The influence of swimming on motor development in preschool children: an integrative review

https://doi.org/10.56238/homeIIsevenhealth-084

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1 INTRODUCTION

The motor is a constant process in which it begins from the birth of the individual and only ends with his death, that is, the individual evolves his motor characteristics throughout his life (GALLAHUE, 2013).

The child is not born with the ability to know how to do, but with the necessary conditions to be able to do, it is born with the potential to learn how to do. These changes depend on the characteristics of empathy between the pedagogical process and the conditions of the organism of the child subjected to it, as well as the broad development of the teacher's mastery of the contents to be taught (DAMASCENO, 1997).

However, lack of motor development in childhood can cause lifelong damage. Therefore, the importance of parents monitoring the motor development of their children, especially in the early years of life, with this monitoring can diagnose motor diseases early on, which can facilitate the treatment of these diseases faster. A good motor development in childhood will serve for a satisfactory future life, in social, cognitive, intellectual and cultural aspects (XAVIER, 2018).

Throughout the predicted developmental stages, Gallahue and Ozmun (2005), distinguish the preschool age that experts call critical learning periods, in which there is a greater physical-cognitive disposition to assimilate external influence, facilitating the acquisition and improvement of motor skills.

It is in the preschool age that the child begins to have autonomy in their motor development, it is in this period that they acquire basic attitudes that they will carry for the rest of their lives (SOUZA, 2018).

It is important to make the child stimulated, with a greater possibility to expose his ideas and the best way to do this is through play, in which the child has the opportunity to develop in all aspects, because he experiments, creates, reinvents, imagines and discovers (SOUZA, 2018).

According to the National Common Curricular Base (BNCC), the competencies and skills of the preschool child are related to the diversified forms of expression of feelings, sensations, and emotions, both in everyday situations and in games, play, dance, theater, music, demonstrating control and adequacy of the use of their body (BRASIL, 2018).

According to Gallahue (2013), motor development in the preschool phase can be worked with several activities, including team sports, playful activities, children's games and play, as well as dance, fights, among others. In addition, some authors cite swimming among these activities as an excellent tool for motor development for children in this phase.

Swimming is the act of moving over a liquid medium or sliding over water (VELASCO, 1994).

Swimming in early childhood provides the acquisition of a feeling of confidence, more appropriate adaptive responses, exercise of motor skills, progressive knowledge and mastery of the body, and socialization, among other aspects (DAMASCENO, 1997).

After an experience with the practice of infant swimming, it was possible to observe the difficulty some children had in adapting to this new stimulus with water, as well as the difficulty in socializing with other children of the same age group and of the opposite sex. This research has enriched the still limited amount of work on swimming for preschool children. Currently we found few qualified materials on this subject, so this study will help people who want to work with the age groups or simply for those who just want to enrich their knowledge on the subject.

In light of this, in researching these studies related to child motor development, the following question arose: is there an improvement in motor development for preschool age children who practice swimming?

2 OBJECTIVE

To identify the benefits that swimming provides for motor development in preschool age children.

3 METHODOLOGY

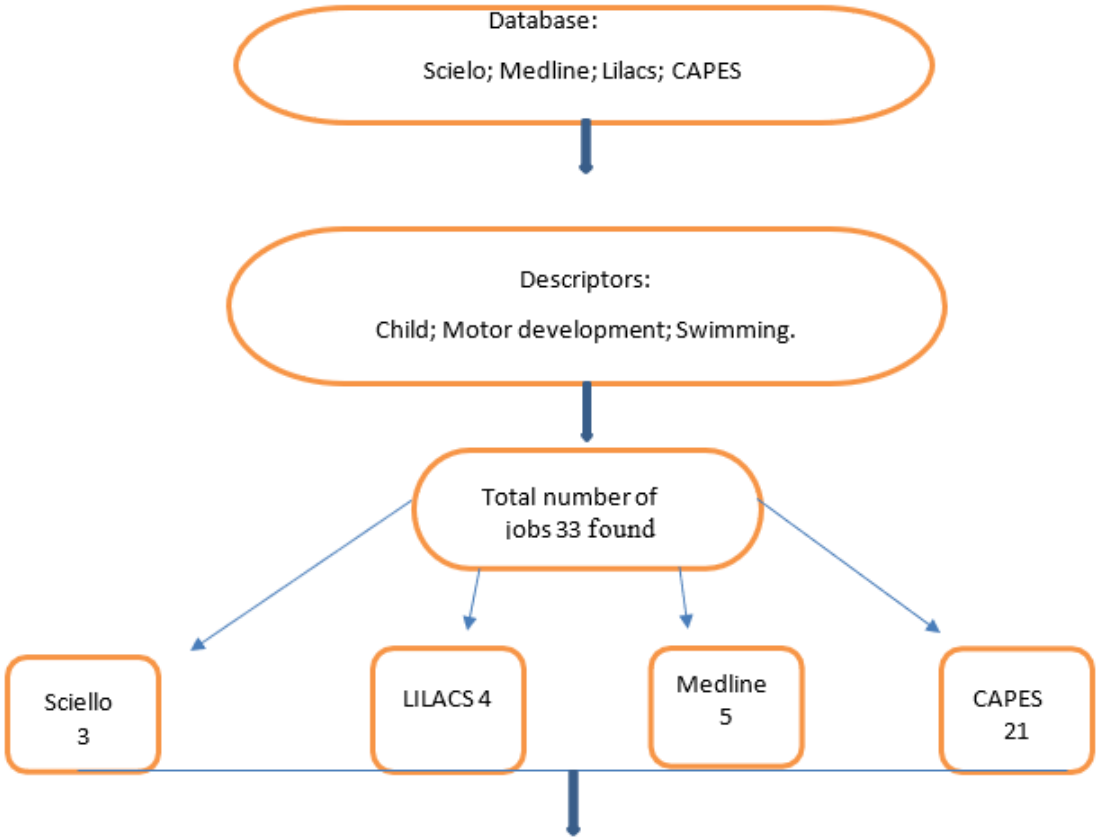
This is an integrative review, which according to Botelho, Cunha, and Macedo (2018), is a specific method that summarizes the past empirical or theoretical literature to provide a comprehensive understanding of a particular phenomenon. This research technique aims to ideate an analysis on the knowledge already constructed. The review incorporates a wide range of purposes such as: defining concepts, reviewing theories and evidence, analyzing methodological problems of a particular topic.

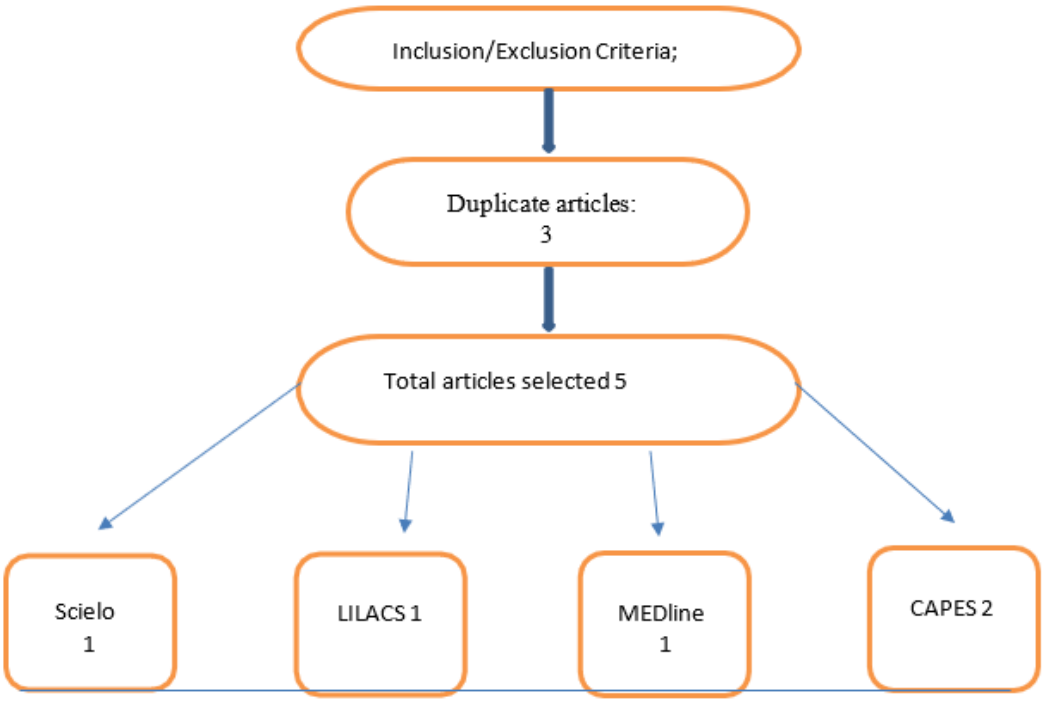
One of the characteristics of integrative review is the freedom in working with the widest universe in both qualitative and quantitative nature texts (BOTELHO; CUNHA; MACEDO, 2018).

Thus, one should follow the steps of the integrative literature review method: it began with the definition of the problem, searches of the literatures with the definition of key words in the databases, and application of defined criteria to find articles related to the topic, evaluation and analysis of the data obtained (MENDES et al., 2018).

To conduct the search for this study, the following health science descriptors (DeCS) were used: Child, motor development, and swimming with the combination of the Boolean operator AND. The searches were carried out in the following databases: Scientific Electronic Library Online (SCIELO); Medical Literature Online Search and Analysis System (MEDLINE); Latin American and Caribbean Literature on Health Sciences (LILACS) and Coordination for the Improvement of Higher Education Personnel (CAPES). The strategy used in the literature search and the flowchart showing the inclusion and exclusion of studies are described in Figure 1. The inclusion criteria were articles in Portuguese and English, according to the theme addressed, published from 2012 to 2022. The exclusion criteria were articles that did not fit the objective of the study and did not correspond to the determined inclusion criteria, studies that were duplicates were also excluded. The materials obtained by crossing the Descriptors in Health Sciences (DeCS) and the Boolean operator AND, used in Portuguese and English, were presented as follows: ("swimming") AND ("motor development") AND ("child") AND ("motor development") AND ("swimming"). After reading the titles and abstracts, the materials that best fit the objective of the study were selected respecting the inclusion and exclusion criteria.

Figure 1 - Flowchart demonstrating the steps for selecting the reviewed studies.





Source: author's own.

Botelho, Cunha, and Macedo (2018), described the six steps necessary to have an integrative review, as we will see below.

1st Step - Consists in elaborating the guiding question of the research: the question must be clear and objective. After defining the question, the authors or key words, the form of the search, and the database used must be defined. The search makes it possible to check the problem question against the data stored in the chosen database.

2nd Stage - Establishing parameters for inclusion and exclusion: after concluding the first stage, the research that will be included in the study is identified. This step depends essentially on the previous one, because it will tend to move towards a diversified sample, which will make the researcher have greater criteria in his analyses.

Step 3 - Recognition of the pre-selected and selected studies: in this phase of the study, a thorough examination of the titles, abstracts, keywords, of all the works located in the search strategy should be performed. If at this stage this examination is not sufficient and able to define the selection, the complete study should be sought, only then can we make a table as pre-selected studies for the integrative review.

4th Step - Cataloguing the selected studies: the purpose of this step is to summarize and document the reports of the scientific articles seen in the third step. The researcher can use criteria to analyze each article separately; it can be methodological as to the relationship of the results of each research studied. The synthesis matrix has been a widely used tool to extract and organize data from this type of review, because it is effective in summarizing the hard questions of knowledge.

5th Stage - Analyze and interpret the results: here the results of the texts studied from the integrative review must be discussed. Following the selected works, the researcher is able to point out flaws or gaps in the existing knowledge and propose themes for future studies.

6th Stage - Presenting the synthesis of knowledge: the presentation must enable the replication of the research, the integrative review, at this point, tends to show the readers information that allows them to judge the relevance of what was used. This last stage contemplates the path and all the results obtained.

4 DEVELOPMENT

In this search, thirty-three works were initially found. Using the inclusion and exclusion criteria that were studies focused on the development of motor coordination in children, others for discussing concepts of the work of physical education professionals, and others talking about swimming and its concepts. Thus, eight articles were selected, some of which were read in full, others only the abstracts. After reading the texts, three duplicates were identified, leaving five to compose this study and serve as a basis for our analyses. The selected studies are described in chart 1.

Chart 1 - Characteristics of the studies included in this integrative review

Author/Year	Sample	Intervention Type	Conlusion
DARIDO, 2017.	24 five-year-old children of both sexes in pre-school	Motor coordination was assessed with the body coordination test battery using recreational swimming activities (Körperkoordinationstest für Kinder - KTK).	We conclude that swimming activities may be related to the good motor coordination index found. coordination index found.
TOMAZELI; GOULARD , 2019.	20 children who practice and children who don't practice swimmers.	The 5 locomotion and 5 manipulative tests were applied over two weeks.	The swimming children participating in the study perform better on the tests than those who do not practice swimming. mode.
GEAMONO ND, 2017.	10 children of both sexes practicing of swimming in the city of Uberlãndia-MG.	The evaluation protocol from aquatic motor development (HOEPA) "Hoja de Observación para la Evolucióndе la Psicomotricidad Acuática".	Conclude that aquatic psychomotor development in the manipulation is deficient.
MACHADO ;RUFFEIL, 2011.	Integrative Review	This article was based on bibliographic research in books and scientific articles related to the subject in question.	It is concluded that through swimming the child is able to know his body and seeks to develop to the maximum his motor, affective and cognitive capacity, besides the capabilities related to motor development.
ROCHA et al., 2021.	The study was compoundopor33 boys in age preschooler (4.8±0.5 years.): 11 practitioners soccer; 11 practitioners of swimming; 11 controls (semenvolvimento previous in sports).	The "test of motor development thick 2" (TGMD-2) for assess competence of the motor children fundamental. After five (T5), ten (T10) and thirty (T30) months of sports practice. TGMD-2 is a referenced standard measured with a good psychometric quality to1evaluate the motor skills that are develop at the beginning of the life.	The study showed that the practice sports during childhood contributes to a larger development and that practitionersdenatation show continuous control of motor development.

Source: Author's own

5 DISCUSSION

The data from the analyzed studies point out that the encouragement of swimming in preschool age has the key to a better motor development in this important phase of the child's life. Swimming is one of the most complete sports, because it can be started from the beginning of life, allowing the child to perform movements in the water that they would not be able to do out of it. The regular practice of physical activity, in this case swimming, can contribute directly to the prevention and treatment of diseases and improve self-esteem.

Under this understanding, the text by Darido (2017), brings initially a discussion about the objectives of the official programs of Physical Education and Sports, which is the responsibility of the educational process to enable students to have a good motor development in preschool age, a high functional capacity in all motor driving processes, it is believed that this way the child can adapt in a less traumatic way the common tasks in the next phase of life, as well as a movement that serves as a basis for new movements. Swimming, besides being an extremely pleasurable activity, can contribute to the success of this goal.

Fialho (2013), comments that the principles of the universal initiation of movements can and should be applied to early childhood education, contextualized in a technical manner without distorting the sport. In the early stages of swimming, these principles are accepted as guiding instructional plans, aiming at the child's motor development process. The teaching of swimming to children must be found in this proposal, theoretically grounding the teaching methods applied in the classroom.

In the study conducted by Angélica Tomazeli and Renata R. Goulart (2019), after performing the tests, the children presented distinct results regarding the following activities: Sliding and Horizontal Jumps. Children who practice swimming show better results than children who do not practice this sport. The study made it possible to recognize that swimming is an extremely valuable resource in the motor development of preschool children.

Recognizing that there is a significant difference between the activities performed in liquid environment, compared to those performed on land, without leaving aside factors of age, environment, and the emotional state of children that can interfere with the motor performance of individuals. However, the main objective was to demonstrate that the practice of swimming can help the motor development of children in the preschool period (MARTINS et al., 2015).

Tomazeli and Goulart (2019), state that the results reveal a significant difference in the motor development of children practicing aquatic activities and the accumulated practice of swimming seems to lead to a positive and significant variation of development in various motor skills. This research allows us to recognize that swimming is a valuable resource for the development of motor stimulation.

The results obtained in the text by Leonardo Geamonond (2017), leads us to conclude that the child when he starts activities in the aquatic environment in the sphere of manipulation, its

development is deficient, so the results should intervene early in changes in motor development, as well as stimulate it. According to the methodology adopted and the results found, it was concluded that the development of the manipulative actions in children of the early childhood practicing swimming, evaluated by the scale "Hoja de Observación para la Evolución de la Psicomotricidad Acuática" (HOEPA), was registered in low development, because only 30.5% of the total of evaluated children sometimes picked up objects in the swimming pool and 20.5% did not find problems in displacing with objects in their hands. What leads us to conclude that in early childhood the motor development in the aquatic environment must be stimulated before the beginning of the swimming styles.

The aquatic environment brings many benefits to children, but it cannot be said that early stimulation in this environment is beneficial for child development in all aspects. Also in Geamonond's (2017) study, no changes were observed in the developmental domains assessed from 4 to 8 weeks of the aquatic stimulation program in typical children.

According to the approach of Bruno Ribeiro Machado and Roberto Ruffeil (2011), in an analysis of the fundamental motor phase (2 to 6 years) it was observed a difficulty for children to adapt to the new aquatic stimulus, as well as the difficulty of interaction with other children. From this study, it became possible to observe and verify the importance of this sport in children's growth and motor development. The authors also define that, through swimming, the child is able to know his/her body and try to develop his/her motor, affective, and cognitive skills to the maximum.

In general, the authors call our attention to swimming being developed in this age group, because it promotes the development of children by allowing an infinite number of experiences and activities in which they discover varied movements that lead them to build concepts and ideas about their actions or about the movement itself.

In this context, Oliveira et al. (2013) state that swimming, besides being a beneficial activity for the child's motor development, is also of great importance for the child's socio-affective, cognitive, intelligence and personality development.

Still in the same approach, the text that shows the various coordinative capacities, developed through swimming, highlighting three general basic capacities: the capacity for motor control, the capacity for motor adaptation and readaptation, the motor learning capacity. Being that these three basic capacities subordinate five fundamental coordinative capacities: spatial orientation, reaction, body movement, balance and differentiation of limits (OLIVEIRA et al. 2013).

In the tests conducted by the authors Rocha et al. (2021), address the test of gross motor development (TGMD-2), was used to assess the competence of children in fundamental motor skills. This study sought to describe the longitudinal changes in motor development arising from swimming or soccer practice in childhood. After the analysis of the results the study showed that the practice of sports in childhood seems to contribute to greater motor development. Despite the improvement in

motor competence of soccer practitioners in the short and long term, swimming practitioners show a continuous motor development, especially in object control skills.

Thus, in accordance with Barreto (2004), it is necessary for the child to evolve, so that he/she can have control over his/her body, developing and improving the possibilities of movement. With this, there will be the discovery of new spaces, forms, overcoming limitations, and conditions to face challenges regarding motor, social, affective, and cognitive aspects, and swimming is essential in the meantime.

6 CONCLUDING REMARKS

After the study, it was concluded that swimming, in addition to providing numerous benefits for the motor development of preschool children, is also a very relevant component for the general development of children, so it should be stimulated as soon as possible. It is also concluded that swimming is a sport that should be worked on in children's Physical Education, for providing favorable benefits to this age group. However, in the preschool phase, more specifically from four to six years old, its benefits are more significant, due to the fact that it works almost all the muscles and joints of the body schema, and also because it helps in the maturation process and promotes motor development.

However, the initiation of swimming activities must work on the practice of general motor development, because for a child starting out in the aquatic environment there is a deficit, so that later on the swimming styles can be worked on.

The study also showed that swimming brings significant benefits to its practitioners. However, it should be started as soon as possible, as it helps in the global development of children. However, for this to occur, it is essential that parents, along with a physical education professional, plan the beginning of this activity appropriately in order to provide opportunities for everyone to achieve these benefits.

However, there is still the need for new studies to be carried out in this area in order to find factors that influence or limit the performance level of motor development in aquatic environments, since there are many benefits indicated by its practice.

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