Data on birth weight in developing countries: can surveys help?

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The main source of data on birth weight in developing countries is statistics from health facilities, although most developing countries do not produce annual estimates of the incidence of low birth weight from these data. Such estimates would be subject to selection bias as the data are usually limited to babies born within health facilities, and therefore are representative of a subgroup that is markedly different from the overall population of neonates. Since 1990 the Demographic and Health Surveys programme has included questions on recalled birth weight and relative size at birth in 15 national surveys. In this article, we show that these cross-sectional surveys can provide a useful data source for making national estimates of mean birth weight and the incidence of low birth weight. The extent of misclassification of birth weight is, however, too large to use the data on relative size at birth as an indicator of low birth weight at the individual level.

Introduction

Data on birth weight are important for several reasons: national and regional estimates of the incidence of low birth weight are internationally recognized indicators of the well-being of neonates and women of reproductive age; such estimates provide specific information on the health of pregnant women and the course of fetal development; and birth weight has been shown to be a leading determinant of the chances for survival of a newborn infant (*1*). Recently, the incidence of low birth weight was selected as one of the indicators for monitoring the health goals established by the World Summit for Children, i.e., to reduce the incidence of low birth weight (defined as <2500 g) to no more than 10%.

The main source of data on birth weight in developing countries is statistics from health facilities. Most developing countries do not produce annual estimates of the incidence of low birth weight from these data. In many countries, the majority of babies are not born in health facilities; for example, over three-quarters of babies born recently in Indonesia, Morocco, Niger, Pakistan, and Yemen were delivered at home (*2–6*). Estimates limited to babies born in health facilities would therefore be subject to selection bias, as there are good reasons to assume that these babies are markedly different from the overall population. It is likely that the incidence of low birth weight would be underestimated and that the findings on the risk of low birth weight would also be misleading.

Retrospective data collected through surveys are an alternative source of information on birth weight. DaVanzo et al. showed that retrospective data from the Malaysia Family Life Survey (*7*) could be used to investigate the correlates of low birth weight, but that the inferences derived from reported birth weights are biased. In their analysis of the Peru Demographic and Health Survey (*8*), Moreno & Goldman showed that retrospective data could be used to estimate the incidence of low birth weight and concluded that estimates of birth weight based on reported weights were substantially underestimated. These analyses motivated the Demographic and Health Surveys programme (DHS) to include questions on both recalled birth weight and relative size at birth in national surveys. In this article, we use these data to assess whether cross-sectional surveys can be used to improve national estimates of mean birth weight and the incidence of low birth weight. In addition, we examine whether data on size at birth can be used in analyses at the individual level, such as studies of determinants of infant mortality, child anthropometry, and effects of maternity care.

Materials and methods

DHS, which is funded by the United States Agency for International Development (USAID), assists developing countries to organize representative national surveys, which provide information for policy and programme decision-making and scientific re-

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search. Survey information includes a full birth history, which is used to estimate fertility and child mortality and various maternal and child health indicators. The survey respondents are women of childbearing age.

Since 1990, DHS surveys have included the following questions for all children born in the 5 years preceding the survey:

— When (NAME) was born was he/she very large, larger than average, average, smaller than average, or very small?

— Was (NAME) weighed at birth?

— (IF YES) How much did (NAME) weigh?

Data from 15 surveys that included these questions were analysed. In 12 of 15 surveys, the question on relative size at birth was phrased exactly as above. In Cameroon and Yemen, the categories "very large" and "larger than average" were combined. In Paraguay, only three categories were used: small, average, and large. In all the surveys a question was asked about the relative size at birth of all children, including those whose mothers reported a numerical birth weight.

The usefulness of survey data on birth weight depends on the ability of mothers to recall accurately the birth weight of children weighed at birth and on the quality of data on relative size at birth. Because the USA maintains an accurate registration system of vital data that includes birth weights from birth certificates, Ekouevi & Morgan (*9*) were able to assess the validity of retrospective reporting of birth weights in the USA National Surveys of Family Growth by comparing survey reports with data from the registration system; they were also able to assess the reliability of retrospective reporting of birth weight by comparing reports across repeated surveys. The findings indicated that levels and trends of low birth weight estimates from retrospective data generally matched data from the registration system and that levels and trends estimated across repeated surveys were similar. These two findings confirm in principle the reliability of retrospective reporting of birth weight. The quality of numerical data on birth weight in the DHS surveys can be assessed only by comparing their results with other national studies in the same country. However, such studies are based on hospital data and are generally not available for concurrent periods.

The quality of relative size at birth data can be assessed only for births for which numerical birth weights were also reported. Mean birth weight and the incidence of low birth weight should correspond with reported relative size at birth. If there is such a correspondence, survey data on birth weight can be used to obtain better estimates of the national incidence of low birth weight.

Low birth weight is defined by WHO as <2500 g. Clustering of birth weight data in multiples of 500 g is common and affects estimates of the incidence of low birth weight. Therefore, we examined the degree of clustering at 2500 g in DHS surveys. For national aggregate analyses, half of the birth weights reported as 2500 g were classified as low birth weight in this study.

In addition, the analysis focuses on the usefulness of the categories "very small" and "small" as indicators of low birth weight. The magnitude of misclassification bias was assessed by analysing the sensitivity and positive predictive value (PPV) of size at birth as an indicator of low birth weight. If the misclassification bias was low, the proportion of births classified as very small or small could be used as an indicator of the incidence of low birth weight. More importantly, data on size at birth could be used in individual-level analyses of the determinants and consequences of low birth weight.

Results

Table 1 shows the DHS survey countries included in the study, the year of the survey, and the number of births in the 5 years preceding it. The proportion of children weighed at birth varied greatly between surveys: from 9% in Pakistan and Yemen to 91% in the Dominican Republic. The proportion of children who had a reported numerical birth weight varied from 6% in Yemen to 90% in the Dominican Republic. Most, but not all women who said their child had been weighed could recall the birth weight. In 10 of 14 surveys, more than three-quarters of the mothers who said their children had been weighed recalled the weight. In Nigeria, however, only 36% of the mothers who said their child had been weighed reported the birth weight to the interviewer. In Jordan, the reported weight was recorded without first asking whether the child had been weighed.

Table 2 shows the units of measurement used to record birth weight and the extent to which responses are clustered in multiples of 500 g. Weights were recorded in g in seven surveys, in kg carried to one decimal place in five surveys, and in kg carried to two decimal places in one survey. In the Dominican Republic, weights were recorded in pounds and ounces, and in Pakistan either pounds or kg were used.

There was considerable clustering in all surveys where reporting was in kg or g, with a third to half of the responses occurring at multiples of 500 g. Clustering was particularly problematic at 2500 g, i.e., the

Table 1: **Survey characteristics and distribution of births according to availability of birth weight data**

	Year	No. of births[a]	% weighed at birth	% of births with weight or size reported: Weight only	Size only	Both missing	Total
Sub-Saharan Africa							
Cameroon	1991	3350	61.1	50.7	49.2	0.1	100.0
Namibia	1992	3966	71.6	44.3	54.0	1.8	100.0
Niger	1992	6962	16.8	12.6	86.3	1.1	100.0
Nigeria	1990	7899	26.2	9.5	88.9	1.6	100.0
United Republic of Tanzania	1991–2	8138	51.9	49.3	49.9	0.8	100.0
Zambia	1992	6479	50.5	41.9	57.8	0.3	100.0
North Africa and Eastern Mediterranean							
Jordan	1991	8364	NA[b]	85.7	13.9	0.4	100.0
Morocco	1992	5245	29.5	21.6	78.3	0.1	100.0
Yemen	1991–2	7230	8.8	5.8	73.3	20.9	100.0
Asia							
Indonesia	1990–1	15708	37.1	36.8	62.0	1.2	100.0
Pakistan	1991	6424	9.3	7.4	91.1	1.5	100.0
Central and South America and the Caribbean							
Colombia	1990	3751	80.7	62.2	37.5	0.3	100.0
Dominican Republic	1991	4164	90.7	90.3	9.5	0.2	100.0
Paraguay	1991–2	4246	72.5	71.7	27.7	0.6	100.0
Peru	1991	9461	64.2	62.0	37.6	0.4	100.0

[a] No. of births in the 5 years preceding the survey.
[b] NA = not available.

Table 2: **Units used for recording birth weight and clustering at multiples of 500 g and 2500 g, DHS**

Survey	Units[a]	Clustering at multiples of 500 g[b]	Clustering at 2500 g[c]
Cameroon	g	33.6	4.9
Namibia	g	22.2	2.9
Niger	kg1	29.6	8.6
Nigeria	kg1	44.1	6.7
United Republic of Tanzania	kg2	46.6	9.1
Zambia	kg1	31.8	6.5
Jordan	g	31.6	6.8
Morocco	kg1	49.2	5.7
Yemen	g	54.7	23.5
Indonesia	g	37.7	6.2
Pakistan	lbs/g	0.6	0.2
Colombia	g	51.3	5.7
Dominican Republic	lbs	0	0
Paraguay	g	30.5	2.7
Peru	kg1	29.2	3.7

[a] kgn = kilograms with n decimal places; lbs = pounds and ounces.
[b] Percentage of all reported weights that are multiples of 500 g.
[c] Percentage of all reported weights that are 2500 g.

cut-off point for low birth weight. Among the surveys where reporting was in kg or g, only five countries had less than 5% of responses clustered in multiples of 500 g, and eight countries had 5–9% clustered at 2500 g. In Yemen, almost a quarter of all responses were clustered at 2500 g. In the Dominican Republic and Pakistan, responses were similarly clustered in multiples of whole pounds: 42% of responses in the Dominican Republic and 85% of those in Pakistan. There does not appear to be a correlation between the level of clustering and the unit of measurement used.

The distributions of the reported relative size at birth are shown in Table 3, with responses split according to whether a numerical birth weight was reported. The distribution of relative size at birth varied considerably across surveys; for example, the proportion reported as "average" ranged from 29% in the Dominican Republic to 79.8% in the United Republic of Tanzania. The distribution of relative size at birth in Yemen differs from that in all other surveys in that virtually all responses were clustered in two categories: average and very small.

Within countries, the distribution of relative size at birth also differs according to whether a numerical birth weight was reported or not. In all countries, the distribution was shifted towards smaller sizes if no birth weight was reported. In all surveys, except Zambia, the difference between the two distributions is significant (Kolmogorov–Smirnov test, $P < 0.05$).

As discussed above, the quality of the data on

Table 3: **Percent distribution of size at birth according to recall of numerical birth weight, DHS surveys**

Survey	Numerical weight reported	Size at birth: Very large (%)	Large (%)	Average (%)	Small (%)	Very small (%)	Missing (%)	Total (%)	No. of births
Cameroon	Yes	NA[a]	38.7	49.7	9.0	2.5	0.2	100.0	1699
	No	NA	26.6	54.4	16.0	2.9	0.1	100.0	1649
Namibia	Yes	6.3	5.5	72.3	10.5	5.3	0.2	100.0	1755
	No	6.4	4.7	66.3	9.8	9.6	3.2	100.0	2140
Niger	Yes	8.2	26.8	40.2	17.4	5.9	1.6	100.0	875
	No	5.3	14.4	40.6	22.2	16.0	1.3	100.0	4357
Nigeria	Yes	16.0	18.5	54.3	7.4	3.6	0.3	100.0	752
	No	16.7	12.5	52.1	10.3	6.7	1.8	100.0	7020
United Republic of Tanzania	Yes	1.8	10.2	78.7	7.0	2.1	0.3	100.0	4015
	No	1.3	6.7	80.8	7.1	2.6	1.5	100.0	4060
Zambia	Yes	4.5	15.3	68.0	9.4	2.6	0.3	100.0	2792
	No	2.3	17.5	68.3	9.4	2.0	0.5	100.0	3666
Jordan	Yes	2.5	12.4	68.4	10.2	6.4	0.2	100.0	7169
	No	0.8	6.7	73.4	8.7	7.6	2.7	100.0	1163
Morocco	Yes	3.0	24.1	53.8	14.8	4.3	0.0	100.0	1133
	No	1.3	18.0	52.8	23.6	4.2	0.1	100.0	4108
Yemen	Yes	NA	2.9	87.0	0.4	8.8	0.9	100.0	421
	No	NA	1.6	63.1	0.3	12.9	22.2	100.0	3894
Indonesia	Yes	8.5	29.8	49.4	10.3	1.9	0.1	100.0	5787
	No	4.2	21.2	59.8	11.7	1.4	1.8	100.0	9739
Pakistan	Yes	2.0	16.6	64.3	11.6	5.4	0.0	100.0	477
	No	1.9	9.1	64.6	16.4	6.4	1.6	100.0	5850
Colombia	Yes	8.9	23.6	49.3	10.9	7.2	0.2	100.0	2334
	No	4.1	24.9	47.5	13.7	8.9	1.0	100.0	1405
Dominican Republic	Yes	4.7	47.0	29.1	16.0	3.2	0.1	100.0	3761
	No	3.1	39.6	26.9	22.1	6.3	2.1	100.0	394
Paraguay	Yes	NA	35.0	47.3	17.3	NA	0.3	100.0	3045
	No	NA	34.6	37.1	26.2	NA	2.1	100.0	1364
Peru	Yes	1.8	22.4	57.9	14.1	3.5	0.3	100.0	5867
	No	0.7	15.7	57.9	20.5	4.2	1.0	100.0	3558

[a] NA = not available.

relative size at birth can be assessed only among children whose numerical birth weights are also reported. Tables 4 and 5 include data on such children only. Table 4 shows the mean birth weight within each size category, the standard deviation (SD), the coefficient of variation, and the number of SDs the mean in each category differs from the overall mean in a particular survey. Mean birth weight varied considerably by size-at-birth category and had the expected pattern in all countries, i.e., very small has the lowest mean, small the next-to-lowest, etc.

With the exceptions of Colombia and Niger, the mean birth weights for very small babies were well below the cut-off point for low birth weight and lay in the range 1800–2300 g. The mean for very small babies fell 1.4–2 SD units below the overall mean in 11 of 14 surveys. The coefficient of variation was largest in the very small category in all surveys except in Colombia, indicating that there is considerable variability in what is meant by "very small".

Babies reported to be very large at birth had mean birth weights >3500 g in all surveys and >4000 g in 7 of 12 surveys. The mean weight for the very large category was 1–1.5 SDs above the overall mean birth weight in most surveys.

Can the proportion of babies reported as very small or small at birth be used as an indicator of the proportion of children with low birth weights? Table 5 shows the sensitivity, PPV, and specificity of relative size at birth as an indicator of low birth weight. Sensitivity is defined here as the proportion of low-birth-weight children identified by the relative size-at-birth indicator; PPV as the proportion of low-birth-weight children among those identified by the relative size-at-birth indicator; and specificity as the proportion of children who do not have low birth weight among those included in the very small or small categories. The sensitivity of the relative size-at-birth category was very low in all surveys (mean, 29%), even though the PPV was ≥70% in most sur-

Table 4: **Distribution of mean birth weight according to size at birth, with standard deviation (SD), coefficient of variation (CV), and standard deviation from the mean, DHS surveys**

Survey/size	No.	Mean weight (g)	Coefficient of variation	SD from mean
Cameroon				
All	1 967	3 306 (640)[a]	0.19	0.00
Very large	NA[b]	NA (NA)	NA	NA
Large	767	3 709 (604)	0.16	0.63
Average	967	3 162 (443)	0.14	−0.23
Small	181	2 640 (414)	0.16	−1.04
Very small	49	2 059 (476)	0.23	−1.95
Namibia				
All	1 659	3 098 (687)	0.22	0.00
Very large	120	3 647 (817)	0.22	0.80
Large	95	3 491 (596)	0.17	0.57
Average	1 171	3 170 (603)	0.19	0.10
Small	172	2 572 (405)	0.16	−0.77
Very small	98	2 110 (610)	0.29	−1.44
Niger				
All	1 821	3 062 (533)	0.17	0.00
Very large	146	3 596 (558)	0.16	1.00
Large	509	3 230 (479)	0.15	0.32
Average	711	3 058 (423)	0.14	−0.01
Small	316	2 744 (440)	0.16	−0.60
Very small	121	2 554 (606)	0.24	−0.95
Nigeria				
All	993	3 308 (752)	0.23	0.00
Very large	163	3 970 (897)	0.23	0.88
Large	207	3 608 (650)	0.18	0.40
Average	507	3 165 (536)	0.17	−0.19
Small	72	2 810 (499)	0.18	−0.66
Very small	40	2 060 (547)	0.27	−1.66
United Republic of Tanzania				
All	3 756	3 026 (613)	0.20	0.00
Very large	89	3 735 (653)	0.17	1.16
Large	370	3 703 (532)	0.14	1.10
Average	2 953	3 024 (477)	0.16	−0.00
Small	254	2 250 (560)	0.25	−1.27
Very small	76	1 791 (611)	0.34	−2.01
Zambia				
All	2 627	3 128 (616)	0.20	0.00
Very large	118	4 048 (660)	0.16	1.49
Large	421	3 665 (456)	0.12	0.87
Average	1 763	3 098 (436)	0.14	−0.05
Small	250	2 348 (477)	0.20	−1.27
Very small	67	1 950 (539)	0.28	−1.91
Jordan				
All	7 083	3 227 (717)	0.22	0.00
Very large	173	4 566 (737)	0.16	1.87
Large	862	4 012 (535)	0.13	1.09
Average	4 858	3 249 (464)	0.14	0.03
Small	744	2 562 (485)	0.19	−0.93
Very small	434	2 014 (603)	0.30	−1.69
Morocco				
All	1 134	3 335 (697)	0.21	0.00
Very large	34	4 382 (647)	0.15	1.50
Large	274	3 855 (681)	0.18	0.75
Average	609	3 343 (379)	0.11	0.01
Small	168	2 609 (456)	0.17	−1.04
Very small	49	2 096 (505)	0.24	−1.78

Survey/size	No.	Mean weight (g)	Coefficient of variation	SD from mean
Yemen				
All	571	2 750 (592)	0.22	0.00
Very large	NA	NA (NA)	NA	NA
Large	34	3 578 (469)	0.13	1.40
Average	451	2 809 (511)	0.18	0.10
Small	4	2 651 (522)	0.20	−0.17
Very small	76	1 915 (591)	0.31	−1.41
Indonesia				
All	5 896	3 188 (581)	0.18	0.00
Very large	533	3 852 (612)	0.16	1.14
Large	1 919	3 467 (441)	0.13	0.48
Average	2 757	3 096 (395)	0.13	−0.16
Small	589	2 528 (448)	0.18	−1.14
Very small	90	1 808 (482)	0.27	−2.38
Pakistan				
All	607	3 169 (804)	0.25	0.00
Very large	14	4 157 (987)	0.24	1.23
Large	101	3 683 (758)	0.21	0.64
Average	392	3 230 (758)	0.23	0.08
Small	73	2 427 (758)	0.31	−0.92
Very small	27	2 074 (1068)	0.51	−1.36
Colombia				
All	2 419	3 436 (778)	0.23	0.00
Very large	215	4 339 (782)	0.18	1.16
Large	570	3 790 (637)	0.17	0.46
Average	1 193	3 353 (587)	0.18	−0.11
Small	263	2 997 (793)	0.26	−0.56
Very small	173	2 564 (600)	0.23	−1.12
Dominican Republic				
All	4 033	3 316 (705)	0.21	0.00
Very large	186	4 261 (690)	0.16	1.34
Large	1 837	3 648 (480)	0.13	0.47
Average	1 133	3 132 (426)	0.14	−0.26
Small	727	2 714 (643)	0.24	−0.85
Very small	143	1 944 (818)	0.42	−1.95
Paraguay				
All	2 857	3 446 (758)	0.22	0.00
Very large				
Large	1 029	4 067 (605)	0.15	0.82
Average	1 300	3 343 (395)	0.12	−0.14
Small	519	2 476 (633)	0.26	−1.28
Very small				
Peru				
All	5 728	3 294 (639)	0.19	0.00
Very large	92	4 160 (750)	0.18	1.36
Large	1 212	3 701 (576)	0.16	0.64
Average	3 417	3 318 (464)	0.14	0.04
Small	797	2 704 (563)	0.21	−0.92
Very small	196	2 247 (666)	0.30	−1.64

[a] Figures in parentheses are standard deviations (SD).
[b] NA = not available.

Table 5: **Sensitivity, positive predictive value (PPV), specificity, and negative predictive value (NPV) of very small and small size at birth as indicators of low birth weight**

	Very small				Small[a]			
Survey	Sensitivity[b] (%)	PPV (%)	Specificity[c] (%)	NPV (%)	Sensitivity[b] (%)	PPV (%)	Specificity[c] (%)	NPV (%)
Cameroon	29	72	99	95	62	33	97	97
Namibia	30	70	98	91	60	47	91	94
Niger	24	35	96	93	61	23	80	96
Nigeria	31	63	99	95	46	31	92	96
United Republic of Tanzania	13	86	100	88	46	69	97	92
Zambia	20	89	100	91	68	65	95	96
Jordan	45	71	98	94	75	46	90	97
Morocco	36	63	98	95	90	35	87	99
Yemen	31	73	97	84	32	71	97	84
Indonesia	23	88	100	94	71	42	92	98
Pakistan	29	85	99	88	68	64	93	94
Colombia	55	37	95	97	83	23	85	99
Dominican Republic	24	81	99	91	78	46	88	97
Paraguay					87	41	89	99
Peru	23	66	99	96	41	70	88	97
Average	29	70	98	92	66	45	91	96

[a] Includes very small.
[b] Proportion of low-birth-weight children identified by the size-at-birth indicator.
[c] Proportion of non-low-birth-weight children included in the very small or small categories.

Table 6: **Mean birth weight and incidence of low birth weight (LBW) among children with numerical reported birth weight, children with relative size-at-birth data only, and all children**

	Numerical weight only:		Size only:		All:	
	Mean (g)	LBW (%)	Mean (g)	LBW (%)	Mean (g)	LBW (%)
Cameroon	3302	8.6	3193	11.6	3248	10.1
Namibia	3098	13.9	3042	17.3	3067	15.8
Niger	3062	13.3	2958	17.9	2971	17.3
Nigeria	3308	10.9	3232	14.1	3240	13.8
United Republic of Tanzania	3024	18.4	2992	19.2	3008	18.8
Zambia	3128	14.6	3126	14.2	3127	14.4
Jordan	3228	13.6	3154	14.9	3218	13.8
Morocco	3335	10.4	3219	13.7	3244	13.0
Yemen	2751	32.8	2253	29.7	—[a]	—[a]
Indonesia	3188	10.3	3118	11	3144	10.7
Pakistan	3169	16.1	3030	19.3	3041	19.0
Colombia	3436	8.3	3374	9.5	3413	8.7
Dominican Republic	3316	11.7	3210	16.9	3313	11.8
Paraguay	3446	9.5	3366	13.4	3424	10.6
Peru	3294	10.2	3211	12.7	3263	11.2

[a] No estimate was made.

veys. Thus, most babies reported as very small are indeed of low birth weight, but only about one-quarter or one-third of all low-birth-weight babies are included in this category.

Sensitivity improves markedly when both the categories very small and small are used as indicators of low birth weight (see Table 5). However, while the two smallest relative size measures capture twothirds of low-birth-weight babies (mean sensitivity, 66%), babies reported to be very small or small are less likely to have a low birth weight: in 11 of 15 surveys fewer than 50% of the very small and small babies had low birth weights (mean PPV, 45%).

Table 6 shows estimates of mean birth weight and low-birth-weight incidence, first for births with reported weights, followed by births with size data only, and finally for all births. Estimated weights for births with only size data were calculated by using the mean birth weight of each size category among births with known weights and the distribution of sizes for births with no weights reported. Similarly, the estimated proportions of low birth weight for births with only size data reported were calculated by using the low-birth-weight proportion in each category for births with known weights and the distribution of sizes for births with no reported weights.

As expected on the basis of the size distributions presented in Table 3, the incidence of low birth weight is higher if all births are taken into account than if only those with reported numerical weights are included. In eight countries, the increase in the incidence of low birth weight was more than 1%, and in Niger, Nigeria, Pakistan, and Morocco, it was well over 2%. Data from Yemen are very different from those in other surveys, probably because of poor data quality.

Discussion

Retrospective surveys can improve estimates of the incidence of low birth weight in developing countries, where a substantial proportion of children are not weighed at birth. The assessment of the quality of data on birth weight has shown that data for relative size at birth are reasonably good indicators of birth weight at the aggregate level. However, two points should be borne in mind. First, assessment of the quality of data for relative size at birth is only possible for children whose numerical birth weights were reported. We have assumed here that the quality of data for relative size at birth for children whose numerical weights were not reported is the same as that for those whose numerical weights were reported. However, mothers who recall numerical birth weights may be able to provide more accurate assessments of relative size than mothers of children who were not weighed at birth. The quality of data for relative size at birth for children whose numerical weights were not reported is probably not better than that for children whose numerical weights were reported. Second, the quality of the numerical data on birth weights cannot be evaluated in detail. There is considerable clustering, which may be the result of errors in recall. However, data from health facilities are also heavily clustered in multiples of 500 g, indicating that the weights are often rounded off.

There are no national estimates, based on health facility data, of the incidence of low birth weight for most of the countries included in this study. Only the United Republic of Tanzania had a sufficiently large number of birth weight studies in the WHO data bank to permit comparison of estimates with data from health facilities.[a] Data for more than 100 000 births in 16 different locations during 1975–86 show a mean birth weight slightly under 3000 g and an incidence of low birth weight of 14%. The mean is close to the survey-based estimate of 3024 g presented here; however, the lower incidence of low birth weight reported in health facilities may be partly the result of excluding all children with weights recorded as 2500 g from the class of children with low birth weight (half of these births were considered low birth weight in this study.)

Because we assigned birth weights to children for whom only size data were reported, the overall estimates of birth weight become more uncertain as the proportion of children with reported numerical birth weights declines. In the case of Yemen, no estimate for the incidence of low birth weight was made, not only because a numerical weight was reported for only 6% of births, but also because, overall, the data were of poor quality. One-fourth of the numerical responses was clustered at 2500 g, one-fifth of the children reported in the survey had no data for either weight or relative size, and reported relative size was clustered at only two categories. It is therefore recommended that relative size should not be used to estimate low birth weight in surveys where the small and very small categories contain fewer than 25 children for whom there is also a numerical measure of birth weight. If the number of such children is 25–50, estimates should be interpreted with caution. Consequently, estimates for countries such as Nigeria and Pakistan, where numerical weights were reported for <50 births, are less accurate than those for countries where a numerical birth weight was reported for at least 40% of births (9 of 15 countries). However, it is difficult to quantify at what point there are too few births with a reported numerical weight to produce a reliable overall estimate of the incidence of low birth weight. In addition, if the reporting of numerical birth weights is limited largely to a specific subgroup (e.g.,

[a] *Low birth weight: a tabulation of available information.* Geneva, World Health Organization, 1992 (unpublished document WHO/MCH/92.2).

better-off urban women), national estimates of the incidence of low birth weight cannot be made.

It does not appear useful to use the relative size-at-birth category "very small" as an indicator of birth weight <2500 g in individual-level analyses of the determinants of low birth weight and the effects of low birth weight on infant mortality, since there is considerable misclassification of birth weights.

Cross-sectional surveys can therefore provide a useful source of data for national estimates of mean birth weight and the incidence of low birth weight, and, if the sample size is sufficiently large, regional estimates within a country can also be made.

Résumé

Données sur le poids de naissance dans les pays en développement: les enquêtes sont-elles utiles?

Dans les pays en développement, les statistiques des établissements de soins constituent la principale source de données sur le poids de naissance. La plupart de ces pays n'utilisent pas ces données pour calculer des estimations annuelles de l'incidence du faible poids de naissance. Ces estimations seraient en effet sujettes à un biais de sélection car les données ainsi obtenues concernent habituellement les seuls nourrissons nés dans l'établissement, qui forment un sous-groupe sensiblement différent de l'ensemble des nouveau-nés. Depuis 1990, le Programme d'enquêtes démographiques et sanitaires a fait figurer dans 15 enquêtes nationales des questions sur le poids de naissance indiqué de mémoire par la mère et sur la corpulence relative du nouveau-né. Le présent article montre que les enquêtes transversales peuvent constituer une source utile de données pour l'estimation du poids moyen à la naissance et de l'incidence du faible poids de naissance. La proportion d'erreurs de classification sur le poids de naissance est cependant trop grande pour qu'il soit possible d'utiliser les données sur la corpulence relative comme indicateur du faible poids de naissance au niveau individuel.

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