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Letter to the Editor: Secretory IgA in Breast Milk

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It is sad to read a paper from such distinguished authors which is so poorly reported. The main purpose of the investigation was to show whether breast fed infants of deprived mothers received less IgA than infants of well-off mothers; thus, the critical data were the concentration of IgA in the breast milk and the amount of breast milk received by the infants. On both counts there are problems in the paper as published. There was apparently no standardisation of collection techniques and it is difficult to understand what was done. The milk collected from the Guatemalan mothers was apparently hind milk. This may well not be a representative sample for IgA concentration. It is not stated how the Ethiopian samples were obtained. Test weighing to estimate volumes of breast milk is notoriously inaccurate. The description of the methods used is again inadequate. It is not clear to the reader whether every feed in 24 h was measured or who did the measurements, because paramedics were only in the home for 3 h. The interpretation of milk volumes obtained under these conditions must be very cautious.

This leads to another problem. The only clear difference in IgA *concentration* occurred at 1 month between urban privileged and rural Guatemalans (Table 2). The calculations of daily output of IgA given in Table 3 show a much reduced and no longer significant difference, implying that the rural women had a greater total breast milk output than the urban privileged; however, reference to Table 1 shows that this was apparently not so, the urban privileged having a slightly greater mean milk volume at one month than the rural women. Thus the data are confused and difficult to interpret.

It is a pity that such uncertainties and inconsistencies are allowed past the refereeing stage.

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Letter to the Editor: Response

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Dr. Brooke is right when he states that, because the purpose of the investigation was to show whether breast fed infants of deprived mothers receive less IgA than infants of well-off mothers, the critical data were the concentration of IgA in the breast milk and the amount of breast milk received by the infants.

In our paper (1) we indicate clearly how the samples were obtained from Guatemalan mothers. Because the methodology was exactly the same in Ethiopia and Sweden we did not consider it necessary to be repetitious in the article.

In regard to the representativeness of the milk sample collected, we had previous information (2, 3) that led us to believe that a random sample obtained at any given time during a day is representative of the milk being produced by the mother. Additional information recently obtained in Guatemala, and submitted for publication, indicates that this is exactly the case: the mean IgA content of milk samples taken from 10 mothers in the morning was 0.267 ± 0.08 g/liter and the mean concentration for milk samples collected in the afternoon of the same day from the same mothers was 0.263 ± 0.09. When we obtained milk specimens from 15 subjects, 5 min before and 5–10 min after a child's feeding, the concentrations of IgA were 0.270 ± 0.110 and 0.270 ± 0.118, respectively. We also measured anti-rotavirus IgA antibodies and did not find any variations in the levels of specific antibodies in the paired samples. All these data indicate that a breast milk sample collected at any given time during the day is representative of the milk the mother produces that given day.

We have found the method to estimate the volume of breast milk ingested by a child in a 24-h period very accurate. Detecto scales with a sensitivity of 5 g were used in our study. The details of the standardization of the test weighing are to be published by the World Health Organization in the book *Report of a Cross Sectional Study of Quantity and Quality of Breast Milk.* The estimated error for intakes of 300, 600, and 900 g of milk were 6, 4, and 3%, respectively and considered acceptable. We described the method in detail in our paper (1); however, the paragraph on page 273 should read: "Paramedical personnel spent a continuous period of 30 h at each mother's home. The first 6-h period was aimed at establishing optimal conditions for normal lactation during the observation phase." Obviously, paramedics did the measurements during the continuous 24-h periods.

The last question brought up by Dr. Brooke, regarding differences in IgA concentration between the urban privileged and rural mothers, but comparable IgA output in 24 h, arises because he examined only the mean values of the volumes and concentrations of IgA. There is great variability in the two parameters in the two population groups, especially among the urban privileged; thus, comparisons of the means is not an adequate analysis. For this reason, we used a non-parametric method, The Wilcoxon test, for the statistical comparisons.

We present the figures, their means and the ranks in Table 1 to allow a better interpretation of the data, as we analyzed them for publication.

Table 1. *Volume of milk, IgA concentration and total IgA output by Guatemalan women*[1]

	Urban privileged						Rural					
	Volume		IgA		IgA/24 h		Volume		IgA		IgA/24 h	
	Liter	Rank	g/liter	Rank	g	Rank	Liter	Rank	g/liter	Rank	g	Rank
	0.680	17	0.880	14	0.598	18	0.525	10	0.520	6	0.273	8
	0.576	15	1.410	19	0.812	19	0.566	13	0.410	2	0.232	5
	0.338	3	0.795	12	0.269	7	0.542	11	0.602	10	0.326	11
	0.465	6	0.596	9	0.277	9	0.490	9	1.088	17	0.533	17
	0.572	14	0.893	15	0.511	15	0.478	7	0.444	3	0.212	4
	0.543	12	0.311	1	0.168	2	0.313	2	0.497	4	0.161	1
	0.079	1	2.640	20	0.209	3	0.373	4	0.746	11	0.278	10
	0.480	8	1.030	16	0.494	14	0.452	5	0.588	8	0.266	6
	0.702	18	1.160	18	0.814	20	0.740	19	0.511	5	0.378	12
	0.771	20	0.527	7	0.406	13	0.615	16	0.859	13	0.528	16
	Σ Ranks	114[a]		131[b]		120[c]		96[a]		79[b]		90[c]
Mean	0.5206		1.0242		0.4558		0.5104		0.6265		0.3187	
S.D.	0.2000		0.6504		0.2340		0.1187		0.2121		0.1263	

[1] According to the Tables (4), for two samples of $n = 10$ and $2\alpha = 0.10$, the significance limits are 82–128 (difference between a, a and c, c: not significant; difference between b, b: is significant).

Table 2. *Comparison of the milk volume (liter), concentration of secretory IgA (g/liter) and total secretory IgA output (g) in 24-h periods by Swedish and Guatemalan women, 1 month after delivery*

	Mean Rank[1]		
Group of mothers	24-h volume	SIgA (g/liter)	SIgA/24 h
Swedish	28.47	24.87	28.93
Guatemalan			
Rural	19.05	16.10	16.30
Urban poor	19.35	21.90	19.70
Urban privileged	22.40	24.87	24.10
H	4.2969	4.7007	6.3654
P	0.230	0.194	0.094

[1] Kruskal-Wallis Test (5).

Based on this analysis, we concluded that the milk samples obtained 1 month postpartum from privileged lactating women contain more IgA than those from rural mothers; the amount of IgA ingested by the children being breast-fed by the two groups of women, however, is comparable.

Due to Dr. Brooke's letter, we noticed that the level used in the Wilcoxon Test was not the appropriate one because we controlled an overall error rate instead of an experimentwise error rate. For this specific case we should have used $\alpha = 0.0167$ (5). Therefore, we reanalyzed all the data, from Swedish mothers and the three Guatemalan groups, using the Kruskal-Wallis test (5). In Table 2 we present the data obtained from such analysis, which indicates that there are no differences in the total volume of milk ingested by the children of the four groups ($P = 0.23$), in the concentration of secretory IgA (SIgA) in g/liter ($P = 0.19$) or in SIgA output ($P = 0.094$). In this regard, the main conclusion of our paper (1) still holds: there is no impairment of SIgA immunity among the underprivileged women as compared to well-off Swedish and Guatemalan mothers.

REFERENCES AND NOTES

1. Cruz, J. R., *et al.*: Studies on human milk. III. Secretory IgA quantity and antibody levels against *E. coli* in colostrum and milk from underprivileged and privileged mothers. Pediatr. Res., *16:* 272 (1982).
2. Carlsson, B., *et al.*: Studies of Escherichia coli 0 antigen specific antibodies in human milk, maternal serum and cord blood. Acta Paediatr. Scand., *65:* 216 (1976).
3. Sohl-Åkerlund, A., *et al.*: A sensitive method for specific quantification of secretory IgA. Scand. J. Immunol., *6:* 1275 (1977).
4. Scientific Tables (Diem, K and Lentner, C., eds). Ciba-Geigy Limited, Basle, Switzerland 1975, p. 124–127.
5. Marascuilo, L. A. and McSweeney, M.: Nonparametric and distribution free methods for the social sciences. California, USA, Brooks/Cole Publishing Company, 1977, p. 312, 299–305.

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