

# Inter-observer variation in symphysis-fundus measurements

## A plea for individualised antenatal care

R. C. PATTINSON, G. B. THERON

### Summary

Two groups of midwives were compared with regard to ability to detect small-for-gestational-age (SGA) babies using symphysis-fundus (S-F) measurements. The patients were all low-risk obstetric patients. In group A 2 midwives provided antenatal care to 97 patients; 14 delivered SGA babies, of which 12 were identified by S-F measurements (sensitivity 85,7%). In group B 15 midwives provided antenatal care to 126 patients, 12 delivered SGA babies, and 5 of these were identified (sensitivity 41,2%). It is considered that this difference was due to inter-observer variability. A plea is made for individualised antenatal care.

*S Afr Med J* 1989; 76: 621-622.

Controversy surrounds the use of symphysis-fundus (S-F) measurements in the detection of small-for-gestational-age (SGA) babies. In high-risk obstetric patients S-F measurements have a high sensitivity.<sup>1-3</sup> This could be due to selection, because in studies on low-risk obstetric patients<sup>4,5</sup> the good sensitivities have not been reproduced. An alternative explanation is that inter-observer variation might be responsible, because numerous observers were involved in the studies on low-risk patients<sup>4,5</sup> whereas a limited number of observers studied the high-risk patients.<sup>1-3</sup> This study was undertaken to test the latter hypothesis in a low-risk obstetric population.

### Patients and methods

A group of 97 randomly allocated low-risk obstetric patients received antenatal care from 2 midwives at a community clinic (group A). A second group of 126 consecutive low-risk obstetric patients (group B), not included in group A, were seen by all 15 of the midwives involved in antenatal care at the community clinics. The observers in group A were qualified midwives. The observers in group B consisted of all nursing personnel involved in antenatal care at the community clinics. The 2 group A midwives also formed part of group B. All the midwives were specially trained in the use of S-F measurements. A low-risk patient was defined as one who booked before 22 weeks' gestation, had an ultrasound examination before 24 weeks (to confirm dates), and had no obstetric risk factors identified at the first visit. If the biparietal diameter and dates differed by more than 2 weeks the biparietal diameter was used to estimate gestational age; otherwise dates were used. Routine antenatal care was provided and the Belizan S-F

growth curve<sup>1</sup> was used. If a patient developed risk factors, or if S-F measurements indicated a SGA baby, she was referred to a high-risk clinic and managed accordingly. Two consecutive measurements under the 10th percentile or 3 individual measurements below the 10th percentile after 20 weeks were the criteria used to indicate a SGA baby on the S-F curve. After delivery all babies were classified according to gestational age and mass as SGA, appropriate for gestational age or large for gestational age by growth curves drawn up for our institution.<sup>6</sup> The sensitivity (proportion of SGA babies with an abnormal S-F curve), specificity (proportion of normal babies with a normal S-F curve) and positive predictive value (likelihood of a baby being SGA if the S-F curve is abnormal) were calculated to assess the two groups. The difference between the two groups was also analysed by the chi-square test and (in the case of small numbers) by Fisher's exact test. A value of  $P < 0,05$  was regarded as significant.

### Results

The obstetric data are compared in Table I. There were no perinatal deaths in either group and the incidence of complications was similar, with the exception of preterm labour. However, most of the preterm babies were born after 34 weeks' gestation, the exceptions numbering only 1 in group A (born at 33 weeks) and 8 in group B (born between 32 and 34 weeks). All patients had a minimum of 4 S-F measurements.

TABLE I. COMPARISON OF OBSTETRIC DATA

	Group A (97 subjects)	Group B (126 subjects)
Age (yrs)	23,6 ± 4,4	24,7 ± 5,5
Primigravidas	38 (39%)	43 (34%)
Multigravidas	59 (61%)	83 (66%)
Complications		
SGA babies		
Mature	13 (13%)	8 (6%)
Preterm	1 (1%)	4 (3%)
Hypertension/pre-eclampsia	9 (9%)	9 (7%)
Preterm labour		
≤ 37 wks	8 (8%)	36 (29%)*
≤ 34 wks	1 (1%)	8 (6%)*
Abruptio placentae	2 (2%)	2 (2%)
Other	3 (3%)	5 (4%)

\* $P < 0,001$ .

In group A, 14 of the 97 babies were SGA; of these 12 were detected by the S-F curve. However, there were also 9 babies falsely identified as SGA, 1 being preterm. In group B, 12 of the 126 babies were SGA, of which only 5 were detected by the S-F curve. There were also 9 false-positives in this group; 6 of these babies were preterm. The sensitivity, specificity and

MRC Perinatal Mortality Research Unit, Department of Obstetrics and Gynaecology, University of Stellenbosch and Tygerberg Hospital, Parowvallei, CP

R. C. PATTINSON, M.MED. (O. & G.), F.C.O.G. (S.A.), M.R.C.O.G.

G. B. THERON, M.MED. (O. & G.), F.C.O.G. (S.A.), B.S.C. HONS

**TABLE II. COMPARISON OF THE VALUE OF THE S-F MEASUREMENTS IN PREDICTING SGA BABIES BETWEEN GROUP A AND GROUP B**

	SGA	AGA	Sensitivity (%)	Specificity (%)	Positive predictive value (%)	Negative predictive value (%)
<b>Group A</b>						
S-F+	12	9	85,7	89,2	57,1	97,4
S-F-	2	74				
<b>Group B</b>						
S-F+	5	9	41,7	92,1	35,7	93,8
S-F-	7	105				

AGA = appropriate for gestational age; S-F+ = S-F measurements predicted a SGA baby; S-F- = S-F measurements did not predict a SGA baby.

predictive values of the groups are shown in Table II. The proportion of SGA babies correctly diagnosed in group A (86%) is significantly larger than that in study group B (42%) ( $P = 0,025$ ). If the preterm babies are excluded the only other difference to emerge is an increase in the positive predictive value in group B.

## Discussion

In this study two groups of low-risk obstetric patients of comparable age and gravidity were followed up in the same manner, the only exception being that group A patients were seen by the same midwife at each visit, while those in group B were seen by several midwives. The S-F growth curve was much more effective in detecting SGA babies in group A (sensitivity 85,7%) than in group B (sensitivity 41,2%). The positive predictive value of the findings was also better in group A (57,1%) than in group B (35,7%). We believe that this is due to inter-observer variability, which can be considerable, as previously shown.<sup>7</sup> It is important to note that the higher proportion of preterm babies in group B did not affect the sensitivity of the S-F measurements, and this does not explain the difference between the two groups.

Our finding that S-F measurements were effective in detecting SGA babies in a low-risk population is in contrast to the findings of Rosenberg *et al.*,<sup>4</sup> and Persson *et al.*,<sup>5</sup> numerous observers were used in both these studies. This factor was excluded in our group A. The results for our group B, however, with numerous observers, were very similar to those of Rosenberg *et al.*<sup>4</sup> and Persson *et al.*<sup>5</sup>

The reason for the significant difference in the incidence of preterm labour between the two groups is not clear. The incidence of preterm labour in the population from which the study groups were drawn is 19%. Group B is thus more representative of the population. The random allocation may not have been strictly adhered to, resulting in selection of patients in group A. An alternative explanation is that in group A a strong bond between patient and midwife was established, enabling better communication and thus earlier detection of risk factors by the midwife and better education of the patient. Papiernick<sup>8</sup> has shown that the incidence of

preterm labour can be decreased by educating patients and changing their lifestyles.

These findings clearly indicate the desirability of restructuring antenatal care towards the maximum individualised care possible. In many rural clinics and private practices this is already the case, since they are usually only staffed by one or two midwives or, in the case of practices, general practitioners or specialists. Midwives, and other practitioners not familiar with the technique, could be taught to use S-F measurements to help identify babies at risk. This will lead to appropriate individualised care and lower perinatal mortality.

The problem of establishing individualised care really lies in the urban areas, where clinics are large and the obstetric staff is relatively large and tends to change frequently. The advantages of individualised care, namely better patient education and motivation and better detection of risk factors, warrant an urgent new look at the administration of the urban antenatal clinics.

We thank the midwives of our community clinics for their help in this study, Dr A. Ferreira and Mrs D. Grové for helping collect the data, Dr B. G. Lindeque for his help in preparing the manuscript, and Mrs H. Kruger for typing the manuscript.

## REFERENCES

1. Belizan JM, Villar J, Nardin JC, Malamud J, De Vicuna LS. Diagnosis of intrauterine growth retardation by a simple clinical method: measurement of uterine height. *Am J Obstet Gynecol* 1978; 131: 643-646.
2. Calvert JP, Cream EE, Newcombe RG, Pearson JF. Antenatal screening by measurements of symphysis-fundus height. *Br Med J* 1982; 285: 846-849.
3. Quaranta P, Currell R, Redman CWG, Robinson JS. Prediction of small-for-dates infants by measurement of symphysis fundal height. *Br J Obstet Gynaecol* 1981; 88: 115-119.
4. Rosenberg K, Grant JM, Tweedie I, Aitchinson T, Gallagher F. Measurements of fundal height as a screening test for fetal growth retardation. *Br J Obstet Gynaecol* 1982; 89: 447-450.
5. Persson B, Stangerberg M, Lunnell NO, Brodin U, Holmberg NG, Vaclavikova V. Prediction of size of infants at birth by measurement of the symphysis-fundus height. *Br J Obstet Gynaecol* 1986; 93: 206-211.
6. Jaroszewicz AM, Schumann DEW, Keet MP. Intrauterine groeistandaarde van Kaapse Kleurlingbabas. *S Afr Med J* 1975; 49: 568-572.
7. Bagger PV, Eriksen PS, Secher NJ, Thisted J, Westergaard L. The precision and accuracy of symphysis-fundus distance measurements during pregnancy. *Acta Obstet Gynecol Scand* 1985; 64: 371-374.
8. Papiernick E. Prediction of the preterm baby. *Clin Obstet Gynecol* 1982; 11: 315-336.