



UNIVERSIDAD
DE
CÓRDOBA



Benefits of Music Therapy and Dance Therapy for Healthy Aging: a Systematic Review

Final Undergraduate Project
Nursing Degree



Author: Pilar Rejano-Toril
n82retop@uco.es

Advisor: Manuel Rich-Ruiz
en1rirum@uco.es

Nursing, Pharmacology, and Physiotherapy Department

Academic Year 2021/2022

University of Cordoba

Acknowledgments

First, I would like to express my gratitude to Manuel Rich Ruiz, my tutor, and a great teacher. His perseverance, advice, and, above all, his effort and interest in education have made me want to learn as much as possible and improve myself day by day. Thank you for helping me and accompanying me during this time.

I would also like to thank my family, especially my parents, Manuel and África, and my sister África, for supporting and encouraging me for a whole lifetime, for believing in me, and for guiding me when I felt lost. I am who I am today because of them. They are my fundamental pillar.

I am also thankful for how my friends and people around me have trusted in me and walked with me.

To finish, I would like to give thanks to the University of Cordoba and all the professionals who have taken part in my academic training as a future nurse.

I am very grateful!

List of abbreviations

DB: Database

EU: European Union

HRQoL: Health-Related Quality of Life

FEV1: Forced Expiratory Volumen in the 1st second

MESH: Medical Subject Headings

PEM: Maximum Expiratory Flow

STS: Sit to Stand Test

TUG: Time Up and Go Test (fall test risk in the elderly)

VO2max: Aerobic Capacity

WWT: Walking While Talking Test

6MWT: 6 Minute-Walk Test

Index

Abstract

Resumen

1. Introduction	1
2. Objectives	3
3. Methods	4
Design	4
Eligibility Criteria	4
Sources of information	4
Search strategy	5
Methodological quality assessment	5
Management and filtering process of search results	5
Data extraction	7
Data synthesis	7
4. Results and Discussion	8
Characteristics of the revised studies	8
Quality of the studies	8
Graphical summary of the results	8
Narrative description of the results	8
Health benefits	9
4.1. Global constructs: quality of life, independence, and autonomy	10
4.2. The different areas of the human being: physical, cognitive and sensory, emotional, and social and psychosocial health.....	11
4.2.1. Physical health	11
4.2.2. Cognitive and sensory health.....	14
4.2.3. Emotional health	15
4.2.4. Social and psychosocial health.....	18
Other benefits	19
i. Help people to die	20

ii. The improvement and efficiency of the resources in the health care system	20
Applicability	20
Limitations	22
Lines of future research	23
5. Conclusions	24
6. Bibliographic references	26
Appendix	I

Table 1. Results of the bibliographic search according to strategy and database (DB)	I
---	---

Table 2. Methodological table: characteristics of the studies V
--

Table 3. Methodological quality table: Systematic reviewsV

Table 4. Methodological quality table: Randomized clinical trials	VII
--	-----

Table 5. Methodological quality table: Quasi-experimental studies	IX
--	----

Table 6. Methodological quality table: Cohort studies	XI
--	----

Table 7. Methodological quality table: Case-control studies .XII

Table 8. Methodological quality table: Cross-sectional studies	XIII
---	------

Table 9. Methodological quality table: Case series studies ...XIV
--

Table 10. Methodological quality table: Qualitative studies .XV
--

Table 11. Methodological quality table: Opinion articlesXVII

Figure Index

Figure 1. PRISMA Flow Diagram of the study selection process	6
Figure 2. Results	8

Abstract

Introduction: The promotion of active and healthy aging is an essential need in response to the demographic revolution of a global aging population. For this purpose, music therapy and dance therapy appear to be key tools to promote the emotional, social, physical, and psychological integration of the elderly.

Objective: to synthesize relevant information on the beneficial effects of music and dance therapy for healthy aging.

Material and methods: a systematic review of the literature was carried out over the last five years in English and Spanish. The databases used were Medline [via Pubmed], CINAHL Complete [via EBSCO], and Scielo [via WOS]. The search terms combined the keywords: "Music therapy, Dance Therapy, Healthy Aging, Quality of life and Aged". A thematic analysis was performed, synthesizing the information in tables on which a narrative development was elaborated.

Results: There were selected 38 full-text articles from a total of 373 scientific articles. The selected information suggests that music (including playing an instrument and singing) and dancing are two types of safe, effective, low-cost, and easily adapted art therapies that have a recreational and therapeutic nature for the elderly. Music and dancing produce a remarkable improvement in their quality of life, independence, and autonomy of them. Likewise, they provide numerous benefits to physical health, cognitive and sensory health, emotional health, and social and psychosocial health, as well as economizing health resources and helping (music therapy) to a peaceful death.

Conclusions: music therapy and dance therapy have been proved to have a wide range of benefits for aged people that promotes healthy aging.

Keywords: Art therapy; Music Therapy; Dance Therapy; Healthy Aging; Quality of Life; Aged.

Resumen

Introducción: la promoción del envejecimiento activo y saludable es una necesidad primordial como respuesta a la revolución demográfica de una población mundial envejecida. Para ello la musicoterapia y la danzaterapia parecen resultar una herramienta clave para promover la integración emocional, social, física y psicológica de la persona mayor.

Objetivo: sintetizar información relevante sobre los efectos beneficiosos de la musicoterapia y danzaterapia para el envejecimiento saludable.

Material y métodos: se realizó una revisión sistemática de la literatura, en los últimos cinco años y en inglés y español. Se han utilizado las bases de datos de Medline [a través de Pubmed], CINAHL Complete [a través de EBSCO] y Scielo [a través de WOS]. Los términos de búsqueda combinaban las palabras clave: "Music therapy, Dance Therapy, Healthy Aging, Quality of life y Aged". Se ha realizado un análisis temático, sintetizando la información en tablas sobre las que se ha elaborado un desarrollo narrativo.

Resultados: de un total de 373 artículos, se seleccionaron 38 a texto completo. La información seleccionada señala que la música (donde se incluye tocar un instrumento y cantar) y la danza, son terapias artísticas seguras, eficaces, de bajo coste y de fácil adaptación con carácter recreativo y terapéutico para los mayores. Producen una mejoría destacable sobre su calidad de vida, independencia y autonomía. Asimismo, aportan numerosos beneficios sobre la salud: física, cognitiva y sensorial, emocional y social y psicosocial. Además, economizan los recursos sanitarios y la musicoterapia ayuda a una muerte tranquila.

Conclusiones: tanto la musicoterapia como la danzaterapia han demostrado tener un número elevado de beneficios para la salud de las personas mayores, promoviendo un envejecimiento saludable.

Palabras clave: Terapias artísticas; Musicoterapia; Danzaterapia; Envejecimiento saludable; Calidad de vida; Personas Mayores.

1. Introduction

In recent decades, the population pyramid has been modified, it is taking place a "demographic aging". The proportion of older people in the EU population rose from 16% in 2001 to 21% in 2020. In addition, the number of people aged 80 and over has risen from 3.4% to 6% in the same period. This is due to several causes, such as the life expectancy growth, which has increased by 3.7 between 2002 and 2019 in the countries of the European Union (1).

But, considering the increase in the number of years lived, it is necessary to consider the quality of life in those years gained. In this regard, and from a psycho-gerontological point of view, aging can be classified into three types: normal aging, pathological aging, and active or healthy aging. Normal aging is attributed to the natural changes related to this stage of life in the absence of any disease. Pathological aging is characterized by the presence of diseases and unhealthy habits that are not part of the aging process. Finally, active or healthy aging is the best physical, psychological, social, and emotional conditions, helping the elderly to achieve a better quality of life and life expectancy (2).

Thus, and as a response to the demographic revolution of an aging world population, the promotion of active and healthy aging is a fundamental necessity (3).

In this regard, art therapies are a key tool to promote healthy aging. Moreover, it has been shown that those older people who continuously attend arts activities have fewer health problems and greater eudaimonic well-being (4, 5). Therefore, committing to the arts contributes to the holistic development of the person (6).

Art is related to creativity, while therapy refers to treatment and healing. The use of both words makes art therapy mean creativity, treatment, and healing (7). There is evidence that early civilizations already recognized the therapeutic value of music and the harmony of movements for the maintenance of good health, cognitive functioning, mental and emotional health, social engagement, satisfaction, well-being, and quality of life... (6). Although, it was not until the 20th century that it was recognized as a discipline. Some pioneers of art therapy, who belonged to the artistic education and psychoanalytic tradition and worked in sanatoriums, hospitals,

and schools, recorded their work and carried out the language and literature of this therapy (7).

Within the artistic therapies, we find several modalities such as music therapy, drama therapy, dance therapy, and visual art therapy... (8). Among them, music and dancing are the activities that are reaching more importance in elderly care (9, 10).

Music therapy uses music and sound as a base for interaction with the person. This includes listening to music, playing an instrument, or singing. All music modalities aim to achieve positive physical, cognitive, social, psychological, and emotional changes. In addition, the person can enjoy listening to music and/or creating music for him/herself.

On the contrary, dance therapy uses creative movement and dance techniques to help promote the emotional, cognitive, physical, and social integration of the person. This therapy is based on the principle that movement reflects a person's pattern of thinking and feeling (7, 8).

Consequently, the use of artistic activities should be contemplated as a lifestyle and as a tool to achieve active and healthy aging with a higher level of quality of life. It is necessary to empower them and investigate their potential to consider these activities appropriate for implementing programs that promote health at this life stage (11).

2. Objectives

The present work aims:

- To revise and synthesize relevant information about the benefits of music therapy and dance therapy in the elderly population.

In addition, the following specific objectives have been defined as emerging objectives of the review work:

- To identify the benefits of these therapies in the global constructs of quality of life, independence, and autonomy.
- To find out their benefits in the different areas of the human being:
 - Physical health.
 - Cognitive and sensory health.
 - Emotional health.
 - Social and psychosocial health.
- To recognize other benefits: help people to die and the economization of health care resources.

3. Methods

Design

In the present study, it has been carried out a literature systematized review.

Eligibility Criteria

The study included all original articles dealing, in any field of the register, with:

1. Population (P): older adults.
2. Intervention (I): music therapy and dance therapy.
3. Comparison.
4. Outcomes (C): quality of life.

The period was limited to the last five years (specifically to studies published from October 1st, 2016 to September 31st,2021). Additionally, the language was limited to studies published in English and Spanish. The types of studies included were: systematic reviews and meta-analyses, randomized clinical trials, quasi-experimental studies, cohort studies, case-control studies, cross-sectional studies, case series studies, qualitative studies, mixed studies, opinion articles, and literature reviews, pilot studies pre-experimental studies, and research reports.

Likewise, we excluded from this review those studies that were not carried out. For instance, projects and articles that included people whose age was not clearly defined or used these therapies as treatment for a disease.

Sources of information

The databases consulted were Medline [through Pubmed], CINAHL Complete [through EBSCO], and Scielo [through WOS Core].

The original articles were retrieved through the library of the University of Córdoba. Although, in certain cases, it was not possible to access the original article.

Search strategy

The search strategy was focused on three concepts: in the first place, referred to the population of interest (the elderly); in the second place, artistic therapies, music therapy, and dance therapy; and in the third place, healthy aging. Additionally, to refer to each of these three concepts, others synonymous that were linked with the connector "OR" were used, and then the three concepts were joined together using the connector "AND". This is described in Table 1.

Methodological quality assessment

The articles included in this systematized review were assessed using the Joana Briggs Institute (JBI) quality tools. The quality of all studies was evaluated using a table for each type of design, except for pilot studies, pre-experimental studies, research reports, and literature reviews, due to the absence of quality assessment tools for them.

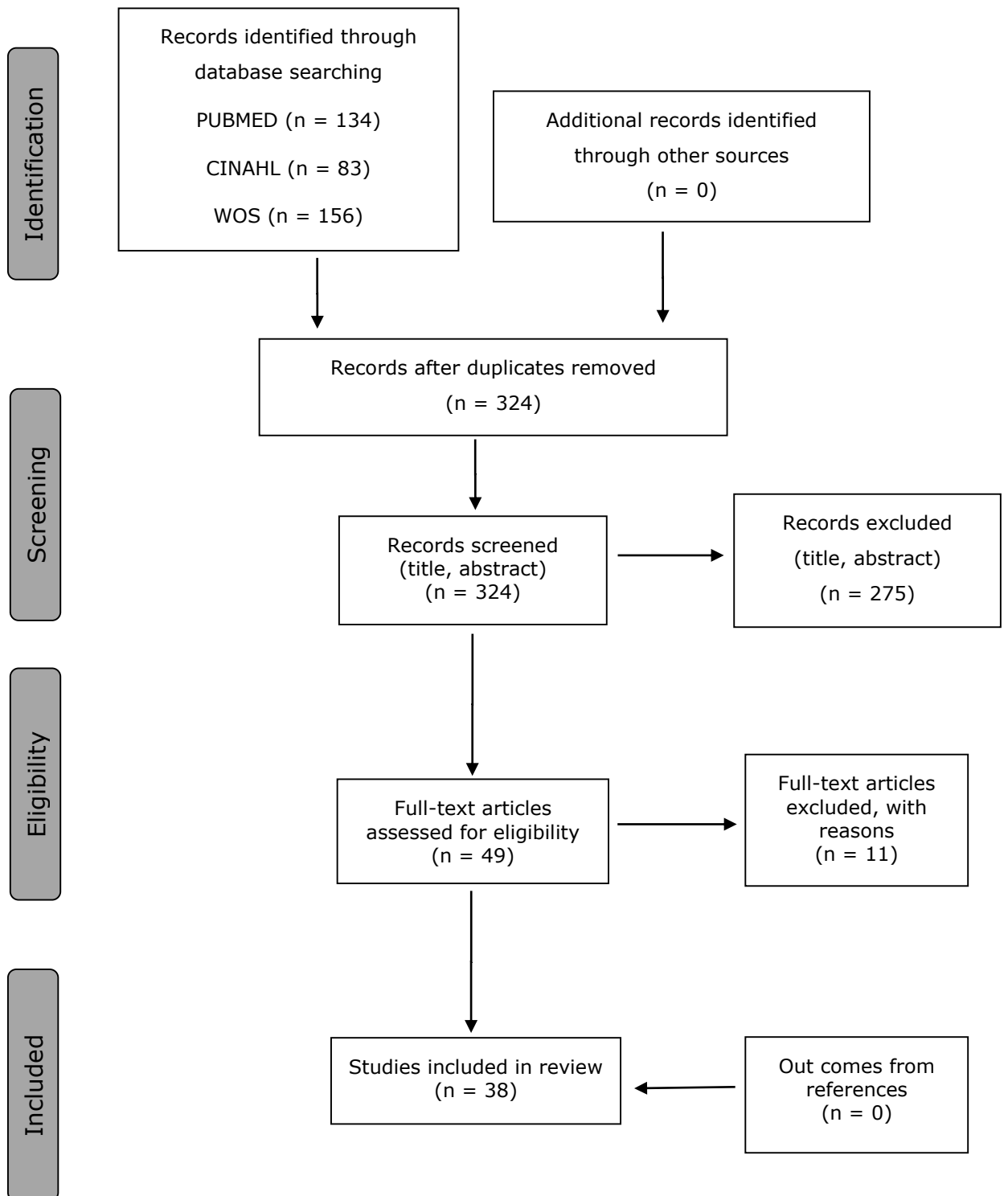
Management and filtering process of search results

The search results were collected within the Zotero bibliography manager to save, manage and organize the bibliographic references obtained. The identified references were classified, following Medina-López (2010) like 1) selected references, after reading the title, keywords and abstract; 2) false positives references that, despite coming from the indicated search strategy, did not answer the research question proposed; and 3) doubtful references, those in which a complete reading was necessary before their proper classification in the categories of Selected or False positive references.

All in all, a total of 373 articles were identified in the literature search and, once those 49 duplicates were removed. This results in 324 articles, and from them, 275 were eliminated by title and abstract, and 11 by full text. The final screening obtained 38 articles that met the inclusion criteria for further analysis.

A description of the management and filtering process is described in Figure 1.

Figure 1. PRISMA Flow Diagram of the study selection process



Data extraction

Once the articles that fulfilled the inclusion criteria had been selected, data extraction was carried out and the information was classified in tables. The following fields were collected:

- 1) A methodological table with the authors, design, population and characteristics, data collection, and themes (5 columns).
- 2) A table of methodological quality for each type of design.
- 3) A figure was created to graphically summarise the results.

Data synthesis

The process of analysis was divided into different phases:

- 1) Reading of the full-text articles and selection of topics of interest (codes).
- 2) Discussion and agreement with the tutor on the topics of interest (codes).
- 3) Re-reading of the articles and coding (selection of contents of interest classified by topic).
- 4) Analysis by topics/codes, identifying regularities and differences.
- 5) Elaboration of results synthesis tables, based on the information found in the articles.
- 6) Narrative development of the results.

4. Results and Discussion

Characteristics of the revised studies

The table that summarises the characteristics of the revised studies is described in Table 2 of the appendix.

Quality of the studies

The tables that summarise the methodological quality of the studies included in the review are also shown in the appendix (tables 3 to 11).

Graphical summary of the results

Before continuing with the narrative description of the results, the following figure provides a graphical summary of them (figure 2).

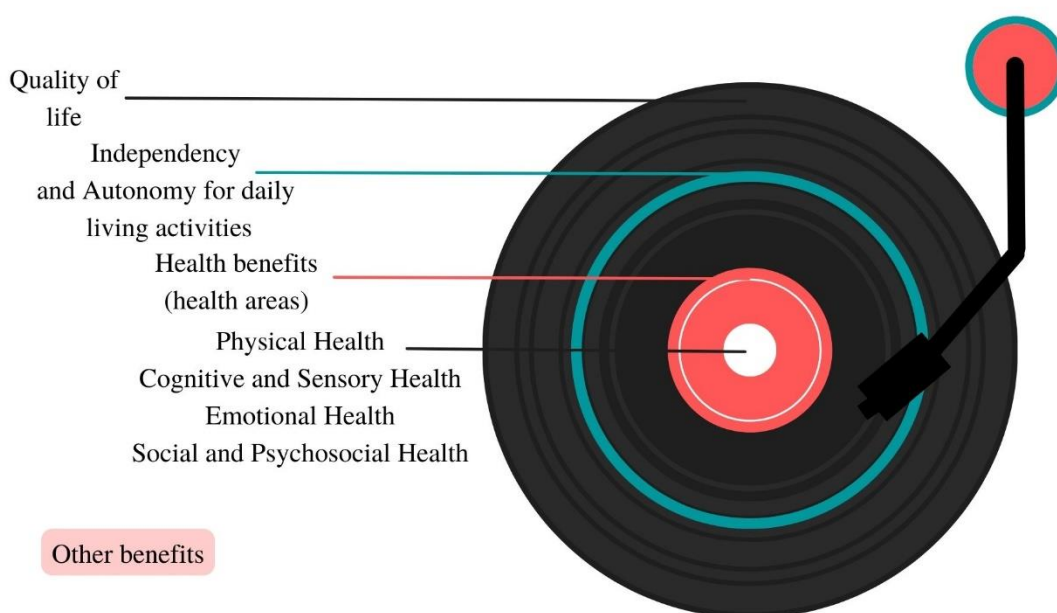


Figure 2. Results

Narrative description of the results

Music therapy and dance therapy, which belong to the area of artistic therapies, are alternative measures to traditional modes of intervention for the elderly's health.

Dance therapy and different types of dances, such as social dance, senior, slow waltz, tango, foxtrot, traditional waltz, polka, mazurka, bachata, or country, are considered a form of entertainment (6, 12). However, they are also a promising therapeutic measure, which is an alternative to traditional physical exercise and rehabilitation of the elderly, and a useful tool for improving wellbeing (12-17).

In this sense, music therapy is considered a leisure measure that allows disconnecting from the routine and the day-to-day problems (18-22). Additionally, it is considered an alternative therapeutic measure due to its health holistic vision (18, 19, 21, 23, 24).

Accordingly, it can be affirmed that these activities are recreational and therapeutic measures for different areas of health, which help the adaptation to the aging process and promote active aging (6, 24, 25).

However, beyond the health benefits, which will be discussed in detail in the following sections, the advantages of their application are the following:

- High level of safety. Music therapy has a low health risk, it does not produce adverse effects or deterioration of the state of health (23). The same happens with dance therapy, which is highlighted because of the low physical risk it involves (6, 15, 17).
- High efficacy and efficiency. These activities make it possible to achieve satisfactorily the expected results even with limited resources (23).
- Low cost. In general, it is not necessary to use expensive materials or a high number of them (6, 12, 26). For instance, singing, which belongs to music therapy, would only require the person's voice (6).
- Easy applicability and adaptation. Both therapies are easy to carry out and adapt to the resources and circumstances of every situation (6, 12, 26, 23).
- High interest and adherence. They are striking and attractive activities that produce great adherence (6, 15, 17).

Health benefits

Numerous studies point out how music, singing, playing an instrument, or dancing increase the general well-being of the elderly (6, 27-30). This includes aspects such as functional capacity, pain, mental health, emotional health, vitality, social relationships... (12). A study from the United Kingdom refers to the potential impact they have on eudaemonic well-being (4).

Nevertheless, some scientific articles such as one by Rita Santana et al. (31) point out that the impact of music like opera (4), choirs (20), and dancing like senior dance (12, 14), ballroom dancing (15), or tango, is not equal in all cases, being greater in women.

To describe health benefits, firstly there will be described those related to the quality of life, independence, and autonomy of people, considering them to be global constructs of the human being. Next, there will be exhaustively explained the positive effects on different areas: physical health, cognitive and sensory health, emotional health, and social and psychosocial health. Finally, other benefits that support the use of these activities will be briefly mentioned. These include how music also improves the last life stage, which is death, as well as how both therapies help to economize health services.

4.1. Global constructs: quality of life, independence, and autonomy

A large number of studies show a positive relationship between these therapies and quality of life (HRQoL) (4, 6). Several conclusions, depending on the activity, are presented below:

- Music and music therapy: improve quality of life in a holistic approach (6, 20, 21, 23, 27, 29, 32-35). Moreover, this improvement is not only in a general approach but is also related to short-term mental health (29), and physical health, specifically in Cantonese opera (22). Lastly, one study shows improvement in some more specific HRQoL factors (love, recreation, creativity, and religion) (34).
- Singing: only one study mentions an improvement in the quality of life, in general terms, and mental health (27).
- Playing an instrument: it decreases and slows the decline in quality of life that sometimes occurs over the years (36).
- Dancing and dance therapy: they maintain and improve holistically quality of life (6, 15, 25, 37, 38). Some authors attribute this to the physiological adaptation that dance brings to the changes that occur at this stage (25, 37). Some studies highlight specific dances: senior dance (12, 14, 26), flamenco, hip-hop, Viennese waltz, folk (4, 6), tango (4, 6, 13, 39, 40), foxtrot, slow and traditional waltz, mazurka, bachata, country, polka (13), aerobic dance (25), traditional dances and ballroom dancing (6, 25, 41).

Nonetheless, two important factors are the type of music and dancing, as well as personal preferences.

Regarding the type of music, it seems that songs such as those of Look Krung, with a rhythm similar to our heart rate, lead to a greater bonding of the physical and emotional body (32).

Regarding personal preferences, it should be contemplated that each piece of music has a dissimilar rhythm, melody, and harmony that influence differently depending on the person (15, 23). One study shows how listening to the participants' favorite songs produces a greater improvement in HRQoL (than listening to songs that are not preferred) (32). However, it seems that, in general, music with a slow tempo, like classical, religious, or traditional music, is among the preferences of the elderly because they affect positively their feelings and emotions, and so their wellbeing (12, 32).

Contrastingly, we also find studies that describe how music and dancing improve the level of independence (20, 42), the ability to take care of oneself (38), and the ability to perform basic (6, 14, 37) and instrumental activities of daily living (22). This description was based on the description of the relationship between these therapies and global constructs such as the aforementioned HRQoL.

Furthermore, according to Urszula Tymoszek et al. (4), art therapies improve the feeling of control and self-fulfillment and the level of autonomy.

4.2. The different areas of the human being: physical, cognitive and sensory, emotional, and social and psychosocial health

After describing the benefits of the global constructs of health, the sections found below reflect those benefits that have been described by different studies in specific areas of human health.

4.2.1. Physical health

Physical health is one of the most mentioned areas. It is not only dancing that influences it, as one might think because of its physical nature, but also singing and music also produce numerous benefits (22, 33). Some authors emphasize a specific type of music, i. e., Cantonese opera (22).

4.2.1.1. Musculoskeletal system

First of all, joint mobility is greatly improved by dance (12) and music (23). An important fact is that people with reduced mobility are also benefited, as explained in a study involving wheelchair users (42). In addition to this improvement, there is an increase in muscle length, range of motion, and thus flexibility (25, 30, 42).

Furthermore, dancing increases muscular resistance and strength, specifically eccentric and isometric strength, combating the loss of muscle mass and muscle strength common in this life stage. This occurs because eccentric strength produces stronger myotatic contractions (25). Both are improved in the upper limbs, as shown by a study of wheelchair users who developed greater manual ability secondary to these improvements (42). This enhancement is also shown in lower limbs, as is indicated by different tests (6MWT, STS, TUG, WWT, etc) performed in some studies, in which several dances were combined (15, 17, 30, 39, 43).

Another significant factor would be balance and gait ability. Dancing helps postural and dynamic gait balance (12, 14, 17, 25, 26, 30, 39, 42, 43), postural anticipatory control (37), and trunk stability (14), which favors gait skill (25, 39, 43).

All of these improvements are directly related to a higher level of agility (12, 14, 26) and motor skills, i.e., coordination of movements and motor skills (6, 12, 38).

Nevertheless, older people who are involved in music, singing, or dancing have a higher level of energy and activity, leading in the long term to an active lifestyle (20). *"One man in a wheelchair initially looked like he was sleeping but one of the songs resonated with him and his hands started to tap out the beat, his head lifted, eyes wide open [...] the music positively affected him"* (music program monitor) (35).

Finally, it should be mentioned these factors influence the risk and number of falls, which are frequent accidents in the elderly. It has been proven that dancing considerably reduces the risk of falls (13, 14, 17, 25, 26, 30, 39, 41, 43). This, added to increased mobility and stability, results in a reduction in fear (14) and the number of falls. For instance, one study suggests a 31% decrease (43).

4.2.1.2. Respiratory and cardiovascular system

Singing improves the strength of the respiratory muscles, making pulmonary gaseous exchange (44) and respiratory capacity (28) effective. Nonetheless, dancing improves maximum expiratory flow (PEM) and forced expiratory volume in the first second (FEV1), leading to an improvement in lung capacity (42).

Additionally, singing and music improve heart rate (44, 45). Music also improves blood pressure (45) and dancing improves cardiovascular health, showing a betterment in endurance and aerobic effort and VO2max (14, 25, 30, 37).

According to a study published in the Journal Alternative Therapies, metabolic parameters markers of cardiovascular risk decrease when practicing dance (triglycerides, glucose, blood pressure, and waist circumference) (25). In addition, dancing has benefits similar to those produced by other types of aerobic exercise on cardiovascular health. For instance, improved myocardial perfusion and function; increased size and volume density of mitochondria and oxidative enzymes in skeletal muscle; reduced endothelial dysfunction; improved autonomic balance, and increased venous return, cardiac output, and systolic volume that can be generated with maximal and submaximal workloads (25).

On balance, it seems to be convincing that cardiorespiratory health is potentially benefited by these therapies (14, 25, 30, 37).

4.2.1.3. Digestive system and phonatory apparatus

Concerning the digestive system, only one paper refers to the fact that singing helps the swallowing function, improving the average swallowing pressure and the swallowing force (28).

Notwithstanding, if we consider that the digestive system and the respiratory system together form the phonatory apparatus, it is necessary to affirm that singing also improves the voice, the level of conversational intensity, and the maximum phonation time (28).

4.2.1.4. Sleeping and rest

Another advantage of music therapy is the improvement of sleep quality and rest (22, 46). Although not all music produces the same effects. For example, relaxing music is more effective than rhythm-centered music. Relaxing music has a slow tempo and a soft melody, which reduces the neuroendocrine activity of the autonomic nervous system, decreasing anxiety and producing greater relaxation. However, benefits are significant in the long-term, as it is shown in a study where sleep quality improves considerably after 4 weeks (46).

4.2.2. Cognitive and sensory health

This important area is also benefited by music therapy (6, 19, 22, 23, 29), and dancing (6, 14-16, 31, 38). Both, help cognitive and psychological health (executive brain functions, cognition, memory, attention, concentration, and mood).

4.2.2.1. Memory function

Singing (29, 44) and music produce great benefits in memory (6, 22, 23, 29), such as the improvement of autobiographical memory and work memory, the categorical fluidity of words, and memory to remember song lyrics and series of digits (19).

Playing an instrument improves memory immediately and in the long term. In addition, it does not matter if the person has never played an instrument before because the benefits are obtained when an instrument is played at present (36).

As for dancing, learning a choreography produces a great stimulation of short and long-term memory (14, 41). Also, practicing Zumba improves visuospatial memory and the task of inhibiting response, something that is related to memorizing dance patterns and inhibiting certain movements in different dance sequences (40).

4.2.2.2. Language function

The only data found about language function is the improvement of language cognitive function, language processing, and the language

executive function that singing promotes. An improvement in the phonological and semantic area of language is also reflected (44).

4.2.2.3. *Hearing and visual function*

There is a study that worked on Cantonese opera therapy. In this opera therapy, hearing and visual attention were significantly favored, as a result of the effect that music produces on hearing and sight (by reading the lyrics of songs) (22).

In addition, dancing also allows a pleasurable multisensory stimulation, thanks to the brain activity that the music and the physical and motor skills of dancing provide. This triggers greater neuronal plasticity due to the coordinative and cognitive demand it implies (16).

4.2.2.4. *Attention, concentration, and level of alertness*

In this respect, (12) Aline Miotto Nadolny et al. indicate that, when dancing, attention and concentration play a fundamental role. They are stimulated and they show improvements when a dancing routine is followed for a considerable period (12, 14). "*Mainly attention, because we are used to doing everything automatically, right, and there, you have to pay attention, memorize, see the exercise, look at everything*" (participant of a dance program).

In contrast, music, dancing, and singing make people become aware and more alert (12, 21, 22, 29, 35). An example would be a study in which older people attending a live chamber music concert were clapping, singing, tapping their feet on the floor, etc. The level of attention and alertness was surprisingly increased (35).

4.2.3. Emotional health

These therapies can have a great emotional impact on health, as Rita Santana et al. reported about tango, which provokes emotional and psychological flourishing (31). To cite an instance, one woman, who was reserved and shy, described the experience after the dance as "freeing", and she said it had helped her remember her youthful years. According to the other participants, she became "the belle of the ball" (38).

4.2.3.1. *The decrease of negative emotions and feelings*

Music and singing (29), help to deal with negative feelings: sadness, worry, anger, anxiety, pain, and discomfort... (14, 20-22, 27, 29, 35) as some participants of a study in Switzerland explained "*It sort[s] of underlines feelings that you have. 'Sad stories' in the music help, if you're in that kind of mood yourself. It sort[s] of feels better, you share the grief with someone. You'd think that joyful music would make you feel better, but no, this is better, more healing*" (24).

Music, singing, and dancing prevent and decrease anxiety and depression (6, 14, 15, 20-22, 26, 27, 29, 35, 39). Agitation and stress are other feelings that are reduced (6), and music helps to reduce the sense of restlessness that these feelings transmit, putting mood at ease (23).

Last but not least, the feeling of loneliness is reduced by music, singing, and dancing, as well as the feeling of being socially isolated (6, 15, 20, 22, 24, 27). Some of these studies refer to Cantonese opera (22), participation in a choir (20), and social dancing (15).

4.2.3.2. *The improvement of positive emotions and feelings*

This is one of the most repeated areas. These therapies have been demonstrated to improve mood (6) and promote positive feelings: happiness, fun, freedom... They make the elderly feel full, young, capable of anything, etc. (5).

What is more, both, music and dancing, have a positive effect on the emotional health of older people. Both of them enhance their enjoyment (14, 15, 20, 24, 28, 29, 32, 38, 45), self-esteem (6, 12, 20-22), connection and regulation of their emotions (16, 24), relaxation and the sense of peace (15, 23, 24, 29, 32), sense of worth, coherence, belonging and purpose in the world (which reinforces the sense of meaning or purpose in life) (6, 19, 31). Apart from that, both activities are described as an outlet for thinking and unwinding (21, 38).

That being said, on a case-by-case basis, each has been shown to bring many more benefits.

- Music and singing.

Besides the above-mentioned benefits, there is an increase in happiness (29, 32), positive affectivity (4, 23), and feelings of gratitude (28) and identity (6, 19). Many people also describe the effect of music as a physical sensation that evokes the need to move and as a way of remembering moments from the past (20) and regulating mood and feelings (20, 21, 29, 34, 35).

"After we are finished, their faces light up, and they are uplifted. It is no doubt how song and music can lead to something completely magical" (nurse) (29).

In a study of an intergenerational choir, most participants wanted to extend the session or have more frequent sessions. They felt enjoyment and respect. *"It was the ...most enjoyable hour of the week"* (45).

In this way, music is given full meaning to them. They describe it as an important, rewarding, powerful, beautiful, majestic, enriching... (24), which allows them to achieve a spiritual upliftment (12). Two participants in music therapy activities said:

"It's the feeling [...] I am an intellectual person, too, but music helps me to connect with my emotions. Somehow it receives my emotions, it's like it becomes a receiver".

"An experience that seems to be deeply existential, being simultaneously disembodied and embodied... a kind of transformation. My body and my person cease to exist [...] it feels as if you step out of yourself or as if you go even deeper" (24).

- Dancing

Dancing, on an individual basis, also increases motivation (14). One participant in a dance program said, *"It was the best day of my life"* (38).

Lastly, another breakthrough is artistic and personal growth. These art activities (5), music (6, 20, 22, 24, 45), and dancing, (12, 14, 16, 31, 38) challenge older people by encouraging them to improve and develop skills. They also encourage them to know their bodies and abilities, and to face adversities with more strength, increasing motivation, self-confidence, self-esteem and sense of achievement.

One woman in a dance programme said excitedly: *"I really just wanted to see if I still could. AND I DID!!"* (38). Other participants in a choir that

performed in public said that turning the spotlight on themselves and seeing people watching them was the most rewarding thing (45).

Thus, it stands to reason that these activities would increase life satisfaction, as it is demonstrated in two studies (16, 19).

4.2.4. Social and psychosocial health

4.2.4.1. *Social interaction*

Art therapies (5, 6), music (21, 23, 24, 34, 35, 44, 45), singing (20, 28, 44) and dancing (12, 13, 15, 16, 31, 38) promote social, physical and emotional interaction. They enable us to feel identified and connected with others, to share moments, and to strengthen and build new relationships. They help to feel people's warmth, closeness, and emotions (24). The feeling of bonding creates a safe place to interact, express themselves and not feel social isolation: *"They made conscious efforts to get out of their houses, meet people, and work on something that was meaningful to them"* (it is described as a "win-win situation") (45).

"In other groups, you don't feel like it is a group [...] here, you still feel like you have taken part in a group experience [...]" (participant in an arts activity program) (5).

"[...] We are so close, so tight. They had my back. And I knew that: 'Whenever I have the possibility, I'm welcome back. This is such a social strength. It means the world to me'" (music program participant) (24).

"I really enjoy all of us talking together" or "It was nice to see new faces" (music program participants) (21).

"The group will be good for me and will help me a lot in many things, mainly for friendships because I like to have friends a lot and I'm a bit quiet" (participant of a dance program) (12).

A study about music in older people states that these activities increase the concentration of oxytocin and vasopressin, two neuropeptides involved in the regulation of social behaviour (34).

Ultimately, it should be said that for aged people's interaction and participation, their preferences should be taken into account. In some studies, older people participated less because they were not comfortable enough with the music (21, 22), in contrast to one study in which the program was fully adapted to their preferences (35).

4.2.4.2. *Form of expression and communication*

Most participants claim that it is difficult to express what they feel in words, but these therapies make their feelings flow through their bodies when it is not possible to communicate verbally (5). Music encourages facial expression (laughter, smiles...) and body language and movements (clapping, stomping, dancing...) (6, 14, 35).

One of the studies concludes that music makes it easier for men to show their emotions breaking the outmoded stereotype that men are emotionally restricted (24, 29).

When verbal language is an option, music, and dance have proven to be a source of inspiration for meaningful, deep, and prolonged conversations (28, 38). This creates a safe space to talk with others about concerns without fear or shyness (21).

4.2.4.3. *Care-caregiver connection*

Many of the elderly are caregivers of their offspring, grandchildren, partners... Music is a great ally to improve the atmosphere, bonding, and well-being of caregivers and those being cared for. One man, who took care of his wife with Alzheimer's disease and spent time listening to music with her, described it as a very pleasant experience. This experience allowed him to continue creating his story and deal with the sadness and pain of losing her (24).

On the contrary, when older people are cared for, the environment and relationship between them and their caretakers are also essential. Music and singing help to achieve these. One study reports the experience of three nursing homes, where music and singing were part of the daily routine, where the idea of a good feeling of togetherness was repeated, increasing well-being, mood, and a feeling of belonging to the group on both sides. *"Music makes the workers feel in a very good mood, and this is directly reflected in the residents"* said the director of the centers (6).

Other benefits

After outlining the advantages of these artistic activities on different areas of health, in terms of healthy aging, it is worth noting that other

benefits are also mentioned. These benefits allude to death, as the last life stage, and the saving of resources in the health system.

i. Help people to die

In the end, it should be added that not only does it promote healthy aging-preventing illnesses and complications, but also suggests that music therapy helps in the process of dying (32), which is another stage of life. This is due to all the health benefits of this type of artistic activity and the possibility of being an alternative to traditional therapies.

ii. The improvement and efficiency of the resources in the health care system

In addition, it should be highlighted that an improvement and greater efficiency in the resources of health systems have been demonstrated. Some authors point out that listening to live music and singing reduce the risk of accidents and the number of health problems, thanks to the state of well-being and calm that they transmit to the person (4, 29). Accordingly, a study from the UK shows that in cases where such therapies were prescribed, the number of consultations and hospitalizations decreased by 37% and 27% respectively (6). Another study suggests that the use of art therapies reduces the number of medicines prescribed (29).

Applicability

These therapies have been proven to play an important role in the leisure of older people by creating high adherence. In the same way, they are safe, cost-effective, and highly adaptable. This makes them promising alternatives to traditional exercise for healthy aging.

The increase in well-being and quality of life in a holistic way is repeated in numerous articles. This shows how far-reaching these therapies can be in health, as both complex concepts encompass all levels of the human being.

With regard to physical health, the musculoskeletal system receives numerous benefits in agility, muscular strength and endurance, balance and gait ability, coordination, motor skills, and so on. This is a great advance for aged people, who sometimes need help with moving around, and for the

physical health of every people with mobility problems. It also reduces the risk of falls, which is a frequent accident with negative consequences in this age group.

Also, within physical health, the cardiorespiratory area has been mentioned several times by different studies. It is necessary to take it into account because at this stage of life it is possible to find problems related to it and because while having similar benefits to traditional aerobic exercise, it is more attractive, which makes it easier to achieve objectives.

Then again, cognitive and sensory health also receive a lot of allusions. Memory and alertness are the most frequently mentioned by different authors. This means that these activities have great potential, as in this age group it is unfortunately common to underestimate and neglect memory problems, as well as not pay the necessary attention to the distraction and activity of the elderly.

Emotional health is one of the most studied topics. Its benefits are extensive. The decrease in loneliness, anxiety, and depression; and the increase in self-esteem, relaxation, fun, and personal growth, are the most repeated benefits. As we become older, certain events can negatively affect us, such as the empty nest syndrome. Another example would be loneliness resulting from the current pandemic situation. It is important to address emotional health, as its absence does not allow us to maintain overall health stability.

Concerning social health, a considerable number of authors affirm its improvement, especially in physical and emotional social interaction. This interaction helps elders to feel integrated and connected to others and to communicate among themselves. These abilities are crucial for the elderly, since over time social relationships change, such as that related to changing social and family roles or the loss of loved ones.

Globally, the fact that a high number of benefits of music therapy and dance therapy for the health of the elderly population have been demonstrated, allows us to contemplate its use as a day-to-day activity for the elderly, in residences, day centers, civic centers, or even at home. The results confirm that healthy aging can be promoted with therapeutic and recreational measures while giving it a more innovative and comprehensive approach.

Limitations

One of the limitations was the difference in the participation of women and men. Rita Santana et al. indicate that the benefits are greater in women and they justified this by the greater participation of women in their study, something that they extrapolated to all women in general. This should be contrasted with other studies where participation is more equal.

It has been shown that different types of music and dances, as well as individual preferences, are key factors. However, very few studies have taken an individualized approach to these preferences. At the same time, how each type of music and dance affects the individual has not been studied nor compared in detail. In other words, most studies investigated the effect of music and dance in general.

Moreover, there are several areas of human health that have not yet been studied in depth. The digestive system, the vocal apparatus, the visual and auditory system, or the language function are some of the least named and therefore least studied findings. This makes the research less comprehensive.

It has also been presented as a limitation that most of the studies have been carried out in nursing homes and daycare centers. Perhaps carrying out these activities in another context, such as a civic center, dance school, outdoor workshop, or at home, might have different results.

Another limitation has been that a large number of studies focused on a group of people and a minority of studies focused on each person. This results in less individualized conclusions, which can lead to a loss of detail. As well, the study was performed on healthy people, so perhaps performing these activities on people with serious health problems would lead to different results.

In addition to these limitations arising from the research topic, there are some limitations arising from the review itself:

1. The search was restricted to the last 5 years to be as up-to-date as possible, therefore important articles published earlier may have been excluded.
2. Only two languages were chosen: English and Spanish. However, the former is the reference language in scientific research, and only one article was published in Spanish.

3. Only articles with free access to the full text of the most relevant databases have been consulted through the University of Cordoba library catalog. Although it should be mentioned that it includes millions of articles.

Lines of future research

In future lines of research, we plan to study:

- The improvement of health in groups where male participation is balanced with female participation.
- The positive relationship between adapting therapies to their preferences, according to the type of music and dances, and a greater benefit.
- The effect of these activities on less researched areas, such as multisensory stimulation, language, the speech apparatus, the action of neuropeptides involved in regulating social behavior, peaceful death, or the care-caregiver connection.
- The use of artistic activities beyond care homes, such as in civic centers or outdoor workshops.
- The more subjective aspects of older people participating in these therapies, through a qualitative study with an individualized view of feelings, rather than in a group.
- The advantages of such therapies for people with health problems once healthy people have been studied. For example, cardiorespiratory problems, such as hypertension and heart rhythm disorders; sleep problems; teething and swallowing problems, such as bronchoaspiration and choking; etc.

It is also suggested to extend the search strategy by increasing the date of publication of the articles and, if possible, the variety of languages.

5. Conclusions

Music therapy and dance therapy are two artistic therapies with a recreational and therapeutic character that help ad to age and promote active and healthy aging. Besides, they have a high number of advantages for their application, such as a high level of safety, efficacy, efficiency, applicability, adaptability, interest and adherence, and low cost.

These activities have been shown to have a large number of health benefits, claiming to improve eudaimonic well-being. The holistic quality of life and the level of autonomy and independence of older people are also highlighted.

In terms of the different areas of health, physical health has benefits for the musculoskeletal system, such as an increase in energy, joint mobility, muscle strength, or walking ability, as well as an improvement in the risk and number of falls. They also help the respiratory and cardiovascular system by improving factors such as gas exchange, heart rate, and blood pressure as well as various metabolic parameters. Swallowing function and maximum phonation time, within the digestive system and phonatory apparatus, are also parameters that have benefited. Lastly, there are also improvements in sleep and rest.

Cognitive and sensory health receives numerous benefits in the area of memory, like improving visuospatial and autobiographical memory or producing a greater categorical fluency of words; in languages, such as improving language processing and the phonological area; in auditory and visual function, which receive multisensory stimulation; and in attention, concentration and level of alertness, which are considerably enhanced.

Furthermore, concerning emotional health, there is a reduction in negative emotions and feelings, such as loneliness, anxiety, depression, or restlessness, and an improvement in positive ones, such as self-esteem, happiness, fun, and a feeling of belonging to the world or positive affectivity. In other words, these activities provoke emotional and psychological flourishing.

Regarding social and psychosocial health, different authors show an increase in physical and emotional social interaction, which improves the feeling of bonding, making them feel safe and connected to others. This is related to positive results in the form of expression and communication, both

verbal and non-verbal communication. Improvements are also seen in the care-caregiver connection, as the quality and environment of care are potentially benefited.

These therapies have been demonstrated to support healthy aging and one of them, music therapy, has even been shown to help with dying. Moreover, these benefits are enhanced by the fact that they promote greater efficiency in health system resources.

To sum up, it is worth mentioning that the evidence on which the results for music therapy are based is well-balanced to those for dance therapy. Only in certain areas of physical health is music therapy less mentioned, although singing appears as a potential resource for music therapy.

6. Bibliographic references

1. European Commission [Internet]. Luxemburgo: Eurostat; 2021 [cited 18 March 2022]. Demography of Europe Statistics visualised 2021 edition, 25p. DOI: 10.2785/428873
2. Zarebski G. II Jornadas de Musicoterapia en Geriatría y Gerontología: Sonido, Salud y Vejez. Diversidad en la psicogerontología. Buenos Aires: Asociación Argentina de Musicoterapia; 2010 [cited 18 March 2022].
3. Ramos A.M., Miranda M.A. El envejecimiento activo: importancia de su promoción para sociedades envejecidas. *J. Arch. Med. Camagüey*. 2016; 20(3): 330-7. Available from: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1025-02552016000300014
4. Tymoszek U., Perkins R., Spiro N., Williamon A., Fancourt D. Longitudinal Associations Between Short-Term, Repeated, and Sustained Arts Engagement and Well-Being Outcomes in Older Adults. *J. Gerontol. B. Psychol. Sci. Soc. Sci.* 2020; 75(7): 1609-19. DOI: 10.1093/geronb/gbz085.
5. Groot B., De Kock L., Liu Y., Dedding C., Schrijver J., Teunissen T., et al. The Value of Active Arts Engagement on Health and Well-Being of Older Adults: A Nation-Wide Participatory Study. *Int. J. Environ. Res. Public Health*. 2021; 18(15): 1-17. DOI: 10.3390/ijerph18158222
6. Mallidou A.A., Babalola T.K. What influences quality of life and healthy aging of older persons?. *Nurs. Care Res.* 2020; (58): 187-99. Available from: <https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=3&sid=d97876d5-5ee2-4272-818e-561f29f48ca2%40redis>
7. Farokhi M. Art Therapy In Humanistic Psychiatry. *Procedia. Soc. Behav. Sci.* 2011; 30(1): 2088-92. DOI: 10.1016/j.sbspro.2011.10.406
8. Prasad Y. Art Therapy: Creativity for Cure. *Tribhuvan Univ. J.* 2017; 31(1-2): 239-44. DOI:10.3126/tuj.v31i1-2.25359
9. Garrido S., Dunne L., Perz J., Chang E., Stevens C.J. The use of music in aged care facilities: A mixed-methods study. *J. Health Psychol.* 2020; 25(10-11): 1425-38. DOI: 10.1177/1359105318758861

10. Lehtikoinen K. Dance in Elderly Care: Professional Knowledge. *J. Dance Educ.* 2019; 19(3): 1-9. DOI:10.1080/15290824.2018.1453612
11. Castellarín M.J., Caamaño L.M. Implicaciones de la educación artística en la salud, bienestar y calidad de vida de los adultos mayores. Una respuesta al envejecimiento activo. *Tercio Creciente.* 2020; 17: 7-20. DOI: 10.17561/rtc.n17.1
12. Miotto A., Trilo M., Fernandes J., Sommer C., Ziemer S., Marquine T. Senior dance as a resource of the occupational therapist with older adults: contributions in the quality of life. *Cad. Bras. Ter. Ocup.* 2020; 28(2): 554-74. DOI: 10.4322/2526-8910.ctoAO1792
13. Brustio P.R., Liubicich M.E., Chiabrero M., Rabaglietti E. Dancing in the Golden age: a study on physical function, quality of life, and social engagement. *Geriatr. Nurs.* 2018; 39: 635-9. DOI: 10.1016/j.gerinurse.2018.04.013
14. Pinheiro D., De Castro A.C., Losada R., Márcia M. Effectiveness of senior dance in the health of adults and elderly people: An integrative literature review. *Geriatr. Nurs.* 2020; 41(5): 589-99. DOI: 10.1016/j.gerinurse.2020.03.013
15. Clifford A.M., Shanahan J., O'Leary H., O'Neill N.B. Social dance for health and wellbeing in later life. *Complement. Ther. Clin. Pract.* 2019; 37: 6-10. DOI: 10.1016/j.ctcp.2019.07.006
16. Kosmat E., Vranic A. The efficacy of dance intervention as a cognitive training for old-old. *J. Aging Phys. Act.* 2017; 25(1): 32-40. DOI: 10.1123/japa.2015-0264
17. Franco M.R., Sherrington C., Tiedemann A., Pereira L.S., Perracini M.R., Faria C.R.S., et al. Effect of Senior Dance (DanSE) on Fall Risk Factors in Older Adults: A Randomized Controlled Trial. *Phys. Ther.* 2020; 100(4): 600-8. DOI: 10.1093/ptj/pzz187
18. Frances A., Heng Y., Chuen S., Ibrahim S., Bin S. Rhythm-centred music making in community living elderly: a randomized pilot study. *BMC Complement. Altern Med.* 2017; 17(1): 311-9. DOI: 10.1186/s12906-017-1825-x
19. Hyun K., Jin-Suk K. Effect of a group music intervention on cognitive function and mental health outcomes among nursing home residents:

- A randomized controlled pilot study. *Geriatr. Nurs.* 2021; 42(3): 650-6. DOI: 10.1016/j.gerinurse.2021.03.012
20. Särkämö T. Cognitive, emotional, and neural benefits of musical leisure activities in aging and neurological rehabilitation: A critical review. *Ann. Phys. Rehabil. Med.* 2018; 61(6): 414-8. DOI: 10.1016/j.rehab.2017.03.006
21. Strong J.V., Plys E., Hinrichs K. L. M., Hartmann C, W., McCullough M. Music for your mental health? The development and evaluation of a group mental health intervention in subacute rehabilitation. *Aging Ment. Health.* 2021; 1-8. DOI: 10.1080/13607863.2021.1935463
22. Wai-Kong D., Ho-Yin F., Chi-Sing E., Yuet-ying G. Effects of traditional Cantonese opera songs on Cantonese-speaking, community-dwelling older adults' cognitive and psychological function, wellbeing, and health. *Aging Ment. Health.* 2021;1-13. DOI: 10.1080/13607863.2021.1871880
23. Sánchez T., Barranco P., Millán A., Fornies M.E. La musicoterapia como indicador de mejora de la calidad de vida en un envejecimiento activo. *Metas Enferm.* 2017; 20(7): 24-31. Available from: <https://web.s.ebscohost.com/ehost/detail/detail?vid=2&sid=befe3fe6-8d6a-4aeb-9146-ef00c15a9f92%40redis&bdata=JnNpdGU9ZWwhvc3QtbGl2ZQ%3d%3d#AN=125469929&db=ccm>
24. Lindbland K., De Boise S. Musical engagement and subjective wellbeing amongst men in the third age. *Nord. J. Music Ther.* 2020; 29(1): 20-38. DOI: 10.1080/08098131.2019.1646791
25. Rodrigues-Krause J., Krause M., Reischak-Oliveira A. Dancing for healthy Aging: Functional and Metabolic Perspectives. *Altern. Ther. Health Med.* 2019; 25(1): 44-63. Available from: <https://pubmed.ncbi.nlm.nih.gov/29428927/>
26. García J. A., Dias M., Bortolozzi F., Grano A., Marques S. M. Impact of Senior Dance on emotional and motor parameters and quality of life of the elderly. *Rev. Rene.* 2017; 18(1): 51-8. DOI: 10.15253/2175-6783.2017000100008
27. Daykin N., Mansfield L., Meads C., Julier G., Tomlinson A., Payne A. et al. What works for wellbeing? A systematic review of wellbeing

- outcomes for music and singing in adults. *Perspect. Public Health*. 2018; 138(1): 39-46. DOI: 10.1177/1757913917740391
28. Segall L. E. The effect of group singing on the voice and swallow function of healthy, sedentary, older adults: A pilot study. *Arts Psychother*. 2017; 55: 40-5. DOI: 10.1016/j.aip.2017.02.007
29. Batt-Rawden K. B., Stedje K. Singing as a health-promoting activity in elderly care: a qualitative, longitudinal study in Norway. *J. Res. Nurs*. 2020; 25(5): 404-18. DOI: 10.1177/1744987120917430
30. Xuegang L., Pei-Lin S., Yung-Shen T. Dance intervention effects on physical function in healthy older adults: a systematic review and meta-analysis. *Aging Clin. Exp. Res*. 2021; 33(2): 253-63. DOI: 10.1007/s40520-019-01440-y
31. Santana R. Gouveia M.J. Carvalheira A. Demographic and Well-Being Predictors of Regular and Long-term Practice of Argentine Tango in a Multicultural Sample of Practitioners. *Am. J. Dance Ther*. 2017; 39(10): 252-66. DOI: 10.1007/s10465-017-9258-0
32. Wattanasoei S., Binson B., Kumar R., Somrongthomg R., Kanchanaklan N. Quality of life through listening music among elderly people in semi-urban area, Thailand. *J. Ayub. Med. Coll Abbottabad*. 2017; 29(1): 21-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/28712166/#:~:text=The%20quality%20of%20life%20among,%25%20CI%200.93%2D0.98>.
33. Fujita T., Ito A., Kikuchi N., Kakinuma T., Sato Y. Effects of compound music program on cognitive function and QOL in community-dwelling elderly. *J. Phys. Sci*. 2016; 28(11): 3209-12. DOI: 10.1589/jpts.28.3209.
34. Diaz V. Lemos A. Justel N. Benefits of Music Therapy in the Quality of Life of Older Adults. *Rev. Cienc. Salud*. 2019; 17(3): 9-10. DOI: 10.12804/revistas.urosario.edu.co/revsalud/a.8349
35. Clements-Cortes A. Artful Wellness: Attending Chamber Music Concert Reduces Pain and Increases Mood and Energy for Older Adults. *Arts Psychother*. 2017; 52: 41-49. DOI: 10.1016/j.aip.2016.10.001
36. Mansky R., Marzel A., Orav E. J., O Chocano-Bedoya P., Grünheid P., Mattle M. et al. Playing a musical instrument is associated with slower

- cognitive decline in community-dwelling older adults. *Aging Clin. Exp. Res.* 2020; 32(8): 1577-84. DOI: 10.1007/s40520-020-01472-9
37. Shanahan J., Coman L., Ryan F., Saunders J., O'Sullivan K., Ni Bhriain O. et al. To dance or not to dance? A comparison of balance, physical fitness and quality of life in older Irish set dancers and age-matched controls. *Public Health.* 2016; 141: 56-62. DOI: 10.1016/j.puhe.2016.07.015
38. Rodio A. M., Holmes A. Lessons Learned from Ballroom Dancing with Older Adults. *Soc. Work Groups.* 2016; 23(51): 1-8. DOI: 10.1080/01609513.2015.1066580
39. Bennett C. G., Angel N., Hackney M. E., Mismatch between subjective and objective motor improvements with adapted tango intervention in older adults. *Physiother Res. Int.* 2020; 25(3): 1-10. DOI: 10.1002/pri.1835
40. Stonnington C. M., Krell-Roesch J., Locke E. C., Hentz J. G., Dueck A. C., Geda Y. E., et al. Impact of Zumba on Cognition and Quality of Life is Independent of APOE4 Carrier Status in Cognitively Unimpaired Older Women: A 6-Month Randomized Controlled Pilot Study. *Am. J. Alzheimer Dis. Other Demen.* 2019; 20(10): 1-10. DOI: 10.1177/1533317519868370
41. Murillo-García Á., Villafrance S., Collado-Mateo D., León-Llamas J. L., Gusi N. Effect of dance therapies on motor-cognitive dual-task performance in middle-aged and older adults: a systematic review and meta-analysis. *Disabil. Rehabil.* 2020; 43(22): 3147-58. DOI: 10.1080/09638288.2020.1735537
42. Wolosyzn N., Wisniowska A., Grzegorzczak J., Kwolek A. The impact of physical exercises with elements of dance movement therapy on the upper limb grip strength and functional performance of elderly wheelchair users living in nursing homes – a randomized control trial. *BMC Geriatr.* 2021; 12(21): 423-37. DOI: 10.1186/s12877-021-02368-7
43. Mattle M., Chocano-Bedoya P. O., Fischbacher M, Meyer U., Abderhalden L., Lang W., et al. Association of Dance-Based Mind-Motor Activities With Falls and Physical Function Among Healthy Older Adults

- A Systematic Review and Meta-analysis. *JAMA Netw Open*. 2020; 3(9): 1-19. DOI: 10.1001/jamanetworkopen.2020.17688
44. Fu M. C., Belza B., Nguyen H., Logsdon R., Demorest S. Impact of group-singing on older adult health in senior living communities: A pilot study. *Arch. Gerontol. Geriatr.* 2018; 76: 138-46. DOI: 10.1016/j.archger.2018.02.012
45. Sekyung J. Intergenerational Choir: A Qualitative Exploration of Lived Experiences of Older Adults and Student Music Therapists. *J. Music Ther.* 2020; 57(4): 406-31. DOI: 10.1093/jmt/thaa012
46. Chia-Te C., Heng-Hsin T., Ching-Ju F., Jiun-Ling W., Nai-Ying K., Ying-Ju C., et al. Effect of music therapy on improving sleep quality in older adults: A systematic review and meta-analysis. *J. Am. Geriatr. Soc.* 2021; 69(7): 1925-32. DOI: 10.1111/jgs.17149

Appendix

Table 1. Results of the bibliographic search according to strategy and database (DB)

DB	SEARCH STRATEGY	N*
PUBMED		
	<p>"Music"[Mesh] OR "Music Therapy"[Mesh] OR "Therapy, Music" OR "music* therap*" OR "music* intervention*" OR "music training" OR "music* lesson*" OR "therapeutic music" OR "music* activit*" OR biomusic OR neuromusic OR "classical music" OR song* OR melod* OR "folk music" OR "traditional music" OR "popular music" OR "popular song*" OR opera OR "Dancing"[Mesh] OR "Dance Therapy"[Mesh] OR "dance therap*" OR "dancing therap*" OR "dance activit*" OR "dancing activit*" OR "dance practice" OR "therapeutic danc*" OR "dance training" OR "dance lesson*" OR "dance movement* therap*" OR biodance* OR "dance choreography" OR "social danc*" OR "improvisational danc*" OR "line danc*" OR tango OR "folk danc*" OR "salsa danc*" OR "modern danc*" OR "aerobic danc*" OR zumba OR "zumba danc*" OR "classical danc*" OR "traditional danc*" OR "creative danc*" OR "contemporary danc*" OR "square danc*" OR "group danc*" OR "partner danc*"</p>	
AND	<p>"Quality of Life"[Mesh] OR "Life Quality" OR "Health-Related Quality Of Life" OR "Health Related Quality Of Life"</p>	
AND	<p>"Aged"[Majr:NoExp] OR "Aged, 80 and over"[Majr] OR elder* OR "elderly people" OR septuagenarian* OR octogenarian* OR nonagenarian* OR centenarian* OR older* OR "old people" OR "older people" OR "old adult*" OR "older adult*" OR "senior</p>	

	citizen*" OR "age group" OR "aged group" OR "young-old" OR "young-olds" OR "middle-old" OR "middle-olds" OR "old-old" OR "old-olds" OR "oldest old" OR "old aged" OR "old-aged people"	
	Filters applied: in the last 5 years, English, Spanish	134
CINAHL		
	(MH "Music") OR (MH "Music Therapy") OR (MH "Music Therapy (Iowa NIC)") OR ("Therapy, Music" OR "music* therap*" OR "music* intervention*" OR "music training" OR "music* lesson*" OR "therapeutic music" OR "music* activit*" OR biomusic OR neuromusic OR "classical music" OR song* OR melod* OR "folk music" OR "traditional music" OR "popular music" OR "popular song*" OR opera)	
OR	(MH "Dancing") OR (MH "Dance Therapy") OR ("dance therap*" OR "dancing therap*" OR "dance activit*" OR "dancing activit*" OR "dance practice" OR "therapeutic danc*" OR "dance training" OR "dance lesson*" OR "dance movement* therap*" OR biodance* OR "dance choreography" OR "social danc*" OR "improvisational danc*" OR "line danc*" OR tango OR "folk danc*" OR "salsa danc*" OR "modern danc*" OR "aerobic danc*" OR zumba OR "zumba danc*" OR "classical danc*" OR "traditional danc*" OR "creative danc*" OR "contemporary danc*" OR "square danc*" OR "group danc*" OR "partner danc*")	
AND	(MH "Quality of Life+") OR "Life Quality" OR "Health-Related Quality Of Life" OR "Health Related Quality Of Life"	

AND	(MM "Aged") OR (MM "Aged, 80 and over+") OR (elder* OR "elderly people" OR septuagenarian* OR octogenarian* OR nonagenarian* OR centenarian* OR older* OR "old people" OR "older people" OR "old adult*" OR "older adult*" OR "senior citizen*" OR "age group" OR "aged group" OR "young-old" OR "young-olds" OR "middle-old" OR "middle-olds" OR "old-old" OR "old-olds" OR "oldest old" OR "old aged" OR "old-aged people")	
	Published Date: 20161001-20210931; Language: English, Spanish; Exclude MEDLINE records	83
WOS		
	TS=(Music OR "Music Therapy" OR "Therapy, Music" OR "music* therap*" OR "music* intervention*" OR "music training" OR "music* lesson*" OR "therapeutic music" OR "music* activit*" OR biomusic OR neuromusic OR "classical music" OR song* OR melod* OR "folk music" OR "traditional music" OR "popular music" OR "popular song*" OR opera OR Dancing OR "Dance Therapy" OR "dance therap*" OR "dancing therap*" OR "dance activit*" OR "dancing activit*" OR "dance practice" OR "therapeutic danc*" OR "dance training" OR "dance lesson*" OR "dance movement* therap*" OR biodance* OR "dance choreography" OR "social danc*" OR "improvisational danc*" OR "line danc*" OR tango OR "folk danc*" OR "salsa danc*" OR "modern danc*" OR "aerobic danc*" OR zumba OR "zumba danc*" OR "classical danc*" OR "traditional danc*" OR "creative danc*" OR "contemporary danc*" OR "square danc*" OR "group danc*" OR "partner danc*")	

AND	TS=("Quality of Life" OR "Life Quality" OR "Health-Related Quality Of Life" OR "Health Related Quality Of Life")	
AND	TS=(Aged OR "Aged, 80 and over" OR elder* OR "elderly people" OR septuagenarian* OR octogenarian* OR nonagenarian* OR centenarian* OR older* OR "old people" OR "older people" OR "old adult*" OR "older adult*" OR "senior citizen*" OR "age group" OR "aged group" OR "young-old" OR "young-olds" OR "middle-old" OR "middle-olds" OR "old-old" OR "old-olds" OR "oldest old" OR "old aged" OR "old-aged people")	
	Refined By: Publication Years: 2021-2017; Languages: English or Spanish; Web of sciences Categories: Geriatrics Gerontology or Gerontology or Medicine General Internal or Rehabilitation or Nursing	156

(*) Found articles.

Table 2. Methodological table: characteristics of the studies

Authors and Year	Design	Population and Characteristics	Data collection	Themes
Groot B., et. al. 2021	Qualitative study	79 older people (78% were female). Some lived independently, some attended day centers, some were institutionalized, etc	Interviews and observation	Music (music and singing) Dance Also: theatre and improvisation, visual arts, video making, and oral work
Woloszyn N., et. al. 2021	Randomized clinical trial	170 people who were 65-85	Questionnaires	Dance therapy versus physical exercise and traditional care
Chia-Te C., et. al. 2021	Systematic review and meta-analysis	People over 60 years of age	Databases: Embase, Ovid Medline, Cochrane Library, Scopus, and Index to Taiwan Periodical Literature System	Music therapy
Sekyung J. 2020	Qualitative study	10 healthy older people (8 were	Interviews	Music therapy and singing

		women) (mean age 68.5 years)		(intergenerational choir)
Mansky R., et. al. 2020	Cohort study	200 institutionalized older people over 70 with a previous fall (mean age 77.7 years old)	Questionnaires and observation	Music therapy (playing an instrument)
Bennett C. G., et. al. 2020	Quasi-experimental study	62 elderly people (mean age 82.3) living independently in a retirement community	Questionnaires	Dance (tango)
Stonnington C. M., et. al. 2019	Randomised clinical trial	53 healthy older women who passed a medical examination	Questionnaires	Dance (Zumba)
Brustio P.R., et. al. 2018	Quasi-experimental study	163 healthy older people (average age 70 years old), living independently	Questionnaires	Dance (Slow Waltz, Tango, Foxtrot, traditional Waltz, Polka, Mazurka, Bachata y Country)
Fu M. C., et. al. 2018	Quasi-experimental study	People over 60 years old living in 3 senior citizen centers	Questionnaires	Música (singing)

Wattanasoei S., et. al. 2017	Cross-sectional study	353 people over 60 years old with different levels of quality of life	Interviews and questionnaires	Music
Frances A., et. al. 2017	Randomised controlled clinical trial	54 people over 65 years old	Questionnaires	Music (rhythm-focused)
Fujita T., et. al. 2016	Quasi-experimental study	15 old people (mean age 84.3 years), (86.6% were female) who attend day centers	Questionnaires	Music (singing and physical exercise with music) Also: recognition of historical images
Shanahan J., et. al. 2016	Cross-sectional study	39 older people	Questionnaires and observation	Dance
Rodrigues-Krause J., et. al. 2019	Systematic review	Older people, of whom a large majority were healthy	Databases: Medical Literature Analysis and Retrieval System Online (MEDLINE), PubMed; the Cochrane Wiley database, a central register of controlled trials; Clinical	Dance (cultural dances, ballroom dancing, aerobic dance, dance therapy focusing on emotional and physical aspects, and classical dance).

			Trials.gov; Physiotherapy Evidence Database (PEDRO); and Literatura Latino- Americana e do Caribe em Ciências da Saúde (LILACS)	
Daykin N., et. al. 2018	Systematic review	Individuals with different years of age. They were separated according to health status into healthy and sick and according to age, into adolescents, adults, and the elderly	Databases: PsychInfo, Medline, ERIC, Arts and Humanities, Social Science and Science Citation Indexes, Scopus, PILOTS, and CINAHL	Music (music and singing)
Diaz V., et. al. 2019	Case-control study	30 older people (mean age 76.9 years), (73% were female)	Questionnaires	Music therapy (musical improvisation, playing instruments, and

				rhythm-focused activities)
Xuegang L., P et. al. 2019	Systematic review and meta-analysis	1029 people aged over 65	Databases: Cochrane Library, PsycINFO, PubMed, Scopus, and Web of Science	Dance therapy (ballroom, ballet, bolero, foxtrot, jazz, hip-hop, polka, rumba, samba, salsa, tango, tap, and waltz)
Pinheiro D., et. al. 2020	Literature review	242 older people. They were people living alone, in residences, attending day centers, etc	Databases: Cochrane, PubMed, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Virtual Health Library (VHL)	Dance (Senior dance)
Sánchez T., et. al. 2017	Literature review	Older people (mostly over 65 years old)	Databases: PubMed, Cuiden Plus, BVS, SciELO, and Dialnet	Music therapy
Lindbland K., De Boise S. 2020	Qualitative study	15 retired Swedish men aged 66-76. They were healthy, active, cognitively	Interviews and questionnaires	Music

		unimpaired, and leading an independent life		
Miotto A., et. al. 2020	Mixed study	9 elderly people (8 were females), (mean age: 67.88 years old)	Questionnaires and interviews	Dance (Senior dance)
Mallidou A.A., Babalola T.K. 2020	Literature review	Older people who took part in various art therapies (e.g. painting, dancing, music)	Databases: CINAHL, Google Scholar, and PubMed	Artistic activities: music, dancing, painting...
Rodio A. M., Holmes A. 2016	Mixed research report	Senior citizens in a senior citizens' center	Questionnaires and interviews	Dance
Clifford A.M., et. al. 2019	Pilot study	60 elderly people aged over 65, living in a nursing home	Questionnaires and interviews	Dance (Senior dance)
Segall L. E. 2017	Pilot study	20 healthy older people (15 were female), (aged 81-94 years old)	Questionnaires	Music (singing)

Hyun K., Jin-Suk K. 2020	Randomised clinical study	20 elderly people aged 65+, living in a nursing home in Korea	Questionnaire	Music therapy vs. routine nursing home activities
Särkämö T. 2017	Opinion article	Elderly people, which were distributed into healthy people and people with neurological problems	Other studies	Music (music and singing-chorus)
Murillo-García Á., et. al. 2020	Systematic review and meta-analysis	Olders over 60 years of age	Databases: Physiotherapy Evidence Database (PEDro), PubMed, Google Scholar, Scopus, and Web of Science	Dance therapy
Kosmat E., Vranic A. 2016	Randomised clinical trial	24 elderly people (mean age: 80.8) living in a nursing home	Questionnaires	Dancing vs. non-dance therapies
Strong J.V., et. al. 2021	Pilot study	Older people living in nursing homes	Questionnaires and interviews	Music

		without mental health problems		
Batt-Rawden K. B., Stedje K. 2020	Qualitative study	19 older women from 3 different nursing homes	Interviews	Music (music and singing)
Clements-Cortes A. 2016	Mixed study	Three participant groups. Group 1: 12 musicians. Group 2: 8 employees. Group 3: 600-800 elderly people	Interviews and questionnaires	Music (live music)
Wai-Kong D., et. al. 2021.	Randomised clinical trial	Older people (aged 65-88 years old)	Questionnaires	Music (Cantonese opera)
Mattle M., et. al. 2020	Systematic review and meta-analysis	Healthy older people (over 65 years old) living independently, with a history or risk of falls	Questionnaires	Music (playing an instrument)
Franco M.R., et. al. 2020	Randomised clinical trial	82 people over 60 years of age, residents of an elderly care home in Brazil	Questionnaires	Dance (Senior dance)

García J. A., et. al. 2017	Pre-experimental study	20 healthy elderly people aged 60-89 years old, who regularly attended two-day centers in Brazil	Questionnaires	Dance (Senior dance)
Santana R., et. al. 2017	Case series study	524 older people from 52 different countries	Questionnaires	Dance (Argentine tango)
Tymoszuk U., et. al. 2020	Cohort study	Older people who had a high consideration for their well-being	Questionnaires	Artistic activities (opera, concerts, cinema, art galleries, museums, and theatre)

Table 3. Methodological quality table: Systematic reviews

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total Yes
Chia-Te C., et. al. 2021	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NR/DK	10
Rodrigues-Krause J., et. al. 2019	Yes	Yes	Yes	Yes	Yes	NR/DK	NR/DK	Yes	Yes	Yes	Yes	9
Daykin N., et. al. 2018	Yes	NR/DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Xuegang L., et. al. 2019	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Murillo-García Á., et. al. 2020	Yes	Yes	No	Yes	Yes	NR/DK	Yes	NR/DK	Yes	Yes	Yes	8

Mattle M., et. al. 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	10
-------------------------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	----

Q1: Is the review question clearly and explicitly stated?

Q2: Were the inclusion criteria appropriate for the review question?

Q3: Was the search strategy appropriate?

Q4: Were the sources and resources used to search for studies adequate?

Q5: Were the criteria for appraising studies appropriate?

Q6: Was critical appraisal conducted by two or more reviewers independently?

Q7: Were there methods to minimize errors in data extraction?

Q8: Were the methods used to combine studies appropriate?

Q9: Was the likelihood of publication bias assessed?

Q10: Were recommendations for policy and/or practice supported by the reported data?

Q11: Were the specific directives for new research appropriate?

Table 4. Methodological quality table: Randomized clinical trials

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Total Yes
Woloszyn N. et al. 2021	Yes	No	NR/DK	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9
Stonnington C. M., et. al. 2019	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9
Frances A., et. al. 2017	Yes	Yes	NR/DK	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9
Hyun K., et. al. 2020	Yes	NR/DK	Yes	Yes	NR/DK	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10
Kosmat E., et. al. 2016	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	11
Wai-Kong D., et. al. 2021	Yes	NR/DK	Yes	NR/DK	NR/DK	NR/DK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9

Franco M.R., et. al. 2020	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	9
---------------------------------	-----	----	-----	----	----	----	-----	-----	-----	-----	-----	-----	-----	---

Q1: Was true randomization used for assignment of participants to treatment groups?

Q2: Was allocation to treatment groups concealed?

Q3: Were treatment groups similar at the baseline?

Q4: Were participants blind to treatment assignment?

Q5: Were those delivering treatment blind to treatment assignment?

Q6: Were outcomes assessors blind to treatment assignment?

Q7: Were treatment groups treated identically other than the intervention of interest?

Q8: Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

Q9: Were participants analyzed in the groups to which they were randomized?

Q10: Were outcomes measured in the same way for treatment groups?

Q11: Were outcomes measured in a reliable way?

Q12: Was appropriate statistical analysis used?

Q13: Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?

Table 5. Methodological quality table: Quasi-experimental studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Total Yes
Bennett C. G., et. al. 2020	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	7
Brustio P.R., et. al. 2018	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	7
Fu M. C., et. al. 2018	Yes	Yes	Yes	No	Yes	No	NR/DK	No	Yes	5
Fujita T., et. al. 2016	Yes	NR/DK	Yes	No	Yes	Yes	Yes	Yes	Yes	7
Miotto A. 2020	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	8
Clements-Cortes A. 2016	Yes	NR/DK	Yes	No	Yes	No	Yes	Yes	Yes	6

Q1: Is it clear in the study what is the “cause” and what is the ‘effect’ (i.e., there is no confusion about which variable comes first)?

Q2: Were the participants included in any comparisons similar?

Q3: Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?

Q4: Was there a control group?

Q5: Were there multiple measurements of the outcome both pre and post the intervention/exposure?

Q6: Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?

Q7: Were the outcomes of participants included in any comparisons measured in the same way?

Q8: Were outcomes measured in a reliable way?

Q9: Was appropriate statistical analysis used?

Table 6. Methodological quality table: Cohort studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Total Yes
Mansky R., et. al. 2020	Yes	Yes	Yes	NR/DK	NR/DK	No	Yes	Yes	NR/DK	NR/DK	Yes	6
Tymoszuk U., et. al. 2020	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	10

Q1: Were the two groups similar and recruited from the same population?

Q2: Were the exposures measured similarly to assign people to both exposed and unexposed groups?

Q3: Was the exposure measured in a valid and reliable way?

Q4: Were confounding factors identified?

Q5: Were strategies to deal with confounding factors stated?

Q6: Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?

Q7: Were the outcomes measured in a valid and reliable way?

Q8: Was the follow up time reported and sufficient to be long enough for outcomes to occur?

Q9: Was follow up complete, and if not, were the reasons to loss to follow up described and explored?

Q10: Were strategies to address incomplete follow up utilized?

Q11: Was appropriate statistical analysis used?

Table 7. Methodological quality table: Case-control studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total Yes
Diaz V., et. al. 2019	NR/DK	Yes	Yes	Yes	No	No	No	Yes	NR/DK	Yes	5

Q1: Were the groups comparable other than the presence of disease in cases or the absence of disease in controls?

Q2: Were cases and controls matched appropriately?

Q3: Were the same criteria used for identification of cases and controls?

Q4: Was exposure measured in a standard, valid and reliable way?

Q5: Was exposure measured in the same way for cases and controls?

Q6: Were confounding factors identified?

Q7: Were strategies to deal with confounding factors stated?

Q8: Were outcomes assessed in a standard, valid and reliable way for cases and controls?

Q9: Was the exposure period of interest long enough to be meaningful?

Q10: Was appropriate statistical analysis used?

Table 8. Methodological quality table: Cross-sectional studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Total Yes
Wattanasoei S., et. al. 2017	No	Yes	Yes	Yes	No	No	Yes	Yes	5
Shanahan J., et. al. 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8

Q1: Were the criteria for inclusion in the sample clearly defined?

Q2: Were the study subjects and the setting described in detail?

Q3: Was the exposure measured in a valid and reliable way?

Q4: Were objective, standard criteria used for measurement of the condition?

Q5: Were confounding factors identified?

Q6: Were strategies to deal with confounding factors stated?

Q7: Were the outcomes measured in a valid and reliable way?

Q8: Was appropriate statistical analysis used?

Table 9. Methodological quality table: Case series studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total Yes
Santana R., et. al. 2017	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	6

Q1: Were there clear criteria for inclusion in the case series?

Q2: Was the condition measured in a standard, reliable way for all participants included in the case series?

Q3: Were valid methods used for identification of the condition for all participants included in the case series?

Q4: Did the case series have consecutive inclusion of participants?

Q5: Did the case series have complete inclusion of participants?

Q6: Was there clear reporting of the demographics of the participants in the study?

Q7: Was there clear reporting of clinical information of the participants?

Q8: Were the outcomes or follow up results of cases clearly reported?

Q9: Was there clear reporting of the presenting site(s)/clinic(s) demographic information?

Q10: Was statistical analysis appropriate?

Table 10. Methodological quality table: Qualitative studies

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Total Yes
Groot B., et. al. 2021	Yes	Yes	Yes	Yes	Yes	NR/DK	No	Yes	Yes	Yes	8
Sekyung J. 2020	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NR/DK	Yes	9
Lindbland K., et. al. 2020	Yes	Yes	Yes	Yes	Yes	NR/DK	Yes	Yes	Yes	Yes	9
Miotto A. 2020	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	8
Clements-Cortes A. 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	10

Q1: Is there congruity between the stated philosophical perspective and the research methodology?

Q2: Is there congruity between the research methodology and the research question or objectives?

Q3: Is there congruity between the research methodology and the methods used to collect data?

Q4: Is there congruity between the research methodology and the representation and analysis of data?

Q5: Is there congruity between the research methodology and the interpretation of results?

Q6: Is there a statement locating the researcher culturally or theoretically?

Q7: Is the influence of the researcher on the research, and vice- versa, addressed?

Q8: Are participants, and their voices, adequately represented?

Q9: Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?

Q10: Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

Table 11. Methodological quality table: Opinion articles

Authors and year	Q1	Q2	Q3	Q4	Q5	Q6	Total Yes
Särkämö T. 2017	Yes	Yes	Yes	Yes	Yes	No	5

Q1: Is the source of the opinion clearly identified?

Q2: Does the source of opinion have standing in the field of expertise?

Q3: Are the interests of the relevant population the central focus of the opinion?

Q4: Is the stated position the result of an analytical process, and is there logic in the opinion expressed?

Q5: Is there reference to the extant literature?

Q6: Is any incongruence with the literature/sources logically defended?

