ORIGINAL ARTICLE

The influence of musical rhythms on the perception of subjective states of adult patients on dialysis

A INFLUÊNCIA DE RITMOS MUSICAIS SOBRE A PERCEPÇÃO DOS ESTADOS SUBJETIVOS DE PACIENTES ADULTOS EM HEMODIÁLISE

LA INFLUENCIA DE RITMOS MUSICALES SOBRE LA PERCEPCIÓN DE LOS ESTADOS SUBJETIVOS DE PACIENTES ADULTOS EN HEMODIÁLISIS

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ABSTRACT

Being submitted to dialysis four hours a day, three times a week can mean experiencing boredom, besides discomfort. Patients often report that the time seems to take longer to go by. The purpose of this study was to explore the influence of two different musical rhythms in the states of mind and perception of adult patients undergoing dialysis, since the literature on this subject is scarce. The study was performed at a private hospital with 43 patients, who participated in two sessions of musical improvisation with a keyboard. The subjective states and perception were evaluated before and after the intervention. Over 80% of the patients felt that time went by faster after the interventions in both rhythms. However, the pace was a decisive factor in the kind of emotional experience that the patients had.

KEY WORDS

Complementary therapies.
Renal dialysis.
Music therapy.

RESUMO

Submeter-se à Hemodiálise quatro horas por dia, três vezes por semana, pode configurar-se uma experiência carregada de tédio, além de causar desconforto durante sua realização. É comum os pacientes relatarem que o tempo parece se arrastar ou durar mais. O objetivo deste estudo foi conhecer a influência de dois diferentes ritmos musicais nos estados subjetivos e na percepção tempo-sensorial de pacientes adultos submetidos à hemodiálise, uma vez que a literatura sobre essa temática é escassa. O estudo foi realizado em um hospital privado, com 43 pacientes em hemodiálise, que se submeteram a duas sessões de improvisação musical em um teclado, nas quais os estados subjetivos e a percepção temporal foram avaliados pré e pós-intervenção. Mais de 80% dos pacientes sentiu o tempo passar mais rápido após as intervenções em ambos os ritmos. No entanto, o ritmo influenciou o tipo de experiência emocional que os pacientes apresentaram.

DESCRITORES

Terapias complementares.
Diálise renal.
Musicoterapia.

RESUMEN

Someterse a la Hemodiálisis cuatro horas por día, tres veces por semana, puede configurarse en una experiencia cargada de tedio, además de causar incomodidad durante su realización. Es común que los pacientes relaten que el tiempo parece arrastrarse o durar más. El objetivo de este estudio fue conocer la influencia de dos diferentes ritmos musicales en los estados subjetivos y en la percepción del tiempo sensorial de pacientes adultos sometidos a la hemodiálisis, una vez que la literatura sobre esa temática es escasa. El estudio fue realizado en un hospital privado, con 43 pacientes en hemodiálisis, que se sometieron a dos sesiones de improvisación musical en un teclado, en las cuales los estados subjetivos y la percepción temporal fueron evaluados antes y después de la intervención. Más de 80% de los pacientes sintió el tiempo pasar más rápido después de las intervenciones en ambos ritmos. Sin embargo, el ritmo influenció el tipo de experiencia emocional que los pacientes presentaron.

DESCRIPTORES

Terapias complementarias.
Diálisis renal.
Musicoterapia.

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INTRODUCTION

Chronic kidney disease has high morbidity and mortality, increasing in endemic proportions in Brazil and the world every year[1], strongly decreasing quality of life. As such, the investigation of new ways of care that could improve the services provided to such patients is of interest for the Nursing careers. Among the many factors that damage the quality of life of chronic kidney patients is the need to undergo constant dialysis sessions[2].

Dialysis is the process of filtering and removal of undesirable substances from the blood, which happens, on the average, in 4-hour sessions, three times a week. As such, patients spend many hours of their lives connected to the dialysis machine, usually saying that this is a tedious experience, where time seems to drag. Besides, there is also the discomfort of adverse effects like pain[3], which sometimes afflict them during the session.

Music has many clinical applications and there is plenty of literature available about its usage as a therapeutic resource in nursing practice, like in pain control[4], being also used by other professionals[5-6]. However, studies on its usage with dialysis patients are few. A search for articles in the Pubmed database, relating music or music therapy and dialysis, amounted to six articles, with three of them being from Asia. A Chinese case study presented the results of a program led by nurses with musical therapy, aromatherapy and massages as a way to minimize the sense of hopelessness and stress presented by patients in dialysis, which favored the expression of feelings and a more positive attitude towards the disease[7]. A Korean study about the influence of music on depression showed lower rates when compared to the control group[8]. One of the references had no published abstract, and three others were about dialysis, but the term music was used in a context that was not therapy, which strengthened the necessity for the present study.

Scholars agree that moods are general and less intense, while emotions are relatively more specific and more intense. For an individual, an event (such as music) can determine whether the response is an emotion or a mood. If the event is greatly significant, it could cause a stronger response that characterizes emotion. On the other hand, if the event is less intense, changes are characterized only in the mood[9]. However, both are subjective states, which are generally affected by music[10]. The subjective states, therefore, can be understood as facts of consciousness characterized by several perceptions, and, largely, by emotions, feelings and humor. They are named states because they always last for a certain amount of time, even though this amount of time may be short, average length or long, and subjective (inner) because they refer to the lower part of the user's skin perception. Perception regards the perceptive content of awareness[11], which include, among others, temporal perceptions, emotions and moods, which can be modulated positively by music within the hospital environment[4]. Because of its non-verbal character, it can cross the defensive networks that consciousness and crystallized language put up against its action, touching effective mental, corporeal, intellectual and affective points of connection[12].

Music consists of sound. Sound waves are oscillating and recurrent signals, which return in periods (repeating certain standards of time), i.e. music obeys a pulse, a reason why one can think of a correspondence between sound scales and body scales that we use to measure time[12]. Music compasses make musical execution easier by defining the unit of time, the pulse and rhythm of the composition or parts of it. Rhythm derives from the Greek rhytmos, denoting something that flows, moves and has a regular movement.

The body/mind complex is a meter of frequencies (perceived as slices of time) and all our experience with sound and music undergoes certain patterns of somatic and psychic pulse, which we play with when we read time and sound. Sounds, therefore, guide us through their successive and linear dimension, but also to another virtual, spiral, non-chronological dimension, which suggests a counterpart between the time of consciousness and the non-time of the unconsciousness, in addition to rhythm, which is at the base of all our perceptions[12].

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Therefore, the rhythmic aspect is related to the music, and the fact that it develops within a temporal matrix led us to question the possibility of altering the subjective states, including the time perception of the patients in dialysis. The purpose was to make the experience seem faster and less tedious for them, with the use of music styles, and to broaden the comprehension of music as a nursing intervention in our midst.

GOALS

Knowing the influence of two different musical styles (waltz and march) on the subjective states of adult patients submitted to dialysis sessions.

METHOD

This was a non-controlled clinical test performed in a dialysis service in a medium-sized general hospital in the city of São Paulo, in July 2007.

The convenience sample consisted of 43 patients who met the following inclusion criteria: adults submitted to

dialysis with a chronic kidney failure diagnosis, without hearing loss, without associated medical diagnoses implying cognitive alterations, with preserved oral communication and who accepted to take part in the research by signing the term of consent, according to the Brazilian laws for studies with human beings (Resolution #196/96), after being informed about the study goals.

The study was submitted to the Review Board of the institution, being approved and filed as #03/07 in an ordinary meeting held on 04/27/2007.

The improvisation technique was performed by one of the researchers, who is also a pianist, in the two proposed styles: march and waltz. March consists of a binary rhythm, i.e. its rhythmic cell is formed by two beats[1-2]. The pulse is strong-weak, i.e. the first beat in the compass is strong and the second is weak. Waltz consists of a ternary rhythm, i.e. it is formed by three beats[1-2-3]. The pulse is strong-weak-weak, i.e. the first beat in the compass is strong and the second and third are weak. The improvisations lasted 20 minutes for each style in two separate sessions, as seen in Chart 1, which consisted of instrumental sounds and songs that were not popular in order to avoid personal associations and minimize the evocation of memories. The pieces were executed on a Yamaha PSR 620 keyboard.

Chart 1 - Distribution of the dialysis groups and musical style utilized - São Paulo - 2007

Groups	1st week of intervention	2st week of intervention
Monday morning	March	Waltz
Wednesday morning	Waltz	March
Monday afternoon	March	Waltz
Wednesday afternoon	Waltz	March
Tuesday morning	March	Waltz
Thursday morning	Waltz	March
Tuesday afternoon	March	Waltz
Thursday afternoon	Waltz	March

The patients were divided in 4 groups: the first group on Monday and Wednesday mornings; second group on Monday and Wednesday afternoons; third group on Tuesday and Thursday mornings; and the fourth group on Tuesday and Thursday afternoons.

On the days assigned to the musical intervention, the subjective states were evaluated immediately before and after each music session with an instrument adopted in studies about the impact of music in the mood of hospitalized patients[13]. The temporal perception was verified with a specific question, which the patient should respond, saying whether time passed at the same rate, if it was faster or if the dialysis session seemed to take longer.

The data were submitted to analytical statistical analyses (NCSS and STATPLUS software). The adopted level of significance was 5%. The statistics with a descriptive p <= 0.05 were considered significant. Wilcoxon's signed ranks test was used as a non-parametric technique, adjusted to compare the magnitude of the difference between each pair. In the present study, each pair was considered as the same individual, both in the pre-post and in different styles (march, waltz). For the exploratory analysis, the multiple comparison charts for groups were used, including the bar chart with the median-weighed error bar (reliability interval of 25-75 percentiles) and the dot plot (all patients) and the comparative histograms).

RESULTS AND DISCUSSION

The average age of the group was 63 years, ranging from 23 to 93. Males (62.8%) were predominant over females (37.2%). Of the 43 studied patients, 30 (70%) were seniors (60 years or older).

Regarding the dialysis time undergone by the patients, 65% had undergone dialysis for 5 years or less. The average time was 4.5 years, varying from 10 months to 12.3 years.

The senior sample showed that 21 patients (70%) had undergone dialysis for 5 years or less, and 15 (35%) for at least 5 years.

In order to calculate the magnitude of this experience for the patients, the following must be considered: being submitted to dialysis for only one year (an average of 3 times a week in 4-hour sessions each day) results in a total 625 hours connected to the dialysis machine, a full 156 days of their life - 43% of the assessed period, representing nearly half a year. The data reinforces that the submission to the treatment results in feelings perceived as impacting quality of life[14].

Regarding music preferences, a great diversity was observed: 10 of the 43 patients (25%) reported being eclectic, and the others varied widely in their chosen musical styles. Only one patient (2%) mentioned not listening to music, which demonstrates once again the universal character and the great acceptance of this complementary healthcare practice.

Many people believe that music is meant only for entertainment; others use it in several environments and daily activities. Consciously or not, people have a special and unique preference. However, it seems that the obtained data suggest that musical preference did not interfere in the obtained results, since the musical styles used did not match their preference. Some studies have shown this non-interference of music preferences in the results measured[4].

Regarding temporal perception, Table #1 and Figure #1 show that, for most, the perception was that time seemed to pass faster, and that the type of rhythm did not influence the patients' temporal perception response.

Table 1 - Patients' temporal perception after two music sessions. São Paulo - 2007

Temporal Perception after the intervention	Binary Rhythm (March)				Ternary Rhythm (Waltz)			
	1st s		2nd s		1st s		2nd s	
	f	%	f	%	f	%	f	%
1. Faster	32	80	34	81	33	85	35	83
3. Slower	---		---		---		1	2
2. Same length	8	20	8	19	6	15	6	15
Total	40*		42*		39*		42*	

* The amount of patients did not reach 43 as some of them were absent from some of the sessions.

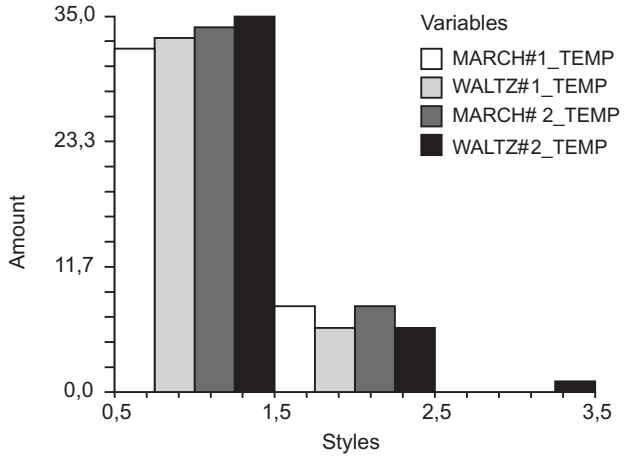

Figure 1 - Patients' temporal perception after two music sessions. São Paulo - 2007

Music brings us out of our frozen mental states and makes our minds move in a way they usually do not. When we are involved by well-written music, we have a comprehension that transcends our worldly existence, and, in general, lies beyond memories. When the sound ceases, we fall back into our mental wheelchairs[15]. Such an idea can justify the feeling that time seemed to pass faster for the study subjects.

Every time perception is a perception of change. Time is not a cold dimension, fit for simple verification; it is permeated by desires and affection. Duration is expectation and boredom. The emotional factor affects the subjective markers[16]. Some authors, for example, persuaded their subjects that an enjoyable or a dislikable event, or even a neutral experience, would follow a waiting period. The group with positive expectations felt that time passed much more slowly than the others. The groups with neutral or negative expectations tended to underestimate the interval[17].

With these questions, we observed that most patients submitted to dialysis did not expect improvements or positive feelings. Since music is not an invasive process and has great universal acceptance, we may infer that they agreed to listen to it without any problems, but without establishing perspectives beforehand, which corresponds to placing them in the perspective of a neutral group. Most patients were observed to have a good time, enjoying the execution, singing and tapping their feet along with the rhythm. At the end, most would say: - *Waaaahhh… is it over yet?*, which showed that the execution was interesting to them, to say the least.

Regardless of the style, most were observed to have mood improvements, which corroborates the influence of music on the well-being of people within the hospital environment[8,15,18].

Table 2 - Patients' sensorial perception of well-being after two music sessions. São Paulo - 2007

Sensorial perception of well-being after the intervention	Binary Rhythm (March)				Ternary Rhythm (Waltz)			
	1st s		2nd s		1st s		2nd s	
	f	%	f	%	f	%	f	%
1. Better	25	62.5	29	69	33	85	33	78.5
3. Worse	1	2.5	---		---		2	4.5
2. The same	14	35	13	31	6	15	7	17
Total	40*		42*		39*		42*	

* The amount of patients did not reach 43 as some of them were absent from some of the sessions.

An important interference occurred in the research: the Pan-American games. The games were broadcast on TV. As such, the TV would be turned off some days, and the patients, especially the younger ones, became restless. Due to the freedom they thought they had with the researcher, they said: *Waaah, turn the VOLUME down, play the keyboard, but leave the TV on without the sound…* At that, they were told about the importance of concentration and the interference of the TV image on the study. The patient who reported feeling that time seemed to pass more slowly after the intervention and two patients who reported having felt worse after the intervention mentioned their dissatisfaction, as they were not allowed to watch the Pan-American games that were broadcast during the intervention. That is why they felt this way. Only one of the patients reported feeling worse for another reason: for this person, the march musical style was *very boring and noisy*, which made him feel uneasy.

Table 3 - Subjective states before and after the music sessions. São Paulo - 2007

Subjective states	Session March		Session Waltz	
	Before	After	Before	After
Tranquility	45	45	48	50
Joy	7	9	5	7
Quietness	4	8	5	7
Peace	---	8	---	12
Distraction	---	2	---	3
Liveliness	---	2	---	2
Uneasiness	5	1	4	---
Conformity	4	---	4	---
Boredom	4	---	4	---
Anxiety	2	2	3	---
Animosity	2	---	2	---
Anger	---	2	---	---
Normalcy	9	3	6	---
Total	82	82	81	81

We observed differences in feelings after the execution of the march, increasing the feelings of quietness, joy, distraction, liveliness, peace and reducing the feelings of boredom, uneasiness, animosity and conformity, showing the importance of this type of intervention for these patients when they are connected to the dialysis machine.

Likewise, after the execution of the waltz, there were differences in feelings, increasing, more than during the march, the feelings of tranquility, distraction, peace and reducing the feelings of anxiety more markedly when compared to the march. Reportedly, although the rhythm seemed not to interfere in the temporal perception, it seems to have been a determining factor for the type of emotional experience the patients presented, revealing statistical significance as shown in Table 4.

The musical structures, as integrated by the rhythm, have different proposals, frequently seen in movie soundtracks, for example.

To understand the experiences suggested by several styles, we can analyze its compositional genesis and the involved cultural factors. Marches, as we know them today, differ widely from its military character, but both the traditional march and the frevo had their first steps inspired by the marching bands of the military corporations of the

Table 4 - Wilcoxon's signed ranks test for the patients' subjective states in the music sessions. São Paulo - 2007

Test Statistics*	March 1_Post / March 1_Pre	Waltz 1_Post / Waltz 1_Pre	March 2_Post / March 2_Pre	Waltz 2_Post / Waltz 2_Pre
Z	-2.874	-3.217	-2.183	-2.762
Significance Bicaudal	0.004	0.001	0.029	0.006

* Wilcoxon Signed Ranks Test

20th century. However, the only similarity that the carnival march, meant for festivities, shares with the military march is the binary compass. This rhythm, considered lively and with a confrontational character, typical of military marches, differs greatly from the waltz, a word whose German root is Walzen, which means to slide.

Marked by its ternary compass, it was widely enjoyed during the latter half of the 19th century and, in the words of a scholar, would be one of the only public spaces for the approximation of lovers and couples at the time[18], revealing a more romantic and whimsical proposal, with subsequent mood states that are more compatible for each style in association with other musical elements. These characteristics may help to understand the stimulus that a given style may cause over a given feeling, in detriment of another.

Nursing care can be understood as a set of actions and behaviors performed to favor, maintain or improve the human condition in the process of living or dying. As such, healthcare is an interactive process focused on development and growth, which happens continuously or at a specific time, with the power of leading to transformation. Music seems to confirm itself as a valuable resource in this sense. Awakening such feelings in the patients is part of the qualification of care, with the possibility of seeking healthier spheres, both physically and mentally.

FINAL CONSIDERATIONS

According to the proposed objective, it was observed that the music style seems not to have influenced the patients' temporal perception response. Both styles influenced this perception intensely, which made the patients feel like the time seemed to pass faster. However, the waltz had a wider and decisive acceptance in the perception of well-being, stimulating feelings of tranquility, peace and distraction more than the march, in addition to reducing anxiety.

Less than the waltz, the march also acted on the patients' perception of well-being, and stimulated feelings of joy, distraction and liveliness. This behavior was expected due to the festive characteristics of the style.

An interesting aspect to be observed is that the patients' experience cannot be reduced only to the march and waltz styles. The researcher's *human energetic field* should also be considered, as he was with the patients every morning and afternoon during the month of July, smiling, talking to them before and after the intervention, creating bonds and more: playing live music to them, which is very different from background music or any other type of passive presentation of music. Human interaction is a variable that, although difficult to measure, is present in the developed study and the clinical environment, since the experiment did not happen within a laboratory.

The study has certain limitations: the impossibility of isolating the music from the other auditory elements that are inherent to the use of a harmonic instrument. Perhaps studies designed only with percussive instruments could be more accurate for this type of analysis, as well as the inclusion of a quaternary rhythm. It is worth noting that the results of this study reaffirm that rhythm, improvised melodies and unknown harmonies, along with the timbre of the piano, yielded the same long-known musical properties. It has several benefits that surpass the physical barriers and affect the mental and social spheres. In addition, as long as music is not understood in a satisfactory way to prescribe it safely, efficiently and consciously, healthcare professionals should develop new studies.

As a final consideration, the aspects reported next were not part of the study goals, but were significant to the author who developed the musical activity during the research, and also because we consider that they may provide insights on new targets for investigation.

The patients' acceptance was visible, and their sensations during the execution were a highly motivating element. The relationship was enjoyable, and the month of July seemed to fly, for the patients and the researcher alike.

Every day was more motivating and the patients' reciprocity was unmistakable. When they arrived, they came over to hug, talk, praise, ask about the possibility of taking private lesions, in addition to requesting several music pieces that they enjoyed at the end of the execution.

In spite of the music pieces, some patients would cry at the end of the execution, showing that, even with the improvisation of different, unknown melodies, they were capable of stimulating imagination and bring past memories back.

Blind patients seemed to be more sensitive to the execution than those with preserved sight were. Only one of the patients was sedated all the time and was not considered for data collection. However, her mother was asked to observe her reactions and expressions. Since she remained by her side during every execution, she reported that her daughter seemed to feel calmer *every time*, with soft facial expressions, feeling less agitated, especially during the waltz, which deserves a more in-depth methodological investigation.

The patients' acceptance and the need for this intervention were also perceived as part of the non-pharmacological care and as a complementary healthcare practice, as many asked the performer not to forget about them and return later, because music brings joy and the dialysis environment is really sad, silent, and chronologically constant. Four hours… These aspects, therefore, show the necessity of this complementary healthcare practice in the life of those people.

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