



Boletín Médico del Hospital Infantil de México (English Edition)

www.elsevier.es/bmhim

RESEARCH ARTICLE

Curriculum analysis and comparison between strategies or programs for early childhood development in Mexico[☆]

Guillermo Vargas-López^{a,*}, Jessica Haydee Guadarrama-Orozco^b,
Antonio Rizzoli-Córdova^c, Francisco Javier Narcizo-Cenobio^a,
Gerónimo Medrano-Loera^a, Daniel Aceves Villagrán^d, Gabriel O'Shea Cuevas^e,
Onofre Muñoz Hernández^b

^a Unidad de Investigación en Medicina Basada en Evidencias, Hospital Infantil de México Federico Gómez, Mexico City, Mexico

^b Dirección de Investigación, Hospital Infantil de México Federico Gómez, Mexico City, Mexico

^c Unidad de Investigación en Neurodesarrollo, Hospital Infantil de México Federico Gómez, Mexico City, Mexico

^d Dirección General del Programa Oportunidades, Comisión Nacional de Protección Social en Salud, Mexico City, Mexico

^e Comisión Nacional de Protección Social en Salud, Secretaría de Salud, Mexico City, Mexico

Received 23 October 2015; accepted 23 October 2015

Available online 27 March 2016

KEYWORDS

Child development;
Curriculum analysis;
Strategies or
programs;
Mexico.

Abstract

Background: Most of the strategies or programs that support early childhood development in Mexico are independent efforts that vary in scale, services offered and means to providing them. For the evaluation of the quality of these programs, an important aspect is the curriculum content. The aim of this study was to analyze and compare the curriculum content of the different strategies or programs focused on the promotion and intervention of early childhood development, which are offered by the Federal Government in Health and Education sectors in Mexico. **Methods:** We conducted a review of the curriculum content of the strategies and programs. The qualitative phase consisted of a comparative analysis where 75 indicators proposed by the Inter-American Development Bank were identified. The quantitative phase consisted of a descriptive analysis of the indicators. Finally, the analyses were compared to establish the performance of each one.

[☆] Please cite this article as: Vargas-López G, et al. Análisis y comparación curricular de las estrategias o programas para el desarrollo infantil temprano en México. Bol Med Hosp Infant Mex. 2016;73:90-104.

* Corresponding author.

E-mail: zucca@live.com.mx; gvargas@himfg.edu.mx (G. Vargas-López).

PALABRAS CLAVE

Desarrollo infantil;
Análisis curricular;
Estrategias o
programas;
México

Results: Six strategies or programs were identified. In the analysis of the presence of indicators, the Oportunidades de Aprendizaje (Learning Opportunities, LO) strategy showed a larger number of indicators. In the amplitude analysis, both PEI-CONAFE and LO were the best balanced. Finally, in-depth analysis of the indicators LO and Skills for life were the best balanced while PEI-CONAFE was the best balanced in the social-emotional area, CeNSIA program for language and LO for cognitive development area.

Conclusions: LO strategy showed the closest level of contents established by the Inter-American Development Bank.

© 2016 Hospital Infantil de México Federico Gómez. Published by Masson Doyma México S.A. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Análisis y comparación curricular de las estrategias o programas para el desarrollo infantil temprano en México

Resumen

Introducción. La mayoría de las estrategias o programas que apoyan el desarrollo de la primera infancia en México son esfuerzos independientes que varían en escala, servicios que ofrecen y modo de proporcionarlos. Para la evaluación de la calidad de estos programas, un aspecto de suma importancia es el contenido curricular. El objetivo de este estudio fue realizar un análisis y comparación curricular de las distintas estrategias o programas enfocados en la promoción e intervención del desarrollo infantil temprano que ofrece el Gobierno Federal en los sectores Salud y Educación en México.

Método. Se realizó una revisión de la información de los contenidos curriculares de las estrategias o programas. La fase cualitativa consistió en un análisis documental comparativo con un ejercicio hermenéutico donde se identificaron los 75 indicadores propuestos por el Banco Interamericano de Desarrollo. La fase cuantitativa consistió en el análisis descriptivo de los indicadores. Finalmente, se hizo la comparación de los análisis para establecer el desempeño de cada uno.

Resultados. Se identificaron seis estrategias o programas. En el análisis de la presencia de indicadores, la estrategia Oportunidades de Aprendizaje (OA) fue la que presentó un mayor número de indicadores. En el análisis de amplitud, tanto PEI-CONAFE como OA fueron los mejor balanceados. Por último, en el análisis de profundidad de los indicadores, OA y Habilidades para la Vida fueron los mejor balanceados, mientras que PEI-CONAFE resultó el mejor balanceado para el área socio-emocional, CeNSIA para lenguaje y OA para el área cognitiva.

Conclusiones. La estrategia OA fue la que garantizó un mayor acercamiento a los contenidos establecidos por el Banco Interamericano de Desarrollo.

© 2016 Hospital Infantil de México Federico Gómez. Publicado por Masson Doyma México S.A. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Without any doubt, the first years of life are the most critical in terms of development of children as human beings. This is a short but unique period of life, during which it is possible to stimulate the potential of individuals in cognitive and non-cognitive areas since the basic formative processes of human beings are closely linked to early experiences of life. Therefore, it turns out to be the most significant period in the formation of the individual and it is key for the development of human capital¹.

Stimulated children tend to show a greater development in the physical area and sensory systems (vision and hearing); on the other hand, they tend to show a greater ability for learning at later ages. The importance of investing in the development of children during their first

years of life has been widely documented by specialized literature².

It is estimated that more than 200 million children < 5 years of age who live in developing countries will not be able to achieve their maximum potential of development due to poverty and precarious conditions in their health and nutrition. These children are likely to have a poor school performance and limited economic opportunities in adulthood, perpetuating poverty and social inequality which will have serious implications for the growth and development of those countries³.

In Mexico, as in the whole world, significant changes that involve redefinition of roles of institutions aimed to support families—care centers, schools and health centers—have occurred, assuming a greater responsibility for the development and well-being of children. This responsibility was

Table 1 Childhood development skills in the physical/motor domain (0-36 months)

Skill	Definition
Attention	The progressive interest in a stimulus from the outside that is perceived through the senses
Physical abilities	Development of physical condition (resistance, strength) and behaviors (interest, participation) that contribute to physical fitness
Spatial awareness	The ability to understand spatial relationships with themselves and the world that surrounds them
Body control	The recognition and regulation of eating, sleeping and elimination cycles
Cooperation in self-care routines	The ability to participate in activities of self-care
Sensory processing	The ability to receive information from the world around them through the senses (touch, smell, taste, sight, and hearing). This includes the experimentation with various materials, flavors and sounds
Sensory integration	The ability to perceive information from the world through the senses, and to integrate it with previous knowledge and experiences
Fine motor	The development of precise movements with hands. This includes reach, grip, handling and transfer of objects from one hand to the other
Gross motor	Physical activities involving control, coordination, and balance of the body and limbs. This includes holding up the head and neck, rolling over with their entire body, resting on their stomach, sitting, standing and jumping, among others
Nutrition	Healthy nutritional habits by identifying, eating and enjoying of nutritious foods. In addition, it creates conditions to help them understand the importance of eating healthy foods
Reflexes	The development of involuntary responses to external stimuli. This includes suction and gripping objects in the palm of their hand, among others
Personal care routines	Personal care and hygiene habits, such as washing their hands and brushing their teeth

assumed through the creation of various strategies, programs, services or actions that favor the early childhood development (ECD), which only concerns children < 5 years of age, and are consolidating as a mechanism to improve life conditions of children and their families.

However, most of these strategies or programs that support ECD are independent efforts that vary in scale, services offered and means of providing them. The term 'quality' in these programs also varies considerably, as it may be inferred. Each program sees the definition of this concept through the prism of its context, opportunities and needs.

For governments, to improve quality usually means to ensure that the highest standards are set and that the development and learning of children are in accordance to their objectives. For the evaluation of the quality of these programs, various sectoral initiatives which intend to use indicators that represent a particular vision of the world on what is desirable in each program have arisen. An extremely important aspect—but unfortunately forgotten within this evaluation of quality—is the curriculum content, which importance lies in the setting of objectives and, therefore, desirable goals in pro of ECD⁴.

The objective of this study was to conduct the analysis and curriculum comparison of different strategies or programs focused on the promotion and intervention of ECD offered by the Federal Government in health and education

sectors in Mexico. This type of analysis will allow the recognition of strengths and weaknesses in the curriculum content of current programs focused on ECD operating in Mexico and, similarly, to give solid recommendations (based on evidence) for the creation of new curriculum contents seeking to actually have an impact on Mexican children.

2. Methods

We conducted a qualitative and quantitative study. Initially, the strategies or programs that exist in Mexico were reviewed; only those programs offered by the Federal Government in health and education sectors responsible for promoting and/or intervene in the ECD in children < 5 years were grouped and analyzed. The information of its curriculum contents, operating rules, standards and evaluations (impact, operational and satisfaction) was used as well as other secondary sources (internet). Despite having broad coverage and being crucial for children < 5 years of age, those which did not include any component for ECD were excluded.

The qualitative phase was developed after obtaining the required information. This consisted of a comparative documentary analysis with a hermeneutic exercise of multiple sources of data where two researchers identified, independently, each of the 75 indicators proposed by the Inter-

Table 2 Childhood development skills in the social/emotional domain (0-36 months)

Skill	Definition
Cooperative learning	The aptitude to start and maintain learning activities with peers and adults. This includes asking their caregivers for help when they need it
Self-control	The ability to accept change, control their behavior and behave in an acceptable manner when something is not satisfying to them. This includes the capacity to control impulses and adapt their behavior to new daily routines, spaces or circumstances
Self-concept	To understand his own characteristics, such as name, age, sex, preference for objects or activities. This includes self-concept as a member of a family, a community and a particular cultural group
Environmental awareness	The capacity to undertake actions that contribute to environmental protection and preservation of natural resources
Self-awareness	The ability to progressively recognize himself as a unique being. It includes the recognition of his own image in the mirror, the possibilities and characteristics of his own body, and the use of words as "I" and "mine"
Self-confidence	The ability and desire to initiate, develop and complete individual and group activities in a successful and satisfactory manner. It includes the recognition and strengthening of their autonomy
Empathy	The ability to recognize, show interest, and understand the feelings and needs of peers and adults. They express affection and concern for others, and at the same time they seek to comfort them
Expression of emotions	The ability to identify, name and express feelings and emotions
Initiative	The desire and the ability to initiate a routine or a learning activity
Interculturalism	The ability to relate to self-cultural expressions and establish equitable relationships with other community members
Interest and exploration behavior	An attitude of search, interest and curiosity for situations and materials of their environment
Innovation and creativity	The ability to generate ideas and approach to already known activities in an innovative way
Play	The ability to enjoy and participate in individual or collective leisure activities
Social play	Social skills to enjoy and successfully participate in leisure activities with their peers
Being part of a group	The skills and interest to be included and take part in activities that promote their belonging to a particular group
Persistence	The continuous interest in an activity despite the difficulties that it may represent. It implies the desire and the ability to complete an activity along with the ability to overcome initial frustration
Emotion regulation	The ability to manage feelings and emotions produced either by personal or external motivations
Relationship with adults	The development of behaviors and attitudes to make the start and maintenance of affective relationships with adults easier
Relationship with peers	The development of behaviors to make the start and maintenance of affective relationships and friendship with their peers easier. It includes sharing, collaborating, initiating interactions, among others
Problem solving	The ability to reach agreements with their counterparts through dialogue
Emotional attachment	The skills associated with the attachment to their caregivers. It includes the ability to differentiate between primary and secondary caregivers, the search for closeness with caregivers and the experimentation of satisfaction to be in contact with them. It also involves the ability to separate from their caregivers with ease and to make use of a figure of attachment to respond to an unknown situation
Will to try	The ability to accept challenges. It includes the will to put into practice ideas or behaviors in new situations or when the answer or solution is not clear

American Development Bank (IDB) within the curriculum content of each strategy or program⁵. These 75 indicators were divided into two sections, one from 0 to 36 months and

another from 36 to 60 months, altogether assessing four domains of development: physical/motor, social/emotional, language and cognitive (Tables 1-8).

Table 3 Childhood development skills in the language domain (0-36 months)

Skill	Definition
Arts	The exploration and use of materials and techniques for the production of visual representations and objects that allow the expression of ideas and feelings. It includes the enjoyment of their own artistic productions and of others
Comprehension	The ability to understand and communicate ideas and to answer questions related to the content of stories they have heard or read
Communication in a second language	The ability to communicate thoughts, feelings or needs in a language different from the mother tongue
Nonverbal communication	The ability to communicate thoughts, feelings or needs through gestures and body language
Verbal communication (expressive)	The ability to communicate thoughts, ideas or needs through spoken language. It includes the use of babbling and words to convey messages to family members and caregivers
Verbal communication (receptive)	The ability to identify and progressively understand verbal expressions and its sounds. It includes understanding the communicative intention of others, the ability to listen to others and follow instructions
Alphabetical awareness	The ability to identify the letters of the alphabet
Phonological awareness	The ability to manipulate sounds, understand that words are made of sounds and associate words with sounds. It includes the reproduction of animal sounds and vocal games
Speech	The ability to use oral language according to generally accepted standards. It includes proper use of the syntax, the progression from babbling to the use of words and from short sentences to more complex phrases
Music	The exploration and expression of ideas and feelings through their voice, body movements (sense of rhythm) and the use of musical instruments
Motivation to read and write	To enjoy and explore various forms of oral and written language. It includes to listen to and create stories, play with words, ask an adult to read a specific story and manipulate several kinds of printed materials
Writing process	The ability to progressively express through written language. It includes the progression from scribbling to the construction of letters and written words
Narrative sequence	The ability to understand a story sequence (beginning, middle and end) and retell it taking into account that the narrated events are the result of other actions. It includes the ability to identify the characteristics of a tale
Use of images	The ability to identify images and symbols in a progressive manner. It includes the ability to understand that they can be used to communicate thoughts, feelings or needs
Use of books	The ability to use books according to conventional forms of reading. It includes to hold the book in their hands and turn the pages
Social use of language	The ability to make use of language as an effective communication tool. It involves the use of language with a purpose, starting conversations with peers and adults, recognizing the differences between formal and non-formal communication environments, managing turn-taking and using different communication strategies when communication is not effective
Vocabulary and meaning of concepts	The ability to understand the meaning of the words and identify objects through verbal and nonverbal language. It includes the use of concepts such as high-low, large-small

Table 4 Childhood development skills in the cognitive domain (0-36 months)

Skill	Definition
Cause and effect	The ability to establish cause-effect relationships. It includes the ability to describe those transformations that occur in their environment and recognize the consequences of their actions on persons and objects that surround them
Natural sciences	The understanding of concepts and processes related to the environment. It includes the development of interest in topics related to the characteristics of living and non-living beings, different landscapes, the universe, among others
Social sciences	The understanding of the roles played by different members of the family and other groups in their community. It includes the knowledge about the past and present of their community and country
Comparison	The ability to compare characteristics of people, objects and events. It includes the ability to establish differences and similarities
Object recognition	The understanding of characteristics (weight, shape, color, size) and functions of things in their environment. It includes naming the usefulness and function of some tools and establish relationships between images and objects
Space recognition	The identification and location of important areas to themselves and their communities
Social conventionality	The ability to follow the rules of social behavior observed and shared in their community. It includes understanding and accepting limits, follow procedures and make proper use of shared spaces
Flexibility	The ability to adapt thought processes, skills and knowledge to new experiences
Formulation of hypothesis	The ability to process information, ask questions and anticipate the effects of a particular action. It includes the ability to make a guess about something that differs from a pattern
Imitation	The ability to reproduce sounds, movements, gestures and behaviors previously observed
Personal information	The ability to transmit information related to their personal history including the size of their family, the names of the members of their family and close caregivers, their address, among others
Exploratory game	The ability to interact in a playful way with objects and novel materials that allow him to explore a particular situation
Symbolic game	The ability to recreate playfully a particular situation through the adoption of roles and the imaginative use of the objects
Memory	The ability to recognize or remember voices, people, events, or information. It includes anticipating routines or activities carried out previously and tell stories already heard
Metacognition	The ability to reflect on their own thinking process
Logical thinking	Includes the experimentation with math concepts such as numbers, shapes, patterns, proportions, sets, time, quantities and measures
Object permanence	The ability to understand that a person or an object continue to exist even when they cannot be observed or may not be present
Planning and intentionality	The ability to carry out plans in order to achieve a particular goal. It includes the ability to anticipate actions
Problem solving	The ability to identify a problem and suggest various strategies in order to solve it. It includes trial and error tests
Safety	The ability to develop habits that allow them to take care of their health and personal safety

Table 5 Childhood development skills in the physical/motor domain (36-60 months)

Skill	Definition
Physical skills	The development of physical fitness (endurance and strength) and behaviors (interest and participation) that contribute to physical fitness
Functional performance	Physical competencies and skills to help themselves to carry out individual and collective activities and routines. It includes habits of personal care and hygiene, such as washing hands and brushing teeth
Motor skills	Fine, gross, oral and sensory skills
Nutrition	Healthy nutrition habits through the identification, enjoyment and consumption of nutritious foods. In addition, it creates conditions for children to understand the importance of eating nutritious foods

Table 6 Childhood development skills in the social/emotional domain (36-60 months)

Skill	Definition
Cooperative learning	The disposition to initiate and maintain learning activities with peers and adults. It includes requesting assistance to caregivers when it seems necessary
Self-efficacy	The belief on one's own ability and capacity to accomplish a task
Self-concept	The understanding of self-characteristics, such as name, age, sex, preference for objects and/or activities. It includes the concept of himself as a member of a family, a community and a particular cultural group
Environmental awareness	The ability to understand the surrounding world, including the concern for and action on behalf of environment and the preservation of natural resources
Empathy	The ability to recognize, show interest, and understand the feelings and needs of peers and adults, and express affection and concern for them and bring them comfort
Exploration and experimentation behaviors	Openness and curiosity for new tasks and challenges
Initiative, persistence and attention	Continuous interest in an activity in spite of the difficulties. It implies the desire and the ability to complete the learning activity or task, as well as to overcome frustration
Interculturalism	The ability to relate to self-cultural expressions and establish equitable relationships with other community members
Invention and imagination	The ability to use innovation and imagination as an approach to learning
Play	The ability to enjoy and participate in individual or collective leisure activities
Participation	The interest to be included and the skills to take part in activities that promote their belonging to a particular group
Emotion regulation	The ability to regulate and express their emotions appropriately (verbal and nonverbal communication of their attitudes and feelings)
Relationship with adults	The development of behaviors and attitudes that indicate the connection/relationship with adults
Relationship with peers	The social skills needed to cooperate with their partners along with the ability to form and maintain reciprocal friendships
Problem solving	The ability to reach agreements with their counterparts through dialogue

Table 7 Childhood development skills in the language domain (36-60 months)

Skill	Definition
Communication in a second language	The ability to communicate thoughts, feelings or needs in a language different from the mother tongue
Comprehension	Understanding of basic literacy-related contents
Nonverbal communication	The ability to communicate thoughts, feelings or needs through gestures and body language
Listening	The ability to follow oral instructions
Alphabetical awareness	The ability to recognize the letters of the alphabet
Use of books	The ability to read from left to right, hold the book and turn the pages correctly
Use of images	The ability to recognize his written name at the time he is aware of the connection between the text and the oral narration and text symbols
Use of literature	The interest in literature. It also includes to remember and tell family stories
Creative uses of nonlinguistic activities	The ability to listen to songs, rhyming words and stories
Creative expression (nonlinguistic)	The exploration and use of materials and techniques for the production of visual representations and objects that allow the expression of ideas and feelings. It includes enjoying his own artistic productions and those of others
Phonological awareness	The ability to discriminate and identify sounds and formulate words
Speech	The ability to communicate verbally. It focuses on the mechanics of the language and not on what it is communicated
Music	The exploration and expression of ideas and feelings through their voice, body movements (sense of rhythm) and the use of musical instruments
Ask questions	The ability to ask questions and seek answers through active exploration
Writing process	The ability to produce scribbles that respond to a given order
Narrative sequence	The ability to understand a story sequence (beginning, middle and end) and retell it taking into account that the narrated events are the result of other actions. It includes the ability to identify the characteristics of a tale
Social use of language	The ability to make use of language as an effective communication tool. It involves the use the language with a purpose, starting conversations with peers and adults, recognizing the differences between formal and non-formal communication environments, managing turn-taking and using different communication strategies when communication is not effective
Technology	The ability to use or explore technology
Vocabulary and meaning of concepts	The ability to understand the meaning of the words and identify objects through verbal and nonverbal languages. It includes the use of concepts such as high-low, large-small, mixed

Table 8 Childhood development skills in the cognitive domain (36-60 months)

Skill	Definition
Social awareness	The ability to be conscious of himself, his family and their community. To be aware of the environment and nature
Social conventions	The knowledge of established rules that are accepted as a guide for social conduct, in addition to the conventions which operate in the learning space
Logical thinking	The knowledge constructed in the mind of the individual that allows him to establish resemblances, differences, and associations between objects, events or persons
Representational thought	The knowledge of real objects learned by observation and experience with the physical world that surrounds him. The ability to think on things that are not present
Reflection and interpretation	The ability to learn from past experiences and the use of this knowledge in new situations, to generate ideas and/or suggestions and make predictions
Safety	The ability to develop habits that allow them to take care of their health and personal safety

These indicators present the following characteristics:

- They respond to the objectives proposed in this study
- They are short and precise
- They evaluate only one aspect of the program

Different opinions regarding the identification of indicators in any area of the curriculum contents were reviewed and agreed on.

The quantitative phase consisted of the descriptive analysis of the indicators which included the following information:

- Presence of indicators: percentage of indicators for each domain present within the curriculum content of the strategy or program.
- Amplitude of indicators: percentage of the total curriculum content of the strategy or program dedicated to each domain according to IDB indicators.
- Depth of indicators: percentage of each indicator in the curriculum content of the strategy or program in every domain according to IDB indicators.

Finally, the comparison of the previously described analysis was made to establish the performance of each strategy or program according to the indicators. Microsoft Excel 2013 statistical software was used for the quantitative analysis.

3. Results

A total of six strategies or programs of health and education sectors were included in the analysis. These programs or strategies were the Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health (CeNSIA, for its Spanish acronym), Community Workshops for Self-care in Health (TCAS, for its Spanish acronym) from the Social Inclusion Program (PROSPERA, for its Spanish acronym), Growing and Learning Together (CyAJ, for its Spanish acronym) and Learning Opportunities (OA, for its Spanish acronym) from the National Commission for Social Protection in Health (CNPSS, for its Spanish acronym), Skills for Life (HV, for its Spanish acronym) from the Popular Health Insurance, and the Non-schooled Initial Education Program from the National Council for Education Develop-

Table 9 Description of the strategies or programs included in the analysis

Program or strategy	Description
Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health	It is a program developed by the National Center for the Health of Children and Adolescents. It consists of workshops where 2 to 10 mothers with their children who are in the same stage are scheduled. They should come once every 3 months (1, 4, 7, 10, 13, 16, 19 and 22 months of life). Activities are taught to promote the development in gross motor, fine motor, social, and language areas. Emphasis is made on carrying out at home the activities learned by integrating them to the child's daily routine
Community Workshops for Self-care in Health	These are directed to beneficiary families from the Social Inclusion Program PROSPERA. Their aim is to contribute to the development and strengthening of a culture of health. They consist of a one-hour bimonthly face-to-face workshop for 25 participants. Nine health determinants grouped in 25 issues, which three of them are about ECD topics in children < 5 years are given
Growing and Learning Together. Early Childhood Development	It is a strategy developed jointly by UNICEF and the National Commission for Social Protection in Health (CNPSS) in which, through a series of materials (flipcharts, notebooks and videos), health centers and families monitor the development of language and social/emotional areas, fine and gross motor skills and nutrition in children from 0 to 5 years. They are organized in nine stages
Learning Opportunities	It is a strategy developed by the CNPSS that arises after the need to care for children with development lag detected by the Child Development Evaluation (CDE) test. It is directed to children < 5 years and organized into nine groups of age. It is given weekly as a workshop group aimed at parents and caregiver-child dyads for only 3 months. Activities are designed to stimulate development milestones of an earlier age group according to the CDE test. Fine motor, gross motor, language, social-emotional, and cognitive areas are addressed
Skills for Life	Skills of Life development model was developed by the Popular Health Insurance concerned to promote exclusive breastfeeding for the first six months of life, prevent the sudden infant death syndrome and promote cognitive development in children. This model was aimed at the training of health personnel to provide, through group workshops with experiential and participatory techniques, tools to generate a healthy childhood development, since their birth until they reach one year of life
Non-schooled Initial Education Program from the National Council for Education Development	Under the Ministry of Public Education, the National Council for Education Development created a program that uses a series of actions to build the capacity of mothers or caregivers to improve the care of children from 0 to 4 years of age and to promote early stimulation in the poorest households in rural areas of the country through a series of group sessions designed considering the learning characteristics of the adults, and promoting the practical understanding of the possibilities to stimulate child development within the daily activities of the home and community. Parent group sessions are carried out throughout a weekly session (on average) during an 8-month period in a schedule agreed by them

ment (PEI-CONAFE, for its Spanish acronym). Table 9 shows a brief description of each one of these strategies or programs.

3.1. Analysis of the presence of indicators

Following the completion of this analysis, it was observed that none of the strategies or programs analyzed contained 100% of the indicators in the four domains proposed by the IDB. OA strategy showed the greatest number of these indicators, with 100% (12/12) indicators for physical/motor skills, 90.9% (20/22) for social/emotional skills, 76.5% (13/17) for language skills and 70% (14/20) for cognitive skills; while CeNSIA showed the least presence of indicators in all the

areas (Figure 1). On the other hand, two particular aspects draw our attention:

- The clear trend of an increased presence of physical/motor indicators in all programs or strategies analyzed, ranging from 50 to 100%.
- The negligible presence of the cognitive domain indicators in the vast majority of these programs or strategies.

3.2. Analysis of the amplitude of indicators

Following the completion of this analysis, it was noted that there is a tendency of strategies or programs to allocate a greater percentage of their contents for the physical/motor

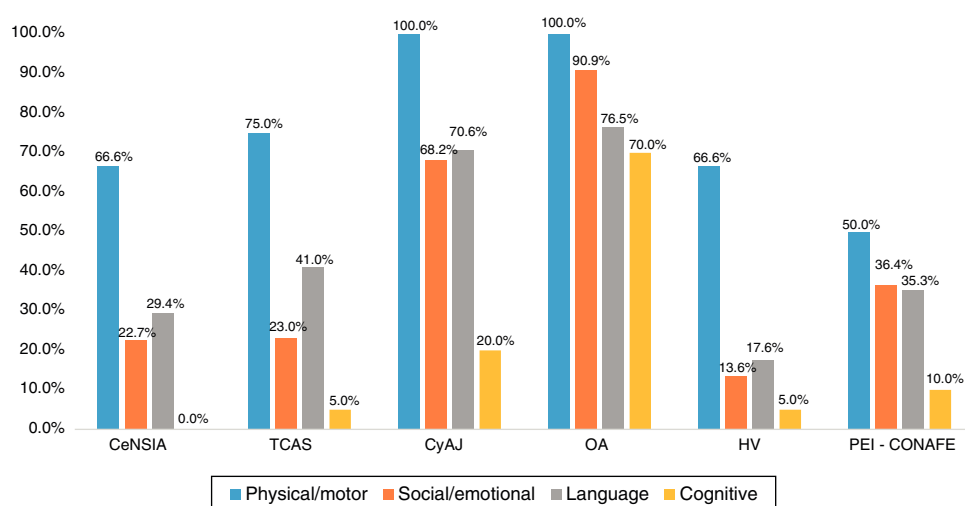


Figure 1 Presence of indicators in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

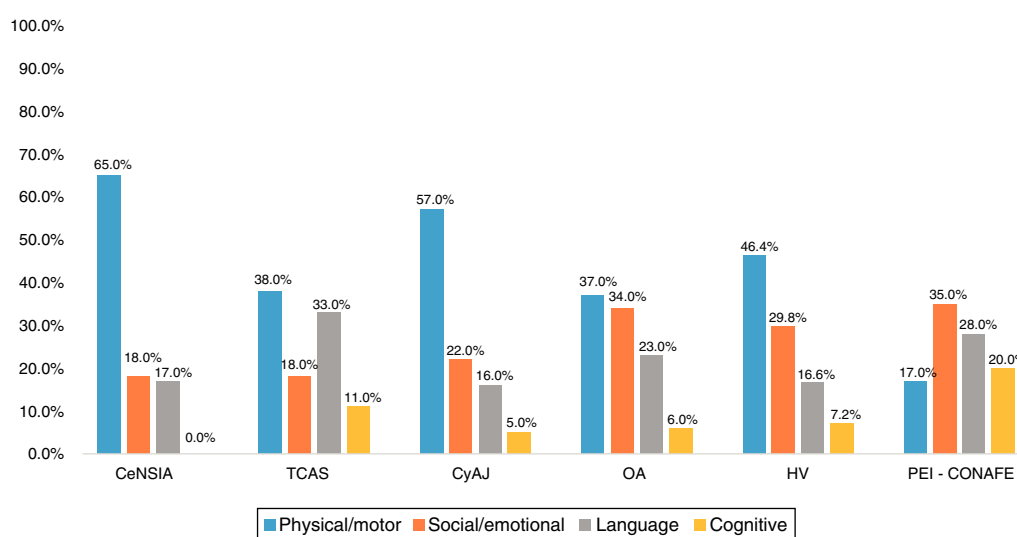


Figure 2 Amplitude of indicators in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

domain. The exception was the PEI-CONAFE program, which allocated the highest percentage of its curriculum to the social/emotional domain (35%). On the other hand, no strategy showed an amplitude balance in its contents and the majority dedicated a low or null percentage in the cognitive domain. Those better balanced programs were PEI-CONAFE and OA, while CeNSIA was the most unbalanced (Figure 2). It should not be forgotten that this is a general picture of the curriculum of both strategies, and the amplitude of indicators may behave differently according to the different ages at which they are directed to.

3.3. Analysis of the depth of indicators

For this analysis, the main indicators for each of the four domains were chosen according to the criterion of the researchers.

3.3.1. Physical/motor domain

The following indicators were selected for this domain:

- Attention
- Sensory processing
- Sensory integration
- Gross motor skills

We observed a great variability in the percentage that these indicators are addressed by the programs or strategies. In contrast to others, OA and HV are those which include these four indicators in a relatively balanced way (Figure 3). It is worth noting that all programs or strategies analyzed have a preferential predominance by aspects of gross motor skills (20-41.6%) and a frank tendency to not address the indicator of attention (2-17.9%).

3.3.2. Social/emotional domain

For this area the following indicators were selected:

- Initiative
- Empathy
- Expression of emotions
- Interest and exploration behavior

In this area, it was found that indicators are addressed poorly. The vast majority do not address the indicators “initiative” and “expression of emotions”. On the other hand, the only indicator that is approached consistently by the curriculum of all strategies or programs is the “interest and exploration behavior” (Figure 4). PEI-CONAFE was the better balanced in these indicators, despite treating them very little within its curriculum.

3.3.3. Language domain

The following indicators were selected for this domain:

- Non-verbal communication
- Verbal communication (receptive and expressive)
- Speech
- Music

The indicators in this area are heterogeneous in the curriculum content of the different programs analyzed. CeNSIA is the only program that shows a balanced approach of them, while HV only addresses “speech” (64%) and “music” (21%) indicators (Figure 5). While these aspects of language are practically treated in the same way, it is worth noting that there is a slight tendency to prefer the aspects of “speech” over “verbal communication”.

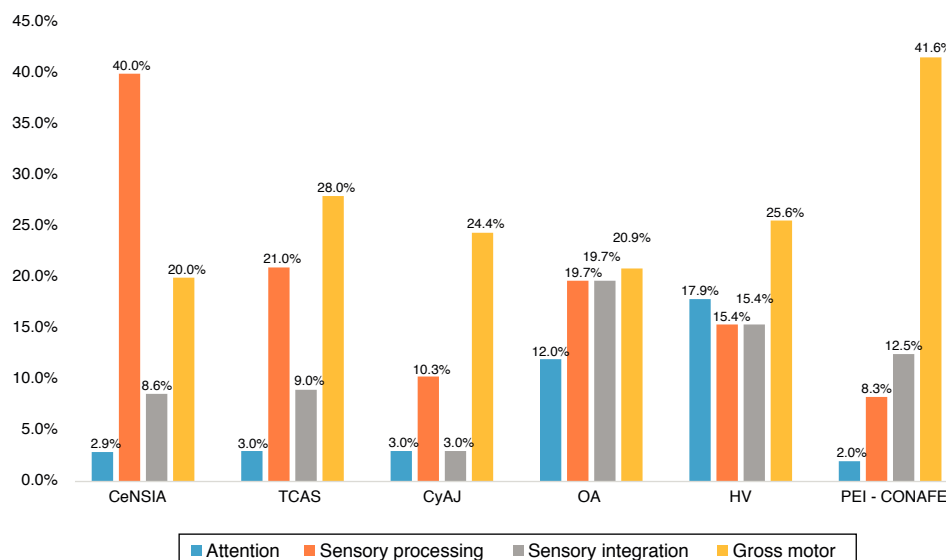


Figure 3 Depth of the main indicators of the physical/motor domain in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

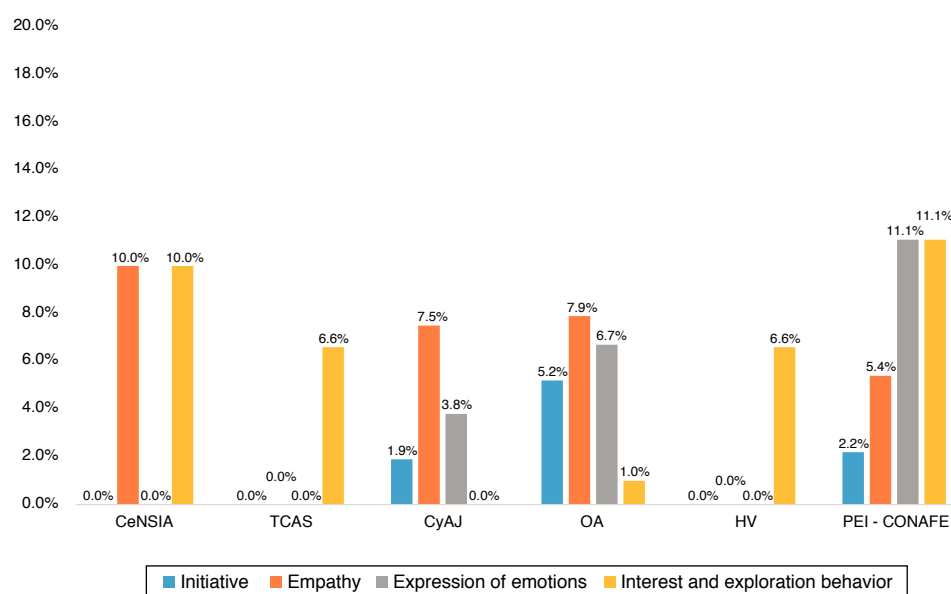


Figure 4 Depth of the main indicators of the social/emotional domain in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

3.3.4. Cognitive domain

The following indicators were selected for this area:

- Imitation
- Symbolic game
- Permanence of objects
- Personal information

Indicators in this area are practically null in the curriculum content of the analyzed programs. OA is the only program that shows a relatively balanced approach of them; CyAJ only approaches the indicator “imitation” (16.6%) and the rest of the programs or strategies do not address any of the other indicators (Figure 6).

4. Discussion

In Mexico, several programs or strategies to promote ECD and improve life conditions of families have been developed. Policies for early childhood have been designed and implemented by a variety of institutions that relate to different secretariats of the Federal Government, as the Secretariat of Health and the Secretariat of Public Education, therefore are independent efforts that vary in scale, services offered and means to providing them⁶.

According to the proposal of Peralta and Fujimoto⁷—in which the “relevance of content” is one of seven conditions that early childhood programs must meet—in this analysis the vast majority of programs or strategies showed a predominance in the presence of indicators of the physical/motor domain, the partial presence of both social/emotional and language domains and a poor presence of

the cognitive domain. There is no complete certainty of the causes that have led to this situation. However, as a situation that does not only occur in our country, it can be assumed that it is mainly due to the predominance of the psychomotor therapy approach (which is purely physical and motor) of those who design and implement the curriculum content. This makes it necessary to consider that the approach of ECD in Mexico is currently focused on a single vision within a large number of currents, each one with a very particular point of view to understand and address childhood development. Physicians, rehabilitation physicians, therapists and psychomotor therapists have a very particular way to understand and address ECD; therefore, there is the need to include other figures, such as teachers and psychologists, for the construction of interventions and actions focused on stimulation. An example of the above, which was constructed by a group of physicians, psychologists, educators and language therapists and showed a good performance in the presence of indicators, was the OA program.

Furthermore, the amplitude of indicators analysis showed that, on the one hand, the vast majority of programs are unbalanced in their content, with a predominance of the physical/motor domain; on the other hand, the only balanced program was PEI-CONAFE (17% in the physical/motor area, 35% in social/emotional area, 28% in the language domain and 20% in the cognitive domain). These percentages may lead to consider a holistic view in the distribution of its content yet not in the quantity of indicators, since the presence of indicators of all areas within the curriculum reached only 50%. Given this, it is important to consider not only the richness and variety of the content, but also the number of times it is worked within each area.

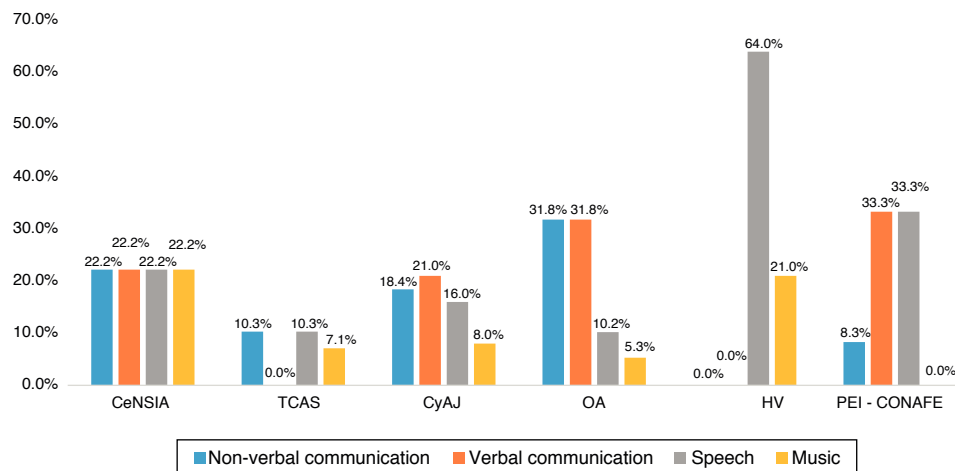


Figure 5 Depth of the main indicators of the language domain in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

Although it is desirable to have a balanced content, the particular conditions of children should be considered first. Elvir and Ascencio proposed that early learning programs should be designed according to the development of children, respond to the social context in which they are immersed and implement pedagogies that place children in the center of each activity.⁸ According to this, the construction of curriculum content should be based in population studies on the conditions and development of children that will be addressed. In 2014, Rizzoli-Cordoba, et al.⁹ reported that 29,484 children under 5 years of age in the state of Guanajuato, Mexico, were evaluated with the Child Development Evaluation (CDE) screening test. From these children, 79.9% showed normal development; 14.9%, developmental lag; and 4.2%, risk of developmental delay. In the groups with developmental lag and risk of delay, a higher prevalence of problems in the gross motor area was noted in the first year of age; in the area of language, in the second year of age; and in the cognitive area, during the third and fourth years of life. These data were consistent both in rural and urban populations. This makes it necessary to consider the construction of not-balanced curriculum contents aimed to strengthen the particular weaknesses in different periods of child development: in the first year of life focused on the physical/motor area; in the second year focused on language; and during the third and fourth year focused on the cognitive area.

With respect to the analysis of depth we have verified the indicators, and therefore the primary actions necessary to work in each of the areas for the different curricula contents analyzed. In general, the indicator with the highest presence was the gross motor followed by development and sensory integration within the physical/motor domain. As stated before, we consider that this preponderance is due to the strong psychomotor trend in the construction of the curricula. In our opinion, emphasis to this area should continue during the first year of life but not exclusively for the gross motor indicator. It is important to remember that motor and

sensory-perception skills develop in a reciprocal way, parallel to the process of maturation; the development of these functions is a starting point to establish milestones in other areas of the ECD.¹⁰

From the social/emotional domain, the interest and exploration behavior indicator was approached. Nevertheless, the aspects of initiative and empathy should not be left behind; particularly the latter, since poor empathy-related problems have been associated to various mental disorders.¹¹

In the area of language, it is noteworthy that the vast majority of the curricula focus on basic topics, such as speech, but actually not on the understanding and emission indicators (receptive and expressive verbal communication). It is well known that the problems of interpretation and expression of the language will have an impact on the academic processes of school age at older ages and, in general, in other skills or cognitive functions, such as working memory in the adult age.¹²

Finally, with regard to the cognition domain, virtually any program addresses aspects related to this area. During childhood and adolescence, the exposure to multiple socio-cultural risk factors impacts directly on children's cognitive development. Poor academic performance, poor employment opportunities in adult life and the inability to break cycles of poverty may come as consequences of the absence of actions or interventions focused on this area. It is essential that the curriculum contents of these programs or strategies focus on promoting indicators of this domain at all cost.¹³

On the other hand, our group has found some other interesting aspects in the curriculum contents which are not related to the indicators of the IDB but are worth mentioning:

- Within the strategies or programs revised none of them has a content aimed at preventing risk factors and promoting child development from the prenatal period. Intrauterine life span represents one of the most sensitive periods of the development of the child. It is known that the exposure to various adverse circumstances, such as

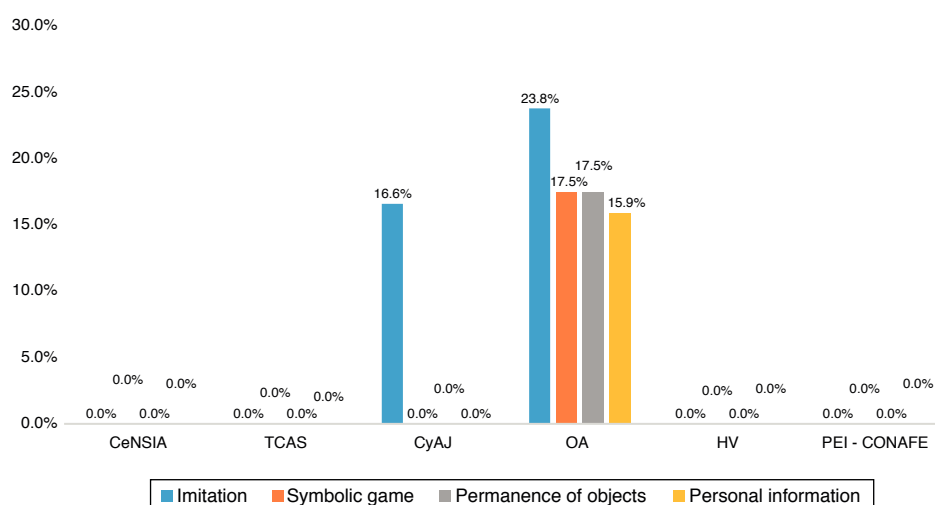


Figure 6 Depth of the main indicators of the cognitive domain in each of the strategies or programs focused on ECD from the Federal Government in the health and education sectors. CeNSIA, Technical Guidelines for Early Stimulation from the National Center for Child and Adolescent Health; TCAS, Community Workshops for Self-care in Health; CyAJ, Growing and Learning Together; OA, Learning Opportunities; HV, Skills for Life; PEI-CONAFE, Initial Education Program from the National Council for Education Development.

maternal depression, maternal malnutrition, restriction of intrauterine growth, among others, can influence immune/inflammatory processes that will impact directly on the postnatal development of the child.¹⁴ Our group proposes the construction of curriculum contents that may be evaluated from the prenatal period.

- All programs reviewed have a net approach to stimulation actions, but none of them shows a clear focus on parenting practices. There are several studies that demonstrated the existence of a link between the upbringing and the child's cognitive development. Specifically, some studies framed within the paradigm of development cognitive neuroscience found that changes in parenting practices may impact the neurodevelopment of children and, concomitantly, their behavior and their cognitive performance. An adequate family support with psychosocial favorable factors in the early childhood influence a greater volume of the hippocampus of both temporal lobes.¹⁵ We propose the creation of new curricula with a clear and direct focus on parenting practices.
- All the revised curricula showed efforts to stimulate a single milestone of development, or in other cases, to facilitate the acquisition of a single competition. The vision for addressing child development should be holistic, and comprehensive in all aspects and senses since cognitive, emotional and language development results from brain plasticity and integration of different areas through the years. As a result, no independent skills arise but a series of interconnected and interrelated milestones in different areas.¹⁶ We suggest to create, for future curriculum contents, activities that promote several developmental skills at the same time.

This analysis highlights the strengths and weaknesses of the curricular content of the main strategies or programs focused on the promotion and intervention of early childhood development offered by the Federal Government in the health and education sectors in Mexico.

OA is the strategy that guarantees a better approach to the contents established by the IDB. Therefore, in this review, OA is considered as a prototype of strategy since it fulfilled the diverse curriculum content analyses based on the 75 indicators from the IDB in the best way, while the rest complied partially with the proposed indicators. Despite this, it is important to strengthen the cognitive and language areas in all the programs.

It will be necessary to perform another type of analysis focused on operational aspects of the programs, such as the mode of delivery, location and teaching staff—since they can be offered at home, in community centers or in childhood development centers—as well as the type of program, resources, intensity of the intervention, goals and needs of the population served.

The need for multidisciplinary work with a holistic view of the curriculum of different strategies to give quality and variety in the aspects of intervention and stimulation to Mexican children is imminent.

Ethical disclosure

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that no patient data appear in this article.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Funding

External funds came from the agreement of collaboration between the Hospital Infantil de Mexico Federico Gomez

and the National Commission for Social Protection in Health from the Popular Health Insurance (agreement CNPSS/Art 1°/023/2013: Design of implementation and evaluation of the childhood development strategy for children < 5 years of age beneficiaries of the 'Oportunidades' program).

Conflict of interest

The authors declare no conflicts of interest of any nature.

Acknowledgments

To Dra. Fátima Adriana Antillón Ocampo, Lic. María Esther Valadez Correa, Dra. Hortensia Reyes Morales, Lic. Elías Hernández Ramírez and Ana Alicia Jiménez Burgos.

References

1. Molina H, Torres A. Gestión de Políticas y Programas de Desarrollo Infantil Temprano. Curso virtual para formadores de políticas y gestores de programas y proyectos. Banco Interamericano de Desarrollo; 2013. Available from: <https://indesvirtual.iadb.org/course/view.php?id=676>
2. Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B; the International Child Development Steering Group. Developmental potential in the first 5 years for children in developing countries. *Lancet*. 2007;369:60-70.
3. Walker S, Wachs TD, Gardner JM, Lozoff B, Wasserman GA, Pollitt E, et al. Child development: risk factors for adverse outcomes in developing countries. *Lancet*. 2007;369:145-57.
4. Myers R, Martínez A, Delgado MA, Fernández JL, Martínez A. Desarrollo Infantil Temprano en México: Diagnóstico y recomendaciones. Washington, D.C.: Banco Interamericano de Desarrollo. División de Protección Social y Salud; 2013. Available from: <http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=37427911>
5. Harris-Van Keuren C, Rodríguez-Gómez D. Pautas para el Aprendizaje en América Latina y el Caribe. Washington, D.C.: Banco Interamericano de Desarrollo. División de Protección Social y Salud, 2013. Available from: <https://publications.iadb.org/bitstream/handle/11319/3350/Pautas%20para%20el%20aprendizaje%20temprano%20en%20Am%C3%A9rica%20Latina%20y%20el%20Caribe.pdf?sequence=2>
6. Vegas E, Santibáñez L, Leroy de la Brière B, Caballero A, Hautier JA, Ruiz-Devesa D. The Promise of Early Childhood Development in Latin America and the Caribbean. Washington, D.C.: The World Bank. The International Bank for Construction and Development; 2010. Available from: http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1099079922573/ECD_LAC.pdf
7. Peralta MV, Fujimoto-Gómez G. La Atención Integral de la Primera Infancia en América Latina: Ejes Centrales y los desafíos para el siglo XXI. Santiago de Chile: Organización de Estados Americanos; 1998.
8. Elvir AP, Asensio CL. La atención y educación de la primera infancia en Centroamérica: desafío y perspectivas. UNESCO; 2006. Available from: <http://unesdoc.unesco.org/images/0014/001474/147488s.pdf>
9. Rizzoli-Córdoba A, O'Shea-Cuevas G, Aceves-Villagrán D, Mares-Serratos B, Martell-Valdez L, Vélez-Andrade V. 7.1 Evaluación del Desarrollo Infantil en México. In: Santibáñez-Martínez L, Calderón-Martín del Campo D, editors. *Los Invisibles —Las niñas y los niños de 0 a 6 años—*. México D.F.: Mexicanos Primero Visión 2030, A.C.; 2014. pp. 117-132.
10. Campo-Ternera LA. Importancia del desarrollo motor en relación con los procesos evolutivos del lenguaje y la cognición en niños de 3 a 7 años de la ciudad de Barranquilla (Colombia). *Salud Uninorte*. 2010;26:65-76.
11. Melchers M, Montag C, Markett S, Reuter M. Assessment of empathy via self-report and behavioural paradigms: data on convergent and discriminant validity. *Cogn Neuropsychiatry*. 2015;20:157-71.
12. DeDe G, Caplan D, Kemtes K, Waters G. The relationship between age, verbal working memory, and language comprehension. *Psychol Aging*. 2004;19:601-16.
13. Guinosso SA, Johnson SB, Riley AW. Multiple adverse experiences and child cognitive development. *Pediatr Res*. 2015. doi:10.1038/pr.2015.195
14. Entringer S, Buss C, Wadhwa PD. Prenatal stress, development, health and disease risk: a psychobiological perspective—2015 Curt Richter Award Paper. *Psychoneuroendocrinology*. 2015;62:366-75.
15. Luby LJ, Barch DM, Belden A, Gaffrey MS, Tillman MR, Babb C, et al. Maternal support in early childhood predicts larger hippocampal volumes at school age. *Proc Natl Acad Sci U S A*. 2012;109:2854-9.
16. Nelson CA. Neural plasticity and human development: the role of early experience in sculpting memory systems. *Dev Sci*. 2000;3:115-36.