MUSICAL INTERVENTION DIRECTED TO CHILD AND ADOLESCENT IN SURGICAL SITUATION: A SYSTEMATIC REVIEW

ABSTRACT

Objective: to evaluate the effectiveness of musical intervention as therapeutic resource for children and adolescents undergoing surgical procedures. Method: systematic review in order to answer the following question, structured on P.I.C.O. methodology (Population, Intervention, Comparison and Outcome): << Which the therapeutic effect of musical intervention in children and adolescents undergoing surgical procedures? >>, in the databases of LILACS, CINAHL, PubMed and the Cochrane Library. Results: eight randomized controlled trials were included. The perioperative period was the predominant phase, being the musical listening, the type of musical intervention mostly used. The main clinical outcomes were assessed anxiety and pain. It was found that the musical intervention was effective in reducing preoperative anxiety and postoperative pain. Conclusion: music intervention directed to children and adolescents in surgical situation can be considered a potential care technology, which could be included in Pediatric Nursing care in order to promote a better coping during pediatric surgery. Descriptors: Music; Pediatric Nursing; Surgical Procedures; Operative.

RESUMO

INTRODUCTION

The hospitalization process causes a break in the child’s routine life, due to the fact that the hospital is considered as an unfamiliar and culturally hostile place. Moreover, the presence of unknown people around the child, the process of facing the disease itself, the necessity of therapeutic procedures and other situations which could alter the lifestyle of the child and family, often generate suffering and negative feelings associated with the hospitalization.1

When hospitalization is conditional upon completion of a surgical procedure, the stress generated is even major2, especially when it is the first experience of child’s hospitalization. Stress, fear and anxiety are considered very common reactions related to surgical event.3 The child may react to the surgical process, expressing different behaviors and feelings, which reflect a reduced self-control efficacy and coping of the situation, expressed such as negative aggressive and regressive behavior and feelings of guilt.1,2,4

In other words, the child is more vulnerable to anxiety and fear response arising from the surgical procedures, since it represents limitation of cognitive and emotional competencies, for being an individual under the process of development.

However, usually the healthcare professionals ignore the cognitive and emotional stage of the child’s development, concentrating all efforts to restore the injured organ through a surgical procedure, and they relapse to provide a humanized and global care to the child in surgical situation.4,5 More than procedures and interventions in the biological dimension, pediatric nursing care in surgical situation must encompass strategies that also fill out the psychological, emotional, social and cultural needs of the child and family.3,5

Instructional interventions directed to parents and children in the pre-and postoperative periods, including the use of therapeutic toy, have been some of the few resources used in pediatric clinical practice for children undergoing surgical procedures.1,4 However, it is necessary to identify new interventions that could be effective and responsive to the child’s developmental needs in surgical situation, in order to contribute to atraumatic care and to promote a positive coping process before the surgical event.

Considering this context, this research intends to investigate the effectiveness of musical intervention, while potential nursing intervention during pediatric surgical care, promoting friendly, non-threatening and humanized care, mainly based on non-pharmacological and non-invasive approach.6 Historically, music as a therapeutic resource on Nursing began with Florence Nightingale in 1859, and later in the first and second world wars with the nurses Is a Maud Ilsen and Harriet Ayer Seymour during the care of the wounded soldiers.6,7

The music listening is currently present in the Nursing Intervention Classification7. However, the use of music during nursing care is still very incipient, because the potential therapeutic effects of music are not yet well described and are also not based on robust scientific evidence.8

Therefore, the objective of this study was to verify the therapeutic effect of music in children and adolescents undergoing surgical procedures.

METHOD

It was a systematic review with the aim to answer the following survey question, structured on P.I.C.O. methodology (Population, intervention, Comparison and Outcome) : << Which is the therapeutic effect of musical intervention in children and adolescents undergoing surgical procedures? >>

Systematic searches were conducted between the months of April and July 2012, via electronic databases: LILACS (Latin American literature and Caribbean Center on health sciences), CINAHL (Cumulative Index to Nursing and Allied Health Literature), PubMed and the Cochrane Library (clinical trials), through the use of controlled and non-controlled descriptors. The descriptors were grouped into three categories that represented the population, the situation of care and the intervention used, and they were combined together with Boolean operators. It is worth mentioning that, they were used in the singular and plural forms of a same descriptor and synonyms of the terms of entry for each descriptor.

Some of the main descriptors used “child, hospitalized”; “adolescent, hospitalized”; “pediatric patient”; “operative surgical procedure”; “surgery”; “ambulatory surgical procedure”, “surgs”; “music”; “music therapy”; “music intervention”; “music”. The inclusion criteria adopted by this systematic review were: studies should consist of controlled clinical trials, randomized or not; that had as target population of children and adolescents undergoing surgical procedures. In addition, the music should have been used as a therapeutic intervention.
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RESULTS

It was identified 518 papers, being deleted 386 from reading the abstract, they did not respect the inclusion criteria, 47 for duplicate and 22 due to unavailability of the abstract in the databases surveyed. Therefore, there were 63 articles eligible for first analysis, which were read in detail, as represented in the flowchart below (Figure 1).

Of these studies, only 8 were selected and analyzed in this review, most of them has been deleted for not encompassing the age range of the target population. It is noteworthy that one of the 63 eligible articles was not possible to buy and still access in full, being thus it excluded from the study sample. The PubMed and the Cochrane Library databases contributed quantitatively with the majority of the articles of this review which four articles were captured from PubMed and three from Cochrane's, and only one article from Lilacs database.

The 8 studies included in this systematic review consisted of randomized controlled clinical trials, being seven articles written in the English language and one in Portuguese, as it is shown in table 1. The studies involved a total of 652 children/adolescents undergoing various surgical procedures, such as cardiac surgery, circumcision, herniography, orchidopexy, hidrocelectomy, and tonsillectomy/adenoidectomy and PIN extraction. Two of these articles did not specify the types of surgeries, they only cited that the surgeries were programmed and at outpatient clinics. Participants were aged less than 24h of life and under 16 years, with an average age of 5.2 years, and male prevalence. One of the studies did not provide data on gender.21

or as an adjuvant therapy, individually or in group, and these studies should report relevant clinical outcomes at the level of individual response.

Exclusion criteria were: participants undergoing dental surgical procedures; articles with summary unavailable in the databases searched; articles that were not published in Portuguese, English and Spanish languages.

The search in each electronic database were performed by one of the authors, and doubts resolved by consensus, with the participation of a second reviewer.

To evaluate the methodological quality of the studies included in the sample, the scale of Downs and Black (D&B) was used. This scale was validated to assessment of methodological quality of randomized non-randomized studies and it consists of a list of 27 items, structured in a format of questions and grouped into four categories: presentation of the study (evaluates clarity); external validity (representativeness assessment); internal validity (analyzes confounding factors and biases) and statistical power of the study. To each item-question can be assigned the score zero, when the article does not meet the criteria evaluated, and score 1, when the article meets the criterion, with the exception of question 5 and 27, which may get score to 2 and 5, respectively. Thus, the maximum score that an article can obtain is 32 points and a minimum of zero.

Before carrying out the evaluation of the quality of the studies, two proofreaders discussed the individual items of the checklist, as well as the score attributes of the items present in the D&B scale, in order to promote uniformity of interpretation. Assessment of quality differences were resolved by consensus through the participation of a third proofreader.
Musical intervention directed to child and adolescent...

Table 1. Clinical and demographic characteristics of included studies. Brasília, 2012.

<table>
<thead>
<tr>
<th>First author, year (Country)</th>
<th>Type of surgery</th>
<th>Age of the participants</th>
<th>N (n% men)</th>
<th>Period of the intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chetta, 1981 (U.S.A)</td>
<td>Not specified elective surgeries</td>
<td>3-8 years</td>
<td>75 (NI)</td>
<td>Pre-operative</td>
</tr>
<tr>
<td>Hatem, 2006 (BRA)</td>
<td>Cardiac surgeries</td>
<td>1 day the 16 years; average between 1 and 6 years</td>
<td>79 (NI)</td>
<td>Immediately After Surgery</td>
</tr>
<tr>
<td>Joyce, 2001 (U.S.A)</td>
<td>Circumcision</td>
<td>&lt; 24 hours of life; average 11:0</td>
<td>46 (100%)</td>
<td>Intra-operative</td>
</tr>
<tr>
<td>Kain, 2001 (U.S.A)</td>
<td>Outpatient Elective surgeries (orchiopexy, herniorrhaphy, hydrocelectomy, tonsillectomy and/or adenoidectomy, and circumcision)</td>
<td>2-7 years; average: group intervention (5.1) group has controlled (5.2)</td>
<td>70 (27%)</td>
<td>Anesthetic induction</td>
</tr>
<tr>
<td>Kain, 2004 (U.S.A)</td>
<td>Not specified elective outpatient surgeries</td>
<td>3-7 years; average: group musical intervention (5.6) group midazolam (5.1) group has controlled (5.5)</td>
<td>123 (64.53%)</td>
<td>Pre-operative</td>
</tr>
<tr>
<td>Marchette, 1989 (U.S.A)</td>
<td>Circumcision</td>
<td>Not informed</td>
<td>58 (100%)</td>
<td>Intra-operative</td>
</tr>
<tr>
<td>Marchette, 1991 (U.S.A)</td>
<td>Circumcision</td>
<td>2-9 days of life; average 3, 1dias</td>
<td>121 (100%)</td>
<td>Intra-operative</td>
</tr>
<tr>
<td>Nilsson, 2009 (IT SWEATS)</td>
<td>Diverse surgeries the arthroscopy; endoscopy; pulling out of bolt; hernia/Hydrocele; superficial surgery</td>
<td>7-16 years; average: experimental group (12 years) group has controlled (13.5)</td>
<td>80 (50%)</td>
<td>Immediately After Surgery</td>
</tr>
</tbody>
</table>

Legend: NI-Not informed.

The type of music used included classical, nursery rhymes, folk songs and sounds of nature. Of these, 6 studies have used passive musical intervention, more precisely, music listening through headphones, speakers, CD player and cassette player unit; while 2 studies used the musical active intervention, namely, musical activities run by music therapists how to play musical instruments, sing and compose songs.

Most studies did not inform the time duration of musical intervention with child, though in two studies, this time was 30 minutes and 45 minutes.

In four studies, musical intervention was applied during intraoperative phase; in two studies during preoperative phase and two on postoperative phase, the intraoperative period was the predominant phase, specifically at the time of anesthetic induction.
### Summary of interventions, outcomes evaluated and results of studies included in a systematic review

<table>
<thead>
<tr>
<th>First author, year (country)</th>
<th>Intervention</th>
<th>Clinical outcomes assessed (the measuring instrument)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chetta, (USA) 1981</td>
<td>G1 (n = 25): teaching session the night before surgery; G2 (n = 25): teaching session + IMA the night before surgery</td>
<td>Anxiety (OBTI)</td>
<td>Significant reduction of anxiety in G3 (p &lt; 0.02)</td>
</tr>
<tr>
<td>Hatem, (BRA) 2006</td>
<td>G1 (n = 34): IMP during 30 min (Vivaldi); G2 (n = 18): &quot;white&quot; CD during 30 min (s/music)</td>
<td>FC, PA, PAM, FR, T, SatO2 (cardiopulmonary monitor)</td>
<td>Significant reduction of CF, FR and pain on G1 (p &lt; 0.02 0.04; p &lt; 0.001)</td>
</tr>
<tr>
<td>Joyce, (USA) 2001</td>
<td>G1 (n = 11): IMP (lullabies and children songs); G2 (n = 11): topical local anesthetic (lidocaine and prilocaine)</td>
<td>FR, FC, Sat O2 (specific monitors)</td>
<td>Significant reduction in pain compared to the G1 G3 (p = 0.028). Significant increase of SatO2 in the G1 in relation to G3 (p = 0.017)</td>
</tr>
<tr>
<td>Kain, (USA) 2001</td>
<td>G1 (n = 33): reduction of sensory stimuli in the operating room - IMP (Bach) + lightning and noise reduction as conversations and alarms of monitors; G2 (n = 37): s/modification in the operating room</td>
<td>Anxiety (mYPAS)</td>
<td>G1 less anxious than the G2 at the time of entrance to the operating room (P = 0.03) and in the introduction of anesthesia mask (P = 0.003). Greater consistency of behavior in G1 (p = 0.02)</td>
</tr>
<tr>
<td>Kain, (USA) 2004</td>
<td>G1 (n = 51): IMA; G2 (n = 34): 0.5 mg/kg oral midazolam 30 min before surgery; G3 (n = 38): s/IMA and s/oral midazolam</td>
<td>Anxiety (mYPAS)</td>
<td>G1 under musician intervention therapist 2 showed lower anxiety in relation to G3 at the time of parental separation (p = 0.025) and at the entrance to the operating room (p = 0.047)</td>
</tr>
<tr>
<td>Marchette, 1989 (USA)</td>
<td>G1 (n = 25): IMP (classical music for newborns); G2 (n = 15): Listening of intrauterine sounds; G3 (n = 18): usual care-s/IMP and s/listening of intrauterine sounds</td>
<td>FC, PA, Transcutaneous oxygen (specific monitors)</td>
<td>Statistically significant difference in systolic blood pressure between the G1 and G3, but are not described values</td>
</tr>
<tr>
<td>Marchette, 1991 (USA)</td>
<td>G1 (n = 20): IMP (classical music for newborns); G2 (n = 20): Listening of intrauterine sounds; G3 (n = 20): received pacifier; G4 (n = 20): IMP + pacifier; G5 (n = 20): Listening of intrauterine sounds + pacifier; G6 (n = 21): usual care-s/any intervention.</td>
<td>FC, PA, Transcutaneous oxygen (specific monitors) Behavioral State (BNAS)</td>
<td>s/statistically significant differences</td>
</tr>
<tr>
<td>Nilsson, (SUE) 2009</td>
<td>G1 (n = 40): IMP (nature sounds-45 minutes during Musicure); G2 (n = 40): usual care-s/IMP</td>
<td>FC, FR, PA and Sat O2 consumption of morphine (FLACC) anxiety (STAI) self-reported pain (CAS) auto report of anguish (FAS)</td>
<td>Lower total consumption of morphine in G1 (P &lt; 0.05).</td>
</tr>
</tbody>
</table>

**Figure 2.** Summary of interventions, outcomes evaluated and results of studies included in a systematic review. Brasilia, 2012. **Caption:** G-Group; IMP-Passive Musical Intervention (musical hearing provided for headaches/speakers, CD player/cassette player unit); IMA - Musical Active Intervention (musical activities directed by musician therapists how to play musical instruments, singing, songwriting etc.); OBTS-Oberved Behavior Time-Sampling; RIPS-Riley Infant Pain Scale; mYPAS-Yale Preoperative Anxiety Scale; ICC-The Induction Compliance Checklist; PHBQ-Post Hospitalization Behavioral Questionnaire; BNAS-Brazelton's Neonatal Assessment Scale; MDFMCS-Maximally Discriminative Movement Facial Coding System; FLACC-Face, Legs, Activity, Cry, Consolability; STAI-State-Trait Anxiety Inventory; CAS-Colored Analogue Scale; FAS-Affective Facial Scale.
Musical intervention was used at the same time with other interventions. For example, in one of the studies musical intervention consisted in providing classical music on CD player as environmental music, which was associated with other low environmental interventions sensory stimulus, which consisted of a lower intensity of illumination of the operating room and in reducing noises like conversations, monitors and alarms handling of surgical instruments. In addition, there was also the combination of musical intervention on preoperative care sessions, in which were held the surgical procedure and guidelines after the participants sang music with lyrics with revision of the information addressed in the preparation session.

In some studies, the experimental group submitted to the musical intervention was compared with standard care groups, groups that have not been subjected to any kind of intervention or modification in the preparation, confrontation or the recovery situation of surgical care. However, in other studies compared the musical intervention group with other groups which were also submitted to other therapies as drug intervention - oral midazolam and anesthetic lidocaine and prilocaine site topic, instructional/educational intervention, listening to intrauterine sounds, provision of pacifier and the combination of these interventions between themselves and placebo intervention (hearing of blank CD).

As for the major clinical outcomes were assessed anxiety and pain, being checked indirectly by physiological measures such as heart rate, breathing, blood pressure, oxygen saturation, as well as by the consumption of analgesics, duration of crying and salivary cortisol concentration.

The instruments used to measure both the pain and anxiety were diverse, which hampered the combination of outcomes assessed in order to perform a quantitative analysis of these outcomes in the form of meta-analysis.

One of the tools used to assess the preoperative anxiety was the Observed Behavior, Time-Sampling instrument developed by the researcher, based on observation of behavior presented by the child. This instrument was applied in two moments, verifying that the Group submitted to the musical active intervention on the night before the surgical procedure and immediately before anesthetic induction, appeared less anxious in two moments, when compared to the group that received only guidelines related to surgery, and the group that received musical intervention only the night before.

Facial pain scale was also used along with a monitor specific cardiopulmonary to measure vital signs to assess postoperative pain. There was statistically significant difference (p < 0.001) between the groups with regard to pain scores after the intervention, such that the Group of musical intervention presented lower values on the pain scale. In addition, children submitted to listening to music showed lower heart rate (p < 0.04) and respiratory (p < 0.02) compared to children in the control group. However, compared to other vital data as mean arterial pressure, temperature and oxygen saturation, there was no statistically significant difference.

The scale Riley Infant Pain Scale (RIPS) was used to measure pain before, during and after the surgical procedure. There was also pain measurement, indirectly, through the salivary cortisol level and duration of crying during the surgical procedure, as well as by some signs of vital functions such as breathing, heart rate and oxygen saturation. The musical intervention group showed lower pain intensity (p = 0.028) and higher values of oxygen saturation (p = 0.017) at the end of the surgical procedure in comparison to the group without musical intervention. There was no statistically significant difference in relation to other outcomes.

In one of the studies included in this systematic review, we used the Brazelton’s Neonatal Assessment Scale and the Maximally Discriminative Movement Facial Coding System to measure, respectively, alertness and facial expressions of pain from newborns participating in the peri-operative period. Furthermore, some vital signs measured as indirect outcomes of pain through specific monitors. There was statistically significant difference in systolic blood pressure between the intervention group and the control group, but it was not described p-values. Both the Group of musical listening, the group of intrauterine sounds presented heart rate within the limit in 5 of the 11 stages of circumcision surgery. In contrast, the control group showed heart rate above the threshold in all phases of surgery. There was no statistically significant difference in relation to other outcomes (diastolic blood pressure, oxygenation transcutaneous, pain, alertness).

This same researcher performed another study in which used virtually the same instruments described above to measure the intra-operative pain in neonates undergoing...
circumcision. It was adopted the same scale (Brazelton Neonatal Behavioral Assessment Scale’s) to evaluate the behavioral state of the participants during 14 stages defined. It also was verified vital data through specific monitors. As regard to the Group of musical intervention, it was not found statistically significant differences in relation to clinical outcomes assessed.

The instrument Face, Legs, Activity, Cry, Consolability (FLACC) was also applied to evaluate the need to administer morphine, and consequently, to measure the consumption of the same, including the inventory of State-Trait Anxiety (simplified version) for measuring anxiety level, and the Colored Analogue Scale (CAS) and the Affective Facial Scale (FAS) as instruments of self-reported pain and fearness, respectively. It was found that the musical intervention group consumed the least amount of morphine compared to the group without any intervention, whether in relation to dosage or the number of children who consumed the medication (p < 0.05). There was no statistically significant difference in relation to other outcomes.

It was also verified in two studies, the preoperative anxiety Scale modified from Yale (EAPY-m) to measure the preoperative anxiety of the participants.

In one of them, the group submitted to listening to music combined with low light and noise reductionthe operating room was less anxious than the control group at the time of entrance to the operating room (p = 0.03) and during the fitting the mask of anesthesia (p = 0.003). Also evaluated the level of cooperation shown by the child’s behavior during anesthetic induction through The Induction Compliance Checklist (ICC), and it was found that the intervention group showed greater collaborative behavior in comparison to the group without any intervention (p = 0.02). However there were no differences between the two groups in the evaluation of behaviors related to bad adaptation postoperatively through the Post Hospitalization Behavioral Questionnaire (PHBQ).

In another study, Preoperative anxiety Scale modified from Yale (EAPY-m) was applied along with The Induction Compliance Checklist (ICC) that evaluates the degree of collaborative behavior of the child during anesthetic induction. These instruments were applied in a group subjected to 2 separate therapists musician, in a group subjected to the drug agent (midazolam) and a control group (without any intervention). The Group of midazolam was the one that showed lower degree of anxiety and greater collaborative behavior in relation to other groups. With regard to the group of musical intervention, effectiveness of music in reducing anxiety in relation to the control group only with one of the music therapists (musician therapist 2) at the time of parental separation (p = 0.025) and at the entrance to the operating room (p = 0.047).

In relation to the average score on the scale of D & B, articles included in this systematic review, the average was 19.25 points, being the lowest score of 14 points and the largest of 23 points. The Figure 3 shows the distribution of scores of articles based on scale D & B. Accounting for blinding, in only two of the eight studies, both evaluators as participants were blinded. In two studies, there was no documentary evidence of masking, in other two articles only the evaluators were blinded, and in the last two studies only participants were blinded.
DISCUSSION

Based on the inclusion and exclusion criteria adopted, this systematic review synthesized the knowledge available about the effectiveness of music intervention applied to children and adolescents in surgical situation.

Other systematic reviews with regard to the effects of music on pediatric populations have already been published, but none that reflects the therapeutic potential of this intervention in pediatric population submitted to surgical procedures. Understanding the importance of this research, precisely for revealing the lack of studies that address the child in surgical situation and the use of innovative and cost-effective practices and substantially focused on developmental needs of the pediatric population, this is the reason for the application of music intervention among children and adolescents undergoing surgical procedures.

In terms of the type of musical intervention, passive mode (listening to music) was the more used as compared to active mode (activities directed by musician therapists), which could be justified by the fact that passive mode seems to be more functional in order to be used, conversely to the other option which requires a specific professional to perform it. Given this fact, it in turn contributes to this mode which has a lower cost in relation to musical active intervention, the last one requires in addition to the material resources (musical instruments, music player, among others), a professional enabled, the musician therapist.

10 The kind of music used was diverse (classical, nursery rhymes and sounds of nature), as also verified in other systematic reviews. However, regardless of musical classification, the important aspect is that existing recommendations based on scientific evidence about the use of listening to music as intervention to deal with the anxiety and pain related to surgical and medical procedures. In 2011, the Joanna Briggs Institute recommended the use of orchestral music and non-lyrical, with 60 to 80 beats per minute, with low tones and minimal percussion, as well as a volume of 60 dB. Depending on the system of classification of the degrees of recommendations from Joanna Briggs Institute, these recommendations are level B, i.e. moderate evident which justifies considering their application in clinical practice.

As for the period of time of the intervention, only two studies reported the duration of 30 minutes and 45 minutes. There is no enough evidence to determine a minimum amount of time necessary to guarantee the effectiveness of the musical intervention, although there are literature reports that the effects are incomplete and few effective when the musical listening has duration of less than 20 minutes. Future research should elucidate those issues such as related to adequate duration of temporality musical intervention.

The operative phase in which the most used the musical intervention was intraoperative phase, with the song employed to relieve stress, anxiety and pain, primarily as an adjunctive strategy at the time of anesthetic induction. It is observed in the literature that studies that used musical intervention to minimize the anxiety and stress, in their majority, they are held in the preoperative stage and mainly the time of perioperative anesthetic induction. However, studies that evaluated the effects of musical intervention on pain and control the use of analgesics were conducted predominantly in the postoperative phase. It should be noted that some studies assessed the pain during the surgical procedure.

The combination of musical intervention with other interventions occurred in two studies, which prevents to obtain strong conclusions from the results obtained from the effect of the music. Therefore, it is utmost important that future research studies on the therapeutic effect of musical intervention applied to music should be in more controlled approach, without combining it with other interventions.

Musical intervention was effective in reducing anxiety in three studies, this reality found in data from the literature in surgical patients, showing that music significantly decreased anxiety and stress. In relation to the pain, music also has demonstrated effectiveness in reducing it, some studies have shown significant decreases in the intensity of the pain with the musical intervention. In relationship the consumption of medication, some surveys have shown decreased use of analgesics postoperatively, but another study showed that musical intervention did not interfere in the decreased use of analgesics postoperatively and in length of stay, because it was not found statistically significant data to support this hypothesis. 

Produção científica sobre avaliação de serviços...
The assessment of pain and anxiety from physiological measures was not statistically significant in all studies. Only in one study, heart rate and respiratory rate were lower in the group of musical intervention, in another study - the oxygen saturation was higher in the group with musical intervention and there was also significant difference in relation to blood pressure between control group and of musical intervention.

Regards to the assessment of the methodological quality of articles of this systematic review, it is worth mentioning that the most of the articles presented an average score (between 13 and 16 points) on scale D & B, i.e., the methodological quality was moderate, since it corresponds to maximum score 32 points. Therefore, there is a need for developing primary research with an appropriate methodological design, considering the necessity of growing evidence from clinical effectiveness studies.

The blinding is an important factor in randomized controlled clinical trials to avoid biases of co-intervention and in the assessment of outcomes, but it is often difficult and impractical to be held as in the case of musical intervention. Therefore, it is necessary to seek alternatives consistent with the design and objectives of the research.

In one of the studies included in this review, which it was investigated the therapeutic effect of music in children undergoing cardiac surgery in order to obtain the blinding of participants, the control group was given a placebo intervention, which consisted of "listening" to a white CD (without any music). However, this strategy brought some problems given the fact that some older children refused to participate in the study, since they believed that the CD player was broken, they had not heard any music. This alternative proposal was not ideal, because it failed to take into account the cognitive development of the child.

In another study which investigated the effect of music on pre-operative anxiety in men undergoing genitourinary surgeries, an interesting alternative to blind participants was used. In this case, all participants listened to music, including the control group, who also had experience with the musical intervention, but it occurred after data collection protocol. In this way, individuals did not know who was belonged to the control group or not, despite listening music in a second moment. The strategy of these authors was interesting, however required a longer time with the control group after data collection.

This systematic review also pointed out the heterogeneity of the measurement instruments of clinical outcomes, which was one of the factors that accounted for the impossibility to conduct a meta-analysis. In fact, it is understood that this wide range of instruments should respect the specificities of the pediatric population in terms of their biophysical characteristics, developmental and cognitive competencies, in the case of being participants of these clinical trials. Thereby, it is highlighted the importance to respect minimal methodological issues in outcome and effectiveness studies which would like to obtain statistical significance based on the use of validated instruments, sensitive or specific, and clinical relevance.

CONCLUSION

The music intervention applied to children and adolescents in surgical situation is a potential technological resource to be included in the assistance of pediatric nursing, contributing in the peri-operative preparation, reducing the level of anxiety and pain, and improving coping strategies during surgical event.

Another relevant aspect pointed out by this review refers to the necessity of primary studies with methodological design more appropriate, especially with regard to masking and randomization; moreover they should be based on existing recommendations about the use of musical intervention.

It is evident that the potentiality of musical intervention as a nursing intervention centered on the developmental needs of the child or adolescent who will face a surgical experience, so it is utmost important to identify the clinical outcomes which are sensibly modulated by music intervention during pediatric clinical practice of pediatric nursing.

REFERENCES


