SDG indicator 4.2.3:
Measurement of Positive and Stimulating Home Environments

Acknowledgements

Introduction

About 250 million children living in low- and middle-income countries are at risk of non-optimal ECD due to poor nutrition and extreme poverty (Black et al., 2017). Additionally, 80.8 million children ages three and four years old have low cognitive and/or socio-emotional development in low- and middle-income countries, with the highest prevalence in sub-Saharan Africa, followed by South Asia, and then East Asia and Pacific region (McCoy et al., 2016). Non-optimal development has adverse effects on educational attainment, productivity and income, and may result in inter-generational cycles of non-optimal ECD and poverty (Black et al., 2017; Frongillo, Kulkarni, Basnet, & de Castro, 2017). These adverse consequences can be mitigated by provision of environments that support and promote development of children (Britto et al., 2017).

The early period of life is critical for development due to the number of structural and functional changes that occur in the brain during this time (Aboud & Yousafzai, 2015). Child development is influenced by health, nutrition, poverty, home environment, policies, and socio-cultural contexts. The ecological model by Bronfenbenner highlights that human development is affected by interaction with people, objects, or symbols in the environment (Bronfenbrenner, 1986; Bronfenbrenner, 1994). Family is the immediate environment of children and their home environment has a substantial impact on their health and well-being (Maggi, Irwin, Siddiqi, & Hertzman, 2010; Frongillo et al., 2017).

The importance of ECD as a necessary and central component of global and national development has been recognized by the international community through the inclusion of a dedicated target within the Sustainable Development Goals (SDGs) (United Nations, 2018). Target 4.2 specifically calls upon countries to "ensure that, by 2030, all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education." One of the indicators selected to measure progress towards achieving target 4.2 is: the percentage of children under age 5 years who are developmentally on track in health, learning and psychosocial well-being (indicator 4.2.1). Optimal development requires multiple inputs: a stimulating environment and responsive care, play, and attention from caregivers; adequate health and nutrition to feed and nourish the architecture of the body; opportunities for quality early learning; and safety and protection to buffer against stress.

While the global monitoring framework for the SDGs does not include a dedicated indicator to measure aspects of children's home environments that are essential for promoting child development, the Technical Advisory Group on Post-2015 Education Indicators, established by UNESCO in 2014, has elaborated a proposed expanded set of thematic indicators to monitor SDG4 and the Education 2030 Agenda. One of the thematic indicators is (4.2.3): the percentage of children under 5 years experiencing positive and stimulating home learning environments (UNESCO-UIS, July 2017). The proposed set of thematic indicators was approved by the Technical Cooperation Group on SDG 4-Education 2030 Indicators.

Aims of paper

This paper aims to: 1) explain what it means to have a positive and stimulating home environment; 2) provide an overview of existing methods used to measure the home environment of young children, including an assessment of the strengths and limitations of each and steps that were taken in developing, testing and validating the measures; 3) provide an overview of the current data availability for indicator 4.2.3, based on data collected through UNICEF-supported Multiple Indicator Cluster Surveys (MICS) and other available data sources; and 4) recommend an existing methodology for collecting data on indicator 4.2.3.

Positive and stimulating home learning environments

Positive and stimulating environments may include provision of play or learning materials, adult involvement, and variety of experiences or stimulations (Bradley & Corwyn, 2005; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Additionally, lack of punitive or violent disciplinary methods and provision of adequate supervision (i.e., not leaving child alone or under supervision of other young children) may help promote development of children (Bradley & Corwyn, 2005). A positive and stimulating environment also includes provision of affection, warmth, responsiveness, and encouragement for autonomy and exploration (Engle, Menon, & Haddad, 1999). Parenting plays a critical role in provision of a positive and stimulating environment to children. Responsive and sensitive behaviors of the parents encourage parent-child interaction, attachment, and help in child development. Caregivers who are sensitive to the needs of children perceive and interpret signals and act appropriately (Mertesacker, Bade, Haverkock, & Pauli-Pott, 2004). Enhanced parental stimulation also protects children from the effects of adverse conditions (Jacobson & Jacobson, 2002).

Psychosocial stimulation at home such as exposure to speech and sounds, songs and lullabies, and faces of people may influence child development (Aboud & Yousafzai, 2015). Additionally, play material and activities and adult conversation are needed for optimal development (Tamis-LeMonda et al., 2001). The importance of stimulation has been supported by multiple intervention studies (Aboud & Yousafzai, 2015). A study conducted by using data from UNICEF-supported Multiple Indicator Cluster Surveys (MICS) demonstrated that children's literacy-numeracy and learning were positively associated with family care behaviors (Frongillo et al., 2017), and that the strongest associations for literacy-numeracy were with programme attendance, provision of books, and stimulating activities.

Children with stimulating learning materials and enriching experiences have higher levels of competence and adaptive functions, but many children do not have access to play or learning materials (Bradley & Corwyn, 2005). Additionally, parents and other caregivers may not be aware of or motivated to be engaged with their children in play. Limited or lack of learning at home can be attributed to poverty, cultural practice, and lack of education or knowledge among caregivers (Bradley & Corwyn, 2005). Acquisition of formal learning materials like books and manufactured toys usually depends on financial resources and socio-economic status of the family (Bradley & Corwyn, 2005). Capabilities of caregivers also influence use of learning resources and provision of psychosocial stimulation to children (Bradley & Corwyn, 2005). A study by Hoff reported that children from high socio-economic status (SES) households had higher vocabulary skills than children from families with mid SES; these differences were accounted for by properties of maternal speech (Hoff, 2003). Similar findings were reported by a study from Brazil which found that children's development was influenced

by the family socio-economic status mediated by stimulation at home and pre-school, home environment, and neighborhood (Santos, 2008).

Review of measurement methods

The indicator definition set forth by UNESCO for 4.2.3 is: percentage of children aged 36-59 months who live in households where their mother, father, or other adult household members engage with them in the following types of activities: reading or looking at picture books; telling stories; singing songs; taking children outside the home; playing; and naming, counting and/or drawing (UNESCO-UIS, July 2017). There are a number of available methods and measures that capture, to a varying degree, different components of this indicator. An overview of the potential data sources for indicator 4.2.3 follows, together with an assessment of the strengths and limitations of each in terms of its comparability and alignment with the indicator definition.

Home Observation for Measurement of the Environment inventory

The Home Observation for Measurement of the Environment (HOME) inventory is a widely used method to assess family environment including responsiveness of caregivers (Bradley & Corwyn, 2005). It examines both quality and quantity of stimulation and support (Bradley & Corwyn, 2005). Assessment by this method involves home visits which usually last about an hour. The visit should include the primary caregiver and child, but other household members can also be included (Bradley & Corwyn, 2005). In this method, semi-structured interviews with the caregiver/family members are conducted. Additionally, home environment and parenting behaviors are also observed and rated (Bradley & Corwyn, 2005; Engle et al., 1999).

The psychosocial needs of children differ by age. Therefore, the HOME inventory has multiple versions for different age groups (Bradley & Corwyn, 2005). In this review, we focus on only on the early childhood version of the inventory. The early childhood version of the inventory has eight scales which are related to learning materials, language stimulation, physical environment, responsiveness, academic stimulation, modelling of behaviors that are socially acceptable, variety of stimulation, and acceptance (Bradley & Corwyn, 2005).

The HOME was first developed by Cadwell and colleagues and used in longitudinal research conducted in the 1960s which examined the association between home environment, day care and development of children. Empirical evidence was used to select the items, and studies have been conducted to validate the method (Elardo, Bradley, & Caldwell, 1975; Totsika & Sylva, 2004). The correlations of HOME score with family structures, family status, and child outcomes have been found in many settings (Bradley, Corwyn, & Whiteside-Mansell, 1996). In contrast, all items of this inventory do not have similar cultural equivalence. The items for assessing cognitive stimulation seem to have greater cross-cultural equivalence than those assessing socioemotional support (Bradley et al., 1996).

There are several strengths of the HOME inventory. First, in a study by Bradley and colleagues, the HOME scale had theoretically meaningful correlations with family structure, family status, and child outcomes measures in many cultures (Bradley et al., 1996). Second, the inventory uses both interviews and observations. It also provides a wide-range of information which can be used in various populations and purposes (Elardo & Bradley, 1981). Third, this method includes assessment of both quality and quantity of psychosocial care (Bradley & Corwyn, 2005). Fourth, the HOME inventory has shown to be useful in both normally developing children and those with high-risk conditions (Totsika

& Sylva, 2004). Therefore, the HOME inventory can produce robust and rich data on children's home environments.

However, there are also some important limitations. The inventory takes a relatively long time (45-60 minutes) to be administered and requires well-trained and skilled interviewers. The inventory may also require considerable adaptations for use in low- and middle-income settings (Frongillo, Tofail, Hamadani, Warren, & Mehrin, 2014; Jones et al., 2017). For example, children in resource-limited settings may not have store-bought toys but are likely to have home-made toys, which are not covered by HOME. Furthermore, this method includes observations which may be difficult to standardize (for example, two observers may perceive differently the quality of the same interaction between a child and a caregiver) (Hamadani et al., 2010). The HOME does not include measures of family violence or maternal depression, which are important predictors of positive and stimulating home environments. Implementing the HOME inventory requires substantial time, training and financial resources, and therefore is not suitable for large-scale population surveys.

Other methods of direct observation such as the Nursing Child Assessment Satellite Training Feeding scale are similarly not suitable for large-scale surveys because of the resources required to administer it (e.g., time and money). Furthermore, participants may behave in a different way than their normal behaviors when being observed, and it may be difficult to standardize the observations (Aspland & Gardner, 2003; Frith, Naved, Ekström, Rasmussen, & Frongillo, 2009; Hamadani et al., 2010).

Family Care Indicators

Indicators of family care behaviors (Table 1) were developed by the United Nations Children's Fund (UNICEF) for use in large-scale surveys and are valuable for assessing the home environment of young children in low- and middle-income countries due to their validity and equivalence in these settings (Kariger et al., 2012; Hamadani et al., 2010). These indicators contain fewer items and require less time to administer and less training than the HOME inventory. The indicators are simple to use in large population-level surveys (Hamadani et al., 2010; Frongillo et al., 2017) and assess adult support for stimulating environment and disciplinary behaviors. They also include items that measure adequacy of the alternate caregiver (Kariger et al., 2012).

In November 2002, UNICEF convened a panel of 25 international experts to develop a framework of family care domains and resources important for children's development and evaluate possible items for pilot testing (Kariger et al., 2012). The initial phase of indicators development included conceptualization and identification of the items and domains. This process was guided by the HOME inventory and the UNICEF conceptual framework of care (Bradley & Corwyn, 2005; Engle et al., 1999). The expert panel defined seven family care domains which were: quality of verbal interactions, support for learning, disciplinary methods, consistency of support, support for emotional well-being and acceptance, support for sense of self, and responsiveness to the child. The expert panel also defined seven domains of resources for care: caregiver's stress, time availability, physical health and knowledge, family cohesion/functioning, social support, and organization of the care environment. These fourteen domains were consolidated into four domains of family care and three domains of resources for care. The four family care domains were responsiveness and acceptance, support for learning, disciplinary methods, and responsiveness during feeding. The three domains of resources for care were availability and use of alternate caregivers, father's involvement with child, and maternal depression symptoms.

Candidate items for each domain were selected from tools that had exhibited good psychometric properties across samples. Expert panel members suggested other candidate items when suitable ones could not be found in the literature.

In the next phase, field testing and cognitive interviews were conducted to examine clarity, relevance, and applicability of the items across countries. In 2003, field testing was conducted in Brazil, Burkina Faso, Nepal, Uganda, and Zanzibar (United Republic of Tanzania). In Nepal and Zanzibar, data regarding SES, maternal education, and nutritional status were available from the existing projects along with the candidate items on family care. Orally administered surveys were conducted to collect quantitative data. The questionnaire was pre-tested. Sample varied widely across the countries (Brazil n=50, Burkina Faso n=119, Nepal n=564, Uganda n=2157, and Zanzibar n=807) (Kariger et al., 2012). Additionally, cognitive interviews were conducted in Bangladesh, Jamaica, and Mexico. Cognitive interviews were used to evaluate interpretation of questions and responses sets by people representative of the population of interest. The sample sizes for the cognitive interviews were 10 in Bangladesh and Jamaica, and 30 in Mexico.

In November 2003, a second panel of 27 experts reviewed the findings from the cognitive interviews and quantitative data to evaluate the items for inclusion in MICS.[1] The evaluation of the items was based on theoretical clarity, clarity of the questions and concepts, reasonable pattern of variability, consistent associations with criteria across countries, usefulness for policy advocacy and accountability, and appropriateness across the age range of 0-59 month-old children. Data were examined to ensure that the items could be used cross-culturally. The items for which the proportion of responses had a gradient with SES were retained in the final set. The final items also showed variability and discrimination within and across study sites (Table 2) (Kariger et al., 2012). The final six items that were related to play activity were included in the core module of MICS. These items indicate support for learning and assess if an adult is engaged with children in activities such as reading books, telling stories, singing songs or lullabies, playing with children, taking the child outside the house, and naming, counting, drawing. Items related to books and play materials, alternate care or adequate supervision, and disciplinary behaviors were in the optional module (Frongillo et al., 2017; Kariger et al., 2012). The indicators for family care had less number requirement for learning materials than the original HOME scale. In Family Care Indicators, availability of children's book refers to having three or more books rather than ten. Additionally, homemade or household objects were also included as play things to be contextually sensitive to low-resource settings (UNICEF, 2018). The questions about the availability of books and play things were included during field testing (Kariger et al., 2012). Judgment by a panel of child development experts guided the selection of the cut-offs for learning materials and inclusion of homemade or household objects as playthings; the panel considered that availability of such materials would be lower in low-income countries and populations without access to economic resources to purchase materials.

The Family Care Indicators have been validated. A study by Hamadani and colleagues conducted in rural Bangladesh that included 801 children aged 18 months and their mothers used the Bayley Scales

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[1] MICS allow countries to monitor and report on a variety of child development and well-being domains including, for example, nutritional status, immunization and parenting practices. In addition, specific questions were developed by UNICEF to gather data in three vital ECD areas: Quality of care within a child's home environment; Access to early childhood care and education; and overall developmental status of children. Beginning with the fourth round of MICS (MICS4), the early childhood development measures were consolidated into a single module included in the questionnaire for children under 5 years of age. The module is administered to mothers or primary caregivers of children under the age of 5 (0 to 59 months).

of Infant Development to assess mental and motor development, while assessment of the language expression and comprehension was based on reporting from the mothers. They found that the indicators had significant association with mental, motor, and language development. Among the five subscales, two subscales (play activities and variety of play materials) had the strongest associations with children's development. Additionally, three subscales (play activities, variety of play materials, and magazines and newspapers at home) independently predicted children's development. The indicators also demonstrated adequate test-retest reliability (Hamadani et al., 2010).

Further evidence of the validity of the Family Care Indicators at the individual level comes from the strong associations with literacy-numeracy found in the MICS4 in analyses discussed above (Frongillo et al., 2017). Because the domains underlying each of the Family Care Indicators (i.e., stimulation and responsive care, availability of children's books, availability of playthings, inadequate supervision, and violent discipline) are distinct, these indicators are not manifestations of a single latent construct, and a one-factor analytic model using data from the MICS4 does not explain well the variation in the indicators. When collapsed as proportions at the country level, however, these indicators that are intended to differentiate countries do so consistently (Table 3). Each of the five indicators is correlated strongly and in the expected direction with a single factor from factor analysis, and with the logarithm of gross domestic product and fertility rate, measures of country economic and social development, respectively. A number of other published papers have also explored the validity and equivalence of the Family Care Indicators (Table 4).

One of the strengths of using the Family Care Indicators is that they are easy to administer by trained personnel and specialized ones are not required. Additionally, relatively few questions are included in this method and the items used to measure family care are clear (Hamadani et al., 2010). In contrast, the indicators are self-reported by the caregivers which may lead to recall or social-desirability biases. Additionally, this method does not include observations of the family environment (Hamadani et al., 2010; Kariger et al., 2012).

Regional Project on Child Development Indicators (PRIDI)

PRIDI, a regional project launched in 2009 by the Inter-American Development Bank, included nationally representative samples from four countries: Costa Rica, Nicaragua, Peru, and Paraguay. The goal of the project was to improve quality and comparability of child development outcomes recognizing that child development is a holistic and integrated process (Verdisco et al., n.d.; Verdisco, Cueto, & Thompson, 2016).

The PRIDI includes the items on early stimulation and responsive care, availability of books and play materials, inadequate supervision and disciplinary practices from MICS Family Care Indicators (Hamadani et al., 2010; Verdisco et al., n.d.). The PRIDI also includes the following items about rule setting within the home environment that are not included as part of the Family Care Indicators: rules on types of food child can eat; time at which child must lie down; tasks that child must carry out in the house; and moments when the family eats together with child.

Results from an analysis of data collected in PRIDI in four Latin American countries found that aspects of the nurturing environment (as measured by the Family Care Indicators) were statistically and significantly associated with children's scores across the developmental domains assessed (socio-emotional, cognitive, motor and language and communication) in all of the countries (Verdisco et al., n.d.). In some cases, this relationship was stronger for some domains than that observed for the

socioeconomic situation of the household; for instance, in Costa Rica and Nicaragua, the wealth index was not found to be statistically significantly associated with socio-emotional development while the composite nurturing environment indicator was (Verdisco et al., n.d.).

Review of data availability

The questionnaires used in the latest round of MICS (MICS6, currently ongoing and expected to the completed by 2020) ask respondents whether, in the last 3 days, they or any other adult household member age 15 or older engaged in any of the following activities with the child: reading or looking at picture books; telling stories; singing songs including lullabies; taking the child outside the home; playing with the child; and naming, counting or drawing things with the child. Beginning with MICS6, the indicator on early stimulation and responsive care is defined as: percentage of children age 24-59 months engaged in four or more activities to provide early stimulation and responsive care in the last 3 days with: (a) any adult household member; (b) father; (c) mother.

Table 5 provides an overview of the MICS items used to measure positive and stimulating home learning environments. There have been some changes in the applicable age group for the indicator on early stimulation and responsive care across MICS rounds. Beginning with MICS4, the age group was revised to capture children aged 36 to 59 months. A new set of changes have also been introduced in MICS6 whereby questions about early stimulation and responsive care are now asked about all children aged 24 to 59 months. As such, data from MICS6 are not directly comparable with data collected in MICS4 and MICS5 (unless data from MICS6 are recalculated for ages 36 to 59 months).

Although most surveys from MICS6 are not yet available, UNICEF global database on ECD currently has comparable and nationally representative data on the percentage of children aged 36 to 59 months with whom an adult has engaged in four or more activities to promote learning and school readiness in the past three days for a total of 84 countries (Figure 1), primarily low- and middle-income, across different geographic regions: sub-Saharan Africa (27 countries); Latin America and the Caribbean (18 countries); Eastern Europe and Central Asia (14 countries); Middle East and North Africa (12 countries); East Asia and the Pacific (9 countries); and South Asia (4 countries). These data can also be disaggregated by fathers' engagement as well as mothers' engagement (the latter only for countries with data starting from MICS5). Around half of these 84 countries have collected these data more than once allowing for a comparison of trends.

Some of the MICS Family Care Indicators, including those on early stimulation and responsive care, have also been used in a number of countries through Demographic and Health Surveys (DHS).

To date, the PRIDI has only included data collection in four Latin American countries: Costa Rica, Nicaragua, Paraguay and Peru.

The HOME has largely been used to collect data for purposes of medical and epidemiological research and individual assessment rather than as a tool for population level measurement (see, for example: Black et al., 2004; Bradley et al., 1994; Williams et al., 2003). It has been used extensively in both low- and middle-income countries in Latin America, Asia and Africa as well as high-income countries including in the United States, parts of northern Europe and Australia. However, results obtained by implementing the HOME are usually not comparable across countries given differences in research methods employed (Totsika & Sylva, 2004).

Recommendations

Assessment of the home environment can provide valuable information on access to quality environments that support ECD and early learning.

The HOME inventory, the MICS Family Care Indicators and PRIDI are potential methods for collecting data on indicator 4.2.3 (UNESCO-UIS, July 2017). However, the HOME inventory is an observational method that takes substantial time to administer, is expensive and requires highly trained and skilled personnel for data collection. Although observational methods do not suffer from potential biases that can result from self-reports, it may be difficult to standardize observations across settings, and the resources (both financial and human) required to administer the instrument make the HOME inventory unsuitable for large-scale surveys. Additionally, the HOME was developed in high-income/industrialized countries and some items may not be suitable for low- and middle-income countries.

As mentioned previously, the items to assess positive and stimulating home environment in PRIDI are from the MICS Family Care Indicators; the set of items on rule setting at home may require additional testing to establish validity and reliability across settings since they were developed and validated for use in only four countries in the Latin America region.

In light of this, the MICS Family Care Indicators are recommended to assess positive and stimulating home environment for several reasons. They are easy to use, understood well by participants, take little time to administer, and do not require highly trained personnel for data collection. Additionally, these indicators were designed for and are sensitive to the contexts of low- and middle-income countries (for example, inclusion of homemade toys or household objects as play things). The indicators are suitable for large population-level surveys—they have been used to collect data for more than 80 countries through the MICS and other nationally representative household surveys, and capture multiple domains of positive and stimulating environments such as early stimulation and responsive care, availability of books and play things, adequate supervision, and limit setting not using physical punishment and/or psychological aggression (UNICEF, 2018).

The validation of Family Care Indicators was established in a few studies (Frongillo et al., 2017; Hamadani et al., 2010); additional work examining relationships between the Family Care Indicators and child development measures would further establish predictive validity although this would require longitudinal studies/surveys that are typically expensive and difficult to implement.

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Table 1. Family Care Indicators included in the Multiple Indicator Cluster Surveys-6 (UNICEF, 2018)

Indicator	Item number in MICS6 standard questionnaires[a]	Indicator definition
Early stimulation and responsive care	EC5 (Under-five questionnaire)	Percentage of children age 24-59 months engaged in four or more activities to provide early stimulation and responsive care in the last 3 days with any adult household member, father, mother
Father's support for learning	EC5 (Under-five questionnaire)	Number of children age 24-59 months whose biological father has engaged in four or more activities to promote learning and school readiness in the last 3 days
Mother's support for learning	EC5 (Under-five questionnaire)	Number of children age 24-59 months whose biological mother has engaged in four or more activities to promote learning and school readiness in the last 3 days
Availability of children's books	EC1 (Under-five questionnaire)	Percentage of children under age 5 who have three or more children's books
Availability of playthings	EC2 (Under-five questionnaire)	Percentage of children under age 5 who play with two or more types of playthings
Inadequate supervision	EC3 (Under-five questionnaire)	Percentage of children under age 5 left alone or under the supervision of another child younger than 10 years of age for more than one hour at least once in the last week
Violent discipline	UCD2 (Under-five questionnaire) FCD2 (Questionnaire for 5-17 years old)	Percentage of children age 1-14 years who experienced any physical punishment and/or psychological aggression by caregivers in the past one month

[a] The individual items are presented in the Table 5.

[b] Also included in Sustainable Development Goals as indicator 16.2.1, specific to 1-17 years old.

Table 2. Response frequencies by socio-economic status from the field testing for items subsequently included in Multiple Indicator Cluster Surveys (adapted from Kariger et al., 2012).

	Response	Zanzibar		Nepal	
		Lower SES	Higher SES	Lower SES	Higher SES
Children's book	None	93.4	84.7	93.9	78.7
	1-5	6.0	15.3	5.7	16.5
	≥6	0.5	0.0	0.4	4.8
Play-materials	Made by adult	26.7	31.7	-	-
	Household objects	47.0	52.0	-	-
	Outside materials	44.0	50.9	-	-
	Musical toys	15.0	25.7	10.1	14.5
	Building toys	19.1	25.0	6.6	10.3
	Drawing/writing	25.2	34.1	3.9	11.4
	Toys for moving	41.7	47.5	26.7	37.5
	Toys for pretending	43.0	48.8	18.6	20.7
Activities with adults (≥1 day)	Read/look at books	17.5	24.7	6.8	19.0
	Tell stories	16.7	21.5	3.9	10.1
	Sing songs	35.9	40.6	15.1	20.9
	Go outside home	44.5	50.3	23.2	27.9
	Play	46.2	51.7	29.8	37.5
	Learning activities	36.7	42.1	17.0	25.1
Setting limits (i.e., discipline)	More positive strategies	5.0	5.9	11.9	20.0
	Less positive strategies	95.0	94.1	88.1	80.0
Days child hit, past week	0	32.8	34.6	29.0	30.4
	1-2	30.4	34.8	26.5	27.8
	3-7	26.7	23.5	43.3	41.9
	≥8	10.0	7.1	1.2	0.0
Alternate caregiver	Adequate	36.9	45.8	33.7	42.4
	Inadequate	10.5	6.8	14.3	9.5
Hours per week with alternate caregiver	0-10	20.1	29.7	13.6	19.7
	11-25	15.1	11.0	14.8	15.9
	>25	12.0	12.2	18.9	17.1

Table 3. Correlations at the country level of Family Care Indicators with a single factor from factor analysis, logarithm of gross domestic product, and fertility rate from Multiple Indicator Cluster Surveys - round 4.

	Pearson correlations with:		
Family Care Indicators	Factor from one-factor model	Logarithm of gross domestic product	Fertility rate
Early stimulation and responsive care	0.719	0.558	-0.533
Availability of children's books	0.920	0.654	-0.675
Availability of playthings	0.682	0.550	-0.620
Inadequate supervision	-0.716	-0.816	0.858
Violent discipline	-0.505	-0.382	0.479

Table 4. Selection of published articles and papers with analyses on the MICS Family Care Indicators

Bornstein, M. H., & Putnik, D. L. (2012). Cognitive and socioemotional caregiving in developing countries. *Child Development*, 83(1), 46–61.

Bornstein, M. H., & Putnik, D. L., Lansford, J. E., Deater-Deckard, K., & Bradley, R. H. (2015). A developmental analysis of caregiving modalities across infancy in 38 low- and middle-income countries. *Child Development*, 86(5), 1571–1587.

Bradley, R. H., & Putnick, D. L. (2012). Housing quality and access to material and learning resources within the home environment in developing countries. *Child Development*, 83(1), 76–91.

Cappa, C., & Khan, S. (2011). Understanding caregivers' attitudes towards physical punishment of children: Evidence from 34 low- and middle-income countries. *Child Abuse & Neglect*, 35(12), 1009–1021.

Chau Duc, N. H. (2016). Developmental risk factors in Vietnamese preschool-age children: Cross-sectional survey. Pediatrics International, 58(1), 14–21.

Frongillo, E. A., Kulkarni, S., Basnet, S., & de Castro, F. (2017). Family Care Behaviors and Early Childhood Development in Low-and Middle-Income Countries. *Journal of Child and Family Studies*, 26(11), 3036–3044.

Hamadani, J. D., Tofail, F., Hilaly, A., Huda, S. N., Engle, P., & Grantham-McGregor, S. M. (2010). Use of family care indicators and their relationship with child development in Bangladesh. *Journal of Health, Population, and Nutrition*, 28(1), 23–33.

Jeong, J., McCoy D. C., Yousafzai, A. K., Salhi, C., & Fink, G. (2016). Paternal stimulation and early child development in low- and middle-income countries. *Pediatrics*, 138(4), e20161357.

Kariger, P., Frongillo, E. A., Engle, P., Britto, P. M. R., Sywulka, S. M., & Menon, P. (2012). Indicators of family care for development for use in multicountry surveys. *Journal of Health, Population, and Nutrition*, 30(4), 472–486.

Lansford, J. E., Cappa C., Putnick, D. L., Bornstein, M. H., Deater-Deckard, K., & Bradley, R. H. (2017). Change over time in parents' beliefs about and reported use of corporal punishment in eight countries with and without legal bans. *Child Abuse & Neglect*, 71, 44–55.

Lansford, J. E., & Deater-Deckard, K. (2012). Childrearing discipline and violence in developing countries. *Child Development*, 83(1), 62–75.

McCoy, D. C., Peet, E. D., Ezzati, M., Danaei, G., Black, M. M., Sudfeld, C. R., ... & Fink, G. (2016). Early childhood developmental status in low-and middle-income countries: National, regional, and global prevalence estimates using predictive modeling. *PLoS Medicine*, 13(6), e1002034.

Ruiz-Casares, M., Nazif-Muñoz, J. I., Iwo, R., & Oulhote, Y. (2018). Nonadult supervision of children in low-and middle-income countries: Results from 61 national population-based surveys. *International Journal of Environmental Research and Public Health*, 15(8), 1564–1591.

Ruiz-Casares, M., & Nazif-Muñoz, J. I. (2018). Non-adult child supervision practices in Lao People's Democratic Republic, Child Abuse & Neglect, 84, 217–228.

Table 5. Items used to collect data on the Family Care Indicators in Multiple Indicator Cluster Surveys-round 6 (UNICEF, 2018)

Indicator	Items	Response options
Early stimulation and responsive care	EC5. In the past 3 days, did you or any household member age 15 or over engage in any of the following activities with (***name***): If 'Yes', ask: Who engaged in this activity with (name)?	
	A foster/step mother or father living in the household who engaged with the child should be coded as mother or father. Record all that apply. 'No one' cannot be recorded if any household member age 15 and above engaged in activity with child.	Mother Father Other No One
	[A] Read books or looked at picture books with (name)? [B] Told stories to (name)? [C] Sang songs to or with (name), including lullabies? [D] Took (name) outside the home? [E] Played with (name)? [F] Named, counted, or drew things for or with (name)?	Read books Told stories Sang songs Took outside Played with Named
Availability of children's books	EC1. How many children's books or picture books do you have for (*name*)?	None Number of children's book Ten or more books
Availability of playthings	EC2. I am interested in learning about the things that (name) plays with when (he/she) is at home. Does (he/she) play with: [A] Homemade toys, such as dolls, cars, or other toys made at home? [B] Toys from a shop or manufactured toys? [C] Household objects, such as bowls or pots, or objects found outside, such as sticks, rocks, animal shells or leaves?	Y N DK Homemade toys...............1 2 8 Toys from a shop....................1 2 8 Household objects or outside objects....1 2 8
Inadequate supervision	EC3. Sometimes adults taking care of children have to leave the house to go shopping, wash	

Indicator	Items	Response options
	clothes, or for other reasons and have to leave young children.	
	On how many days in the past week was (name):	
	[A] Left alone for more than an hour?	Number of days left alone for more than an hour__
	[B] Left in the care of another child, that is, someone less than 10 years old, for more than an hour?	Number of days left with another child for more than an hour __
Child discipline	UCD2 and FCD2. Adults use certain ways to teach children the right behavior or to address a behavior problem. I will read various methods that are used. Please tell me if you or any other adult in your household has used this method with (name) in the past month.	
	[A] Took away privileges, forbade something (name) liked or did not allow (him/her) to leave the house.	Yes No
	[B] Explained why (name)'s behavior was wrong.	
	[C] Shook (him/her).	
	[D] Shouted, yelled at or screamed at (him/her).	
	[E] Gave (him/her) something else to do.	
	[F] Spanked, hit or slapped (him/her) on the bottom with bare hand.	
	[G] Hit (him/her) on the bottom or elsewhere on the body with something like a belt, hairbrush, stick or other hard object.	
	[H] Called (him/her) dumb, lazy or another name like that.	
	[I] Hit or slapped (him/her) on the face, head or ears.	
	[J] Hit or slapped (him/her) on the hand, arm, or leg.	
	[K] Beat (him/her) up, that is hit (him/her) over and over as hard as one could.	

Figure 1. Percentage of children age 36 to 59 months with whom an adult has engaged in four or more activities to promote learning and school readiness in the past three days
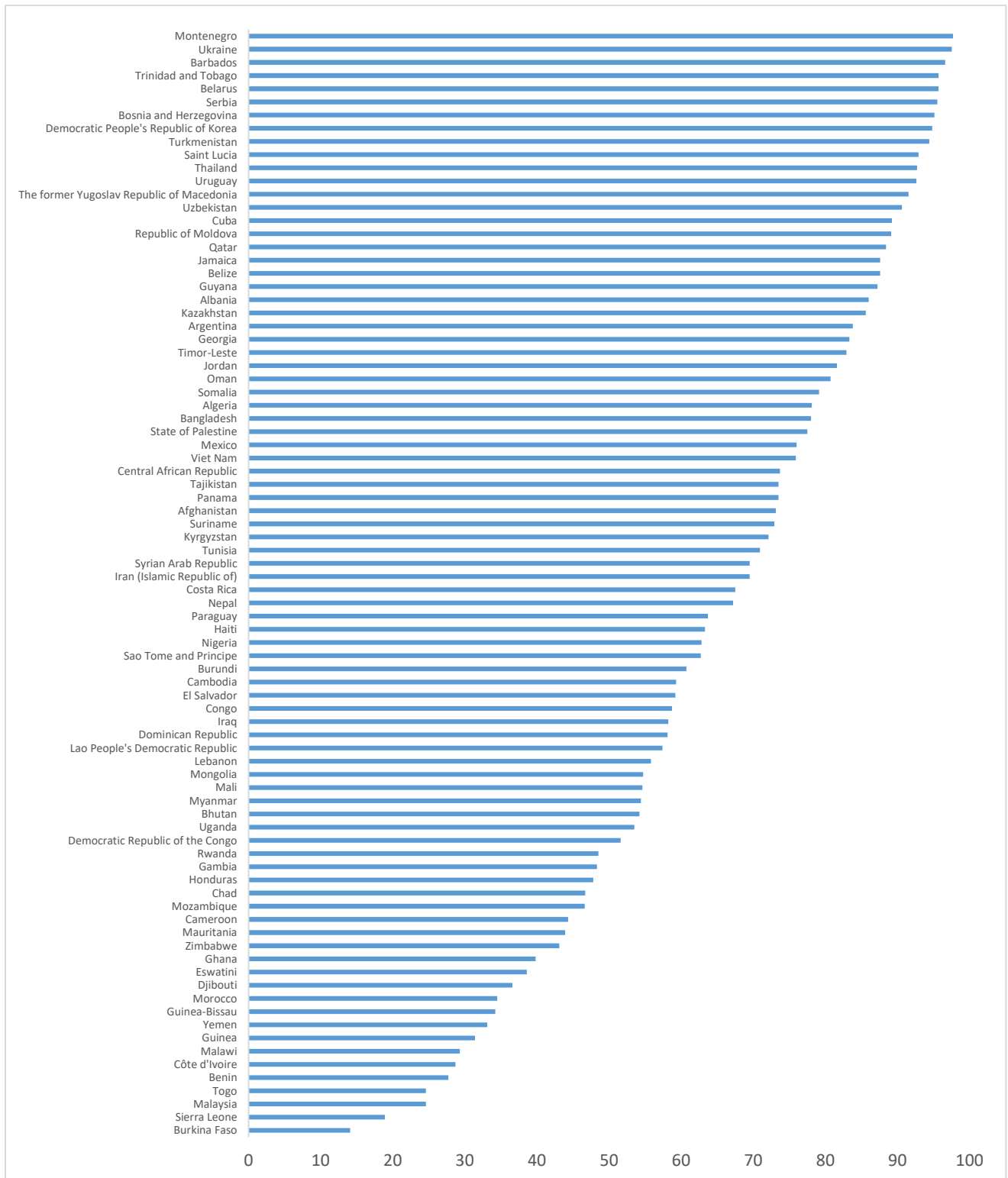
Notes: For Argentina, the sample was national and urban (municipalities with a population of more than 5,000), since the country's rural population is scattered and accounts for less than 10 per cent of the total. Data for the Democratic People's Republic of Korea and Sierra Leone are from MICS6 and refer to children aged 24-59 months. Data for Burundi, Cambodia, Democratic Republic of the Congo, Haiti, Jordan, Rwanda, Togo and Uganda refer to the youngest child in the household aged 36-59 months. Data for Chad and Myanmar refer to the oldest child in the household aged 36-59 months. Data for Timor-Leste refer to the youngest child in the household aged 36-47 months. Data for Djibouti, Lebanon and Morocco refer to children aged 0-59 months.

Source: UNICEF global databases, 2018, based on DHS, MICS and other nationally representative surveys, 2005-2017.