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The effects of classical music interventions in gynecological medical units

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ABSTRACT

The present research presents the results of a quasi-experimental study on the effects of classical music interventions in gynecological medical units. The study involved 60 women between 18 and 67years old. Of these, 30 were included in the experimental group and 30 in the control group. The experimental group was exposed to listening to recorded classical music, in the waiting area, before the consultation or medical intervention, for about 15-20 minutes. The instrument used for the measurement of anxiety were The Hamilton Anxiety Rating Scale, HARS (α = .92), and The Hospital Anxiety and Depression Scale, HADS (α = .89). Intervention through music had positive effects on reducing the anxiety of patients waiting in the waiting room of the medical office. The level of anxiety was higher in 18-23 years patients than in patients over 24 years old, even they were exposed to the same conditions of listening to classical music in the waiting room. The level of HADS anxiety differs significantly according to the level of education of the patients. Further research is needed on music and its effects on patients, given the low cost of implementation and the potential of music to reduce patient stress.

Keywords: *gynecological patients, music intervention, anxiety*

1. INTRODUCTION

The present research aims to examine the levels of anxiety among patients waiting under standard routine and patients waiting under standard routine augmented with recorded classical music, before the procedure for consultation or for gynecological medical intervention. The study also proposes two additional objectives regarding investigation of the differences in the levels of gynecologist anxiety according to age, respectively according to formal education of the patients.

Anxiety is a common problem associated with visiting a doctor (Tang, 2012). The prospect of visiting a medical office is often associated with the risk and uncertainty of negative news (especially physical), exposure or pain, and the psychological dimensions of risk and uncertainty include not

only a cognitive assessment of danger, but also an emotional assessment (Loewenstein, Weber , Hsee, & Welch, 2001; Peters & Slovic, 1996).

Doctors and nurses face challenges throughout the medical act. They often give priority to physical care and less to the patient's psychological needs (Nilsson, 2008).

The situation is not different either in the case of gynecologist visits. Routine gynecological care is important for maintaining health and is an integral part of early detection and treatment of sexually transmitted diseases and cancer (Frye & Weisberg, 1994). Along their lifes, most women undergo several gynecological examination (Yanikkerem, Ozdemir, Bingol, Tatar, & Karadeniz, 2009), and some of them may perceive these examinations as aversive procedures (Hilden, Sidenius, Langhoff-Roos, Wijma, & Schei, 2003). Gynecological examination is one of the medical procedures that frequently cause anxiety (McCarthy, 1997) and also embarrassment and discomfort (Yanikkerem et al., 2009). The gynecological examination involves exposing the intimate parts of the body in a situation of vulnerability. At such a time, women experience various emotional states, such as embarrassment about the need to undress (Kocabaş & Khorshid, 2012; Yanikkerem et al., 2009), worries about cleanliness or vaginal odors, fear of discovering a medical condition, fear of pain (Hilden et al., 2003; Yanikkerem et al., 2009).

There are certain differences in the perception of anxiogenic factors in women at different stages of life. While a postmenopausal woman, whose reproductive life has already reached its peak, more calmly accepts even major interventions such as removal of an organ (hysterectomy), a young woman may have a very different point of view. The latter will want doctors and nurses to explain the details of her illness, its functioning, and medical procedures (Wade, Pletsch, & Morgan, 2000).

To reduce a patient's anxiety during examination, various approaches have been used to distract the patient, such as therapeutic communication, visualization, aromatherapy, therapeutic touch, and music listening (Chlan, Evans, Greenleaf, & Walker, 2000).

The literature includes a large number of studies that highlight how music could be a tool for psycho-emotional support of the patient, by creating an environment that stimulates and maintains relaxation and well-being. Music can be used as a technique to reduce or control stress (Nilsson, 2008).

The anxiolytic effects of music have been studied in a variety of patients, including those in surgery (Winter, Paskin, & Baker, 1994; Good, Anderson, Stanton-Kicks, & Makii, 2002; Leardi, Pietroletti, Angeloni, Necozione, Ranalletta , & Del Gusto, 2007), in cardiac patients (Gagner-Tjellesen, Yurkovich, & Gragert, 2001) as well as in oncological patients (Baxter, Scott, Vos, & Whiteford, 2013).

The present work has as a starting point the following questions: ”Why do we like music?” and ”Is music really useful beyond the relaxing effect?” From the multitude of studies we can draw a conclusion about the possibility of using music in the most different and beneficial ways.

The first question inevitably leads us to the need to understand how the brain works, the center of emotions. Psychologist and behavioral neuroscientist Daniel Levitin supports the idea of a perpetual process of integrating information received from sensory organs into meaningful elements for us. And to make sense at any given time, the brain makes predictions (Levitin, 2010). These observations are in accordance with the gestalt theory, according to which the whole has priority over the component parts.

The main way in which the human brain processes ordinary situations is to extract those common elements to a large number of situations and to create a framework in which these elements are placed; this framework is called a scheme (Levitin, 2010). This would be one of the fundamental principles of its functioning, whereby existing models are continually modified, improved with new information and new predictions (Hawkins & Blackeslee, 2005). In other words, we feel good about making predictions about what is about to happen or making postdictions about what happened. And all these processes take place unconsciously.

About the predictive process of the brain and music, Levitin (2010) argues that when we listen to music, the brain tries to guess what the next sound or note of the song is. Sometimes successful, sometimes unsuccessful. And with the success comes the feeling of pleasure that everyone wants. However, some of us are not satisfied with the simple pleasures, they need more. And the unsophisticated music that we can anticipate without much effort becomes boring at one point. Therefore, maintaining a level of unpredictability ensures a higher degree of satisfaction, through a higher level of challenge. A more complex music, with a higher degree of unpredictability, can be tasted, appreciated, but without going so far as to become chaotic, incomprehensible.

We note from the above the close relationship between music and the emotions of the human being. It is unlikely that a person will ever have experienced the emotion produced by the music of a movie, which may have been a love movie like Love Story or a thriller such as Silence of the Lambs. For the most passionate, Beethoven's 9th symphony or piano concerto no. 1 by Pyotr Ilyich Chaikovsky are hard to ”digest”. In general, the connection between our emotions and our perceptions about certain life events is accepted. In the films, the music-emotion correlation prepares us for the next scene, which will in turn generate a more intense emotion against the background, already prepared by the song. It is noted that music can

influence, in a way, our state of mind, most often in a pleasant, positive, relaxing, motivating way.

On the website of the American Society for Music Therapy, it is specified that "music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of individuals". A significant number of meta-analyzes are also cited with reference to results in improving behavioral functioning and others with reference to results in anxiety management (www.musictherapy.org).

Numerous other studies show that unique results have been achieved using music therapy, possible especially when interventions are directed to reduce pain, anxiety, and depression. Being a strongly non-invasive method physically and mentally, it is preferred in a lot of situations where people are affected by traditional methods.

Its successful use in the medical field is documented through studies and research covering the use of music as an environmental and adjuvant modality, as a tool during perioperative and postoperative procedures or to be used in chronic pain management (Good, Anderson, Stanton-Hicks, Grass, & Makii, 2002; Cooke, Chaboyer, & Hiratos, 2005). And anxiety is a problem that is increasingly seen in people in various situations, often even in a clinical or hospital environment (Baxter, Acott, Vos, & Whiteford, 2013).

Music reception in humans

Music can create strong emotions. Sometimes it convinces individuals to buy the most diverse products.

It seems that the effects appeared in primordial times. Darwin (1967) mentioned that the simplest animals, such as crustaceans or mosquitoes, have developed sensitivity to noise, which makes them suitable for distinguishing musical notes as well. And this was following the reproductive instinct. Animals need sensitivity to sounds to ensure the perpetuation of the species. Going further, on the scale of evolution, Darwin concluded that humans could assume that the musical tones and rhythm were used by their semi-human ancestors during the reproduction period, assuming that speech appeared after the ability to create rhythms and musical instruments (Darwin, 1967).

The structure of the human brain is particularly complex. Most anatomy treatises have described the main components of the brain as: brainstem, cerebellum, diencephalon, and telencephalon or cerebral hemispheres. The cerebellum (most often next to the brainstem) is sometimes called, in popular terms, a reptilian brain, probably as a result of phylogenetic studies, performed on animals at different stages of evolution, in which it has been observed that this component is one of the oldest evolutionarily. It is responsible for measuring time, coordinating body movements, and maintaining balance. But in recent years, it has been discovered that the cerebellum also has a role related to emotions. It is activated in people who listen to music (Levitin, 2010). Moreover, it seems that in musicians the volume is higher, compared to the volume of the cerebellum in people not actively involved in music. (Schlaug & Levitin, 2010)

In the composition of the brain it can be also find another critical element, the limbic system, which is made up of all the brain structures located in the middle and deep regions of the brain: the amygdala, cingulate gyrus, fornix, hippocampus, hypothalamus, olfactory cortex, and thalamus. The limbic system plays a major role in controlling emotions, emotional responses, hormonal secretions, mood, motivation, and feelings of pain and pleasure. We retain the functions of pleasure and pain. Therefore, it is also part of the brain regions involved in music reception (Crick & Levitin, 2010).

Modern imaging technologies have allowed the observation of other regions of the brain that are mobilized by music, even in the sequence of their activation. Thus, in the music processing chain, the auditory cortex, the areas of the frontal cortex, the mesolimbic system, the nucleus accumbens (whose role was discovered only in 2005) successively enter, all in addition to the cerebellum and the basal ganglia that are permanently active during the listening process (Levitin, 2010).

Sacks (2007) mentions functional FNMR studies (Functional Nuclear Magnetic Resonance identifies the movement of blood to the cortical areas activated at one point, using the magnetic properties of hemoglobin), performed by a team led by Zatorre, which demonstrates the activation of the auditory cortex under the conditions in which a person imaginarily sing a song. Therefore, simply imagining a piece of music requires sustained mental activity. Sacks (2007) considers the cortical area involved in the composition, interpretation or simple listening to music to be wider than that involved in language development. The conclusions he reaches are based on the study of the responses of a large number of people, in a special relationship with music, from professional musicians to people with bizarre neurological conditions (their memory holds nothing for a long time, less the music) (Sacks, 2007).

Schalug and Gaser (2003) find significant differences regarding the volume of gray matter in the brain, higher than for professional musicians compared to the volume of ordinary people.

The anxiolytic effect of music

Some theories refer to the effects of reducing anxiety through music as a result of the fact that music can help patients focus on something pleasant and soothing, thus moving away from stressful events (Mitchell, 2003; Nilsson, 2008; Dileo & Potvin, 2013).

It is known that in people without disorders, both men and women, the level of subjective anxiety, generated by a cognitive stressor such as preparing an oral presentation,

can be controlled by exposure to classical music (Knight & Rickard, 2001).

Levitin (2010) talks about the emotional reactions following the activation of the mental structures created by the human brain when listening to music, a fact that is not found in other complex representations. Other theories are in favor of a much wider spectrum of consequences that music can generate, even on those in suffering and who listen to or interpret music. Interpretation or composition are acts by which the patient can acquire a pronounced sense of control of the situation by contrast with the passive expectation of an intervention (Thaut, 2010).

It has been shown that, at the neurophysiological level, music induces relaxation through its impact on the central nervous responses (Gillen 2008; Lai, 2006; Bradt et al. 2013). More precisely, it is believed that the anxiolytic effect of music is achieved by its suppressive action on the sympathetic nervous system, which leads to decreased adrenergic activity and decreased neuromuscular excitation (Bradt, Dileo & Shim, 2013; Chlan, Evans, Greenleaf, & Walker, 2000). Music further triggers the limbic system in the brain to release endorphins. These neurotransmitters play an important role in creating a sense of well-being (Arslan, 2008; Bradt, Dileo, & Shim, 2013).

The use of music in medicine and psychotherapy

It is worth noting that music can be used in many ways to alleviate suffering, dysfunctionality or to cure patients with the most severe psychological or physical conditions. Thus, a distinction can be made between music interventions administered by medical personnel, a kind of musical medicine (Iamandescu, 2004) and those implemented by therapists trained in psychotherapy through music or melotherapy (sometimes music therapy). Numerous research results have been published (Dileo & Bradt, 2005; Bradt, Dileo, & Shim, 2013) that indicate a significantly higher level of effectiveness of psychotherapeutic interventions through music, compared to a lower level of efficiency of medical interventions with music. This difference could be attributed both to the fact that psychotherapists individualize the interventions so as to meet the specific needs of their patients, succeeding in actively engaging them in therapy, but also because they use a systematic therapeutic method in which the evaluation, the treatment itself, and feedback that maximizes effects can be found.

The American Music Therapy Association (AMTA) defines this type of therapy as the clinical, evidence-based use of music interventions to achieve individualized goals, in a therapeutic relationship, by an accredited professional, who has completed an approved program training in music therapy (www.musictherapy.org).

The modalities of performing music therapy cover a wide range, from passive therapy, often called receptive music therapy, to active therapy, in which the patient is actively involved in the interpretation or creation of music, with beneficial effects on his suffering or discomfort (Iamandescu, 2004). In the latter case, the interpretation may be spontaneous, possibly suggested by specialized personnel or it may be an interpretation after the score. Also, music can be used in combination with other elements with beneficial effects for the patient, such as visual, artistic, and moving objects.

Given the superior results in the case of music therapy compared to those in music medicine, we can observe the importance of the person choosing the music. By extension, it can be assumed that there are differences between the effects of different genres of music or between the effects of music of different composers (Chi & Young, 2011).

Schlaug, who has been conducting investigations for the use of music and musical stimuli as intervention tools for educational and therapeutic purposes for many years, states, in a 2015 article, the potential of music as an intervention factor in neurological disorders and even pervasive developmental disorders (Schlaug, 2015). In another article published with Altenmüller, the ability of music to be used in therapeutic approaches is supported, due to the ability to engage multisensory and motor neural networks along with the involvement of emotion-responsive areas and areas responsible for the system. of reward in the brain (Altenmüller & Schlaug, 2015).

Studies on the use of music in different medical specialties

Bins-Turner and his team treat the subject of significant anxiety reduction in the research group, in a preoperative study, with patients who were to undergo a mastectomy surgery (Bins-Turner, Wilson, Pryor, Boyd, & Prickett, 2011).

In a quasi-experimental study, a group of 60 patients waiting for a surgical operation, who listened to instrumental music in headphones for 20 minutes before the procedure, reported lower anxiety levels compared to the values reported by patients in the control group. The measuring instruments used were the State-Trait Anxiety Inventory Scale (STAI) along with methods for assessing physiological parameters including heart rate, respiratory rate, systolic blood pressure and diastolic blood pressure (Mohammadi, Ajorpaz, Torabi, Mirsane, & Moradi 2014).

Patients with terminal stage renal failure under hemodialysis participated in a study to investigate the effects of preferred music listening on anxiety and pain perception. Anxiety levels and pain were measured, at pre-test and post-test levels. The control group had significantly higher anxiety scores than the experimental group and experienced significantly higher pain intensity in the post-test phase. The findings provide experimental evidence that supports the effectiveness of listening to favorite music in medical

settings (Pothoulaki, Macdonald, Flowers, Stamataki, Filiopoulos, Stamatiadis, & Stathakis, 2008).

A team led by Thaut found improvement in executive function, general emotional balancing, and depression and anxiety reduction in people with head and brain trauma, beneficiaries of the treatment. Participants in the study group were involved in four pre-test sessions, where for 30 minutes they were exposed to neurological therapy through music, focused on an aspect of rehabilitation (attention, memory, executive function or emotional balancing). The participants in the control group rested for 30 minutes, pre-tested, and than post-tested. In experimental group there were improvements in emotional balancing and diminished hostility, and positive affectivity (Thaut, Gardiner, Holmberg, Horwitz, Kent, Andrews, Donelan, & McIntosh, 2009).

The existing literature includes another study by Chang and Chen in Taiwan on Caesarean section patients. The level of anxiety measured in the experimental group was significantly reduced compared to the level of anxiety measured in the control group. The experimental group also received music, in addition to routine assistance, while the control group received only routine assistance (Chang & Chen, 2005).

Other results are provided by a randomized controlled study on examining the effect of music intervention on stress hormones, physiological parameters, pain, and anxiety, before and during catheter placement procedures. The pain and anxiety levels of 100 oncology patients were measured using the Analogical Visual Scale and the Status-Trait Anxiety Scale (STAI). The results show that music led to a significant reduction in pain level and anxiety scores in the study group compared to the control group (Zengin, Kabul, Al, Sarcan, Doğan, & Yildirim, 2013).

A study of children born prematurely analyzed the positive effects of musical pieces and swing songs (parents' preferences) on physiological functions (electrocardiogram, heart rate, respiratory rate, O2 saturation levels, and others) and on development (sleep, feeding behavior, and weight gain). The children received three interventions per week, in a period of two weeks, when physiological and developmental data were collected before, during, and after the intervention, compared with the data collected daily during a two week period, without intervention (Loewy, Stewart, Dassler, Telsey, & Homel, 2013)

Another randomized controlled study investigated the effect of three non-pharmacological medical care situations (through relaxation, through music, and through a combination of relaxation and music) on pain and distress arising from gynecological surgery. The results has shown positive results in using music (and other methods) to reduce stress (Good, Anderson, Statnton-Hicks, Grass, & Makii, 2002).

The perspective of Cook, Chaboyer, and Hiratos (2005), although slightly critical of the methodology used by some researchers, shows conclusive evidence identified in a number of studies evaluated on the use of music, as a simple method and with efficient implementation costs, to reduce anxiety in patients waiting for invasive interventions.

Bradt, Dileo, and Shim (2013) mention the positive results of a meta-analysis that included 26 studies aimed at examining the effects of using music along with standard patient care procedures, compared with the effects of using only standard care procedures, on preoperative anxiety in patients who were to undergo surgery.

Another meta-analysis focuses on studying the effects of music on the anxiety of patients with coronary heart disease, with results indicating that music can have a beneficial effect on anxiety in people with coronary heart disease, especially on those with myocardial infarction (Bradt, Dileo, & Polvin, 2013).

From another geographical area comes a very interesting meta-analysis on using music to improve global and social functioning in schizophrenia and severe mental disorders, in improving walking and other related activities in Parkinson's disease, in reducing depressive symptoms and in improving the quality of sleep. Given the severity of these conditions, the results are all the more worthy of consideration. As the authors argue, the research is unique because it summarizes the evidence for each target disease, in line with the revised International Classification of Diseases 10 (ICD-10). It is also very comprehensive, being performed on a large number of databases (Kamioka et al., 2014);

Last but not least, the journal Psychomusicology: Music, Mind, and Brain mentions in the special issue of 2013, dedicated to neuroscience and music, the results of nine empirical studies of collaborators from seven different countries. The contributions of these research concern perception, cognition, affect, neurological aspects, but also therapeutic aspects of music, and are the result of a series of neuroimagistic approaches, statistical, and paradigmatic approaches (Stewart, 2015).

We note how all of the above studies and meta-analyzes show significant results in reducing anxiety (and other beneficial effects) in the most diverse medical fields, from psychiatry (serious disorders such as schizophrenia and Parkinson's disease) to cardiology, oncology, surgery, neurology, obstetrics, neonatology, and gynecology.

Also, it is worth noting the varied geographical origin of the teams of researchers and, implicitly, of the patients involved in the studies in this direction, from Japan, the United States of America, Taiwan, Turkey, Iran, and countries of Europe. This findings suggest a fact that is not to be neglected, regarding the lack of correlation between the patient's race, nationality or culture and this type of intervention, which leads to the conclusion of the possibility of using music in any country in the world.

In addition to the above, there are also voices that report difficulties in analyzing the results of the studies in the field, due to the methodological inconsistencies of the different researchers. And as today without conclusive scientific evidence it is not possible to accept the integration of any type of intervention in the health care system, Robb, Burns, and Carpenter (2011) propose a solution of structuring the clinical data for use in scientific studies. It consists of a system of reporting the results of the interventions, which includes seven different components of the interventions based on music, including the theory of intervention support, the content of the intervention, the timing of the administration of the intervention, the specialist administering the intervention, the fidelity of the treatment, the framework and the type of the institution where the intervention is administered. All items will be included in two reporting formats - The Consolidated Standards for Reporting Trials (CONSORT) and Transparent Reporting of Evaluations with Nonrandomized Designs (TREND), intended for transparency, interpretation, and replication, and finally for eventual transposition into practice of interventions based on music.

Since the mentioned studies were, in the majority, oriented towards the analysis of diseases and interventions of a wide medical scope, it seems very appropriate to study the possibility of using this procedure, with very low implementation and operating costs, in medical situations with technical implications and lower procedural requirements, where higher costs could be more difficult to justify. However, from the patients' perspective, the positive effects of using music to reduce anxiety level in situations such as waiting periods before medical consultations are not insignificant, for reasons that will be detailed below.

Aspects of physician and hospital anxiety

Physician anxiety, sometimes known as iatrophobia, can be characterized as fear of blood, needles, syringe, injury or pain.

Gerdes and Guidi (1987) indicate the existence of predictors of situational anxiety among patients present in the waiting area, before being consulted by their doctors. These include a passive or addictive attitude towards the doctor's visit, feelings of insecurity about their health, anticipation of potential physical discomfort, embarrassment or concern for invading private life.

This type of anxiety can arise from multiple causes. Some common examples could be: doctors usually work in hospitals or offices associated with trauma, pain, accidents, deaths; a bad situation or a traumatic event that occurred in the person's life, as a child, and which involved a doctor; some people are intimidated by the doctor, identified with an authority figure; medical offices usually have a specific odor or a specific aspect, which is scary for some people; other physicians are not too attentive to patients' emotions; people are afraid of illnesses they might get from medical staff or other patients around them; people are generally afraid of medical procedures, even the simplest ones; some people are afraid of possible negative results in medical tests, preferring the false security of the lack of information; most people are afraid of painful things or events, such as needles or wound cleaning; alcoholic or substance users may be afraid to face addiction. These are just a few possible causes among hundreds of other causes.

People with this type of anxiety may experience some or more of the following symptoms and signs: dyspneea, excessive sweating, nausea, dry mouth, feeling sick, tremor, tachycardia, and heart palpitations, inability to speak or to think clearly, with excessive fear of losing control, fear of dying, sensation of detachment from reality or even panic attack. You can also see the repeated postponement of routine medical examination or an increase in blood pressure levels in the medical clinic, or even hypochondriac disease at the lowest cough or cold, associated with fear that medical treatment will be needed.

Taking into account the above, we formulate the hypotheses of the study:

H1. *Patients in the waiting area of gynecology offices under standard routine will have higher levels of anxiety than patients in the waiting area of gynecology offices under standard routine augmented with recorded classical music.*

H2. Y*ounger patients in the experimental group (18-23 years) will experience higher levels of anxiety than patients over the age of 23 years.*

H3. *Patients with a lower level of education in the experimental group will have higher levels of anxiety than patients with a higher level of education.*

2. METHODOLOGY

Participants and procedure

The participants were selected from patients who presented for consultations or medical interventions at two gynecological offices, women aged between 18 and 67 years, from the urban and rural areas. Both the experimental group and the control group were selected from the visitors of two medical clinics, the first in Bucharest and the second in Brașov.

In the first stage, the participants taken in the order of arrival were randomly selected, with the help of a randomized selection software, installed on a computer, among the patients who came to the office in a certain

category of day. Two categories of days were established, which followed one another consecutively, each category comprising two days. Thus, the sequence was: two days in which the classical music was played in the cabinet, in the stimulus days category, followed by another two days in which the classical music was not played, in the neutral days category. The result of this stage was the inclusion in the study of a number of 74 participants, the first half was selected in the days of the first category (stimulus days category), and the other half was selected in the days of the second category (neutral days category). After administering the questionnaire and eliminating the non-validated answers, 30 participants in each of the two categories remained in the study (Table 1 and Table 2).

The stimulus administered to the experimental group was recorded classical music, from the works of three composers: Ludwig van Beethoven (classical-romantic), Wolfgang Amadeus Mozart (baroque), and Johann Sebastian Bach (baroque), during the standard waiting period.

The exposure time to classical music, in the waiting area, before the consultation or medical intervention, for the patients in the experimental group, was at least 15-20 minutes.

Table 1. *Experimental group composition by age*

		Frequency	%	Valid %	Cumulative %
Valid	1 (18-23)	8	26.7	26.7	26.7
	2 (24-67)	22	73.3	73.3	100,0
	Total	30	100,0	100,0	

Table 2. *Control group composition by age*

		Frequency	%	Valid %	Cumulative %
Valid	1 (18-23)	10	33.3	33.3	33.3
	2 (24-67)	20	66.7	66.7	100,0
	Total	30	100,0	100,0	

The age categories for each of the two groups were established by interviewing a number of gynecologists, thus establishing the limit of 23 years between them.

For the third research hypothesis, it was necessary to establish the educational categories for each of the two samples, experimental and control.

Table 3. *Experimental group composition by educational level*

		Frequency	%	Valid %	Cumulative %
Valid	L	6	20.0	20.0	20.0
	F	19	63.3	63.3	83.3
	M	5	16.7	16.7	100.0
	Total	30	100,0	100,0	

Note: L – High-school, F – Bachelor level, M – Master level

Table 4. *Control group composition by educational level*

		Frequency	%	Valid %	Cumulative %
Valid	L	8	26.6	26.6	26.6
	F	18	60.0	60.0	86.6
	M	4	13.4	13.4	100.0
	Total	30	100,0	100,0	

Note: L – High-school, F – Bachelor level, M – Master level

Instruments

The *Hamilton Anxiety Rating Scale* (HARS) was used to measure anxiety. The 14 items of the scale assess anxiety, fear, insomnia, cognitive symptoms, depression, behavior and symptoms of gastrointestinal issues, cardiovascular, genitourinary, vegetative and muscle tension (α = .92).

The *Hospital Anxiety and Depression Scale* (HADS) was also used to measure hospital anxiety and depression. The scale includes 14 items, with seven items assigned to each of the two HADS-anxiety and HADS-depression subscales (α = .89).

3. RESULTS

Since two instruments were used to measure anxiety level for the two samples, in Table 5 below are presented the means, standard deviations, skewness, and kurtosis for each of them, as well as for each of the two groups.

Table 5. *Descriptive statistics – means and standard deviations for HARS and HADS in experimental group and control group (pre-experiment)*

Anxiety	M	SD	Skewness	Kurtosis
HARS exp.	7.13	2.19	.07	-.66
HADS exp.	7.90	2.25	.15	-.35
HARS control	9.00	1.95	-.36	-.47
HADS control	8.97	2.55	.37	-.79

Hypothesis testing

H1. *Patients in the waiting area of gynecology offices under standard routine will have higher levels of anxiety than patients in the waiting area of gynecology offices under standard routine augmented with recorded classical music*.

To test this hypothesis, the t test for independent samples was performed.

Table 6. *Differences in means and standard deviations for anxiety measured with HARS (post-experiment)*

		N	M	SD	SEM
HARS	Control	30	9.00	1.95	.36
	Experimental	30	7.11	2.20	.40

Table 7. *The t test for independent samples, anxiety (HARS) in experimental group vs. control group*

							95% CI	
	F	Sig.	t	df	p	MD	SED	Lower	Upper
Equal variance assumed	.48	.49	3.49	58	.001	1.87	.54	2.94	.80

It can be seen that the level of anxiety measured with HARS differs significantly between the two groups. Thus, the patients in the experimental group who were exposed to classical music had lower levels of anxiety, M = 7.11, SD = 2.20, while the patients in the control group who were not exposed to music in the waiting room, M = 9.00 , SD = 1.95. The difference is statistically significant, $t(58) = 3.49$, $p < .01$, with an effect size d = .91.

Table 8. *Differences in means and standard deviations for anxiety measured with HADS (post-experiment)*

		N	M	SD	SEM
HADS	Control	30	7.90	2.25	.41
	Experimental	30	6.07	.37	.07

Table 9. *The t test for independent samples, anxiety (HADS) in experimental group vs. control group*

								95% CI	
	F	Sig.	t	df	p	MD	SED	Lower	Upper
Equal variance not assumed	36.63	.00	4.41	58	.000	1.83	.42	.98	2.68

It can be seen that the level of anxiety measured with HADS differs significantly between the two groups. Thus, the patients in the experimental group who were exposed to classical music had lower levels of anxiety, M = 6.07, SD = .37, while the patients in the control group who were not exposed to music in the waiting room, M = 7.90 , SD = 2.25. The difference is statistically significant, t(58) = 4.41, p < .01, with an effect size d = 1.13.

Given these results, it can be stated that the level of anxiety decreases markedly in patients in the waiting room when exposed to classical music, which allows us to state that hypothesis H1 is supported by the analyzed data.

H2. *Younger patients in the experimental group (18-23 years) will experience higher levels of anxiety than patients over the age of 23 years.*

To test this hypothesis, the t test for independent samples was performed.

Table 10. *Age differences in means and standard deviations for anxiety measured with HARS (post-experiment)*

		N	M	SD	SEM
HARS	18-23	8	9.38	1.60	.57
	24+	22	6.32	1.78	.38

Table 11. *The t test for independent samples, anxiety (HARS) in experimental group, 18-23 years old vs. over 24 years old*

								95% CI	
	F	Sig.	t	df	p	MD	SED	Lower	Upper
Equal variance assumed	.13	.72	4.26	28	.000	3.06	.72	1.59	4.53

It can be seen that the level of anxiety measured with HARS differs significantly between the two groups. Thus, the patients in the experimental group aged 18-32 years who were exposed to classical music had higher levels of anxiety, M = 9.38, SD = 1.60, while the patients in the experimental group aged over 24 years who were also exposed to music in the waiting room, M = 6.32 , SD = 1.78. The difference is statistically significant, t(28) = 4.26, p < .01, with an effect size d = 1.81.

Table 12. *Age differences in means and standard deviations for anxiety measured with HADS (post-experiment)*

		N	M	SD	SEM
HADS	18-23	8	9.13	2.36	.83
	24+	22	6.96	1.79	.38

Table 11. *The t test for independent samples, anxiety (HADS) in experimental group, 18-23 years old vs. over 24 years old*

								95% CI	
	F	Sig.	t	df	p	MD	SED	Lower	Upper
Equal variance assumed	.98	.33	2.70	28	.01	2.17	.80	.53	3.82

It can be seen that the level of anxiety measured with HADS differs significantly between the two groups. Thus, the patients in the experimental group aged 18-32 years who were exposed to classical music had higher levels of anxiety, M = 9.13, SD = 2.36, while the patients in the experimental group aged over 24 years who were also exposed to music in the waiting room, M = 6.96 , SD = 1.79.

The difference is statistically significant, t(28) = 2.70, p < .01, with an effect size d = 1.04.

Given these results, it can be stated that the level of anxiety is higher in 18-23 years patients than in patients over 24 years old, even they are exposed to the same conditions of listening to classical music in the waiting room of the gynecologist office, which allows us to state that hypothesis H2 is supported by the analyzed data.

H3. *Patients with a lower level of education in the experimental group will have higher levels of anxiety than patients with a higher level of education.*

To test this hypothesis we ran two one way ANOVA tests.

Table 12. *Means and standard deviation for the differences in anxiety (HARS) in experimental group, according to educational level*

					95% CI for Mean	
	N	M	SD	SE	Lower Bound	Upper Bound
L	6	6.33	2.07	.84	4.17	8.50
F	19	7.56	2.25	.52	6.44	8.61
M	5	6.60	2.19	.98	3.88	9.32
Total	30	7.13	2.19	.40	6.32	7.95

Table 13. *One way ANOVA for the differences in anxiety (HARS) in experimental group, according to educational level*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	8.19	2	4.09	.84	.44
Within Groups	131.27	27	4.86		
Total	139.47	29			

Table 14. *Means and standard deviation for the differences in anxiety (HADS) in experimental group, according to educational level*

					95% CI for Mean	
	N	M	SD	SE	Lower Bound	Upper Bound
L	6	6.33	1.03	.42	5.25	7.42
F	19	8.68	2.29	.53	7.58	9.79
M	5	6.80	1.92	.86	4.41	9.19

Table 15. *One way ANOVA for the differences in anxiety (HADS) in experimental group, according to educational level*

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	32.46	2	16.23	3.84	.03
Within Groups	114.24	27	4.23		
Total	146.70	29			

The first ANOVA test results show that the level of HARS anxiety does not differ significantly according the level of education of the patients (p > .05).

The results of the second ANOVA test show that the level of HADS anxiety differs significantly according to the level of education of the patients. Thus, patients with bachelor's studies have the highest level of anxiety, M = 8.68, SD = 2.29, followed by patients with high school studies, M = 6.33, SD = 1.03, and those with master's studies, M = 6.80, SD = 1.92. Differences are statistically significant, F (2,27) = 3.84, p <.05.

We can say that hypothesis H3 is supported only to some extent by the analyzed data.

4. DISCUSSION

The present research aimed to evaluate the existence of a relationship between listening to classical music and the anxiety of the patients waiting for a routine gynecological examination. The demographic variables taken into account were age range and the educational level.

Following the statistical processing and interpretation of the results, the first hypothesis was sustained by data, regarding the assumption that there are statistically significant differences in the levels of anxiety, between the patients in the waiting room of the gynecology offices under the standard routine and the patients in the waiting room of the gynecology offices under the standard routine augmented with recorded classical music.

The statistical results highlighted significant differences between the values of gynecologist anxiety reported by the patients in the experimental group and the values of gynecologist anxiety reported in the patients in the control group, for both the HARS measurement method and the HADS measurement method. Therefore, it can be stated that the present research complements the results of the other research presented above regarding the potential of music to diminish the anxiety level of the patients in a medical situation.

In the studied cases classical music composed of three authors from the Baroque, Romantic period was used. Although the present study does not specify the mechanism by which a reduced level of anxiety is obtained, as a result of the exposure of the participants to the environment created through music, it is still possible to support the presence of such a beneficial effect on patients in the waiting room of gynecology offices.

Regarding the second hypothesis, the results of both statistically processed scales confirm the assumption that the effects of classical music on gynecologist anxiety are differentiated according to the age range, meaning a higher level of anxiety among patients between 18 and 23 years compared with the level of anxiety among patients over 24 years old.

We can argue that there is a difference in the increased level of anxiety recorded by patients under 23 years of age, waiting at the gynecological office, compared with the level recorded by the older patients. Recent initiation of sexual relations, a higher level of modesty, fear of pregnancy, a still close relationship with parents, lack of knowledge about the procedures in the cabinet, due to the lack of previous experiences could be the justifications behind this higher level of anxiety in women under the age of 23, which remains to be addressed in another research. On the other hand, patients above the age of 23 have their own experience in the relationship with doctors, in addition to life experience, in general, which allows them a correct level of anticipation of the results of the medial interaction, thus registering a lower level of gynecologist anxiety.

Regarding the assumption of the existence of differences among levels of anxiety of according to the educational level of the patients, supported in the third hypothesis, the results of the two methods of investigation are discordant. Thus, the statistics of the results of the HARS scale do not support the existence of such a difference whilethe results obtained through HADS scale lead to a different conclusion, suggesting a statistically significant difference between the levels of anxiety in patients in relation to the level of formal education. The presence of the two different positions, does not support the affirmation of the existence of a differentiation between the levels of gynecologist anxiety recorded by the patients belonging to the three categories of education studied - high school, faculty and master. In other words, higher education does not confer immunity on women, to the stress generated by the anxiety-generating factors relative to the environment in the gynecology offices. Equally, it cannot be argued that the absence of higher education or a potential lack of information would protect patients from anxiety upon contact with the gynecological office.

The study shows that there is an effect of classical music on decreasing the level of anxiety of patients waiting for a gynecological examination. The paper also highlights the existence of a difference between the levels of anxiety measured in patients in the age groups under 23 and over 23 years, as well as the inconsistency of the statistical results regarding the presence of differences between the levels of anxiety measured with the two scales used in patients with different educational levels.

The procedure used in the research – exposing women to classical music in the waiting room of the gynecologist office - confirmed the advantages that this type of intervention can generate, among which we can mention the low implementation costs, the non-invasive character, the lack of negative side effects, the simplicity in implementation.

The research presented brings an additional and novel contribution to the numerous studies conducted on this topic, in various other locations around the world, both by arguing the effects of music on the Romanian patients, and by verifying the hypotheses in a preparatory environment, such as the halls, waiting rooms, located in the antechamber of the offices specialized in gynecological interventions or consultations.

Limitations

A limitation of this study could be the size of the sample. Although 60 patients from two different geographical locations participated in the study, the representativeness of the sample for the entire population of gynecology patients is not certain. Also, the stimulus exposure time, reduced to

a single session of 15-20 minutes, may be another limitation of this study. Reporting bias may be another element that constitutes a certain limitation of research.

Future research directions

Due to the reasons presented above the implementation of such an intervention in the medical units could be very useful, which is why studying the topic for other medical fields could lead to new results, relevant to the population of Romanian patients.

Not less interesting would be the results of studies on the effects of music on medical personnel, be they doctors or nurses.

Since the palette of musical genres and composers is practically endless, other variants can be used, besides those present in the present research, to investigate new results.

The use of larger samples could bring additional benefits in terms of clearer and more objective highlighting of the final results.

The study could be extended by exploring other demographic variables such as the place of residence or the family of origin, presumed to have a certain involvement in the manifestation of anxiety in this type of research framework.

Practical and theoretical implications

From a practical point of view, the present work contributes to highlighting the relationship between exposure to classical music and anxiety, on a sample of Romanian population, in a specific medical context. Thus, based on the results obtained, a solution can be implemented quickly and with minimal costs in any medical unit in Romania, at the level of a hospital or in a smaller cabinet.

The data obtained suggest beneficial effects, with a significant impact on patients, possible in the Romanian medical institutions, with gynecological offices, in an economic context oriented towards the most efficient solutions. Therefore, the results are addressed to the decision makers in the medical system up to the persons with responsibilities at government level.

From the perspective of the theoretical implications, the paper can be considered a pilot study, from which can start larger investigations towards new areas. The information presented in the first part can also be the starting point for new studies, through the models or suggestions offered. From those presented above, we can observe a series of advantages offered by the use of music as an intervention in medical and non-medical situations, with physical, mental, emotional, and social effects.

The non-invasive character that gives the music priority over other types of treatments is also noted. Also, it is worth noting the lack of negative side effects, which encourages its use at a wide range of ages. The simplicity and the reduced costs of implementation and operation recommend it for any healthcare structure, from the cabinets to the large hospital units.

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