycho-oncological considerations as well as on clinical experience, we assume that both anxiety and depression roughly approximate normal distribution, and this is substantiated by the visualization of data. Interpretation of the quantitative results has to take into account that the depression distribution is closer to the Gaussian bell curve than the anxiety distribution.

In the reference group ($n = 156$), the anxiety average $\mu = 17.5$, the standard deviation $\sigma = 2.3$, and the 95% confidence interval.[12,21] As regard depression the average $\mu = 17.7$, the standard deviation $\sigma = 2.4$, and the 95% confidence interval (12.9, 22.4).

The intervention group ($n = 22$) was estimated according to intention-to-treat standards, that is, we refer in each case to the last HAD-data collected during the whole course of treatment. The anxiety average was $\mu = 9.73$, the standard deviation $\sigma = 2.28$, and the 95% confidence interval (8.16, 9.84). Concerning depression was $\mu = 7.86$, $\sigma = 2.03$, and the 95% confidence interval (6.16, 7.84).

To estimate the effect sizes, we used two measures, Glass' Δ and Cohen's d. Given that, our study works with a relatively large reference sample as control group, Glass' Δ is more appropriate. To facilitate comparison with other studies, we also provide the more common Cohen's d. Nonetheless, this statistically relevant bias has to be taken into account. To get positive results, which are equal to taking the absolute result values, we exchanged μ_1 and μ_2 in the standard formula:

Glass' Δ (Anxiety) $= \dfrac{\mu_2 - \mu_1}{\sigma_2} = 3.38$ Glass' Δ (Depression) $= \dfrac{\mu_2 - \mu_1}{\sigma_2} = 4.1$.

These are extremely high values, which heuristically correlate with interpretations recommended for the HAD: while the control group ranges – both concerning anxiety and depression – in the middle field of "abnormal case," the intervention group are located in the moderate field of borderline cases. Given that, the intervention group is relatively small ($n = 22$), we have to qualify the robustness of the statistical data, and this huge difference would be enough to hypothesize a positive therapeutic trend.

The second effect size is given by Cohen's d $= \dfrac{\mu_1 - \mu_2}{\sigma}$ with σ is the pooled standard deviation using Bessel's correction

$$d = \sqrt{\dfrac{(n_1 - 1)\sigma_1^2 + (n_2 - 1)\sigma_2^2}{n_1 + n_2 - 2}},$$

and using the www.socscistatistics.com/effectsize/default3.aspx calculator we got

Cohen's d (anxiety): 3.39

Cohen's d (depression): 4.43

According to Cohen and Sawilowsky, the effect size can be described as huge.

To indicate the statistical power and with that the probability of avoiding a type II error, we first calculated the critical value using the formula $c = \varphi^{-1}(1 - \alpha,\ \mu, \dfrac{\sigma}{\sqrt{n}})$, $\beta = \varphi(c,\ \mu, \dfrac{\sigma}{\sqrt{n}})$.

Note: As the mean of the intervention group is lower than the mean of the control, we used $c = \varphi^{-1}(1 - \alpha,\ \mu, \dfrac{\sigma}{\sqrt{n}})$ instead of the usual formula $c = \varphi^{-1}(1 - \alpha,\ \mu, \dfrac{\sigma}{\sqrt{n}})$ and accordingly not $\alpha = 0.95$ but $\alpha = 0.05$.

Anxiety:

Standard error $\dfrac{\sigma}{\sqrt{n}} = 0.49$

Critical value c $= \varphi^{-1}(1-\alpha, \mu, \frac{\sigma}{\sqrt{n}}) = \phi^{-1}$ (0.05, 17.5, 0.49) = 16.69

$\beta = \varphi(c, \mu, \frac{\sigma}{\sqrt{n}}) = \phi$ (16.69, 9.73, 0.49) = 1. Again, we have to take the inverse the values, meaning that the actual power is (nearly) the highest possible.

Depression:

Standard error $\frac{\sigma}{\sqrt{n}} = 0.51$

Critical value c $= \varphi^{-1}(1-\alpha, \mu, \frac{\sigma}{\sqrt{n}}) = \phi^{-1}$ (0.05, 17.7, 0.51)

= 16.86

$\beta = \varphi(c, \mu, \frac{\sigma}{\sqrt{n}}) = \phi$ (16.86, 7.86, 0.51) = 1. Again, we have to alter the values accordingly and the actual power is actually the highest possible.

We emphatically recommend to critically interpret these extremely positive results which require further studies with focus on core issues: (i) Do the outcomes change with bigger samples and/or in randomized controlled trials? (ii) Can depressive and anxiety traits in breast cancer patients be so easily modified, or do these positive outcomes also depend on other factors such as social inclusion, cheering interactivities, and the knowledge that the actual oncological state is not highly threatening? (iii) How do the positive outcomes depend on personality factors such as openness and basically positive attitudes?

QUALITATIVE RESULTS

Since a relaxed, joyful, encouraging, and creative atmosphere is a hallmark of the Shanghai music therapeutic model, express data generation was limited to a necessary minimum, hence, the decision to only use the HAD for formal data generation.

Going without formal interviews, qualitative data generation was effected through written records and video recording and comprised (i) spontaneous verbal communication, statements and exclamations, (ii) non-verbal messages (body language and facial expression) and motor behavior (e.g., giving a hug), and (iii) changes in music behavior, for example, a spontaneously better sound quality or a creative outburst.

The entirety of these data was processed by both qualitative cluster analysis (Mayring's content analysis) and epistemological variable reduction (Mastnak's qualitative factor analysis). Different from its algorithmic counterpart, qualitative factor analysis not only reduces variables but also uses heuristic and theory-guided principles to condense variables and discover underlying agents, the "factors." While content analysis did not add germane knowledge to the quantitative outcomes, which comprised statistical analyses of each item, qualitative factor analysis gave rise to new perspectives.

Qualitative factor analysis identified the following topics as subjectively vital to mental and emotional relief, a sound self and QoL: (i) Music as a viable means to break through obsessive-compulsive cognitions about cancer and its detrimental nature, (ii) music-based empowerment to regain both self-esteem and meaning of life, (iii) music techniques to facilitate emotional self-regulation and to release auto-therapeutic power, hence the decrease in feeling dependent on external (medical) help, as well as the Sword of Damocles permanently hanging over one's head, (iv) rediscovery of the beauty of life through the beauty of music, (v) joyful immersion in music and achievement of a "musical self," (vi) unchained fun and complete relaxation, and (vii) positive effects on fatigue and élan vital, as well as somatic benefits such as the decline in pain intensity.

DISCUSSION AND CONCLUSION

The outcomes of this study strongly encourage music-based psycho-oncological programs and consistent implementation throughout China. Taking the still deficient psycho-oncological situation in China into consideration, such measures would not only make a major music-therapeutic contribution to Chinese oncology but also provide vital mental and emotional support of breast cancer patients.

Although the Shanghai model can be considered culturally appropriate for patients from this area, there are good reasons to qualify generalization. In other parts of China, for example, in the province Hunan, we know breast cancer patients who feel an aesthetic preference for traditional Chinese music, and Guqin music therapy gains in importance. Moreover, we have to take regional cultural traditions and folk music into consideration and respect the unique cultures of the 55 ethnic minorities living in China. The wealth of cultural phenomena in China calls for further research on culturally sensitive music therapy, and oncological epidemiology makes supportive care in breast cancer a key mission.

In light of research on intersections of music therapy and music education, the 1st author coined the term "clinical music education," and akin to this notion the Shanghai model of music therapy for breast cancer covers a broad spectrum of educational methods and benefits. In addition to distinct therapeutic purposes, these encompass discovery of the "musician within," artistic utilization of one's unique creativity, music-based personal growth, acquisition of self-regulation techniques to cope with strenuous psychological

episodes, and means to facilitate social inclusion. With regard to clinical music education, awareness of cancer and pertinent preventative measures also belong to the BNU model of health education.

The present study was continuously accompanied by meta-theoretical investigations. There is still the core issue whether standardized research designs, for example, randomized controlled trials, match music and arts therapeutic features, and philosophy of science is called into play. Exempli gratia, there is no "musical placebo" and there is no plausible model of music therapeutic double-blind-studies. Moreover, music involves more dissimilar therapeutic factors than, for example, chemical compounds, and breast cancer patients in their wholeness are probably more deeply involved in the entire music therapeutic process than cardiac patients in a heart surgical intervention. Such considerations also relativize the level-hierarchy of evidence based medicine in music and arts therapeutic domains.

The present study emphatically encourages cross-cultural collaboration and exchange in music therapy for breast cancer patients. There is evidence of huge cultural differences, for example, compared to the European Alpine regions, and interdisciplinary reasoning gains momentum. Music therapy in breast cancer seems to have a promising future, and ingenious research is needed.

CLINICAL PRACTICE POINTS

Before music therapy starts, we recommend assessment of how patients access their emotions and perceive cancer-related feelings and distress. Careful sensitization soothes the path to the inner self and helps to avoid escalating negativism and fatalism. Music therapy provides appropriate tools.

We also recommend a short "musical screening" to discover how patients respond to music before music therapy starts. It is self-evident that therapeutic effects are more important than subjective music preferences and asking for favorite songs, for instance, is not necessarily the best way to select music for therapeutic purposes.

Although in Shanghai the therapeutic effect of work with Chinese pop music and political/communist songs was high, we must not fall into the pitfall of generalization, and assuming that these were the best repertoire for all Chinese breast cancer patients is a grave error. In fact, there is very promising treatment for Chinese breast cancer patients with Guqin music therapy, and also ethnic minority cultures have to be taken into account.

Awareness of cultural sensitivity in music therapy is diverse in China and greatly depends on the therapists' training backgrounds; ergo, Chinese music therapists with, for example, education in US-American music therapy might need re-education to be able to tailor their interventions to Chinese patients.

As regard the still low availability of psycho-oncology in China, music therapy may compensate for these shortcomings. Moreover, music therapy can interact with other therapies and interdisciplinary communication is needed, for example, in cases of increased therapy-related fatigue or distress triggered by the knowledge of rapidly growing new neoplasms.

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