

Beyond the Score: An In-Depth Analysis of Early Childhood (36 to 59 months) Development in Algeria using the ECDI (MICS6, 2019).

ما وراء المؤشر: تحليل معمق لنمو الطفولة المبكرة (من 36 إلى 59
(ECDI) شهراً) في الجزائر باستخدام مؤشر تنمية الطفولة المبكرة
(MICS6 2019)، استناداً إلى المسح العنقودي متعدد المؤشرات

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الملخص:

تمثل مرحلة الطفولة المبكرة فترة حاسمة في مسار النمو الإنساني، إذ تُبنى خلالها الأسس الرئيسة للصحة مدى الحياة، والإنتاجية المستقبلية، والرفاه العام. وتمتاز الفترة بين 36 و 59 شهراً بتسارع النضج العصبي واكتساب المهارات المعرفية واللغوية والاجتماعية-العاطفية والجسدية، مما يجعل أي اختلال فيها ذا آثار طويلة الأمد. استجابة لذلك، طورت منظمة اليونسيف مؤشر تنمية الطفولة المبكرة (ECDI) ضمن مسح (MICS 2005) (2006) وتبناه لاحقاً برنامج DHS كأداة لقياس التقدم نحو الهدف 4.2.1 من أهداف التنمية المستدامة. يقيس المؤشر مدى تقدم الأطفال (3-4 سنوات) في ثلاثة من أربعة مجالات نمائية أساسية، بما يوفر أداة معيارية للمقارنة الدولية.

وفي الجزائر، شمل مسح MICS6 لعام 2019 وحدة ECDI لأول مرة، ما أتاح إمكانية بناء خط أساس وطني لتقييم تنمية الطفولة المبكرة.

يهدف هذا البحث إلى عرض الأسس النظرية ومنهجية بناء المؤشر، وتحليل النتائج الأولية الخاصة بالجزائر، سعياً لفهم أعمق للتحديات المرتبطة بتنمية الطفولة في مراحلها الأولى.

الكلمات المفتاحية: تنمية الطفولة المبكرة، مؤشر ECDI، الجزائر، مسح MICS، أهداف التنمية المستدامة.

Abstract:

Early childhood is a critical stage of human development, laying the foundation for lifelong health, well-being, and productivity, particularly between the ages of 36 and 59 months when brain development accelerates. Developmental deficits during this period may result in long-term and often irreversible consequences. To monitor early childhood development, UNICEF introduced the Early Childhood Development Index (ECDI) within the Multiple Indicator Cluster Surveys (MICS), which later became a key indicator for tracking Sustainable Development Goal target 4.2.1. The ECDI assesses children's progress across four core developmental domains using a standardized and internationally comparable framework. In

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Algeria, the ECDI was included for the first time in the MICS6 survey conducted in 2019, providing a national baseline on early childhood development. This study presents the theoretical and methodological foundations of the ECDI and analyzes its initial findings in the Algerian context, with the aim of identifying key challenges related to holistic child development.

Keywords:

Early Childhood Development, ECDI, Algeria, MICS Surveys, Sustainable Development Goals, Child Well-being, Cognitive Stimulation, Holistic Child Development

Introduction:

The measurement of early childhood development represents a fundamental stake for contemporary public policies. Historically, the imperative of rigorous monitoring for the development of this demographic group has been enshrined within the international framework, initially through the Millennium Development Goals and subsequently via their extension in the Sustainable Development Goals. More specifically, Sustainable Development Goal 4.2.1—aimed at ensuring that all children have access to quality early childhood development, care, and pre-primary education so that they are ready for primary education—thereby emphasizes the critical need for robust indicators. It is within this perspective that UNICEF has developed the Early Childhood Development Index (ECDI), an instrument designed to furnish a straightforward, reliable, and internationally comparable metric, seamlessly integrated into the flagship Multiple Indicator Cluster Surveys (MICS) program (Loizillon et al., 2017). In the wake of this global momentum, Algeria has strategically opted to incorporate this module into its sixth MICS survey. This choice aligns with a national vision geared toward bolstering child protection and education policies, with the objective of appraising the developmental status of young Algerian children to better inform public interventions. The present article undertakes to scrutinize the origins, rationale, and ramifications of the ECDI's adoption in Algeria, situating it within the dual nexus of international commitments and domestic priorities.

1. Study Aims:

The aims of this study are as follows:

1. To present the Early Childhood Development Index (ECDI) by elucidating its theoretical foundations, its calculation methodology, and by conducting a preliminary analysis of its adaptation within the MICS6 survey conducted in Algeria in 2019.
2. To estimate the proportion of Algerian children aged 36 to 59 months who are on track for overall development, as defined by the ECDI criteria.
3. To identify the socio-demographic and familial factors associated with this development.

2. Theoretical Foundations of the Early Childhood Development Index (ECDI) (Loizillon et al., 2017):

The conceptualization of "development" through the lens of the ECDI is structured around the following three key points:

1. **A Multidimensional Perspective:** A child's development cannot be reduced to a single, isolated cognitive dimension. The ECDI is grounded in a holistic vision, integrating the full range of biopsychosocial components of the developing child.

2. The Four Core Developmental Domains:

- **Cognitive and Physical Domain:** Acquisition of pre-school competencies (such as letter and number recognition) and mastery of fine motor skills.
- **Socio-Emotional Domain:** Abilities to interact harmoniously with peers, comply with directives from authority figures, and regulate affective processes.
- **Literacy-Numeracy Domain:** Capacity to name concrete objects and formulate syntactically simple sentences.
- **Physical Domain (Health and Motor Skills):** Autonomy in performing self-care activities (such as feeding and dressing) and dexterity in object manipulation.

3. **The Target Age Range (36-59 months):** The rationale for this specific chronological delineation is that this critical period represents a transitional threshold, immediately preceding entry into primary education, during which foundational competencies are decisively consolidated.

3. Methodology and Calculation Method: How Is the ECDI Constructed?

3.1. Data Collection

Who Responds? (The mother or the primary caregiver of the child). A typical question format: "Can [child's first name] do this?" with response options of "Yes," "No," or "I don't know".

3.2. Selection of Questions

A list of the 10 core questions used to compute the final index (examples: "Can the child name at least 10 letters of the alphabet? », "Can the child count to 5?" , "Does the child easily accept another child playing with their toys?").

3.3. Calculation Process (Simplified for Dissemination Purposes)

- **Step 1:** For each domain, the number of skills mastered by the child is tallied.
- **Step 2:** A success threshold is established for each domain (example: the child must master at least 3 out of 4 skills in a given domain).
- **Step 3:** The child is considered "developmentally on track" (or "ontologically developed") if the threshold is met in at least 3 of the 4 domains.
- **Step 4:** The ECDI for a population is the percentage of children aged 36 to 59 months who are "developmentally on track."

4. Application and Results: The Case of Algeria According to the MICS6 Survey (2019).

4.1. Description of the Data Source: the MICS6 Survey in Algeria (2018-2019)

This study is based on data from the Multiple Indicator Cluster Survey (MICS) conducted in Algeria between 2018 and 2019 by the National Statistics Office (ONS), in partnership with UNICEF and the Ministry of Health and Population. This initiative is part of an international program led by UNICEF, designed to collect statistically robust and internationally comparable data on the situation of children and women, with the aim of informing public policies and monitoring progress towards the Sustainable Development Goals (SDGs). It generates reliable estimates covering a broad spectrum of indicators, including maternal and child health, education, neonatal and child mortality, child protection, family planning, as well as knowledge about HIV/AIDS. Contributing to more than thirty SDG indicators, this survey adopts a holistic perspective on the well-being of vulnerable populations.

Table (01)
Distribution of the sample of children aged 36-59 months.

Sex		Age Group		Place of Residence		Territorial Programming Area						
Male	Female	36-47	48-59	Urban	Rural	North Center	North Est	North West	High Plateau Center	High Plateau Est	High Plateau	South
3 173	2 972	3 120	302 6	3 60 8	2 538	1 984	776	925	518	879	32 6	73 8
Other characteristics												
Mother's Education					Functional Difficulties of the Child		Economic Well-being Index					Total
None-preschool	Primary	Intermediate	Secondary	Higher	Has a functional difficulty	No functional difficulties	Poorest	Second	Middle	Fourth	Richest	
863	950	1 987	1 385	96 1	176	5 970	1 526	1 368	1 249	1 070	93 3	6 14 6
Source : unicef-algeria-mics-6-report 2018-2019												

The survey covered a representative sample of 29,919 households spread across the 07 territorial programming areas: North-Centre, North-East, North-West, Western Hauts Plateaux, Central Hauts Plateaux, Eastern Hauts Plateaux, and the South. The number of individuals covered by this operation amounts to 147,838 people (75,316 men, 72,522 women). The number of children under five was 14,741 children (7,584 boys vs. 7,157 girls). As for the children relevant to the focus of our study (early childhood), namely the 36–59 months age group, the previous table (table 1) provides a detailed overview of their sample distribution (ONS Algeria, 2020).

4.2. The Algerian National Score:

Analysis of data from the Multiple Indicator Cluster Surveys (MICS) reveals a significant progression in the Early Childhood Development Index (ECDI), which increased from 70.0% in MICS4 (2012-2013)[†] to 76.8% in MICS6 (2018-2019), representing a net gain of 6.8 percentage points.

[†] (*) : Statistics based on 25-49 unweighted cases, reason that discouraged us from conducting an in-depth temporal comparison between MICS4 (2012-2013) and MICS6 (2018-2019)

This upward trend was widely observed, affecting both sexes (an increase of 7.4 points among boys compared to 5.7 points among girls) and both residential areas (an increase of 8.6 points in urban zones compared to 3.7 points in rural zones). The progression was also noted in the majority of Territorial Programmatic Spaces (TPS). With the notable exception of the High Plateau West, which recorded a decline of 3.1 points, all other TPS witnessed improvement, with gains ranging from 3.6 points (North Center) to 16.9 points (North West).

Finally, the distribution by wealth quintile shows that the improvement benefited all socioeconomic categories, except for the poorest quintile, where the ECDI slightly decreased by 0.5 points. The most marked progressions were observed among the more affluent quintiles, with increases of 13.1 points for the fourth quintile and 12.7 points for the richest quintile.

4.3. Domain-Specific Analysis:

This table 02 presents the percentages of children considered "on track" according to the composite Early Childhood Development Index (ECDI) and its four domains: Literacy-Numeracy, Physical, Socio-Emotional, and Approach to Learning. The analysis reveals significant disparities across various demographic and socio-economic subgroups.

Table (02)

Percentage of Children Aged 36-59 Months Who Are Developmentally on Track in the Indicated Domains

	Literacy-	Physi	Socio-	Approach to	EC
Total	39,1	97,1	76,9	88,1	76,
Sex					
Male	36	96,9	74,5	87,9	74,
Female	42,5	97,2	79,4	88,3	79,
residence					
Urbain	44,1	97,4	76,8	90,2	79,
Rural	32	96,6	77	85,1	72,
Territorial Programming Area					
North Center	40,4	97,2	80,8	86,3	77,
North East	50,1	97,6	78,5	92,3	84,
North West	37,4	96,5	79,2	88	78,
High Plateau	32,5	96,4	71	92,8	76,
High Plateau Est	34,6	97,5	74,3	86,9	74,
High Plateau West	25,7	97,3	72,7	80,5	64,
South	42,3	96,7	70,8	90	73,
Age					
3 years	27,5	96,6	77,9	85,4	71,
4 years	51,1	97,5	75,8	90,8	81,
Attendance at a Preschool Program					
Attends	77,8	98,7	75,6	96,1	91,
Does not attend	32,7	96,8	77,1	86,7	74,
Missing	(*)	(*)	(*)	(*)	
Mother's Education					
None	21,8	96,4	75,9	85,4	69,
Primary	32,8	95,5	77,3	85,6	73,
Intermediate	37	97,5	76,1	88,1	75,

Secondary	46,9	97,5	77,8	89	80,
Higher	54,1	97,4	77,6	91,5	83,
Functional Difficulties					
Has a functional	18,4	91,5	47,3	52,3	38,
No functional	39,7	97,2	77,7	89,1	77,
Economic Well-being Index					
Poorest	28,3	96,0	75,3	85,0	70,
Second	36,3	96,5	77,2	85,9	74,
Middle	40,7	96,5	75,1	88,0	75,
Fourth	45,7	99,1	78,0	90,3	82,
Richest	51,3	97,8	80,0	93,7	84,
Source : unicef-algeria-mics-6-report 2018-2019					

4.4. General Observations and Domain Performance:

The overall ECDI stands at 76.8%. An examination of the individual domains reveals an uneven developmental profile:

- The Physical domain is nearly universally attained (97.1%), suggesting that fundamental health and motor needs are largely met.
- The Approach to Learning domain also exhibits a high score (88.1%), indicating a general capacity among children to engage in learning activities.
- Socio-Emotional development is moderate (76.9%), highlighting a domain requiring particular attention.
- The Literacy-Numeracy domain is the lowest (39.1%), constituting a critical challenge. This score reflects a substantial deficit in foundational cognitive skills essential for school readiness.

4.5. Analysis of Disparities:

4.5.1. Demographic Characteristics:

a) Sex:

- A gender disparity is evident. Girls outperform boys in the overall ECDI (79.3% versus 74.4%) and across all domains, particularly in Literacy-Numeracy (42.5% versus 36.0%).

b) Age:

- As expected, a clear developmental progression is evident: the ECDI score rises from 71.8% at age 3 to 81.9% at age 4. The largest gap is in Literacy-Numeracy (27.5% to 51.1%), consistent with anticipated skill acquisition trajectories.

4.5.2. Geographic Characteristics:

a) Place of Residence:

- A pronounced urban-rural divide is observed. Children in urban areas have an ECDI of 79.6%, compared to 72.7% in rural areas. The gap is most pronounced in Literacy-Numeracy (44.1% versus 32.0%) and Approach to Learning (90.2% versus 85.1%), suggesting unequal access to educational stimuli.

b) Territorial Programming Zones (TPZs):

- Performance is heterogeneous across regions.
- The North East (84.3%) and North West (78.3%) exhibit high scores.
- The High Plateau West is a particularly vulnerable region, with the lowest ECDI (64.8%), primarily due to very low performance in Literacy-Numeracy (25.7%) and Approach to Learning (80.5%).

4.5.3. Analysis of Socio-Economic and Educational Determinants:

a) Mother's Education:

- A strong positive correlation exists between maternal education level and the ECDI. The index increases from 69.8% (mothers with no education) to 83.7% (mothers with higher education). This trend is most striking in the Literacy-Numeracy domain, which rises from 21.8% to 54.1%.

b) Participation in Preschool Education:

- Attendance at a preschool program is the most discriminant factor. Children who participate have an ECDI of 91.2%, compared to 74.3% for those who do not. The impact is dramatic in Literacy-Numeracy (77.8% versus 32.7%) and Approach to Learning (96.1% versus 86.7%).

c) Wealth Level:

- A clear socio-economic gradient is visible (Fernald et al., 2012). The ECDI increases steadily with wealth quintile, from 70.4% (poorest) to 84.9% (richest). Disparities between quintiles are significant across all domains.

d) Functional Difficulties:

- Children with a functional difficulty experience severe developmental exclusion. Their ECDI (38.2%) is less than half that of children without difficulties (77.9%). The gaps are particularly stark in the Socio-Emotional domain (47.3% versus 77.7%) and Approach to Learning (52.3% versus 89.1%), indicating a critical lack of inclusive support.

4.5.4. Synthesis and Implications:

The analysis illuminates two key realities:

1. A solid foundation in the Physical domain and Approach to Learning.
2. Major challenges in equity, with profound inequalities (Engle et al., 2011) linked to geography, socio-economic status (Fernald et al., 2012), parental education levels, and disability. The primary intervention levers identified are:
 - Massive expansion of preschool education, particularly in rural and disadvantaged areas.
 - Targeted programs for early literacy and numeracy.
 - Strengthening of support and inclusion systems for children with disabilities.
 - Gender-sensitive interventions to close the gap favoring girls.
 - Policies to reduce regional inequalities, specifically targeting the most vulnerable zones such as the High Plateau West.

5. Key Limitations of the Early Childhood Development Index (ECDI)

The ECDI, developed by UNICEF for Multiple Indicator Cluster Surveys (MICS), is a vital tool for global monitoring of early childhood development. However, as a broad metric, it has significant limitations that affect its scope and reliability (UNICEF, 2023).

1. Limited Scope and Superficial Measurement:

The index covers only four domains (literacy-numeracy, physical, social-emotional, and learning), omitting crucial areas like creativity and problem-solving. Its ten binary questions ("on-track" or not) provide a simplistic assessment, unsuitable for capturing the complexity of child development and serving only as a rudimentary screening tool.

2. Subjectivity from Parental Reporting

Data relies on subjective reports from parents or caregivers, which can be biased by cultural expectations, education level, or a desire to give socially acceptable answers. Without direct observation, these reports may inaccurately reflect a child's true abilities, particularly in marginalized groups.

3. Cultural and Contextual Bias

Designed for international comparison, the ECDI incorporates ethnocentric norms. Behaviors considered "on-track" in one culture may not be in another. Furthermore, some items assume universal access to resources like books, making the tool less relevant in certain socio-economic contexts.

4. Focus on Outcomes, Not Inputs or Quality

The ECDI measures a child's ability to perform tasks but ignores the *process*, such as the quality of the home learning environment or parent-child interactions. It cannot identify specific developmental delays or disabilities, masking the need for targeted support.

5. Psychometric Weaknesses and Simplistic Dichotomy

Compared to in-depth standardized assessments, the ECDI has weaker psychometric properties (e.g., construct validity, reliability). Its binary questions are insensitive to children at the extreme ends of the developmental spectrum (floor and ceiling effects). Furthermore, it is restricted to children aged 36-59 months, excluding the critical first three years of life. The simplistic "on-track/not on-track" classification lumps children with minor delays together with those having severe issues, hindering the design of nuanced policy interventions.

General conclusion

This study provides a critical analysis of the Early Childhood Development Index (ECDI) and its first application in Algeria using the 2019 MICS6 data. The findings reveal both significant progress and profound structural challenges in the developmental readiness of Algerian children aged 36 to 59 months.

Nationally, the ECDI score of 76.8% represents a notable 6.8 percentage point improvement since 2012, indicating a positive trajectory in early childhood development outcomes. This overall progress, however, masks a deeply fragmented developmental profile. The near-universal mastery in the **Physical domain (97.1%)** and the strong performance in **Approach to Learning (88.1%)** are encouraging, suggesting that basic health and motor needs are met and that children are generally receptive to learning. Conversely, the critically low score in the **Literacy-Numeracy domain (39.1%)** constitutes the most significant challenge, revealing a widespread deficit in the foundational cognitive skills essential for primary school readiness (ONS Algeria, 2020).

The analysis unequivocally identifies major determinants of developmental disparities. A strong socio-economic gradient is evident, with ECDI scores correlating positively with wealth quintile and, most strikingly, with **maternal education level**. Furthermore, **attendance at a preschool program** emerges as the most discriminant factor, with participants scoring 16.9 percentage points higher than non-participants, highlighting its transformative potential. Significant geographic inequities persist, with a clear urban-rural divide and the **High Plateau West region** identified as particularly vulnerable. The study also confirms a gender gap in favor of girls and exposes the

severe developmental exclusion faced by **children with functional difficulties**, whose ECDI score is less than half that of their peers.

While the ECDI has been instrumental in providing this crucial national snapshot and aligning Algeria with its international SDG monitoring commitments, the instrument's limitations must be acknowledged. Its reliance on parental reporting, cultural biases, simplistic binary scoring, and limited scope constrains its ability to capture the full complexity of child development or to diagnose specific needs.

In conclusion, Algeria stands at a crossroads. The positive national trend demonstrates the efficacy of past policies, but the stark inequities demand targeted, multi-sectoral interventions. The evidence points to four key policy imperatives: (1) the **massive and equitable expansion of preschool education**, particularly in rural and disadvantaged regions; (2) the implementation of **targeted programs to bolster early literacy and numeracy**; (3) the **strengthening of inclusive support systems for children with disabilities**; and (4) the development of **regional strategies to address territorial disparities**. Future research should complement the ECDI with more nuanced, qualitative tools to better understand the processes driving these outcomes and to inform more effective, equitable, and evidence-based public policies for early childhood.

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