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PSYCHOMOTOR INTERVENTION IN CHILD DEVELOPMENT: AN INTEGRATIVE REVIEW

Intervenção psicomotora no desenvolvimento infantil: uma revisão integrativa

Intervención psicomotora para el desarrollo infantil: una revisión integrativa

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ABSTRACT

Objective: Understand the effects of psychomotor intervention in children with neuropsychomotor developmental delay. **Methods**: This study is an integrative review of the scientific literature. For the research, articles were searched in the following databases: PubMed, PEDro (Physiotherapy Evidence Database), VHL (Virtual Health Library). CAPES Journals Portal and Web of Science, from December 2018 to January 2019, and the Research gate were consulted in January 2019. **Results**: A total of 867 articles were found, of which 142 were excluded due to non-compliance with the inclusion criteria and 33 were read in full. The study consisted of 7 articles selected according to the criteria, which showed that psychomotricity contributes positively to child development. **Conclusion**: The contribution of structured psychomotor intervention, despite the heterogeneity of protocols adopted, has positive results in the neuropsychomotor development process in childhood, being a usable resource to recover or prevent delays in child development.

Descriptors: Child development; Early Intervention (Education); Developmental Disabilities.

RESUMO

Objetivo: *Compreender os efeitos da intervenção psicomotora frente ao atraso do desenvolvimento neuropsicomotor de crianças.* ***Métodos****: O presente estudo trata-se de uma revisão integrativa da literatura científica. Para a realização da pesquisa, artigos foram buscados nas seguintes bases de dados: PubMed, PEDro (Physiotherapy Evidence Database), BVS (Biblioteca Virtual em Saúde), Portal de Periódicos CAPES e Web of Science, no período de dezembro de 2018 a janeiro de 2019, e houve consulta ao Research gate no mês de janeiro de 2019.* ***Resultados****: Foram encontrados 867 artigos, dos quais se excluíram 142 devido à falta de conformidade aos critérios de inclusão e 33 foram lidos na íntegra, sendo o estudo composto de 7 artigos selecionados de acordo com os critérios, nos quais se observou que a psicomotricidade contribui positivamente para o desenvolvimento da criança.* ***Conclusão****: A contribuição da intervenção psicomotora estruturada, apesar da heterogeneidade de protocolos adotados, apresenta resultados positivos no processo de desenvolvimento neuropsicomotor na infância, sendo um recurso passível de utilização para recuperar ou prevenir atrasos no desenvolvimento infantil.*

Descritores: *Desenvolvimento Infantil; Intervenção Precoce (Educação); Deficiências do Desenvolvimento.*

RESUMEN

Objetivo: *Comprender los efectos de la intervención psicomotora frente el retraso del desarrollo neuropsicomotor de niños.* ***Métodos****: El presente estudio se trata de una revisión integrativa de la literatura científica. Para la realización de la investigación se buscó artículos en las bases de datos PubMed, PEDro (Physiotherapy Evidence Database), BVS (Biblioteca Virtual en Salud), Portal de Periódicos CAPES y Web of Science en el periodo entre diciembre de 2018 y enero de 2019 y la consulta en el Research gate en el mes de enero de 2019.* ***Resultados****: Se han encontrado 867 artículos de los cuales 142 han sido excluidos por el no cumplimiento de los criterios de inclusión. Se han leído 33 artículos completos de los cuales 7 han sido elegidos según los criterios de los cuales se ha observado que la psicomotricidad ha contribuido de manera positiva para el desarrollo del niño.*

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***Conclusión**: Pese la heterogeneidad de los protocolos adoptados, la contribución de la intervención psicomotora estructurada presenta resultados positivos en el proceso del desarrollo neuropsicomotor en la infancia y es un recurso pasible de utilización para recuperar o prevenir los retrasos del desarrollo infantil.*

***Descriptores:** Desarrollo Infantil; Intervención Precoz (Educación); Discapacidades del Desarrollo.*

INTRODUCTION

Child development begins in intrauterine life and involves the processes of neurological maturation, acquisition of motor, cognitive, social, and emotional skills, as well as physical growth, and is subject to the influence of biological and environmental factors. With birth, surveillance begins to the domains of functions indicative of neurodevelopment, which are: sensory, psychomotor, social, cognitive, fine and gross motor functions, communication, and language; being this monitoring a predictor of the need for early stimulation to promote child development or early intervention in cases of neurodevelopmental disorder identification[1,2].

The scientific literature presents several studies that show that the damages resulting from the delays in child development are mostly future social concerns, since it is related to the later school dropout, teenage pregnancy, and juvenile offenses, therefore, an inhibiting, inadequate or poorly stimulating environment may have negative repercussions on the child's neurodevelopment[3-6].

Psychomotricity is a relatively new science, emerging in France in the early twentieth century, understood as a transdisciplinary field, which studies and investigates the influences and relationships between the emerging psyche and motricity of the total, singular and evolutionary personality that characterizes the human being, in the multiple and complex biopsychosocial, affective-emotional and psychosociocognitive manifestations. Psychomotricity has seven basic elements: body scheme, tonicity, laterality, spatial structuring, temporal orientation, rhythm, and balance[7-9].

Thus, the psychomotor activity aims to use the body, in the sense of pervading the real, going beyond, interacting with the body that moves. This transcendence allows the body not only to be turned towards itself for physical improvement, but rather a search for a space in which symbolism is allowed, and the expression of the mind by the body[10-12].

The use of psychomotricity as an early intervention by health professionals to stimulate child development integrates the motor and the psychological, making the important relationship between mind and body, thus constituting the basis of psychomotor development. Therefore, neuropsychomotor development is fundamental in the child's life, because from the discovery through his body, movements and everything in his environment, he will be able to organize and conquer his space, develop skills and emotions, learning to few to coordinate them to seek their independence[10-12].

Thus, the body scheme and body image are fields of human development, showing that the psyche influences the motor skills, movements, postures, and the relationship of the human being with the environment[10,11]. Hence, the study is justified by the need to prevent or recover delays in neuropsychomotor development during childhood, since the condition is prevalent and these individuals, when they enter adolescence and adulthood, have negative results for society, besides increase school dropout, teenage pregnancy, public health and safety[13].

The aim of this review is therefore to understand the effects of the psychomotor intervention on the delayed neuropsychomotor development of children.

METHODS

An integrative review study of the scientific literature based on the following guiding question: What are the effects of psychomotor intervention in children with neuropsychomotor developmental delay? Therefore, it was sought in the current literature evidence on the use of psychomotor intervention to treat children with neuropsychomotor developmental delay, with the main objective of identifying efficient psychomotor intervention protocols and understanding their repercussions on child developmental delay.

The hypothesis formulated was that, to prevent or recover delays in child development, psychomotor intervention is well established and scientifically evidenced and that studies are likely to show favorable results, although there is heterogeneity in the interventions used.

For this, we searched for articles published in the following databases: LILACS, SciELO, PubMed, Capes Journal Portal, Physiotherapy Evidence Databases (PEDro), and Web of Science, during the months of December 2018 and January 2019, corresponding to the period that ended the research. The search in Portuguese was based on the Health Sciences descriptors (DeCS) of the Virtual Health Library, and the descriptors in English were based on the Medical Subject Headings (MeSH), except for the term psychomotricity, which does not exist on DeCS nor MeSH. The descriptors used in the search in Portuguese were exactly the translation for the terms in English: *child development, child development disorder, early intervention, psychomotricity,* and *physical therapy modalities* (Chart I). We added a survey of the Research Portal in January 2019, a study published in the Nuances da Educação Journal, and a study published in the Annals of the Congress of Scientific Initiation Internship and Teaching Campus Formosa.

Thus, the search began for the identification and maximum uptake of available studies related to the objective of this article and that met the inclusion and exclusion criteria previously established. Then, we applied the PEDro scale to evaluate the methodological quality and statistical description of the articles selected for this integrative review. On this scale the score ranges from 0 to 10 based on 11 criteria (Specified Inclusion Criteria, Random Allocation, Allocation Confidentiality, Pre-Treatment Group Similarity, Blind Subjects, Blind Therapists, Blind Examiners, Follow-up of at least 85% of participants, intention to treat, statistical comparisons between groups, and reporting of variability measurements)[14].

We included studies in English and/or Portuguese whose target population were children from 0 to 6 years, with delayed neuropsychomotor development, who used the neuropsychomotor/psychomotor intervention in their study, and articles from the last 10 years (2008 to 2018). Although the title and abstract corresponding to the object of the study, the following were excluded: studies that did not specify in the text the methodology used, studies that dealt with psychomotor delays in atypical children with neuromotor and orthopedic dysfunction, duplicates, reviews, and letters.

Chart I. Terms and crossings used in electronic searches.

"Desenvolvimento Infantil"	1) "*Child development*"
"Deficiências do desenvolvimento"	2) "*Child development disorder*"
"Intervenção precoce"	3) "*Early intervention*"
"Fisioterapia"	4) "*Physical therapy modalities*"
"Psicomotricidade"	5) "*Psychomotricity*"
Crossings: (1 AND 3 AND 4) OR (1 AND 4 AND 5) OR (1 AND 3) OR (1 AND 4) OR (1 AND 5) OR (2 AND 3 AND 4) OR (2 AND 4 AND 5) OR (2 AND 3) OR (2 AND 4) OR (2 AND 5).	

RESULTS

The following articles were identified: BVS (n = 265); Journal CAPES (n = 156); PubMed (n = 164); PEDro Base (n = 6), Web of Science (n = 266), Researchgate (n = 11), a study by the Nuances da Educação Journal, and a publication in Annals. After reading titles and abstracts, we selected only 33 studies for full reading, of which 7 articles remained, which met the inclusion and exclusion criteria previously described, in addition to meeting the principles advocated in the development of an integrative review.

The flowchart shows how the studies included in the research were collected (Figure 1). The studies selected for discussion in this review article are described in Table II and classified according to the PEDro scale score[14], presenting a score ranging from 4 to 8 points, and the methodological quality of these studies is presented in Table I.

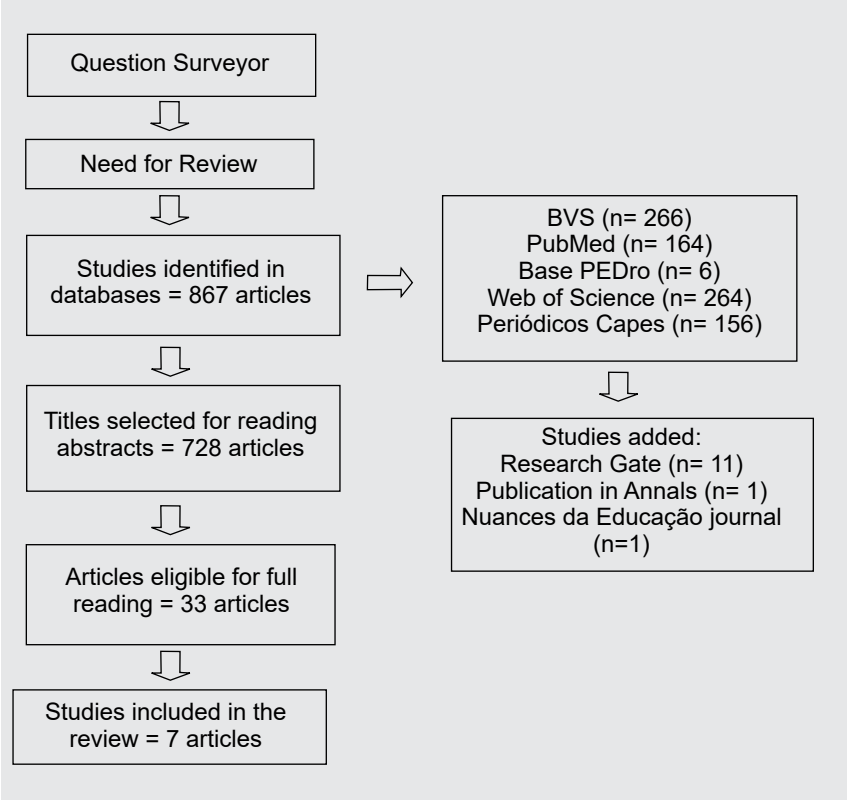

Figure 1 - Articles identification and selection flowchart for the integrative review.

Chart II - Characterization of articles according to author / year, objective, methodological approach, intervention, results and conclusion.

Author/ year	Objective	Methodological Approach	Intervention studied	Results	Conclusion
Soejima et al.2012[15]	To verify if an early intervention program has positive effects on the neuromotor development of children between 0 and 3 years old who attend public day care.	63 children, aged 0 to 36 months, distributed in three classes. The children were assessed using the Bayley II Mental and Motor Developmental Scales and the early intervention program was designed individually for each baby.	Twenty children with developmental delay were selected and the intervention took place within 1 month, from Monday to Friday, lasting 20 minutes.	Progression in the development of children participating in the intervention was evidenced when compared to pre- and post-intervention Bayley II.	The feasibility of early intervention in public daycare centers was verified, but further research should be conducted to find suggestions and answers to relevant forms of care.
Santos et al. 2016[16]	Check the effects of two different psychomotor interventions in the child's social-emotional and self-concept development.	Forty-six preschool children participated, aged 4.1 ± 0.8 years. Of these 46 children, 17 belonged to the relational psychomotor group, 17 to the functional psychomotor group, and 12 to the control group.	The 46 participants were divided into three groups (GE, GD and GC). Groups GE and GD received 24 sessions twice a week over 3 months.	Statistically significant differences were found in the relational psychomotricity, between the pre and the posttest, which were observed in decreasing behavioral problems.	The method used in relational psychomotricity allows the spontaneity of the child as the axis of intervention. Thus, gains in cognitive, motor, social and emotional skills seem to be most favored.

Costa et al. 2016[17]	To verify the influence of Physical Education on the psychomotor development of five-year-old preschoolers.	The study included 126 Portuguese students (71 female and 55 male) aged 5 years. The sample students were divided into two groups: the control group (CG n = 64) and the experimental group (GE n = 62).	The experimental group (GE) received intervention for 24 weeks, with 2 weekly sessions of 45 minutes during Physical Education classes.	The results showed that both groups evolved their psychomotor profile, however this evolution was always superior in the EG. There were no significant gender variations.	Structured Physical Education is important for the psychomotor development of preschoolers.
Ene et al. 2016[18]	Improve the components of psychomotor skills in children aged 4 to 6 years through playful activities performed within the framework of physical activity.	The sample consisted of 96 children, aged 4-6 years, students from an elementary school in Romania. The children were divided into three groups: 4 years, 5 years and 6 years. A pre and post intervention test was applied.	The children participated in a psychomotor program, twice a week, lasting 40 to 50 minutes, for a period of one year.	The 4-year-old group significantly improved spatial orientation and body awareness. The 5-year-olds showed no differences, while the 6-year-olds had improvements.	The role of early childhood education is essential in child development. Primary school should include physical activities (movement and games) centered on psychomotor improvement.
Panceri et al. 2017[19]	To evaluate the impact of motor intervention on the motor and cognitive development of infants aged 1 to 18 months hospitalized for respiratory diseases. .	Quasi-experimental study of 39 hospitalized infants according to medical diagnosis and missing signs and symptoms of previously diagnosed neurological or mental illness.	The babies were divided into 2 groups, being the CG (n = 10) and GI (n = 12). The GI participated in a motor cognitive intervention program daily for 30 minutes until hospital discharge. .	A significant interaction between group x time was observed in motor and cognitive scores. When buying the pre and post intervention period, the GI showed significant positive improvements.	The cognitive-motor intervention in the hospital environment during the babies' hospitalization contributed positively to the cognitive and motor development.
Brandão et al.2017[20]	Address the motor aspect and play in child development, according to Jean Piaget's psychogenetic theory.	The sample consisted of 15 children, male and female, between 2 and 3 years old, from a public school in Goiás.	The children formed a single group, and the psychomotor intervention consisted of 10 sessions, with 1 meeting per week, lasting 3 hours and 15 min each.	Worked activities contributed to motor development, social interaction and self-confidence.	Play enables children to move and explore the space around them, and is essential, according to Piaget's theory, for the passage of each stage.
Mas et al. 2018[21]	To show how the usual practices of psychomotricity from 12 months of age can increase the child development.	Twenty-six children, aged 11 to 22 months, attending a preschool in a province of Barcelona were selected.	The study was divided into two parts: 1 - 5-month training with children divided into 3 groups (G0, G1 and G2); 2 – A 23-month period of psychomotor practice with children divided into the same groups.	The results obtained with the measures gathered in the training phase and in the post-final practical phase concluded that the systematization of psychomotor activity has positively influenced the development of preschool children.	Psychomotricity is a necessary activity in early childhood, being a fun and relational activity that contributes to optimal development.

Table I - Methodological classification evaluated by the PEDro scale.

	Soejima et al. 2012[15]	Ene et al. 2016[16]	Santos et al. 2016[17]	Costa et al. 2016[18]	Panceri et al. 2017[19]	Brandão et. al. 2017[20]	Mas et al. 2018 [21]
1.specified inclusion criteria	Yes	Yes	Yes	Yes	Yes	-	Yes
2. random allocation	No	No	No	Yes	Yes	-	No
3. allocation confidentiality	No	No	Yes	Yes	Yes	-	No
4. pretreatment group similarity	Yes	Yes	Yes	Yes	Yes	-	Yes
5. blind subjects	Yes	No	Yes	Yes	Yes	-	Yes
6. blind therapists	No	No	No	No	No	-	No
7. blind examiners	No	No	No	No	Yes	-	No
8. follow-up of at least 85% of participants	No	Yes	Yes	Yes	No	-	No
9. intention to treat	Yes	Yes	Yes	Yes	Yes	-	Yes
10. statistical comparisons between groups	Yes	No	Yes	Yes	Yes	-	No
11. report of variability measurements	No	Yes	Yes	Yes	Yes	-	Yes
TOTAL	4	4	7	8	8	-	4

DISCUSSION

Given the results obtained, we sought to discuss the similarities and divergences between the findings of the studies and confront the literature on how psychomotor interventions can be implemented in child development, minimizing delays in neuropsychomotor development of children, promoting early stimulation, so that possible delays can be overcome.

Psychomotor intervention in the hospital environment

The environment in which the child is inserted can influence its development. Thus, hospitalization is rated as one of the factors that can negatively impact on child development, because most of the time, the experience is traumatic and unpleasant, besides restrictions on physical space, lighting, mobility, high sound stimuli, and constant touches[18].

Thus, a study aimed at investigating the impact of the cognitive-motor intervention on the motor and cognitive development of hospitalized children resulting from respiratory pathologies selected 39 children. From these, 12 were part of the intervention group. The motor cognitive intervention took place daily for 30 minutes, performed in the unit's recreation room or the bed until the participant's hospital discharge. The activities consisted of the attempt to allow the baby to try new motor and cognitive skills, occurring as follows: playful interventions, in which the 5 minutes of onset were used for ambiance. Then 5 minutes in the prone or supine position for stretching, rolling stimulation, visual pursuit, and toy exploration; in the next 10 minutes the sitting position was experienced; the final 10 minutes were used to favor the child's displacement. As a result analyzed after application of the Alberta Infant Motor Scale (AIMS) and Bayle III Scale in the pre and post-intervention period, the study suggests that this type of intervention during the baby's hospitalization period contributes positively to child development, protecting the child of the negative effects of hospitalization for respiratory diseases[19].

According to the application of the PEDro scale, the study obtained a score of 8, showing to be of good methodological quality, however, we found that the lack of standardization in the number of interventions, the small sample size, the blindness of the therapists and the lack of follow-up contribute so that the score is not better.

Psychomotor intervention in very early childhood

Psychomotricity allows children to play with objects in their context, because through movement, it includes the interaction between neuromotor and psychological functions, contributing to the child's neuropsychomotor development. Thus, the quality that the environment can offer from birth has a later impact on all stages of child development[14,20].

Another study aimed to verify whether an early intervention program has positive effects on the psychomotor development of children aged 0 to 3 years olds who were in a public daycare center. The 1-month program then consisted of individual planning of playful activities for the 20 children in the intervention group, lasting 20 minutes once a week. The results showed progression in the development of children who were lagged and who participated in the intervention program when compared to children with developmental delays who did not participate in the intervention. Thus, according to the comparative results of the application of the Bayle II Mental and Motor Scales of Child Development in the pre- and post-intervention period, they subsidize the use of early intervention programs in public daycare centers[15].

The application of the PEDro scale classifies the study as of poor methodological quality, with a score 4, as details such as blindness of therapists and examiners, non-detailing of the interventions performed, non-follow-up, and non-reporting of the variability of the measurement contributed to a poor score according to the scale.

Within this context of very early childhood, another study showed how the practices of psychomotor from the age of 12 months could contribute to the neuropsychomotor development of children. There were 2 groups of participants, G1 with 8 children receiving care once a week and G2 with 7 children receiving care twice a week. The intervention took place during 23 months, lasting 45 minutes per session, divided into three short moments. The first moment consisted of welcoming the group, then free games involving mainly motor skills, and the last moment, back to calm. By analyzing the results obtained with the application of the Merill-Palmer-R test before and after the intervention, it was evidenced that psychomotricity is necessary at this stage of development and may contribute to the identification of problems in the development of skills in the pre-intervention period -school. Therefore, the psychomotor intervention should be used in the educational context, as it contributes to the ideal development of the child[21].

In the application of the PEDro scale, the study obtained a score equal to 4, being classified as poor in methodological quality. The lack of details about the applied intervention, as well as the non-randomized allocation, non-blinding of therapists and examiners, as well as the lack of follow-up contribute to this poor methodological outcome.

Within this perspective of child development, in an experience report, aiming to analyze the development of children between 2 and 3 years after the cognitive-motor intervention, suggested that the psychomotor intervention contributes to the overall development of the child, besides verifying the improvement in motor performance and socialization of children, more specifically. The intervention program took place for a period of 10 meetings, which took place once a week, with a total duration of 3h and 15 minutes per meeting, in which the activities developed were: psychomotor circuit, fine motor coordination, and broad motor coordination[20].

Psychomotor intervention in preschoolers

Psychomotor development in childhood seeks to provide children with the conditions necessary for good school performance. There are two main currents of psychomotor intervention, functional psychomotricity, which follows a traditional line of directed method aiming at the development of the main psychomotor areas, and relational psychomotricity, which focuses on spontaneity, based on creativity, motor discovery and expressiveness[17].

Psychomotor intervention in preschoolers is addressed in another study that verified whether relational psychomotor is more advantageous compared to functional psychomotor and whether they are better compared to the control group. This study involved 46 children, aged 4 to 5 years, divided into 3 groups (GE -relational psychomotricity, GD - functional psychomotor, and GC - control group). Both intervention groups adopted a 4-part intervention protocol: I) entrance ritual, II) session itself, III) storytelling and IV) return to calm, while the control group performed unstructured activities. The study results show that there were no statistical differences in the GD group in any of the evaluated parameters (self-concept, social skills, and behavioral problems) concerning GE and GC[17].

In the application of the PEDro scale, the study scored 7, being classified as a study of good methodological quality. It was also observed that the non-randomized allocation and non-blindness of therapists and examiners contributed to the better methodological results presented.

In the context of preschool education, a study aimed to verify the influence of Physical Education class on the psychomotor development of 5-year-olds. Thus, the study had 126 participants of both sexes, divided into 2 groups (CG- control group and GE- experimental group), being the GE group assisted by a three-part structured intervention program (1st part - warm-up, 2nd part - fundamental with emphasis on specific work and 3rd part - return to calm),

during 24 weeks, with activities performed once a week for 45 minutes, while the control group performed unstructured intervention during the same period. The results obtained and compared between the pre- and post-intervention moment, through the application of the self-designed Psychomotor Assessment Test, whose outcome measures were coordination, balance, body scheme, laterality, spatial organization, and temporal organization, suggest that the structured psychomotor intervention performed by preschool physical educators positively contributes to the child's psychomotor development[18].

The PEDro scale was applied and the study had a score of 8, thus pointing to a study of good methodological quality, but the lack of blindness of therapists and examiners made it impossible to obtain a better score for the study analyzed.

Still performing psychomotor activities in the preschool context, another study aimed to promote integral neuropsychomotor development and individual potentialities through specific playful activities for the participating children. The psychomotor intervention selected preschool participants who were between 4 and 6 years old. The intervention program lasted 1 year, with activities performed twice a week, lasting 40 minutes for children of 4 and 5 years and 50 minutes for children of 6 years. As a result of the pre- and post-intervention evaluation, after further spatial organization test and body schema recognition, the study shows that, after the proposed intervention, the children showed significant improvements regarding the analyzed outcomes, besides verifying that there is a relationship between movement games within the activity program and the level of skills acquired[16].

In the methodological evaluation of the PEDro scale, the study received a score of 4, is classified as a low methodological quality study. The absence of statistical comparisons, non-randomization, as well as the non-blindness of therapists, examiners and research subjects prevented the study from obtaining a better score in this evaluation scale.

Most studies are of low methodological quality, according to the PEDro scale, resulting in a low level of evidence for psychomotor practice. Besides, very few studies were found in the area of Health Sciences, hindering the consolidation of psychomotor practice as a method of prevention and recovery concerning child health, and these factors limit the search for this study. Therefore, further studies should be carried out, adopting more methodological rigor, besides the need for further investigation of this type by health professionals, for unrestricted application aiming at good results in health promotion.

CONCLUSION

This integrative review made it possible to construct a synthesis of scientific knowledge about the use of the psychomotor intervention concerning child development and how this approach contributes to the prevention and recovery of delays in pediatrics. Structured psychomotor intervention, despite the heterogeneity of protocols adopted, shows positive results in the neuropsychomotor development process in childhood, being a useful resource to recover or prevent delays in child development.

CONFLICTS OF INTEREST

The authors state that there were no conflicts of interest in the execution of this research.

CONTRIBUITIONS

Kátia Virginia Viana Cardoso and **Sarah Amaral Lima** contributed to the elaboration and design of the study; data acquisition, analysis and interpretation; and the writing of the manuscript.

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