Total number of interviewed households were

MICS 2012: 51895 & MICS 2019: 64400

The Children under 5 years of age were selected from MICS 2012 & 2019.

N1 = 20903 & N2 = 23101

Children under 3 years of age were omitted from both the survey data.

n1 = 15282 & n2 = 15340

The children with age 36 months to 59 months were selected from both the survey

n1 = 8148 & n2 = 9346

MICS 2019 data contains with

Rural = 1735 & Urban = 7611

Male 4823 & Female 4523

MICS 2012 data contains with

Rural = 1293 & Urban = 6855

Male 4234 & Female 3914

Figure 1. Schematic diagram of the analytic study sample

**Table.2** Sample characteristics of children by developmental status, MICS 2012 and 2019.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Characteristics** | 2012 | |  | 2019 | |  |
| **Developmentally on track** | | **P-value** | **Developmentally on track** | | **P-value** |
| **Yes** | **No** | **Yes** | **No** |
| **N (%)** | **N (%)** | **N (%)** | **N (%)** |
| ***Age of child*** | | | | | | |
| 3 | 2392 (59.46) | 1649(40.54) | <0.001 | 3166 (68.72) | 1584 (31.28) | <0.001 |
| 4 | 2909 (71.40) | 1198 (28.60) | 3680 (81.26) | 916 (18.74) |
| ***Child’s sex*** | | | | | | |
| Male | 2669 (63.41) | 1565 (36.59) | 0.002 | 3383 (71.51) | 1440 (28.49) | <0.001 |
| Female | 2632 (67.65) | 1282 (32.35) | 3463 (78.46) | 1060 (21.54) |
| ***Place of residence*** | | | | | | |
| Urban | 4388(63.72) | 2467 (36.28) | <0.001 | 5541 (73.99) | 2070 (26.01) | <0.001 |
| Rural | 913 (72.17) | 380 (27.83) | 1305 (78.15) | 430 (21.85) |
| ***Division*** | | | | | | |
| Barishal | 526 (67.86) | 262 (32.14) | <0.001 | 552 (67.8) | 269 (32.20) | <0.001 |
| Chattogram | 940 (55.04) | 682 (44.96) | 1479 (78.26) | 470 (21.74) |
| Dhaka | 1286 (67.45) | 674 (32.55) | 1453 (81.85) | 343 (18.15) |
| Khulna | 740 (71.70) | 326 (28.30) | 895 (73.07) | 409 (26.93) |
| Mymensingh | - | - | 347 (61.26) | 209 (38.74) |
| Rajshahi | 527 (66.76) | 263 (33.24) | 720 (69.57) | 307 (30.43) |
| Rangpur | 866 (78.38) | 262 (21.62) | 896 (83.71) | 207 (16.29) |
| Sylhet | 416 (54.15) | 378 (45.85) | 504 (61.73) | 286 (38.27) |
| ***Mother’s Education*** | | | | | | |
| Primary incomplete | 2076 (58.80) | 1462 (41.20) | <0.001 | 847 (68.56) | 389 (31.44) | <0.001 |
| Primary complete | 772 (62.73) | 447 (37.27) | 1590 (69.38) | 727 (30.62) |
| Secondary incomplete | 1800 (70.01) | 760 (29.99) | 3363 (76.88) | 1143 (23.12) |
| Secondary complete or Higher | 653 (79.46) | 178 (20.54) | 1046 (83.11) | 241(16.89) |
| ***Wealth Index*** | | | | | | |
| Poorest | 2621 (60.36) | 1696 (39.64) | <0.001 | 3026 (69.84) | 1331 (30.16) | <0.001 |
| Middle | 1839 (66.06) | 886 (33.94) | 2574 (75.65) | 904 (24.35) |
| Richest | 841 (77.55) | 265 (22.45) | 1246 (84.05) | 264 (15.95) |
| ***Religion*** | | | | | | |
| Islam | 4486 (66.08) | 2384 (33.92) | 0.044 | 5518 (74.97) | 2025 (25.03) | 0.658 |
| Others | 534 (61.42) | 321 (38.58) | 908(74.26) | 325(25.74) |
| ***Household Head Sex*** | | | | | | |
| Male | 4411 (65.67) | 2348 (34.33) | 0.852 | 5500 (75.12) | 1996 (24.888) | 0.254 |
| Female | 609 (65.26) | 357 (34.74) | 926 (73.42) | 354 (26.58) |
| ***Ethnicity of the household head*** | | | | | | |
| Bengali | 4865 (65.58) | 2620 (34.42) | 0.798 | 6684 (74.89) | 2438 (25.11) | 0.474 |
| Others | 155 (66.60) | 85 (33.40) | 162 (72.70) | 62 (27.30) |
| ***Mother’s Age at the Survey Time*** | | | | | | |
| 15 - 19 | 190 (68.00) | 86 (32.00) | 0.010 | 1276 (77.02) | 428 (22.98) | 0.027 |
| 20-34 | 2991 (68.18) | 1444 (31.82) | 3035 (73.85) | 1148 (26.15) |
| 35+ | 883 (62.75) | 536 (37.25) | 2009 (74.83) | 751 (25.17) |
| ***Early Childhood Diseases*** | | | | | | |
| Yes | 1262 (64.63) | 712 (35.37) | 0.494 | 1895 (73.84) | 738 (26.16) | 0.205 |
| No | 4035 (65.72) | 2132 (34.28) | 4940 (75.24) | 1761 (24.76) |
| ***Underweight*** | | | | | | |
| Yes | 1660 (61.12) | 1047 (38.88) | <0.001 | 1591 (71.86) | 667 (28.14) | <0.001 |
| No | 3308 (68.11) | 1618 (31.89) | 5038 (75.97) | 1732 (24.03) |
| ***Stunned*** | | | | | | |
| Yes | 2037 (59.86) | 1355 (40.14) | <0.001 | 1749 (70.34) | 802 (29.66) | <0.001 |
| No | 2860 (70.83) | 1240 (29.17) | 4824 (76.79) | 1572 (23.21) |
| ***Wasted*** | | | | | | |
| Yes | 444 (65.59) | 239 (34.41) | 0.989 | 647 (74.34) | 238 (25.66) | 0.721 |
| No | 4516 (65.63) | 2415 (34.37) | 5905 (74.96) | 2134 (25.04) |
| ***Overweight*** | | | | | | |
| Yes | 407 (64.98) | 219 (35.02) | 0.832 | 395 (76.0) | 158 (24.0) | 0.544 |
| No | 4894 (65.50) | 2628 (34.50) | 6451 (74.78) | 2342 (25.22) |
| ***Sanitation*** | | | | | | |
| Improved | 4819 (65.17) | 2575 (34.83) | 0.348 | 6218 (74.83) | 2279 (25.17) | 0.712 |
| Unimproved | 201 (61.09) | 128 (38.91) | 207 (76.0) | 71 (24.0) |
| ***Early childhood programs*** | | | | | | |
| Yes | 936 (78.93) | 246 (21.07) | <0.001 | 1498 (85.99) | 269 (14.01) | <0.001 |
| No | 4364 (63.31) | 2599 (36.69) | 5348 (72.19) | 2231 (27.81) |
| ***Mother Stimulation*** | | | | | | |
| Yes | 4619 (66.26) | 2422 (33.74) | 0.002 | 5696 (75.86) | 1949 (24.14) | <0.001 |
| No | 682 (60.2) | 425 (39.8) | 1150 (70.2) | 551 (29.8) |
| ***Father Stimulation*** | | | | | | |
| Yes | 3035 (66.49) | 1613 (33.51) | 0.078 | 3024 (73.11) | 1151 (26.89) | <0.001 |
| No | 2266 (64.02) | 1234 (35.98) | 3822 (76.29) | 1349 (23.71) |
| ***Other Stimulation*** | | | | | | |
| Yes | 4356 (66.5) | 2282 (33.5) | 0.003 | 3646 (74.15) | 1344 (25.85) | 0.118 |
| No | 945 (61.19) | 565 (38.81) | 3200 (75.68) | 1156 (24.32) |
| ***Inadequate Supervision*** | | | | | | |
| Yes | 542 (62.96) | 306 (37.04) | 0.343 | 590 (68.92) | 279 (31.08) | <0.001 |
| No | 4754 (65.74) | 2538 (34.26) | 6256 (75.41) | 2221(24.59) |
| ***Salt Iodization*** | | | | | | |
| Yes | 3600 (64.441) | 2075 (35.59) | 0.004 | 5172 (74.65) | 1894 (25.35) | 0.400 |
| No | 1420 (69.03) | 629 (30.97) | 1251 (75.77) | 456 (24.23) |
| ***Books*** | | | | | | |
| Yes | 3325 (72.13) | 1251 (27.87) | <0.001 | 3837 (80.65) | 1017 (19.35) | <0.001 |
| No | 1976 (55.8) | 1596 (44.2) | 3008 (68.58) | 1483 (31.42) |
| ***Toys*** | | | | | | |
| Yes | 4084 (68.18) | 2053 (31.82) | <0.001 | 5645 (74.69) | 2081 (25.31) | 0.465 |
| No | 1217 (57.41) | 794 (42.59) | 1201 (75.67) | 419 (24.33) |
| ***Mass Media*** | | | | | | |
| Yes | 2038 (71.38) | 838 (28.62) | <0.001 | 3830 (74.69) | 1411 (25.31) | 0.803 |
| No | 2024 (61.88) | 1228 (38.12) | 2490 (74.95) | 916 (25.05) |
| ***Child Punishment*** | | | | | | |
| Yes | 137 (49.01) | 145 (50.99) | <0.001 | 321 (64.8) | 165 (35.2) | <0.001 |
| No | 5164 (66.13) | 2702 (33.87) | 6525(75.42) | 2335 (24.58) |

**Table 3.** Factors associated with the developmental status of children, MICS 2012 and 2019.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristics** | **MICS- 2012** | | | | **MICS- 2019** | | | |
| **Univariate** | | **Multivariable** | | **Univariate** | | **Multivariable** | |
| **Unadjusted**  **OR (95% CI)** | **P-value** | **Adjusted**  **OR (95% CI)** | **P-value** | **Unadjusted**  **OR (95% CI)** | **P-value** | **Adjusted**  **OR (95% CI)** | **P-value** |
| ***Age of Child*** | | | | | | | | |
| 4 | 1.70 (1.52-1.90) | <0.001 | 1.62 (1.39-1.87) | <0.001 | 1.97 (1.77-2.20) | <0.001 | 1.80 (1.59-2.03) | <0.001 |
| 3 | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Child’s Sex*** | | | | | | | | |
| Female | 1.21 (1.07-1.36) | 0.002 | 1.42 (1.23-1.63) | <0.001 | 1.45 (1.31-1.61) | <0.001 | 1.41 (1.26-1.59) | <0.001 |
| Male | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Place of residence*** | | | | | | | | |
| Rural | 1.48 (1.21-1.79) | <0.001 | 1.09 (0.88-1.36) | 0.408 | 1.26 (1.09-1.44) | <0.001 | 0.88 (0.75-1.03) | 0.105 |
| Urban | Reference | - | Reference | -- | Reference | - | Reference | - |
| ***Division*** | | | | | | | | |
| Chattogram | 0.58 (0.48-0.71) | <0.001 | 0.59 (0.45-0.76) | <0.001 | 1.71 (1.43 - 2.05) | <0.001 | 1.47 (1.19-1.83) | <0.001 |
| Dhaka | 0.98 (0.81-1.19) | 0.851 | 0.99 (0.78-1.27) | 0.981 | 2.14 (1.77 -2.60) | <0.001 | 1.89 (1.51-2.35) | <0.001 |
| Khulna | 1.20 (0.97-1.48) | 0.089 | 1.03 (0.79-1.33) | 0.838 | 1.29 (1.07-1.55) | <0.01 | 0.99 (0.80-1.23) | 0.930 |
| Mymensingh | - | - | - | - | 0.75 (0.59 - 0.95) | 0.017 | 0.81 (0.62-1.06) | 0.125 |
| Rajshahi | 0.95 (0.76-1.19) | 0.664 | 0.88 (0.65-1.17) | 0.374 | 1.09 (0.88-1.33) | 0.430 | 0.97 (0.77-1.23) | 0.817 |
| Rangpur | 1.72 (1.39-2.11) | <0.001 | 1.89 (1.44-2.48) | <0.001 | 2.44 (0.62-0.95) | <0.001 | 2.66 (2.11-3.35) | <0.001 |
| Sylhet | 0.56 (0.45-0.70) | <0.001 | 0.63 (0.46-0.85) | 0.003 | 0.77 (0.62-0.95) | 0.015 | 0.76 (0.59-0.97) | 0.031 |
| Barishal | Reference | - | Reference |  | Reference | - | Reference | - |
| ***Mother’s Education*** | | | | | | | | |
| Secondary complete or Higher | 2.71 (2.14-3.43) | <0.001 | 1.77 (1.28-2.44) | <0.001 | 2.26 (1.82-2.79) | <0.001 | 1.36 (1.05-1.78) | 0.021 |
| Secondary incomplete | 1.64 (1.43-1.87) | <0.001 | 1.24 (1.03-1.50) | 0.023 | 1.53 (1.31-1.78) | <0.001 | 1.18 (0.98-1.42) | 0.078 |
| Primary complete | 1.18 (0.99-1.40) | 0.059 | 0.97 (0.78-1.21) | 0.809 | 1.04 (0.88-1.23) | 0.651 | 0.94 (0.78-1.14) | 0.540 |
| Primary incomplete | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Wealth Index*** |  |  |  |  |  |  |  |  |
| Rich | 2.27 (1.85-2.79) | <0.001 | 1.33 (0.98-1.79) | 0.063 | 2.28 (1.93-2.69) | <0.001 | 1.75 (1.40-2.19) | <0.001 |
| Middle | 1.28 (1.13-1.44) | <0.001 | 1.02 (0.87-1.21) | 0.794 | 1.34 (1.20-1.50) | <0.0001 | 1.12 (0.98-1.29) | 0.094 |
| Poor | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Religion*** |  |  |  |  |  |  |  |  |
| Islam | 0.95 (0.77-1.17) | 0.652 |  |  | 1.04 (0.88-1.23) | 0.659 | - | - |
| Others | Reference | - |  |  | Reference |  | - | - |
| ***Household’s Head Sex*** | | | | | | | | |
| Male | 1.01 (0.77-1.31) | 0.960 |  |  | 1.09 (0.94-1.27) | 0.254 | - | - |
| Female | Reference | - |  |  | Reference |  | - | - |
| ***Ethnicity*** |  |  |  |  |  |  |  |  |
| Bengali | 0.89 (0.64-1.25) | 0.512 |  |  | 1.12 (0.82-1.53) | 0.474 | - | - |
| Others | Reference | - |  |  | Reference |  | - | - |
| ***Mother’s Age*** | | | | | | | | |
| 15 - 19 | 1.26 (0.90-1.77) | 0.182 | 1.21 (0.82-1.78) | 0.345 | 1.12 (0.97-1.31) | 0.121 | 1.15 (0.97-1.36) | 0.102 |
| 20 – 34 | 1.27 (1.09-1.49) | 0.003 | 1.15 (0.96-1.38) | 0.127 | 0.95 (0.84-1.07) | 0.406 | 0.95 (0.84 – 1.09) | 0.480 |
| 35+ | Reference | - | Reference | - | Reference | --- | Reference | -- |
| ***Early Childhood Diseases*** | | | | | | | | |
| No | 1.05 (0.91-120) | 0.492 |  |  | 1.08 (0.96-1.21) | 0.205 | - | - |
| Yea | Reference | - |  |  | Reference |  | - | - |
| ***Underweight*** | | | | | | | | |
| No | 1.36 (1.19-1.55) | <0.001 | 1.11 (0.93-1.35) | 0.237 | 1.24 (1.10-1.39) | < .001 | 1.01 (0.87-1.17) | 0.908 |
| Yes | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Stunned*** | | | | | | | | |
| No | 1.63 (1.44-1.84) | <0.001 | 1.17 (0.98-1.39) | 0.080 | 1.40 (1.25-1.56) | < .001 | 1.08 (0.94-1.24) | 0.299 |
| Yes | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Wasted*** |  |  |  |  |  |  |  |  |
| No | 1.01 (0.81-1.23) | 0.989 |  |  | 1.03 (0.86-1.23) | 0.721 | - | - |
| Yes | Reference | - |  |  | Reference |  | - | - |
| ***Overweight*** |  |  |  |  |  |  |  |  |
| Yes | 0.98 (0.79-1.21) | 0.831 |  |  | 1.07 (0.86-1.32) | 0.544 | - | - |
| No | Reference | - |  |  | Reference |  | - | - |
| ***Sanitation*** | | | | | | | | |
| Unimproved | 1.33 (1.14-1.55) | <0.001 | 0.92 (0.74-1.14) | 0.440 | 1.06 (0.76-1.48) | 0.711 | - | - |
| Improved | Reference | - | Reference | - | Reference | - | - | - |
| ***Early Childhood education Programs*** | | | | | | | | |
| Yes | 2.17 (1.79-2.64) | <0.001 | 1.44 (1.14-1.82) | 0.002 | 2.37 (2.00-2.79) | < .001 | 1.59 (1.32-1.92) | < 0.001 |
| No | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Mother Stimulation*** | | | | | | | | |
| Yes | 1.30 (1.10-1.53) | 0.002 | 0.97 (0.77-1.24) | 0.832 | 1.33 (1.17-1.52) | < .001 | 0.99 (0.85-1.18) | 0.993 |
| No | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Father Stimulation*** | | | | | | | | |
| Yes | 1.12 (0.99-1.26) | 0.079 | 0.97 (0.83-1.12) | 0.644 | 1.18 (1.07-1.31) | <0.001 | 1.28 (1.13-1.44) | < 0.001 |
| No | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Others Stimulation*** | | | | | | | | |
| Yes | 1.26 (1.08-1.46) | 0.002 | 1.33 (1.10-1.61) | 0.004 | 1.09 (0.98-1.20) | 0.118 | 1.16 (1.03-1.30) | 0.016 |
| No | Reference | - | Reference | - | Reference | - | Reference | - |
| ***Inadequate Supervision*** | | | | | | | | |
| No | 1.13 (0.88-1.45) | 0.344 |  |  | 1.38 (1.16-1.64) | < .001 | 1.29 (1.06-1.58) | 0.011 |
| Yes | Reference | - |  |  | Reference | - | Reference | - |
| ***Salt Iodization*** | | | | | | | | |
| Yes | Reference | - | Reference | - | Reference | - | - | - |
| No | 0.79 (0.70-0.90) | <0.001 | 0.99 (0.84-1.17) | 0.936 | 1.06 (0.92-1.22) | 0.400 | - | - |
| ***Books*** | | | | | | | | |
| Yes | 2.05 (1.83-2.30) | <0.001 | 1.50 (1.26-1.77) | <0.001 | 1.91 (1.72-2.13) | < 0.001 | 1.53 (1.34-1.73) | < 0.001 |
| No | Reference | - | Reference | -- | Reference | - | Reference | - |
| ***Toys*** | | | | | | | | |
| Yes | 1.59 (1.37-1.84) | <0.001 | 1.54 (1.29-1.84) | <0.001 | 1.05 (0.91-1.22) | 0.309 | - | - |
| No | Reference | - | Reference | -- | Reference | - | - | -- |
| ***Mass Media*** | | | | | | | | |
| Yes | 1.54 (1.34-1.76) | <0 .001 | 1.13 (0.95-1.34) | 0.179 | Reference | - | - | - |
| No | Reference | - | Reference | -- | 1.01 (0.91-1.13) | 0.803 | - | - |
| ***Child Punishment*** | | | | | | | | |
| Yes | 0.49 (0.36-0.67) | <0.001 | 0.70 (0.49-0.99) | 0.044 | 1.67 (1.36-2.05) | <0.001 | 1.53 (1.19-1.97) | < 0.001 |
| No | Reference | - | Reference | -- | Reference | - | Reference | -- |