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Assessment of Early Childhood Development using scales used in America and Europe: Review of the literature

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ABSTRACT

Introduction: The article aims to carry out a review of the literature on scales for measuring early childhood development used in America and Europe. To carry out this work, Kitchenham's proposal was followed.

Subjects and Method: Systematic literature search. Participants: Primary studies whose population corresponds to boys and girls from 0 to 5 years old. Types of studies: Those studies in which the last methods were quantitative or quantitative published in the 5 years were included. Databases: Scopus, ProQuest, SciELO and ScienceDirect, it is worth mentioning that the search string was different for each database.

Results: 17 articles remain for analysis.

Conclusion: The articles obtained helped us to answer the three questions posed, the first one refers to the instruments that exist to measure early childhood development during the last 5 years, where the Bayley scale and the Psychomotor Development Test stand out (TEPSI) in the year 2017 and 2019; Regarding the second question focused on the most cited authors about measuring early childhood development during the last 5 years, Huertas Y, Castro F, Guil R, Ponce J and Robles MA stand out; The third and last question is focused on the countries that have published the most on measuring early childhood development, with Mexico and Spain being the most prominent in terms of the number of publications during the last five years.

Keywords: *early childhood development, measurement scales, early childhood, literature review*

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INTRODUCTION

Early childhood development (ECD) is a big challenge for everyone. As the years have passed, very interesting advances have been made in relation to reducing malnutrition in children as well as mortality. In the same way, everything related to progress in the different dimensions such as: motor dimension, socio-emotional dimension, cognitive development and language dimension. The most visible gaps can be detected in the most vulnerable groups of the population. As a result, children are most affected as they cannot fully develop their potential, causing difficulties when they enter school.

There is currently a high interest in improving early childhood development. To this end, different governments have considered this issue in their policy agenda. There are also different civil society organizations that fight for early childhood. Thanks to this, we can count on a more fertile field to continue advancing with the implementation of social programs in favor of early childhood.

In this context, in September 2015 a regional workshop was held in Brazil, where different representatives from ten countries were invited to jointly develop a regional agenda for child development. Among the activities established in this agenda, it was considered to strengthen the systematic measurement of child development, in order to inform the design of policies as well as evaluate existing child development programs.

Following what was started in Brazil, and responding to the activities suggested in the agenda, in September 2016, a seminar was held in Peru called: Measuring child development in Latin America. Currently, having access to quantitative data on child development becomes very limiting, because it is difficult to reach a consensus on how child development can be measured, mainly in terms of which instruments to use and which areas of child development to measure.

Psychomotor development is the progressive acquisition of functional skills of the child as he grows; It is a consecutive process in which stages or stages of increasing complexity can be identified. (1) Child development is also determined by biological aspects, social interactions, and learning experiences. (2)

The measurement of child psychomotor development is of utmost importance for different professions, since it allows to evidence the changes that manifest themselves from birth to childhood.

Early childhood development is a process that ranges from the gestation stage to the five years of life of the child. It is a progressive, multidimensional, comprehensive and timely process, which translates into the construction of more complex capacities, which allows the child to be competent from their potentials to achieve greater autonomy in interrelation with their environment in full exercise of their rights. (3) Faced with this challenge, it is worth asking: What is the most widely used measurement scale to assess early childhood development?

The objective of this research is to conduct a review of the literature on scales of measurement of early childhood development in America and Europe. To this end, this work is organized as follows: initially a brief introduction to the subject is prepared; the second section describes the subjects and method; Subsequently, the results obtained are presented and, finally, the discussion is presented.

It is necessary to have effective and economical methods to identify the children who need support to carry out timely and relevant interventions that manage to prevent, reduce or correct the risk situations that the youngest in vulnerable situations may face, all this allows to offer the child population an integrated system of interventions and social services that support children and their families from gestation, giving them the necessary tools so that they can fully develop their skills and abilities.

SUBJECTS AND METHOD

Design and participants

Systematic literature search. A phased process involving the identification of published papers on measuring early childhood development in the Americas. The participants were primary studies whose population will correspond to children from 0 to 5 years old. We included primary studies whose methodologies were qualitative or quantitative published in the last 5 years, with restriction in language other than Spanish. The range of years chosen was based on the need to identify and know the recent studies on the subject.

Search methodology

Search questions: The following article will try to answer the following research questions (RQ) following Kitchenham's proposal. (4)

RQ1: What instruments were used to measure early childhood development over the past 5 years?

RQ2: Who were the most cited authors on measuring early childhood development over the past 5 years?

RQ3: What were the countries where the most research on measuring early childhood development has been published during the last 5 years?

Search sources: Articles published in four databases, which are Scopus, ProQuest, Scielo and ScienceDirect.

Search strategy: A sensitive search is initiated and then specified using free terms and use of specific bowling terms in Table 3.

Search date: First half of January 2021.

TABLE 1: Search string for all four databases

Database	Search string
Scopus	"Early Child Development" Or "Early Child Development" Or "Assessment Scales"
ScienceDirect	
ProQuest	"Early Child Development" And "Assessment Scales"
Scielo	Early Child Development And Assessment Scales

This initial search in the four databases already mentioned, identified a total of 3,335 results.

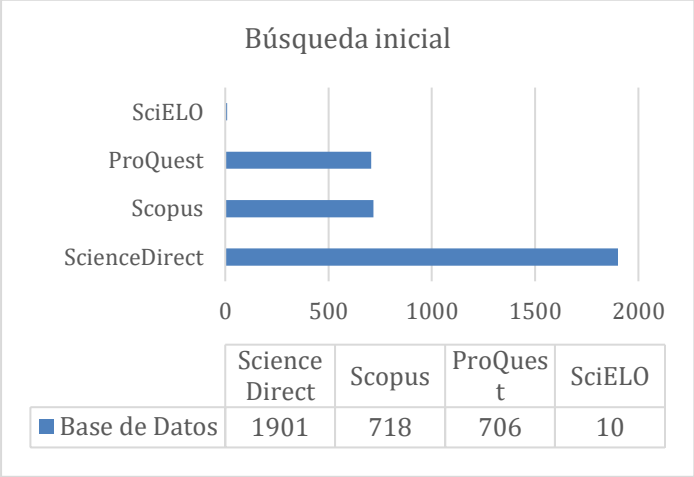

FIGURE 1: Results of the initial search in the four databases.

Inclusion criteria for articles

To consolidate the quality of the literature, articles published in journals of academic excellence that use a peer review system were considered. Studies that provided qualitative or quantitative data on the subject were taken into account. Only main articles, published in the last 5 years, with access to full text, main Spanish language and social sciences were considered.

As we are working with different types of databases and these have different ways of filtering the information, we chose to separate in a table the inclusion criteria for both Scopus, ProQuest, SciELO and ScienceDirect in Table 1.

In this way, the organization used in this selection of articles will be presented in detail, and thus determine which documents will be the most appropriate for the development of this review article.

TABLE 2: Criteria for inclusion in the four databases

Database	Inclusion criteria
Scopus	a. Open Access: All Open Access b. Year: 2015, 2016, 2017, 2018, 2019, 2020 c. Document type: Article d. Source type: Journal e. Language: Spanish
ProQuest	a. Limit to: full text b. Limit to: peer-reviewed articles c. Source type: scientific journals d. Publication date: last five years e. Document Type: Main Article f. Language: Spanish
SciELO	a. Language: Spanish b. Publication year: 2015, 2016, 2017, 2019, 2020 c. Type of literature: Article
ScienceDirect	a. Year: 2016, 2017, 2018, 2019, 2020 b. Article type: Research articles c. Subject areas: Social Sciences d. Access type: Open Access

Article exclusion criteria

TABLE 3: Exclusion criteria in the four databases

Database	Exclusion criteria
Scopus	a. Duplicate items. b. Book chapters, books, systematic literature review, models or others. c. Language: English. d. Articles less than 5 sheets in length. e. Articles that are not cited in other publications. f. The topic described in the study is not related to the research. g. The subject addressed in the study does not refer to the field of social sciences.
ProQuest	
Scielo	
ScienceDirect	

In the Scopus base of the total of the initial search of 718 works, by applying the criteria that are detailed in Table 2 and Table 3. In the case of the inclusion criteria, it decreased to 11 papers as shown in Figure 2. And when applying the exclusion criteria shown in Figure 3, the number of jobs that have been eliminated were 7, leaving us with a total of 4 jobs.

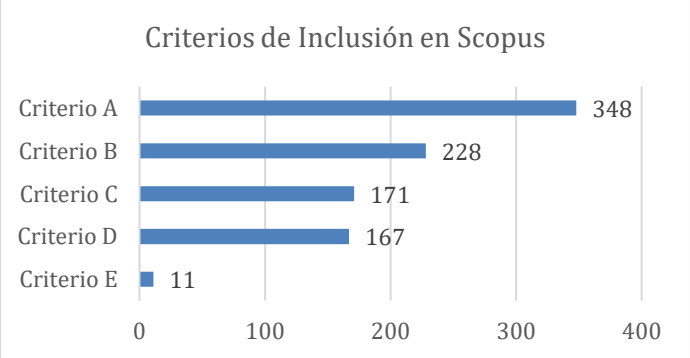

FIGURE 2: Search results Scopus with inclusion criteria.

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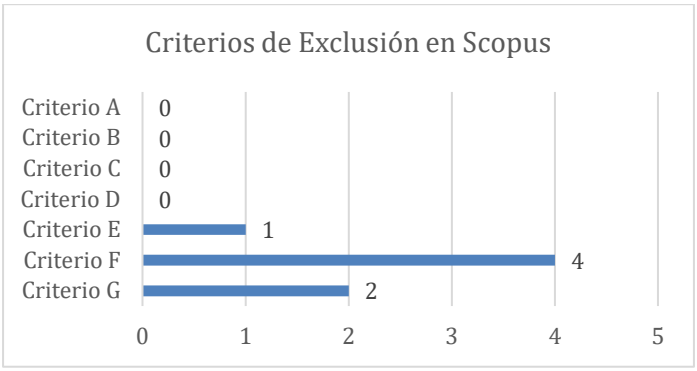

FIGURE 3: Search results in Scopus with exclusion criteria.

Regarding the ProQuest base of the total initial search of 706 works, by applying the criteria detailed in Table 2 and Table 3. It decreases to 21 papers in the case of inclusion criteria, as shown in Figure 4. And when applying the exclusion criteria shown in Figure 5, the number of jobs eliminated was 11, leaving a total of 10 jobs.

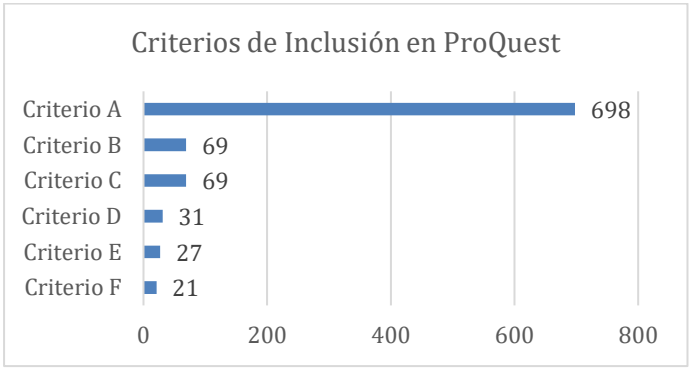

FIGURE 4: ProQuest search results with inclusion criteria.

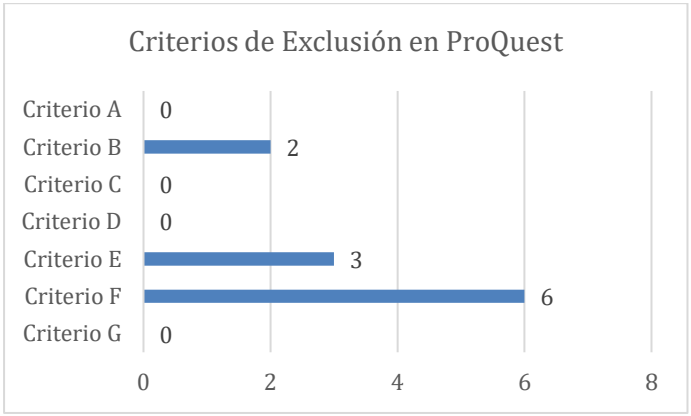

FIGURE 5: ProQuest search results using exclusion criteria.

In the SciELO base of the total of the initial search of 10 works, by applying the criteria that are detailed in Table 2 and Table 3. In the case of the inclusion criteria, it decreased to 4 papers as shown in Figure 6. And when applying the exclusion criteria shown in Figure 7, the number of jobs that have been eliminated were 3, leaving us with a total of 1 work.

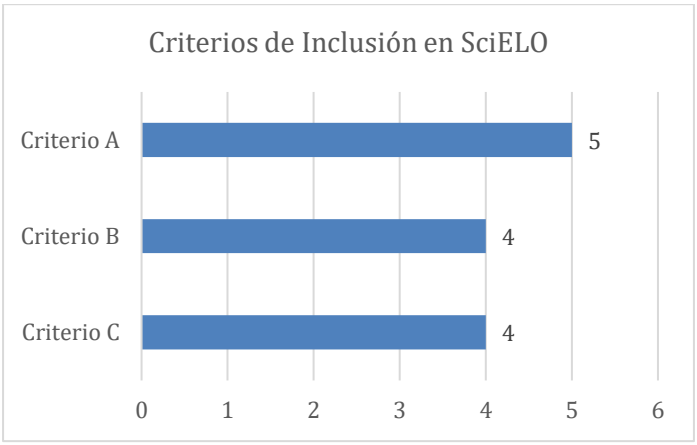

FIGURE 6: SciELO search results with inclusion criteria.

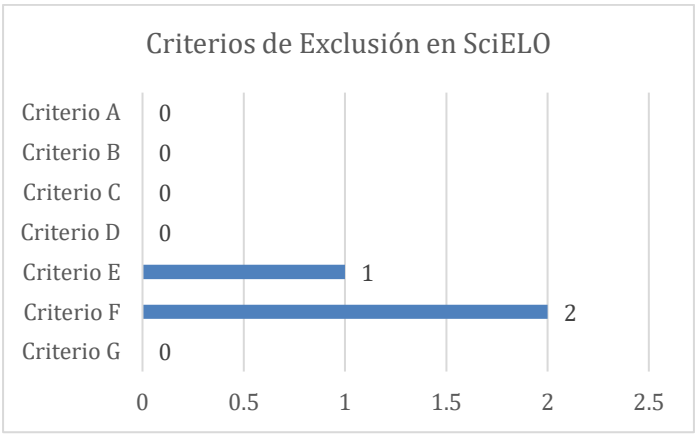

FIGURE 7: Search results in SciELO with exclusion criteria.

In the ScienceDirect base of the total of the initial search of 1901 papers, by applying the criteria that are detailed in Table 2 and Table 3. In the case of inclusion criteria, it decreased to 27 papers as shown in Figure 8. And when applying the exclusion criteria shown in Figure 9, the number of jobs that have been eliminated were 25, leaving us with a total of 2 jobs.

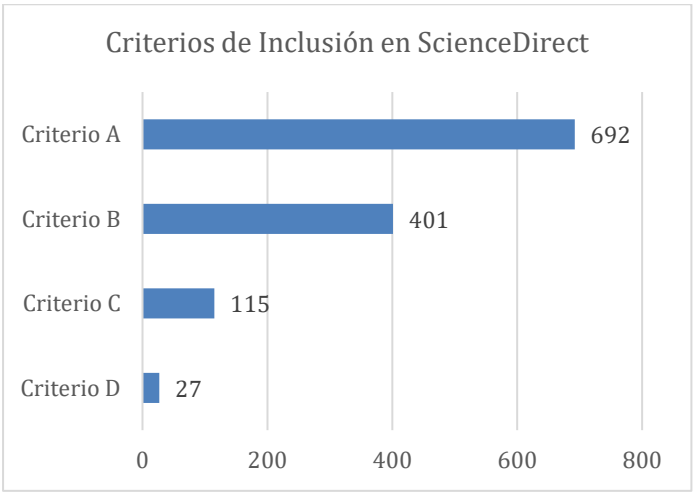

FIGURE 8: Results of the ScienceDirect search with inclusion criteria.

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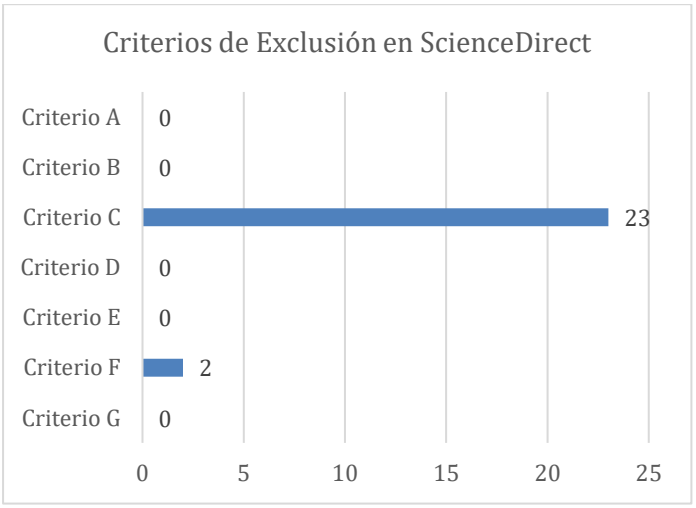

FIGURE 9: Results of the ScienceDirect search with exclusion criteria.

After having carried out the process of the inclusion and exclusion criteria in both Scopus, ProQuest, SciELO and ScienceDirect, it is emphasized that the exclusion process was worked manually in some cases. Table 4 shows the number of articles that are considered suitable for the elaboration of the research and the total is 17 works.

TABLE 4: Results then filter by inclusion and exclusion criteria in the four databases

Database	**Number of articles with inclusion criteria**	**Number of articles with exclusion criteria**	**TOTAL**
Scopus	11	7	4
ProQuest	21	11	10
Scielo	4	3	1
ScienceDirect	27	25	2
TOTAL	63	46	**17**

Selection process

The articles obtained from the databases were entered into the reference manager, from which the duplicates were removed. Subsequently, following Atkinson's recommendations, relevance screening was performed in two stages. This screening involves the use of a sufficiently broad approach at the initial stage, allowing the inclusion of potentially relevant studies; and progressive narrowing as documents are read in depth. In the initial stage, a first selection of articles was made based on the reading of titles and later based on the reading of the abstracts. Those articles that did not meet inclusion criteria were removed. In a second stage, the remaining articles were inspected in full text and evaluated for eligibility.

RESULTS

First, by entering the search string in Scopus, ProQuest, SciELO and for ScienceDirect, a total of 3,335 results were obtained , which is detailed in Figure 1. In the four databases, in the process of the inclusion and exclusion criteria, 17 articles were expressed in Table 4, which will be used to answer the questions.

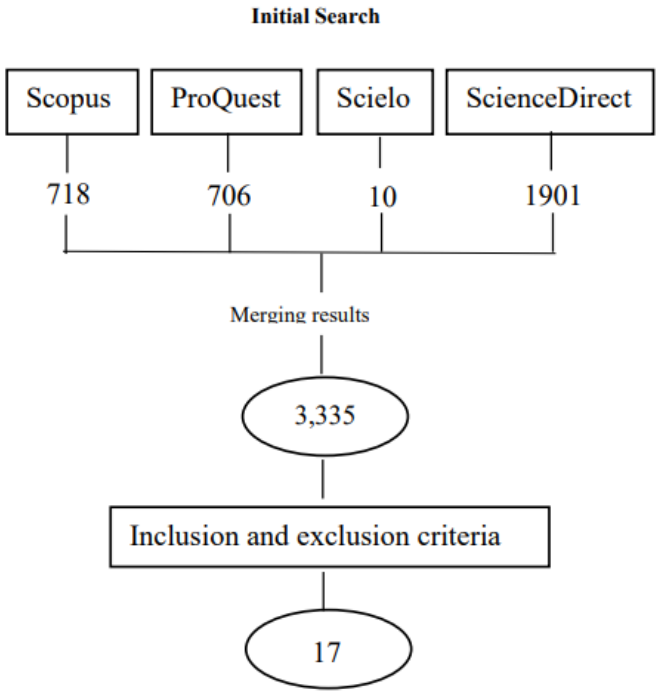

FIGURE 10: Complete process of the selection of definitive works.

In this section we focus on synthesizing the information recorded in the works obtained in the search process in order to answer the three research questions that were previously formulated.

RQ1: What instruments were used to measure early childhood development over the past 5 years?

To obtain the results to this question, it has been considered convenient to group the articles according to scales of measurement of early childhood development during the last 5 years that will be detailed in Table 5 and Table 6.

TABLE 5: Articles on measuring early childhood development

Measurement scale	**Articles**
Bayley	(5), (6), (7), (8)
Psychomotor Development Test (TEPSI)	(9), (10), (11), (12)
Battelle Developmental Inventory-Jean Newborg	(13), (14), (15)
National Test of Research for Child Development (PRUNAPE)	(16), (17), (18)
Developmental abbreviation	(19), (20), (17)

Table 6: Articles by year on measuring early childhood development

Year	**Articles**
2016	(9), (13), (21)
2017	(22), (17), (8), (23), (14), (5)
2018	(16), (12)
2019	(20), (15), (18), (11)
2020	(19), (6)

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FIGURE 11: Chart of classification of articles by year.

RQ2: Who were the most cited authors on measuring early childhood development over the past 5 years?

The articles reviewed are mostly written by various authors, to obtain the number of citations were located each of the authors in Google Scholar finding the number of citations with the name of the author and the article since these were previously filtered to appear only during the last 5 years, the same process was carried out by the 16 authors shown in Table 7 in more detail, which have produced articles about augmented reality in the education sector.

TABLE 7: Classification of authors on the scales of measurement of early childhood development.

Author	**Article**	**Number of citations**
orchards and	(5)	16
Castro F	(20), (19)	7
Guil R	(22)	4
Ponce J	(8)	3
Robles MA	(10)	3
Vargas G	(9)	1
White A	(17)	1
Cárcamo RA	(15)	1
Jimenez AM	(18)	1
Mareovich F	(13)	1
Gomez MV	(16)	1
Gonzalez A	(14)	1
Garcia A	(11)	1
Vasquez N	(21)	1
Riggs and	(12)	1
Trujillo FA	(6)	1

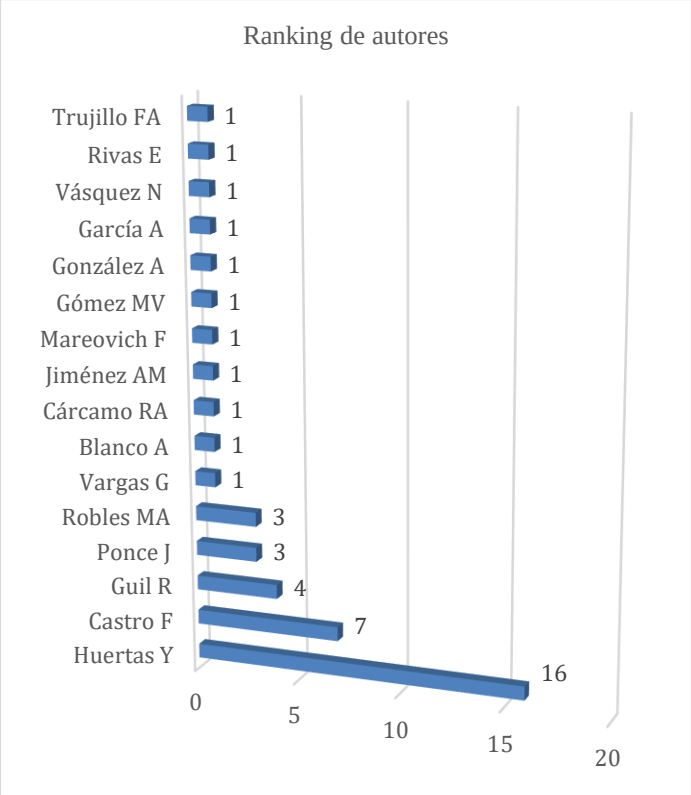

FIGURE 12: Graph of the ranking of authors by their number of citations about scales of measurement of early childhood development

RQ3: What were the countries where the most research on measuring early childhood development has been published during the last 5 years?

Table 8 shows the ranking of which countries have published the most research on scales of measurement of early childhood development during the last 5 years (2015-2020).

TABLE 8: Classification of articles by country.

Country	**Article**	**Number of articles**
Spain	(17), (11), (21), (6)	4
Mexico	(5), (20), (9), (19)	4
Colombia	(22), (18), (16)	3
Chile	(15), (14), (12)	3
Argentina	(10), (13)	2
Peru	(8)	1

Of the 17 articles reviewed, papers were found with a great diversity of countries divided into two geographical regions. In Latin America, as shown in Figure 13 the country that stands out is Mexico with more articles and the geographical region of Europe, as shown in Figure 14 the country that has the most publications is Spain.

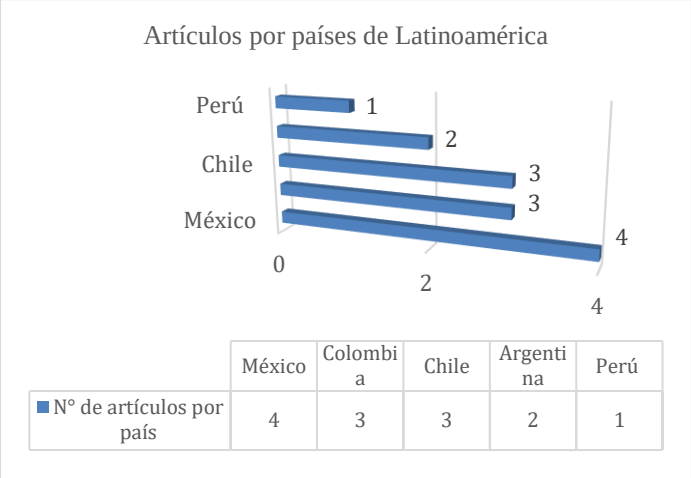

FIGURE 13: Chart of articles by Latin American countries.

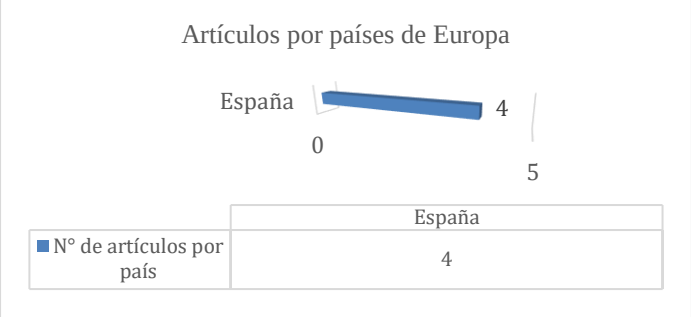

FIGURE 14: Chart of articles by European countries.

DISCUSSION

In this research, the scales of measurement of early childhood development were found as an important point as a result of various investigations during the last 5 years, which reflects a greater trend in two types of scales that are the Bayley scale, followed by the Psychomotor Development Test (TEPSI). During the years 2015 to 2020, the years that stood out were two: 2017 and 2019; one with 6 publications and the other with 4 publications, however in 2018 and 2020 2 publications were made.

Regarding the authors who stand out for their number of citations in measuring early childhood development, there are five. Among them the author Huertas Y with 16 citations, then the author Castro F with 7 citations, then Guil R with 4 citations and followed by Ponce J with a total of 3 citations and finally Robles MA with 3 citations. This perception alludes that there are not many authors specialized in the area, since of all those mentioned only one has published at most two articles on the subject and the rest have published at least one scientific work on scales of measurement of early childhood development.

On the other hand, it was found that 6 is the total number of countries where scientific articles referring to the research topic have been published. In Latin America the country that tops the list is Mexico with 4 articles and in Europe, the country that stands out is Spain with 4 articles. Therefore, it can be said that Spain and Argentina have a clear advantage over more research publications on scales of measurement of early childhood development during the last 5 years.

In conclusion, child development is a commitment of all, due to its complexity and dependence on each of its authors, measuring it is not an easy task. It is necessary to include in detail the different dimensions in which it develops in individual, in order to objectively understand the particular process that each child has. Therefore, instruments are required that integrate each of the spheres of the development

of the individual, providing significant value for it. It is necessary in our context, to validate and standardize instruments that allow a more complete evaluation of the child from birth to infant age. In addition, some adaptations can be included for special cases, after doing the literature review I can conclude that the best scale used as an instrument for assessing mental and psychomotor development at an early age is the Bayley Scale.

It is recommended that our country delve into the Bayley scale and propose its validation and implementation for its multiple benefits as a global tool for the assessment of child development.

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None.

Conflict of interest
The author declares that she has no conflict of interest.

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