

WEIGHT GAIN IN NORMAL PREGNANCY

by

P. K. DEVI, M.S., F.R.C.S.

and

S. J. BAKHRU, M.D.

During a survey of the nutritional status of antenatal cases, with particular reference to anaemia and toxæmia, it was observed by one of us (P.K.D.) that a certain group of normal mothers who attended the clinic regularly showed only a total weight gain of 7—10 pounds during the entire period of pregnancy. As the number of cases observed in that group was too small, a separate study was undertaken to determine the mean weight gain during pregnancy in apparently healthy normal women belonging to two different socio-economic groups. A great deal has been written regarding the problem of excessive weight gain during pregnancy, but there are very few references in literature regarding the significance of very low rates of weight gain during pregnancy. This is a problem particularly concerning the clinicians dealing with patients belonging to lower socio-economic groups.

Material

The material analysed in this report consists of two groups of patients.

(1) 32 normal mothers belonging to a higher socio-economic group con-

sisting mainly of wives of members of the staff or officers well placed in life.

(2) 124 normal mothers belonging to a lower socio-economic group consisting of wives of mill workers, rickshaw-pullers and labourers. The criteria, as suggested by Humphreys (1954), for selection of cases were mostly used and were as follows:—

1. First antenatal visit at or before 12 weeks.

2. No major diseases in the mother. Routine chest X-rays were taken to exclude tuberculosis.

3. Toxaemias of pregnancy were excluded.

4. The last antenatal visit took place within a maximum of seven days of delivery.

5. Delivery took place within twenty days of the expected date.

6. A normal live baby was delivered.

Observations

The following observations were made after analysis of the data.

The difference, between the maternal weight gain in the two socio-economic groups, is significant at the 5% level. In the poorer socio-economic group the coefficient of correlation between maternal weight gain and foetal birth weight was signi-

Department of Midwifery & Gynaecology, Medical College, Nagpur.

Received for publication on 26-10-62.

TABLE 1

	Group I	Group II
Mean Maternal gain in weight	19.1 lb.	11.4
	S.D. 3.44	S.D. 5.00
Mean weight gain in the latter half of pregnancy	12.9 lb.	8.52
	S.D. 2.96	S.D. 4.4
Mean maternal gain in weight .. .	6.5 lb.	6.0
	S.D. 1.07	S.D. 0.85

ficant as also the parity and the foetal birth weight (0.2204). In the higher socio-economic group the age, parity or foetal birth weight did not show any statistically significant relationship to the maternal weight gain during pregnancy.

Discussion

The statistical evaluation of weight changes in pregnancy is difficult. In man, as well as in animals, metabolism during pregnancy is anabolic, weight gain being more than accountable for by the growth of the products of conception and the organs of reproduction.

The question, what constitutes maternal weight gain, has only been partly answered. The "reproductive weight gain" includes the weight of the baby, placenta, amniotic fluid, mammary parenchyma, augmented blood volume, and growth of the uterus, and amounts to 14—15 pounds. The remaining increment of about ten pounds is presumably due to water retention, acquisition of fat and protein storage. A great deal of work has been done in attempts to correlate weight gain in pregnancy with pre-pregnancy weight, age, parity etc., but conclusions show a great deal of disagreement. The mean total weight gain in normal

pregnancy is reported as about twenty-four pounds by most observers, though some have quoted as low as thirteen pounds four ounces (Hannah 1925) and some as high as 30.7 pounds (Stander and Pastore 1940). Alexander and Downs (1953) used the initial body weight as the base line and found that, among one thousand normal women observed, mean total weight gain was approximately seventeen per cent of initial body weight. Fish et al (1959) observed one thousand patients and classified them according to their total weight gain. Seventy-one per cent showed weight gain of over twenty-five pounds. Increase of weight, above the accepted normal, need not always be due to fluid retention though this is usually presumed by the clinician. Many workers have observed that the incidence of pre-eclampsia rose as the rate of weight gain increased and the routine recording of weight gain in pregnancy is emphasized in clinics the world over as an important aid in the early diagnosis of pre-eclampsia. Not so much attention has been paid to patients with less than average weight gain. Tompkins et al (1955) discussing "the under-weight patient as an increased obstetric hazard" pointed out that the failure to gain weight

should be considered as an early warning of the patient's inefficient response to the increased metabolic and physiologic requirements of pregnancy. Clinicians have also been interested in the question whether curtailment of weight gain of the mother has any influence on foetal weight. Smith (1947) studied the average weight of a group of infants in undernourished mothers in wartime Holland and found that all groups had a decrease in average weights of the infants. Slemons and Fagan (1927) studied infant birth-weight and the maternal weight gain and reported an average weight gain of twenty-six pounds in women delivered of infants of ten pounds or over but were doubtful whether curtailing maternal weight gain would significantly reduce birth-weight. Thomson and Hytten (1960) observed that if the total weight gain is limited to 7—8 kilograms, it would be impossible for the mother to store nutrients in her non-reproductive tissue. They point out that high gains are associated with excessive storage of water, whereas low gains are associated with reduced birth weight. The gain in weight during pregnancy, of patients in the poorer group observed by us, accounts barely for the reproductive weight gain so that there is practically no storage of nutrients in the reproductive tissues. Under such conditions, how the katabolic phase during lactation is dealt with is an enigma. Usually personnel working in antenatal clinics take serious note only of excessive gain in weight during pregnancy in their efforts to detect toxæmia in the early stages. It is equally important

to pay serious regard to problems concerning low rates of weight gain in the apparently healthy mothers. The cause for this poor weight gain during pregnancy is presumably due to caloric as well as protein under-nutrition. The impact of this on the health of the mother during the puerperium, the efficiency of lactation and nutritional status of the infant is very important and deserves the attention of research workers in this country.

Summary

The results of a study on the mean maternal weight gain during normal pregnancy in mothers of good and poor socio-economic groups are presented. The mean maternal weight gain in the better socio-economic group is 19.1 lb. (S.D. 1.07). In the poorer socio-economic group, the mean maternal weight gain is 11.4 lb. (S.D. 5.00) and the mean foetal birth weight 6.0 lb. (S.D. 0.85).

The gain in weight in the poorer group barely meets "the reproductive weight gain" consisting of the weight of the baby, placenta, amniotic fluid, the increase in blood volume and the growth of the reproductive tissues, leaving no margin for storage of nutrients. It is pointed out that the cause of this low weight gain, and the impact of this on the health of the mother and the infant are problems which deserve serious attention from research workers.

Acknowledgement

We have to acknowledge with thanks the help obtained from Sister R. Gunion in the follow up of the cases and Mr. Menon for the statisti-

cal analysis of the data presented in this paper.

References

1. Alexander, S. A. and Downs, J. T.: Am. J. Obst. & Gynec. 66: 1161, 1953.
2. Fish, J. S., et al: Ibid. 78: 743, 1959.
3. Hannah, C. R.: Ibid. 9: 854, 1925.
4. Humphreys, R. C.: J. Obst. & Gynec. Brit. Emp. 61: 764, 1954.
5. Slemons, J. M. and Fagan, R. H.: Am. J. Obst. & Gynec. 14: 159, 1927.
6. Smith, C. A.: Ibid. 53: 159, 1947.
7. Stander, H. J. and Pastore, J. B.: Ibid. 39: 928, 1940.
8. Thomson, A. M. and Hytten, F. E.: Proc. Nutr. Society. 19: 5, 1960.
9. Tompkins, W. T., Wiehl, D. G. and Mitchell, R. M.: Am. J. Obst. & Gynec. 69: 114, 1955.