Methodology

**Data source and study variables**

For the purposes of the study, we combined all available ECDI data from the 2012, 2019 MICS (Multiple Indicator Cluster Survey), a nationally representative household survey conducted by the United Nations Children’s Fund (UNICEF). This survey use standardized questionnaires to provide the information and key indicators on the situation of children and mothers. The MICS survey is a two-stage cluster sampling procedure, randomly selecting households with children under the age of 5 years (Mccoy *et al.*, 2016). The final analysis contains 8148, 9346 children between 3 and 4 years of age (36 to 59 in months) from the 2012 and 2019 MICS survey respectively.

**Outcome variable**

For identifying the early childhood development index (ECDI) we create the outcome variable as children are developmentally on track, we use four domain as literacy numeracy, physical, social emotional and learning to calculate the developmentally on track. If any three of these four domains are developmentally on track, the total percentages of the domains are indicated as the ECDI.

**Exposure variable**

The exposure variable was the ECDI score that is children are developmentally on track, which is a  
binary variable (“Yes”, “No”).

**Covariates**

MICS survey indicates 10 items these are used to determine if the children are developmentally on track in four domains. Children can identify/ name at least ten letters of the alphabet, can read at least four simple, popular word, they know the name, recognize the symbols of all number from 1 to 10, can pick up small object with two fingers, like stick or rock from the ground, child is sometimes too sick to play, get alone with other children, doesn’t kick, bit or hit other children, child doesn’t get distracted easily, follow simple directions how to do something correctly, when given something to do, is able to do it independently. For identifying the factors associated with ECDI some reliable variables are selected as age of child, child’s sex, residence area, division, mother’s educational level, wealth index, religion, household’s sex, ethnicity of the respondent.

**Statistical Analysis**

The Bivariate analysis (Chi-square test for association) was conducted to assess the association between ECDI with children developmentally on track status with the other covariates. Binary logistic regression model applied in two way, univariate logistic regression model and multivariate logistic regression model to show the factors individuals and adjusted associations or impact of different socio-demographic variables with the early childhood development index on the developmentally track. For both the 2012 and 2019 MICS survey data we applied both model separately to find the associations separately. Variables with a probability of its score statistic less than 0.05 were included in the model. We introduce simultaneously all the covariates to examine their effects on ECDI. Odds ratio (OR) measure of association between the exposure and outcome. OR > 1 indicates that the event is more likely to occur in the first group. And OR < 1 indicates that the event is less likely to occur in the first group. All the statistical analysis were conducted in Stata version 13 (Stata Corp, College Station, TX).

References

1. Mccoy, D. C. *et al.* (2016) ‘Early Childhood Developmental Status in Low-and Middle-Income Countries: National, Regional, and Global Prevalence Estimates Using Predictive Modeling’. doi: 10.1371/journal.pmed.1002034.