**Improving maternal and newborn care: Assessment of content of antenatal and postnatal care from report from women during household surveys**

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**Background:** To track maternal and newborn health care, household surveys focus on coverage of antenatal (ANC), skilled birth attendance (SBA) and postnatal care (PNC). Yet these metrics only assess contact, not content or quality of care.

**Methodology:** We used DHS data from 2010-2014 from 21 countries. We analysed the proportion of pregnant women with >1 ANC and those with >=4 visits, who received eight interventions and newborns delivered with SBA who received seven interventions. We ran random effect logistic regression to assess factors associated with receiving all interventions.

**Results:** Very low proportion of women and newborn received all selected interventions.  Average of 6% of women with at least one ANC visit received all eight interventions. For those with >=4 visits, 8% received all interventions. On average 5% of newborns received all seven postnatal interventions.

**Conclusion:** Closing the large coverage-quality gap will require improving coverage as well as quality of care.

**Extended Abstract**

**Background**

At the close of the endline year for the Millennium Development Goals, assessment of progress showed that the world has not achieved the health goal four and five of reducing under-five and maternal mortality respectively by two-third and three quarters between 1990 and 2015. Both indicators have reduced by only about half over this period. At the same time, changes in coverage of maternal and newborn health have not progressed enough for the needed acceleration to occur. Lessons learned to date suggest critical gap in terms of measurement of quality of services received by women and children, an important mediating factor of the effectiveness of the high-impact interventions being scaled up. Furthermore, measures of coverage of interventions such as antenatal care, skilled attendance at birth, and postnatal care indicate only the level of contacts between women or children with the health system and provide no indication of the content of services and quality of care delivered. While national household surveys such as the Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS) have collected data to inform progress in maternal, newborn and child heath, they are limited in terms on content of care during the antenatal, labor and delivery and postnatal period. However, advantage has not been well taken of the limited content information data that are collected to appreciate the level of quality of care delivered during these critical periods. For example, data are often collected on basic services received during antenatal care such weighing, testing for urine and blood, measuring blood pressure, tetanus protection, etc. During intra and postpartum, information is often collected about the newborn on breastfeeding initiation, weighing, immunization and postnatal care. While this information does not cover the breath of all services required, and especially in cases of emergency care and treatment, together, it can allow an assessment of whether women and children are receiving the minimum expected services, providing therefore an indication of level of quality of care. Unlike health facility or quality of care surveys that focused on care provided at service delivery sites for which nationally representative estimates are often difficult to obtain, taking advantage of limited content of services data collected through household surveys provide nationally representative estimates that can also be disaggregated by relevant stratifiers such as regions, education, wealth quintiles, etc.

In the paper, we analyse co-coverage of interventions received by women during antenatal care and by the newborn during postnatal period using data from nationally representative surveys. We described the proportion of women or newborn with contact with skilled attendant at birth who received all selected interventions and explore factors associated with the receipts of all these interventions. We make recommendations for improving quality of care delivered along of the continuum of antenatal, delivery and postnatal periods.

**Method**:

We used data on antenatal care (ANC) and postnatal care (PNC) interventions from DHS surveys conducted from 2010-2014 in 21 countries for which data was collected on eight ANC and seven PNC interventions. Countries and survey years included in the analysis are: Benin (2011-2012), Burkina Faso (2010), Burundi (2010), Cambodia (2010), Cameroon (2011), Comoros (2012), Congo (2011-2012), Congo Republic (2013), Cote Divoire (2011-2012), Gabón (2012), Guinea (2012), Liberia

(2013), Mozambique (2011), Níger (2012), Nigeria (2013), Rwanda (2010), Senegal (2010-2011), Sierra Leone (2013), Tanzania (2010), Uganda (2011), Zimbabwe (2010-2011).

The ANC intervention included are: urine sample, blood pressure, blood sample, iron supplementation, tetanus protection, counselled on pregnancy complications, tested for HIV and received results, intermittent preventive treatment of malaria in pregnancy (IPTP). The PNC interventions include: newborn weighed at birth, early initiation of breastfeeding, no prelacteal feed during first three days of live, BCG vaccination, polio vaccination at birth, postnatal care for newborn, postnatal care for the mother.

We analysed the proportion of pregnant women with at least one ANC visit with a skilled health personnel and those with four or more visits, who received all selected ANC interventions. For PNC, we analyzed women delivering with a skilled birth attendant (SBA) whose surviving newborn received the seven interventions. We carried out random effect logistic regression on pooled data to assess factors associated with receipt of all interventions separately for during ANC and PNC periods.

The analysis was based on latest pregnancy that led to a live birth within two years preceding the survey. For postnatal intervention, data on immunization was collected only on surviving children. We therefore restricted the analysis to those children.

**Result**:

Although 61% to 99% (average of 89%) of women received at least one ANC visit with a skilled health personnel across the 21 countries, only 0.5% to 22% (average 6%)  received all eight ANC interventions. Excluding IPTP, only 2% to 41% (average 18%)  received all seven remaining ANC intervention. Women who had four or more ANC visits were more likely to receive all seven interventions, but the proportions remained low, ranging from 0.7% to 25% (average = 8%) for receipt of all interventions and 3% to 46% (average 21%) for seven interventions. For PNC, only between 0.1% to 14% (average 5%) of newborns received all seven interventions, despite their mothers having SBA. Characteristics associated with receipt of seven ANC interventions included urban residence, wealth, low parity, age 30-39, education, at least 4 ANC visits, and ANC with a doctor. For PNC, wealth, married, secondary or higher education were significantly associated with receipt of all seven interventions.

**Conclusion**: The coverage-quality gap was large in all countries. To be effective, more need to be done to strengthen the quality of care as well as coverage of maternal and newborn health interventions.

Figure 1: Average percentage of women with at least one ANC visit and women with four or more visits by intervention received during ANC, 21 countries, DHS 2010-2014
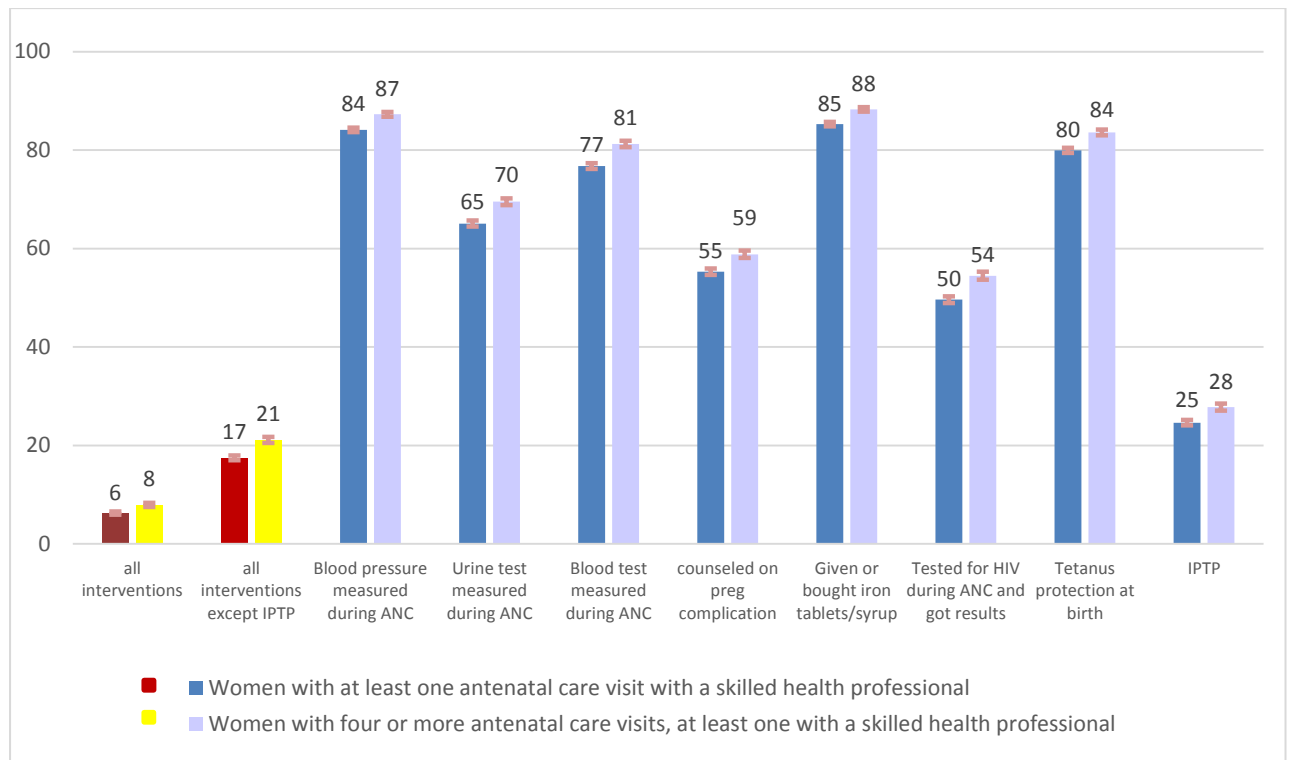


Figure 2: Percentage of women with at least one ANC visit and four of more ANC visits who received all selected eight interventions, 18 countries, DHS 2010-2014
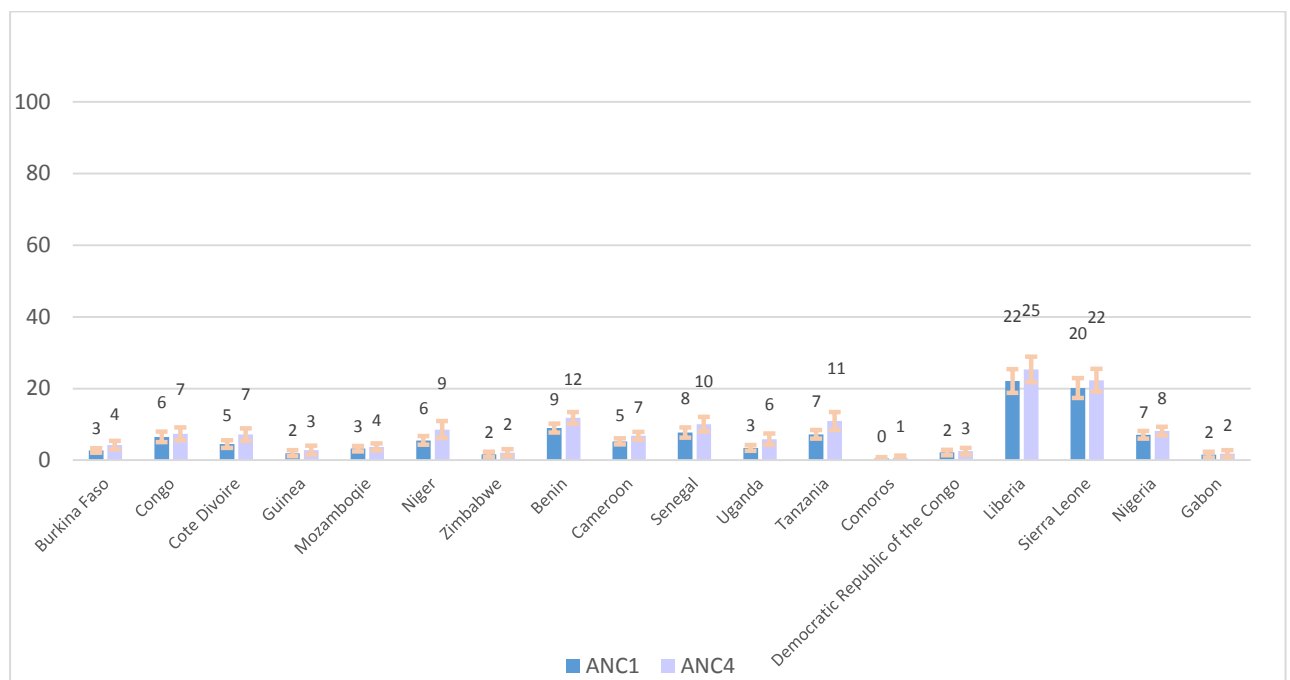
Figure 3: Average percentage of newborn/mothers with skilled attendance at birth by type of intervention received during postnatal period, 21 countries, DHS 2010-2014



Figure 4: Odds ratios, 95% confidence intervals and p-values of receipt of all ANC interventions from random effect logistic regression, (pooled DHS data from 21 countries, DHS 2010-2014)

**Forest plot for ANC(All intervention)**

| Variables | P-value | | Odds Ratio [95% CI] |
|---|---|---|---|
| *Residence* | | | |
| Urban vs. Rural | 0.0746 | | 1.24 [ 0.98 , 1.57 ] |
| *Wealth* | | | |
| Poorer vs. Poorest | 0.0093 | | 1.24 [ 1.05 , 1.46 ] |
| Middle vs. Poorest | <.0001 | | 1.45 [ 1.24 , 1.68 ] |
| Richer vs. Poorest | <.0001 | | 1.71 [ 1.42 , 2.06 ] |
| Richest vs. Poorest | <.0001 | | 2.13 [ 1.80 , 2.51 ] |
| *Current Marital status* | | | |
| Other vs. Married | 0.3849 | | 0.93 [ 0.78 , 1.10 ] |
| Single vs. Married | <.0001 | | 0.72 [ 0.61 , 0.85 ] |
| *Number of Children Born* | | | |
| 1 vs. 5+ | 0.0193 | | 1.23 [ 1.03 , 1.47 ] |
| 2-4 vs. 5+ | 0.0909 | | 1.12 [ 0.98 , 1.28 ] |
| *Age* | | | |
| 15-19 vs. 20-29 | <.0001 | | 0.74 [ 0.67 , 0.82 ] |
| 30-39 vs. 20-29 | 0.096 | | 1.12 [ 0.98 , 1.28 ] |
| >=40 vs. 20-29 | 0.5669 | | 1.10 [ 0.80 , 1.51 ] |
| *Education* | | | |
| Primary vs. No education | <.0001 | | 1.34 [ 1.18 , 1.52 ] |
| Secondary+Higher vs. No education | <.0001 | | 1.60 [ 1.34 , 1.89 ] |
| *Anc Provider* | | | |
| Doctor vs. Nurse or Midwife | 0.9069 | | 0.99 [ 0.84 , 1.17 ] |
| Other vs. Nurse or Midwife | 0.2318 | | 0.61 [ 0.27 , 1.37 ] |
| *Number of ANC* | | | |
| 4+ vs. 1-3 | <.0001 | | 2.06 [ 1.72 , 2.46 ] |

Odds Ratio smaller | Odds Ratio bigger

0.00    0.60    1.00  1.20    1.80    2.40    3.00

Figure 5: Odds ratios, 95% confidence intervals and p-values of receipt of all PNC interventions from random effect logistic regression (pooled DHS data from 21 countries, DHS 2010-2014)

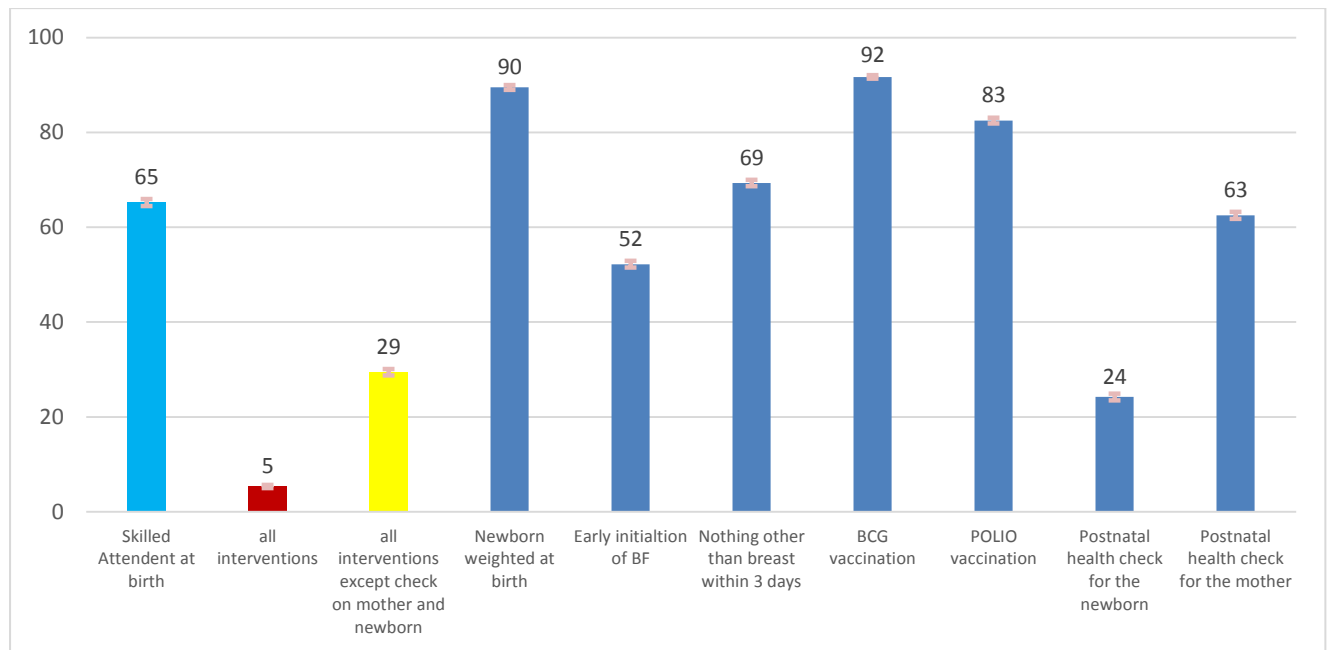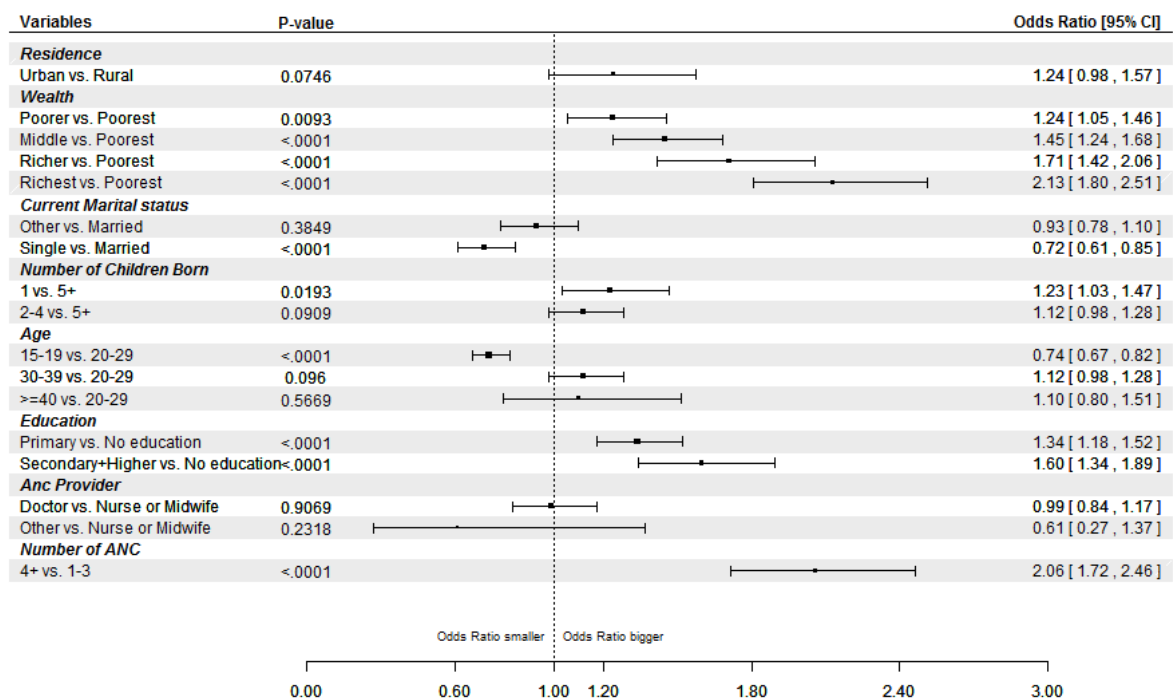**Forest plot for PNC(All intervention)**

| Variables | P-value | Odds Ratio [95% CI] |
|---|---|---|
| **Residence** | | |
| Urban vs. Rural | 0.6178 | 0.96 [ 0.80 , 1.14 ] |
| **Wealth** | | |
| Poorer vs. Poorest | 0.6965 | 0.96 [ 0.76 , 1.20 ] |
| Middle vs. Poorest | 0.1428 | 0.89 [ 0.77 , 1.04 ] |
| Richer vs. Poorest | 0.8639 | 0.98 [ 0.81 , 1.19 ] |
| Richest vs. Poorest | 0.0353 | 1.31 [ 1.02 , 1.67 ] |
| **Current Marital status** | | |
| Other vs. Married | 0.9381 | 0.99 [ 0.87 , 1.14 ] |
| Single vs. Married | 0.0034 | 0.75 [ 0.62 , 0.91 ] |
| **Number of Children Born** | | |
| 1 vs. 5+ | 0.0017 | 0.80 [ 0.70 , 0.92 ] |
| 2-4 vs. 5+ | 0.5862 | 0.96 [ 0.82 , 1.12 ] |
| **Age** | | |
| 15-19 vs. 20-29 | 0.2782 | 0.92 [ 0.79 , 1.07 ] |
| 30-39 vs. 20-29 | 0.9485 | 1.00 [ 0.90 , 1.12 ] |
| >=40 vs. 20-29 | 0.8646 | 1.02 [ 0.82 , 1.26 ] |
| **Education** | | |
| Primary vs. No education | 0.8088 | 0.98 [ 0.82 , 1.17 ] |
| Secondary+Higher vs. No education | <.0001 | 1.23 [ 1.12 , 1.35 ] |
| **Pnc Provider** | | |
| Doctor vs. Nurse or Midwife | 0.5884 | 1.08 [ 0.82 , 1.41 ] |
| Other vs. Nurse or Midwife | 0.1957 | 1.23 [ 0.90 , 1.68 ] |
| **Number of ANC** | | |
| 0 vs. 1-3 | <.0001 | 0.22 [ 0.12 , 0.40 ] |
| 4+ vs. 1-3 | 0.1618 | 1.17 [ 0.94 , 1.46 ] |

Odds Ratio smaller    Odds Ratio bigger

0.00    0.40    0.80    1.00    1.20    1.60    2.00