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Original Article

Effects of music on body and facial expressions and psychological and behavioral symptoms of older adults

Efeitos da música nas expressões corporais e faciais e nos sintomas psicológicos e comportamentais de idosos

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Abstract

Objective: To compare the physiological, behavioral and expressive effects of nonpharmacological interventions through songs of Brazilian popular character (representative of the life history of the older adults) and classical music in the elderly population with institutionalized dementia. **Method:** A quantitative, almost-experimental and comparative study was carried out in two groups: "Intervention Group with Popular Music" (IGPM; n = 19) and "Control Group with Classical Music" (CGCM n = 14) in two Long Institutions Stay for the Elderly people (ILPI). After approval by the Research Ethics Committee (Process nº 1,981,699 / 2017), four (4) individual sessions were held, with five (5) songs. The measures of Psychological and Comparative Symptoms of Dementia (PCSD) were compared between groups; the physiological parameters (frequency and blood pressure) before and after the intervention; facial expressions through the Facial Action Coding System (FACS); and bodily movements. **Results:** Greater percentage obtained by IGPM for: expressions by FACS of joy (p = 0.039) and surprise (p = 0.041); and greater number of head and trunk movements (t) (t = 2.94, p = 0.006) when compared to CGCM. Regarding SPCD, GIMP presented a significant decrease in the severity of delirium symptoms (t = 2.379, p = .029). **Conclusion:** The findings demonstrate that the representative of the song of the life trajectory of this population can awaken: satisfaction with life, memories, and joy to live when compared to classical music.

Keywords: Dementia, Aged, Homes for the Aged, Music.

Resumo

Objetivo: Comparar os efeitos da música popular brasileira (representativa da história de vida do idoso) e da música clássica nas expressões corporais e faciais e sintomas psicológicos e comportamentais de idosos com demência institucionalizados. **Método:** Realizou-se um estudo quantitativo, quase experimental e comparativo, com dois grupos: "Grupo Intervenção com Música Popular" (GIMP; n=19) e "Grupo Controle com Música Clássica" (GCMC; n=14), em duas Instituições de Longa Permanência para Idosos (ILPI). Após aprovação do Comitê de Ética em Pesquisa (Processo nº 1.981.699/2017), foram realizadas quatro (4) sessões individuais, com apresentação de cinco (5) músicas. Foram comparadas as medidas dos Sintomas Psicológicos e Comportamentais da Demência (SPCD) entre os grupos; os parâmetros fisiológicos (frequência e pressão arterial) antes e após intervenção; as expressões faciais por meio do "Facial Action Coding System" (FACS); e movimentos corpóreos. **Resultados:** Maior percentual obtido pelo GIMP para: expressões pelo FACS de alegria (p=0,039) e surpresa (p=0,041); e maior número de movimentos de Tronco e Cabeça (TC) (t=2,94; p=0,006) quando comparados ao GCMC. Quanto aos SPCD, o GIMP apresentou diminuição significativa na gravidade dos sintomas de delírio (t=2,379; p=,029). **Conclusão:** Os achados demonstram que as músicas representativas da trajetória de vida a esta população podem despertar: satisfação com a vida, recordações e alegria em viver quando comparadas às músicas clássicas.

Palavras-chave: Demência, Idosos, Instituição de Longa Permanência para Idosos, Música.

1 Introduction

Dementias of different etiologies stand out among the Chronic Non-communicable Diseases (NCDs) that currently exist, due to higher prevalence and consequences. We estimated that the number of cases of dementia worldwide has exceeded 47 million, and may expand to more than 130 million by 2050 (Alzheimer's Disease International, 2015). The prevalence of dementia tends to increase with aging and can vary in "3% to 40% among elderly people aged 65 to 85 years old" (Rabelo & Lopes, 2017, p. 8).

Alzheimer's disease (AD) is the most prevalent among the different types of dementia, representing more than 50% of cases (Alzheimer 360, 2017). Its installation and progression are generally slow and irreversible, passing through different aggravations of its general condition. In the most advanced stage, there is a minimal or nonexistent capacity for self-care and worse performance in basic and instrumental activities of daily living, also associated with the aggravation of psychotic symptoms, such as delirium and communication difficulties, generating total dependence on a caregiver and long-term care (Costa, 2016).

Neuropsychiatric disorders are the biggest problem for patients with dementia, associated with a higher degree of cognitive impairment and the rapid progression of

dementia, decreasing the patient's quality of life (increasing morbidity), increasing the degree of difficulty in care and caregiver stress (Bremenkamp et al., 2014).

The management of neuropsychiatric complications, most common in the initial or moderate stages of dementia is in general through pharmacological treatments (Laks & Engelhardt, 2008). However, their association with non-pharmacological measures has a greater potential for controlling symptoms, offering improved expression, socialization, anxiety, delayed progression of dementia, among others (Bottino et al., 2002).

In general, the care for people with dementia is performed by a family member who ends up presenting losses to their self-care and control of their own lives, generating more and more vulnerability to stress factors, that is, they tend to be affected by overload and by physical impairment (Flesch et al., 2017). When this reality is associated with different issues (insertion of women in the labor market, complications of the older patient, difficulties in hiring professionals for home care, among others), it ends up opting for the institutionalization of the older adult (Kuchemann, 2012).

In general, in Long Institutions Stay for the Elderly people (*ILPI*), there is a lack of human resources and few stimulating activities offered to the elderly patient throughout the day, remaining idle most of the day (Rosa et al., 2014). Music can be an important tool to avoid the idleness of elderly patients in these institutions. The *Associação Alzheimer Portugal* (Alzheimer Portugal, 2019) stated that although cognitive abilities have been lost, the appreciation of old familiar sounds seems preserved. However, the use of music to control difficult behaviors can be applied "as a formal therapy or simply to bring joy and satisfaction" (Alzheimer Portugal, 2019).

Musical memory is an important tool that health professionals have to intervene in the advancement of the AD (Cuddy et al., 2015). We believe that the conservation of musical memory is due to the storage of music in the brain areas different from other memories to establish an independent relationship with the memory systems (Jacobsen et al., 2015).

According to Levi (2016), memory is articulated with moments experienced for a long time and when they are awakened through memories, it is capable of awakening feelings to individuals. The recovery of events through stimuli brings associated emotional charges that in a way would explain the indestructible storage of moments of strong emotion in the brain.

Different aspects of musical memory can remain intact while the anatomy of the brain and the corresponding cognitive functions are severely impaired. The hypothetical explanation established is that the network responsible for encoding musical memory is independent of other types of memory, which is why its preservation in the dementia of Alzheimer's disease, for example (Jacobsen et al., 2015).

The music intervention acts on the individual as a whole: biologically, psychologically and socially, even more, if considering their experience (Rocha & Boggio, 2013). Thus, there is the rescue of memories related to family members, the situations experienced, the musical memory and the recent music; the evocation of feelings; body manifestations through facial features, among others (Albuquerque et al., 2012).

According to the literature, the classical music has been the type of music with the greatest influence, benefiting the cardiovascular system, heart rate, blood pressure, aid

in pain, motor functions, among others (Areias, 2016). There are few studies still investigating the effect of popular music on older adults. The music of their own choices thus appreciated, is consistent with a set of emotions that join the brain's repertoire, causing the release of dopamine and serotonin. These neurotransmitters then guide nerve activity and stimulate feelings of pleasure and well-being (Leonardo, 2017).

The great advantage of using interventional music is that it does not require "prolonged attention, and it can also trigger "reminiscence", also emphasizing in this approach the vital importance of "knowing what music the person likes and dislikes". Reminiscence is associated with "a way of reviewing past events and is usually a very positive and rewarding activity" (Alzheimer Portugal, 2019).

Although the person affected by dementia has difficulty/inability to express verbally, the reference brings the fact that "they can feel pleasure in being involved in reflections on their past". Something positive in its use can be also seen in its applicability on occasions when the elderly person feels ill or bored, which can also be "a means of distraction" (Alzheimer Portugal, 2019).

In the study by Rosa et al. (2014), the difficulty in offering leisure and recreation activities to the elderly people in the institutional context is noticeable. Although there are efforts, their high and progressive dependence, unfortunately, tends to extend for much longer due to the basic and nursing care adopted in these spaces.

According to Samsi & Manthorpe (2014), the use of music can stimulate the search for the correct application of non-pharmacological measures, which should benefit not only the quality of life of the elderly people but also their caregivers.

Thus, this research aimed to compare the effects of Brazilian popular music (representative of the life history of the older adults) and classical music on body and facial expressions and psychological and behavioral symptoms of institutionalized elderly people with dementia.

2 Method

It is a quantitative, quasi-experimental, descriptive and exploratory study, carried out in two *ILPIs* with similar profiles of a city in the interior of São Paulo. It started only after approval by the Research Ethics Committee (CEP) under opinion nº 1,981,699/2017. All procedures performed in this research were based on the conditions established in Resolution number 466/2012 and Resolution number 510/2016.

A sample estimate calculated using the G Power Software (Faul F, 1992-2014), effect size = 0.4, α = 0.05, β = 0.7, for two (2) groups, generated the value minimum of forty-two (42) participating individuals (21 individuals in each group). Inclusion criteria were: older adults aged 60 years old or older; living in one of the two ILPIs; with a diagnosis of probable dementia. The exclusion criteria of the research were having severe psychiatric disorders and/or auditory deficits that were not corrected, hindering to hear the music. Two groups were then established, one group in each institution studied. The Control Group with Classical Music (CGCM) had fourteen (14) participants, and the Intervention Group with Popular Music (IGPM) had nineteen (19) individuals.

The IGPM musical tracks were selected by the elderly participants who still minimally answered direct questions about musical preferences, representative of their

own lives (example: Roberto Carlos, Caetano Veloso, and country music) and classical piano music (Richard Clayderman) for the other group.

When necessary, the search for the appropriate repertoire was aimed at close caregivers and/or family members, as they reported passages sung by the older adults when they were most lucid (used to find specific songs), or even the older adults admired the names of these songs and singers.

We carried out individual interventions using the type of music previously defined for each institution. There were four sessions of approximately 20 minutes each for each participant, held once a week. They took place in a suitable and silent room, previously prepared. A Sony Headphone was used in the auditory pavilion, comfortable, with dimensions 207x57x271mm (AxLxP), of the circumaural or over-ear type (that sits around the ear), in the frequency of 60-70 decibels (corresponding to the volume normal conversation), together with a notebook with the songs previously selected for each participant.

We submitted the older adults of both groups (IGPM and CGCM) to the procedures in a similar way in terms of application time, period and assessment instruments. All procedures were performed and monitored by the person in charge of the study, who had mastery of the objectives and preparation for the application of the instruments. When necessary, previously trained members of the research group or extension projects participated in the study.

All the applicators were instructed to detect discomfort (such as signs of sweating, palpitation, negative features, crying sounds, negative speech by the elderly participant, among others). When any discomfort is noticed, the music could be replaced or the activity immediately stopped. The following instruments were applied for data collection:

Characterization of the older adult: It describes the profile of the elderly participants in the research, and included socio-demographic and health characteristics information, such as gender; age; marital status; nationality; comorbidities; medications in use and time of diagnosis of dementia and also information about musical preferences.

Neuropsychological inventory (NPI-Q -): Reliable instrument with a questionnaire administered to family members and/or caregivers of people diagnosed with dementia, composed of questions about the intensity and frequency of neuropsychiatric manifestations during the last month. It intended to assess the ten behavioral disorders (Cummings et al., 1994). Later, it was modified by Cummings (1997) through the addition of 2 symptoms. In total, there are delusions, hallucinations, agitation, depression, anxiety, euphoria, apathy, disinhibition, irritability, aberrant motor activity, disturbances of nocturnal behavior and changes in appetite. The score for each behavior is obtained by multiplying the intensity (1-3) by the frequency (1-4). For each manifestation, the caregiver must score the intensity of the symptoms, such as 1 - mild; 2 - moderate; 3 - severe. In 2015, Camozzato et al. (2015) validated the version of the NPI-Q (Neuropsychiatric Inventory Questionnaire), which can be self-administered and applied to the informant, evaluating only the severity of symptoms, rather than the severity and frequency of symptoms, measured at NPI. If there is a symptom, the patient is scored as "1"; if there is no symptom, the score is canceled. Therefore, the total score can vary from 0 to 12, and the severity was scored in the same way as previously reported (1 - mild; 2 - moderate; 3 - severe). For this study, we chose the application of the NPI-Q as the application is simpler and faster.

Cardiovascular biofeedback (Cardioemotion): This is a technique of physiological self-modulation mediated by resonance between two mechanisms of cardiovascular regulation: the baroreceptor reflex and respiratory sinus arrhythmia. This measure represents the interval between two consecutive heartbeat pulsations (RR interval). The recording of the time intervals between each heartbeat was through an external sensor, followed by the mathematical treatment of these data by software. By non-invasive sensors placed on the fingers or the auricular lobe, the beats are captured and then transmitted to a computer program to assess the heart rate. Thus, we assessed heart rate and survey the frequency at which the elderly maintained emotional balance (cardiac coherence).

Facial Action Coding System (FACS): This is an instrument for evaluating facial expressions based on the study by Ekman & Cordaro (2011), in which he describes the basic emotions (anger, fear, joy, surprise, sadness, and disgust) as components of more complex emotions. Thus, complex emotions come from basic emotions, which are applied as the intensity of basic expression changes. More specific representations of these expressions are seriousness, indignation, anger, fury, disdain, disgust, concern, restlessness, fear, terror, satisfaction, fun, joy, laughter, discouragement, melancholy, sadness, distress, attention, admiration, surprise and shock. The application of this instrument happened during the musical interventions individually by the responsible researcher and other trained researchers. The records were performed by detecting facial expressions experienced by the elderly person, guided by the representative figures, and then reported their frequency and facial sequence.

Reactions of participants during the interventions with music: during the interventions, we also recorded the behaviors and reactions of the participants grouped into parts of the body, such as Trunk and Head (TH), Upper Limbs (UL) and Lower Limbs (LL), understanding how stimulating the music was about the one who listened to it. Examples of TH movements are trunk swinging, constant mouth opening movements trying to sing; UL: by clapping; orchestration signal with hands; directing the arms towards the sky; and finally the LL: rhythm and dragging the feet on the floor; shaking of the legs in musical rhythm, among others, demonstrating expressions for the stimulus of the music. Komolgorov-Smirnov test analyzed statistical data verifying normality and the Fisher's Exact Test compared the proportion of categorical variables of the IGPM versus the CGCM group, in the two moments of the study.

During the interventions, we compared the frequency of body movements and facial expressions in both groups (IGPM and CGCM) using the Student's T-test and Fisher's exact test. For this purpose, confidence levels and significance were set at 95% and 5% ($p \leq 0.05$), respectively.

3 Results

Musical sessions were held individually for the two groups of older adults (IGPM and CGCM).

Descriptive analyses demonstrated similar socio-demographic characteristics between groups of elderly people. The groups were different only in the category of several drugs in use, in which the CGCM obtained the highest average (8.9). Table 1 shows such results.

Table 1. Comparisons of demographic variables and health of "IGPM" and "CGCM" groups (N=33). São Carlos, SP, 2017.

Older adult profile	IGPM (n=19)	CGCM (n=14)	IGPM *vs* CGCM
Age (mean)	85.1 (±8.68)	85.3 (±7.6)	t=-0.6; p=0.9[2]
Gender	10.5	28.6	p=0.19[1]
Female %	89.5	71.4	
Male %	10.5	28.6	p=0.19[1]
Marital Status			
Single %	36.8	14.3	NA
Married %	5.3	7.1	
Widow %	57.9	78.6	NA
Separate %	-	-	
Medications	5.6 (±2.9)	8.9 (±3.0)	**t=-3.1; p=0.00[2]**
Morbidities	3.1 (±1.5)	4.1 (±1.5)	t=-1.9; p=0.06[2]

IGMP: Intervention Group Popular Music; CGCM: Control Group Classical Music; n: number of participants. [1]Fisher's exact test for proportions; [2]Student's t-test for continuous variables. NA= Not assessed.

Table 2 describes the information obtained weekly by recording facial expressions and body movements.

Table 2. Comparison of the frequency of body and facial expressions during music sessions at IGPM and CGCM. São Carlos – SP, Brazil, 2017.

Expression	IGPM (n=19)	CGCM (n=14)	IGPM *vs* CGCM
Surprise			
No %	52.6	85.7	**p=0.040[1]**
Yes %	47.4	14.3	
Disgusted			
No %	84.2	78.6	p=0.510[1]
Yes %	15.8	21.4	
Joy			
No %	21.1	57.1	**p=0.039[1]**
Yes %	78.9	42.9	
Fear			
No%	78.9	100	p=0.095[1]
Yes %	21.1	0	
Anger			
No%	100	100	NA
Yes %	0	0	
Sadness			
No %	84.2	42.9	p=0.092[1]
Yes %	15.8	57.1	
LL movement			
No %	36.8	28.6	p=0.453[1]
Yes %	63.2	71.4	
Mean (±sd)	3.74 (±3.72)	1.71 (±1.54)	t=1.54; p=0.136[2]

Table 2. Continued…

Expression	IGPM (n=19)	CGCM (n=14)	IGPM *vs* CGCM
UL movement			
No %	15.8	14.3	p=0.649[1]
Yes %	84.2	85.7	
Mean (±sd)	5.21 (±4.52)	4.86 (±3.65)	t= 0.24; p=0.812[2]
TH movement			
No %	0	0	NA
Yes %	100	100	
Mean (±sd)	17.16 (±5.58)	11.21 (±5.92)	**t=2.94; p=0.006[2]**

IGMP: Intervention Group Popular Music; CGCM: Control Group Classical Music; n: number of participants; t: Student's t test for continuous variables; p: significance of the test. LL=lower limbs; UL=upper limbs; TH=trunk, neck, and head. sd=standard deviation. Comparison: [1] Fisher's exact test for proportions and [2] Student's t-test for continuous variables. NA=Not assessed.

There is a significant difference between the groups in the expression of joy (p = 0.039) and surprise (p = 0.041), more frequent in IGPM and the mean related to trunk, neck and head movements (t = 2.94; p = 0.0006), also more frequent in IGPM.

Table 3 describes the information obtained weekly through digital archiving in "Cardioemotion" and the results of the application of the "NPI" instrument.

Table 3. Comparison of cardiemotion and neuropsychiatric symptoms in IGPM (n=19) and CHCM (n=14) groups before and after the intervention. São Carlos – SP, Brazil, 2017.

Variables	IGPM (n=19)		Pre *vs* Post	CGCM (n=14)		Pre *vs* Post	IGPM *vs* CGCM Pre	IGPM *vs* CGCM Post
	Pre	Post		Pre	Post			
Heart rate	74.6	73.8	t=0.4[3];	73	71.3	t=0.9;	t=0.4;	t=0.6[2]
	(±10.6)	(±12.4)	p=0.64[3]	(±7.9)	(±10.1)	p=0.37[3]	p=0.63[2]	p=0.531
Systolic blood pressure (SBP)	117.7	115.8	t=1.383;	113.2	110.9	t=1.242	t=0.8[2];	**t=2.3[2]**
	(±8.4)	(±7.1)	p=0.1843	(±7.9)	(±11.1)	p=0.23[3]	p=0.40[2]	**p=0.02[2]**
Diastolic blood pressure (DBP)	73.5	72.6	t=-0.4[3];	69.2	66.7	t=-1.2;	t=1.9	**t=2.2**
	(±8.4)	(±6.4)	p=0.67[3]	(±6.1)	(±5.7)	p=0.23[3]	p=0.61[2]	**p=0.03[2]**
% Coherence	25.8	28.6	t=1.2 p=0.23[1]	30	33	t=1.1 p=0.27[1]	t=-1.4 p=0.16[4]	t=-1.3 p=0.18[4]
Total NPI	4.8	4.4	t= 1.937;	2.9	2.6	t= 1.110	t=1.1	**t=3.2**
	(±2.7)	(±2.4)	p=0.16[3]	(±2.1)	(±1.9)	p=0.26[3]	p=0.25[2]	**p=0.00[2]**

Table 3. Continued…

Variables	IGPM (n=19)		Pre *vs* Post	CGCM (n=14)		Pre *vs* Post	IGPM *vs* CGCM	IGPM *vs* CGCM
	Pre	Post		Pre	Post		Pre	Post
Delirium severity	1.1	0.5	**t=2.3**	0.5	0.5	t=0.5	t=-0.1	t=0.0
	(±1.3)	(±1.1)	**p=.02³**	(±0.9)	(±0.9)	p=0.58³	p=0.941	p=0.98²
Hallucination severity	0.5	0.5	t=-0.6	0.5	0.3	t= 1.4	t=1.6	t=0.6
	(±0.9)	(±1.0)	p=0.54³	(±1.0)	(±0.8)	p=0.16³	p=0.101	p=0.52²
Agitation severity	1.3	1.2	t=-0.1	0.6	0.3	t= 1.2	t=1.5	**t=2.7**
	(±1.2)	(±1.4)	p=0.88³	(±1.0)	(±0.6)	p=0.21³	p=0.13²	**p=0.01²**
Depression severity	1.3	1.2	t=0.3	0.7	0.3	t= 2.1	**t=2.6**	**t=2.3**
	(±1.3)	(±1.4)	p=0.71³	(±0.9)	(±0.8)	p=0.055³	**p=0.01**1	**p=0.02¹**
Anxiety severity	1.4	1	t=1.3	0.4	0.2	t= 1.1	**t=2.4**	**t=2.8**
	(±1.3)	(±1.3)	p=0.18	(±0.9)	(±0.3)	p=0.26²	**p=0.01²**	**p=0.00²**

IGMP: Intervention Group Popular Music; CGCM: Control Group Classical Music; n=number of participants; t = statistical test value; p=significance of the test.[1] Fisher's exact test for proportions and [2] Student's t-test for independent samples for continuous variables. [3] Student T-Test for paired samples. [4] McNemar test for related samples.

Considering the sum of the variation (the difference between the pre and post-intervention measurements) of the values of the physiological parameters, we found that the IGPM was 6.4 points of improvement, while the CGCM was 9.5 points of improvement. Thus, the CGCM improved 3.1 points more than the IGPM. There was a difference between the frequency of neuropsychiatric symptoms after interventions between IGPM and CGCM (t = 3.2, p = 0.001). The IGPM showed an improvement of 0.5 points greater than the CGCM. For the severity of neuropsychiatric symptoms, there was a statistically significant difference between the groups in the pre-intervention measures for the depression severity (t = 2.6) and the anxiety severity (t = 2.4) and in the post-intervention for the agitation severity (t = 2.7), depression (t = 2.3) and anxiety (t = 2.8).

4 Discussion

The comparison of the effect of different musical styles on facial expressions, movement, and behavior of the older participants with institutionalized dementia between the IGPM (n = 19) and the CGCM (n = 14) showed a difference caused by the musical genres.

The results showed that the intervention with Brazilian popular music representative of life history (IGPM) was effective to improve the severity of the symptoms of delirium, causing the expressions of joy and surprise, frequently, and arousing more movements of the trunk and head when compared to CGCM.

The profile analysis showed a similarity between the groups, meaning that the results had differences between the elderly participants. The participants in this study are represented by long-lived, with an average age of 85 years old, with a prevalence of

women, and with a wide composition of widowers. This demographic composition is also observed by other studies, in which there are greater chances of institutionalization of females, with advanced age, without a partner (single, divorced, widowed) and with functional disability (Del Duca et al., 2012).

In an advanced dementia context, music was effective, minimizing impaired communication between those affected and those around them. The facial expressions analyzed are in line with the view of researchers, who for example said that musical language has power over the evocation of human emotions and feelings, such as the joy observed throughout the interventions (Richards, 2016).

The significant expression of joy in the IGPM group highlights what Amaral says (Amaral, 2017, p.13): when using referenced songs of self-choice, there are greater chances of "[…] creating positive emotions, activating memories, affecting heart rate, blood pressure, breathing and decreasing pain levels". Also, this result can be explained due to the activation of several brain areas by this interventional tool, such as the cortex, which can reach spheres such as the induction of physiological results besides emotions and behaviors (Richards, 2016).

The fact that the surprise was the greatest significance of the expression by the IGPM, there is the hypothesis of breaking stability in the environment in which there are few sound stimuli. In this way, musical stimuli of high pleasantness to this audience are inserted, either because it is significant music from the life trajectory, bringing memories, or even due to the affable melody (Barbosa & Cotta, 2017).

When IGPM is compared to the CGMC, the identification of behavior through body movements with greater significance is linked to a greater stimulus of significant music to the older adults. According to a scientific study, this result is caused by the ability of each individual to perform movements, such as "tapping feet" in sync with the musical rhythm to which they are exposed (Rocha & Boggio, 2013).

According to studies related to the theme of dementia and music, the difficulty in verbal communication is something common with the worsening of dementia (Aldridge, 2005). Therefore, body communication is shown as an efficient alternative to allow them to manifest in front of the music heard through the body movements and facial expressions detected in this study, as it is possible to observe in the results of the IGPM, through behaviors Trunk and Head (TH).

The qualitative study by Martins (2017, p. 20), with music sessions in an institution for the elderly people with varying degrees of mental and physical illness, is consistent with the reality of this study because even though individuals have not reported memories verbally, we note the positive influence of the music on the elderly participants, showing the change that occurred through attitudes. An example in the study was the case of an elderly woman, who, when listening to the music, expressed through gestures since "[...] she put her hands on her heart when she heard the clap of her palm as if the songs fixed her thoughts at some point and she wished to have the experience back".

In the analyses based on neuropsychiatric symptoms of dementia we found that when the groups were compared, the IGPM showed, in general, a higher average of behavioral symptoms than in the CGCM, both when comparing the groups in the pre-intervention, 4.8 (± 2.7) against 2.9 (± 2.1), and in the post-intervention, 4.4 (± 2.4) against 2.6 (± 1.9). Although all elderly people have the same diagnosis of dementia in

the severe stage, the etiology of dementia has not been raised and known, a fact that may have influenced the analyses. The elderly participants in the CGCM used more medications ($p < 0.05$) than in the IGPM, and another limitation of the study was not identifying the class of medication used.

Delirium was highlighted by the important improvement obtained after the intervention in IGPM among the manifestations of neuropsychiatric symptoms of dementia. Delirium is a marker for greater cognitive impairment and it is a phenotype of the most rapidly deteriorating disease (Bremenkamp et al., 2014). Such information may support studies that want to better study how much music that represents the life trajectory can act as a non-pharmacological intervention to improve this specific symptom, easing the worsening of dementia.

Although "the physiological bases of music therapy" are unknown, it is considered as a tool for quality of life, influencing aspects of health, ranging from cardiac to cerebrovascular benefits. The beneficial effects of music (specifically of a classical character) on the cardiovascular system are already known, acting on balance in heart rate, respiratory rate, and blood pressure, as seen in the results of another study (Areias, 2016).

There are justifications for the importance of implementing significant music to the life of the elderly people in these spaces due to the positive results obtained in the face of the musical stimulus. Among the causes for this effect, the issue of musical identity is addressed through the choice of music as the one responsible for socialization (Martins, 2017).

According to Ferreira et al. (2014), health professionals must know complementary strategies in the health service to offer improved quality of life for patients. Well-designed measures could improve health care, the provision of safe, humanized, low-cost and easily implemented care.

Although the potential use of music is for both professionals and music therapists, music therapy is used only when proposed by the music therapist since it is based on musical elements (tones, rhythm, melody, among others). However, nothing prevents a professional from another background (nurse, doctor, psychologist, among others) to specialize in music therapy, aligning their knowledge to meet the demands of their performance.

Then, the use of activities with music would be an alternative to be easily developed because although music therapists are the specific professionals to use music for therapeutic purposes as mentioned earlier, this practice can be applied by any health professional who knows the content (Araújo et al., 2014). The results obtained reinforce this possibility of the demand of the dementia reality, music being a tool corresponding to the demands of care, of low cost, among others previously mentioned.

The limitations of this study were to find articles in the area about interventions with music in elderly people with severe dementia; manual registration of observations, non-randomization of the study, lack of information about the etiology of dementia and the class of drugs, which did not allow further analysis in these aspects.

5 Conclusion

The control of vital signs is something important and classical music proved to benefit it. However, music representative of the life of the older adults has shown a better overall effect on it. This is because it can stimulate non-verbal communication,

the activation of memories and the breakdown of homeostasis, generating happiness, surprise, greater movement and improvements in delirium, which may increase the possibility of reducing caregiver burden.

Also, more important than offering leisure time to try to improve the general condition of the elderly population, it supports positive attitudes about the life history of those who live in institutions and are distant from their environment (family, representative objects, everyday life, among others). Thus, it seems that representative music would be the most suitable.

We suggest that other variables may be included in the analyses in future studies, such as the drugs in use, time of dementia, among others, already mentioned. In this way, we expect to better analyze the effects of interventions with music in elderly people with dementia, which are a line of investigation that deserves further study.

In conclusion, the results showed that during the sessions, there was a higher percentage of expressions of joy and surprise; and a greater number of trunk and head movements in the IGPM when compared to the CGCM. As for neuropsychiatric symptoms, the IGPM showed a significant decrease in the severity of the symptoms of delirium after the interventions.

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Larissa Corrêa: She contributed to the design and interpretation of data, writing and critical review of the article and approval of the final content. Ana Júlia de Souza Caparrol: She contributed to the design of the data, writing of the article and approval of the final content. Gabriela Martins: She contributed to the interpretation of data, writing of the article and approval of the final content. Sofia Cristina Iost Pavarini: She contributed to data design, writing and critical review of the article and approval of the final content. Aline Cristina Martins Gratão: She contributed to the research design, protocol elaboration, data conception, analysis and interpretation, writing and critical review of the article and approval of the final content. All authors approved the final version of the text.

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