Indicator Sheet

PREVALENCE OF SMALL FOR GESTATIONAL AGE

MoNITOR

CONCEPT AND DEFINITION

Concept

Newborns born small for gestational age (SGA) are defined as those weighing below the 10th percentile of birthweight for newborns of the same sex and gestational age in weeks as compared to population-based fetal growth curves *(1)*. SGA newborns may be proportionately small for other measurements, such as length and head circumference, or they may be of normal length but have a lower weight than expected. These newborns can be born premature (before 37 weeks of gestation), full term (37 to 41 weeks), or post-term (after 42 weeks) *(1)*.

Newborns born SGA have a higher risk for mortality and morbidity during the neonatal period and later in development, including delayed neurodevelopment and poor linear growth. These risks are even higher for SGA newborns born premature. Risk factors for SGA are poor maternal nutrition, maternal infection, young maternal age and short birth spacing. Many SGA newborns experience intrauterine growth restriction (IUGR), which occurs when the fetus does not receive the necessary oxygen needed for proper growth and development *(1)*.

Definition

The number of newborns that are SGA[1] in a specified reference period is expressed as a percentage of the total number of live births in the same period.

Unit of measurement: Percentage (%)

Level of indicator use: Population-based at global, national and subnational (first and second administrative level)

Monitoring and evaluation framework: Impact

Domain: Other health status

Continuum of care: Postnatal

---

[1] A newborn who weighs less than the 10th percentile of the expected weight of a newborn of the same gestational age, as defined by a reference population for fetal growth is the threshold for being called small for gestational age (SGA).

MoNITOR

MEASUREMENT GUIDANCE

Data sources

There are two common data sources for this indicator:

   a. Routinely collected administrative data

   b. Population-based household surveys.

Routinely collected administrative data

Data from routinely collected and compiled administrative data sources will provide information as recorded in medical charts/records or registers and are entered into national and/or subnational health management information systems (HMIS).

Data from health information systems may collect information on the number of newborns born SGA among all newborns born in a health facility. Routinely collected administrative data and health facility statistics are the preferred data source in settings with a high utilization of health facility services and where data are recorded in a manner that ensures good data quality for both the public and private health sectors. The compiled data in the national HMIS or District Health Information System (DHIS2) should include data from both public and private health sectors, especially when the private sector is a substantial source of service provision to the population. In settings where utilization of health facilities is not high (e.g. settings with a high prevalence of births occurring at home), data may suffer from incompleteness if births occurring outside facilities are not captured. In addition, there are often challenges in accurately measuring the numerator and denominator when routine HMIS data are used to measure this indicator.

Key source of data: Administrative data sources include health facility and health services data abstracted from obstetric and neonatal medical records, including health services registers. Information about birthweight is recorded by health personnel within health facilities on paper forms completed by health personnel and/or through an electronic medical record. Data from paper or electronic sources are entered or abstracted into a database or registry and are compiled and analysed within the national and/or subnational HMIS. The Ministry of Health (MoH) and/or National Statistical Offices (NSO) are usually responsible for the reporting of this indicator.

Indicator definition and calculation: The indicator is calculated as the percentage of newborns SGA among the total number of live births in a health facility during a specified reference period. In order to calculate this indicator, the newborn's gestational age at birth and birthweight are needed and the growth is to be compared to a reference population to determine if the baby weighs below the 10th percentile for the expected birthweight. The indicator consists of the following numerator and denominator:

Numerator: The number of newborns SGA (birthweight below the 10th percentile of the expected weight of a newborn of the same gestational age) in a specified time period.

Denominator: Total number of live births in health facility in a specified time period.

Frequency of measurement: The indicator can be calculated on an annual basis or may be tracked on a more frequent and ongoing basis (e.g. monthly, quarterly), depending on facility, subnational and national processes for data entry, compilation and analysis. As a guide, the recommended frequency of measurement based on reporting level is outlined below:

- *Facility level:* Monthly, quarterly, or as needed based on the country and/or facility need

- *Subnational (first and second administrative) level:* Monthly or quarterly

- *National level:* Annually (data can be aggregated to provide national-level data).

Disaggregation: By level of facility, location of facility (e.g. urban, rural), gestational age at the time of birth and maternal age at delivery.

Missing values: Missing values are usually not known or not reported.

Population-based household surveys

The main source of data for this indicator has been through population-based household surveys collected through nationally or subnationally representative and structured questionnaires, such as:

- Demographic Health Surveys (DHS) *(2)*

- Multiple Indicator Cluster Surveys (MICS) *(3)*

- Reproductive Health Surveys (RHS)

- Other household surveys with a similar methodological design.

Population-based household survey data are the preferred data source in settings with a low utilization of health facility services or where private health sector data are excluded from routinely collected administrative data sources.

Key source of data: Eligible women of reproductive age (15–49 years) are identified in the household survey for inclusion and interviewed using an individual women's questionnaire. Women are considered eligible for survey interview if they are either usual residents or visitors of the household who stayed there the night before the interview.

All eligible and interviewed women between 15 and 49 years old who had a live birth during a specified reference period, typically 2–5 years prior to the time of interview, are asked *"When (NAME) was born,*

MoNIT⬤R

was (NAME) very large, larger than average, average, smaller than average, or very small?", where "name" refers to the name of the live birth the individual woman had during the same reference period. If the woman cannot recall, a response option for "don't know" may be selected by the interviewer.

The MoH and NSO typically conduct household surveys and compile, analyse and report the results for this indicator in collaboration with the survey programme (e.g., DHS, MICS, RHS) and funding agency. Indicator definition and calculation: Individual women of reproductive age (15–49 years old) are asked in regards to their most recent live birth if the newborn was *"born … very large, larger than average, average, smaller than average, or very small"* irrespective of the delivery location and the child's current living status (dead or alive), and are asked for births that occurred during a specified reference period, which is typically 2–5 years before the time of the survey completion. For this indicator, the recommended reference period is two years preceding the survey interview. The definition is as follows:

The percentage of interviewed women (aged 15–49 years) with a live birth in the 2–5 years prior to survey completion whose most recent live birth was estimated by the woman to be born small or very small at birth. The indicator consists of the following numerator and denominator:

Numerator: Number of interviewed women (15–49 years old) with a live birth in the 2–5 years prior to survey completion whose most recent live birth was estimated to be born small or very small at the time of birth.

Denominator: The total number of interviewed women (aged 15–49) with a live birth in the 2–5 years prior to survey completion.

Frequency of measurement: Household surveys are typically conducted every 3–5 years.

Disaggregation at population level: Type of health personnel, place of delivery, mode of delivery, place of residence (e.g. urban, rural), sex of live birth, birth order, socioeconomic status (e.g. education level, wealth quintile), age of woman at the time of delivery, and births attended by skilled health personnel.

Missing values: Included in the distribution as "don't know" or missing.

INTERPRETATION AND USE

Interpretation

For live births, birthweight should preferably be measured within the first hour of life, in order to ensure a more accurate measurement is taken before significant postnatal weight loss has occurred. Not being weighed at birth reflects a lack of appropriate newborn care and also presents a challenge to accurately estimate the prevalence of SGA newborns, which is associated with newborn health and survival. Newborns who are born SGA (below 10th percentile of the recommended birthweight for sex and gestation age) is a better indicator of assessing fetal growth restriction or malnutrition, when compared to measuring birthweight alone and without consideration of sex and gestational age at birth.

This indicator helps public health programmes, governments and global health leaders track progress towards targets on reducing SGA incidence, as well as monitor and evaluate the implementation and progress towards effective programming targeted to reducing SGA.

Common challenges

Data collected from administrative and other routine data systems

Data collected from administrative and other routine data systems Administrative data may suffer from poor quality such as irregularities in report generation, data duplication and inconsistencies *(4)*. Reporting challenges exist at the facility level given data quality issues, including incomplete, inaccurate and lack of timely data due to insufficient capacity in the health system or inadequate system design. In low-income countries, many babies are born outside of health facility settings and thus are not weighed at birth. As a result, information on birthweight and gestational age at birth are incomplete in many parts of the world, and vary in quality.

Many HMIS databases or registries are event-based and only include women who delivered a birth at a health facility. In some instances, the denominator may include births delivered by women of an unspecified age range and include both live births and stillbirths. These differences in definitions compromise the ability to compare data between countries and across different data sources.

Administrative data should be interpreted with caution in settings where data quality is poor and the percentage of births at public and private sector health facilities is low, or where data from the private health sector are not compiled within the HMIS reporting.

In settings where routine HMIS data lack information on pregnancies and/or births that occur outside the public sector – for example, in homes or in private sector facilities – the total number of births in the HMIS should not serve to estimate the denominator for this indicator. Where data on the total numbers of live births for the entire population for the denominator are unavailable, evaluators can calculate total estimated live births using census data for the total population and

MoNITOR

crude birth rates in a specified area (total expected live births = estimated population x the total crude birth rate).

Data collected through household surveys

The systematic recording of births in many countries remains a serious challenge. In the absence of reliable CRVS systems/routine administrative data, household surveys have become the key source of data to monitor levels and trends of births. In most low- and middle-income countries, such surveys represent the sole source of this information.

However, women may not be able to accurately recall details around childbirth when data are collected through household surveys *(5)*. There is also a time lag as the recall period is up to 2–5 years before the survey data were collected. Furthermore, in the DHS and MICS, women are asked to subjectively assess their newborn's size at birth as very large, larger than average, average, smaller than average, or very small. These assessments by the mother are prone to a high degree of error and the categories of measurement are broad, leading to a bias towards larger sizes at birth *(6)*. In addition, data measured in this manner using household surveys are not comparable to more rigorous calculations of SGA using gestational age, birthweight and population growth data to determine if the newborn was born below the 10th percentile for weight and gestational age.

The most commonly reported denominator is the number of women with a live birth in the years preceding the survey, which acts as a proxy for the number of live births. This indicator is prone to survivor bias in that only those women who are alive at the time of the interview would be surveyed, and underestimates the total number of live births and the total number of newborns born SGA.

In these surveys, women are asked about their most recent live birth and when, if at all, their newborn's health was checked following delivery. This should include both live births that were delivered at home and those delivered in a health facility. However, older iterations of household surveys may only obtain this information for births at home; this should be taken into consideration when reviewing older data.

Validation studies

Technical work to improve the specificity of this indicator has been conducted via the following:

Publications

AMANHI (Alliance for Maternal and Newborn Health Improvement), Baqui A, Ahmed P, Dasgupta SK, Begum N, Rahman M, et al. Development and validation of a simplified algorithm for neonatal gestational age assessment – protocol for the Alliance for Maternal Newborn Health Improvement (AMANHI) prospective cohort study. J Glob Health. 2017;7(2):021201 (http://jogh.org/documents/issue201702/jogh-07-021201.pdf, accessed 23 October 2020).

Blanc AK, Wardla T. Monitoring low birth weight: an evaluation of international estimates and an updated estimation procedure. Bull

World Health Organ. 2005;83(3):178−85 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2624216/pdf/15798841.pdf, accessed 23 October 2020).

Chang KT, Mullany LC, Khatry SK, LeClerq SC, Munos MK, Katz J. Validation of maternal reports for low birthweight and preterm birth indicators in rural Nepal. J Glob Health. 2018;8(1):010604 (http://jogh.org/documents/issue201801/jogh-08-010604.pdf, accessed 22 October 2020).

Seidman D, Slater PE, Ever-Hadani P, Gale R. Accuracy of mothers' recall of birthweight and gestational age. Br J Obstet Gynaecol. 1987;94(8):731−5. doi:10.1111/j.1471-0528.1987.tb03717.x.

GLOBAL MONITORING

Global database

There is currently no global database responsible for monitoring and tracking progress of the prevalence of SGA. However, the United Nations Children's Fund (UNICEF) and WHO jointly maintain a database for global monitoring and reporting on LBW prevalence (< 2500 g). More information about the joint UNICEF/WHO database for LBW can be found at: https://data.unicef.org/topic/nutrition/low-birthweight/.

Key initiatives

Countdown to 2030 – Women's, Children's and Adolescents' Health: http://countdown2030.org/

Every Newborn Action Plan (ENAP): http://apps.who.int/iris/bitstream/10665/127938/1/9789241507448_eng.pdf

Global Strategy for Women's, Children's and Adolescents' Health (2016–2030): http://www.who.int/life-course/partners/global-strategy/en/

MoNIT❤R

ADDITIONAL RESOURCES

The DHS Program: https://dhsprogram.com

MEASURE Evaluation: Family Planning and Reproductive Health Indicators Database: Percent of low birth-weight singleton live births, by parity: https://www.measureevaluation.org/prh/rh_indicators/womens-health/nb/percent-of-low-birth-weight-singleton-live-births

UNICEF – Multiple Indicator Cluster Surveys: http://mics.unicef.org/tools

WHO recommendations on interventions to improve preterm birth outcomes: https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/preterm-birth-guideline/en/

MoNITOR

REFERENCES

1. Lee AC, Kozuki N, Cousens S, Stevens GA, Blencowe H, Silveira MF, et al. Estimates of burden and consequences of infants born small for gestational age in low and middle income countries with INTERGROWTH-21st standard: analysis of CHERG datasets. BMJ. 2017;358:j3677 (https://www.bmj.com/content/358/bmj.j3677, accessed 23 October 2020).

2. The DHS Program [website]. Rockville: ICF International; 2020 (http://www.dhsprogram.com/, accessed 21 October 2020).

3. Multiple Indicator Cluster Surveys (MICS) [website]. New York: UNICEF; 2020 (http://mics.unicef.org, accessed 21 October 2020).

4. Abouzahr C, Boerma T. Health information systems: the foundations of public health. Bull World Health Organ. 2005;83(8):578–83 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2626318/, accessed 22 October 2020).

5. Blanc AK, Diaz C, McCarthy KJ, Berdichevsky K. Measuring progress in maternal and newborn health care in Mexico: validating indicators of health system contact and quality of care. BMC Pregnancy Childbirth. 2016;16(1):255 (https://doi.org/10.1186/s12884-016-1047-0, accessed 21 October 2020).

6. United Nations Children's Fund (UNICEF), World Health Organization (WHO). UNICEF-WHO Low birthweight estimates: Levels and trends 2000–2015. Geneva: World Health Organization; 2019. (https://data.unicef.org/resources/unicef-who-low-birthweight-estimates-levels-and-trends-2000-2015/)

MoNITOR