CHANGES IN BODY-WEIGHT AND SKINFOLD THICKNESS IN PREGNANT WOMEN IN NORTH INDIA

by

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Introduction

Progressive weight gain in the second and third trimesters is a well known feature of normal pregnancy. Products of conception and additions to the maternal structures like the uterus, breast, blood and extracellular fluid constitute the major components of the weight gain (Hytten and Leitch, 1964). In addition a substantial increase in the maternal fat depots especially in the subcutaneous region is said to occur (Pipe *et al*, 1979; Traggart *et al*, 1967). Some workers in India (Venkatachalam *et al*, 1960) and abroad (Seitchik and Alper, 1954) have reported significant loss of body fat in second and third trimesters of pregnancy.

According to W.H.O. expert committee (1965) average weight gains reported in pregnant women in Europe and the U.S.A. are between 10-12 kg, but women living in the developing countries appear to gain only half as much. This opinion is based on a few reports on pregnant women from rural communities of South India (Venkatachalam *et al*, 1960), Ceylon (Clements and Bocomo, 1957) and South Africa (Thomson *et al*, 1966). In the absence of data on economically better-off Afro-Asian women, it is not clear whether the reported low weight gain in pregnancy in the developing countries is an ethnic variation related to their low pre-pregnant body weight or a result of maternal malnutrition. In this paper observations on weight gain and skinfold thickness in North Indian pregnant women of different socio-economic status are presented.

Material and Methods

In India, it is extremely rare for the women to attend the antenatal clinic regularly throughout the pregnancy. Therefore, 1200 random observations were made in pregnant women attending the antenatal clinic of the local hospital, consisting of 248 observations in 8-12 weeks, 352 in 24-28 weeks and 600 in 36-40 weeks of normal pregnancy. Patients with complications like twins, oedema or hypertension were excluded. Mean age was 22.70 years ± 2.86 SD in primiparae and 27.49 years ± 4.71 SD in the multiparae. Average parity of the latter was 2.8 ± 1.17 SD. The subjects were mostly housewives and none was involved in heavy manual labour. Family income of the patients ranged from Rs. 100 to Rs. 1000 per month. The women were classi-

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fied as having average socio-economic status (ASES) and poor socio-economic status (PSES) if the monthly income was above or below Rs. 500 respectively. Body-weight of the subjects was recorded in light clothes (of known weight) on a beam type balance. Triceps skinfold thickness was measured in the left arm using Harpenden calipers (Jallife, 1966).

Observations

The results of investigations in women of ASES and PSES are shown in Tables I and II respectively.

Discussion

Weight gain of 9 kg, in primiparous and 11 kg, in multiparous women of ASES (Table I) is impressive considering their first trimester body-weight was 10-20% less than their Caucasian counterparts. However, women of PSES whether primi- or multiparae showed mean weight gain of 6 kg only (Table II). Low weight gain in pregnancy has been reported in poor labourers in South India (Venkatachalam *et al*, 1960) and Ceylon (Clement and Bocomo, 1957). In rural South African women weight gain in pregnancy has been correlated with the seasonal variations in the availability of food (Thomson *et al*, 1966).

The validity of the measurements of skinfold thickness in the assessment of the amount of body fat of an individual is well established (Durnin and Rahaman, 1967) and triceps skinfold has been found to be the most useful and practical parameter (Jalliffe, 1966). Pregnant women belonging to both ASES and PSES showed a similar pattern of changes in the skinfold i.e. slight increase in

TABLE I

Results of Investigations in Pregnant Women of Average Socio-economic Status

Pregnancy, weeks	Primiparae			Multiparae		
	(n)	Weight, kg	Triceps skinfold, mm	(n)	Weight kg.	Triceps skinfold, mm
8-12	(48)	49.40 ± 4.72	20.20 ± 6.76	(64)	49.55 ± 4.18	21.66 ± 7.64
24-28	(72)	53.51 ± 6.29	21.16 ± 6.10	(90)	56.96 ± 8.02	22.70 ± 8.20
36-40	(113)	58.52 ± 6.84	19.56 ± 6.25	(125)	60.26 ± 7.47	21.24 ± 6.76

TABLE II
Result of Investigations in Pregnant Women of Poor Socio-economic Status

Pregnancy, weeks	Primiparae			Multiparae		
	(n)	Weight, kg	Triceps skinfold, mm	(n)	Weight kg.	Triceps skinfold, mm
8-12	(57)	46.30 ± 4.69	14.60 ± 5.54	(79)	46.85 ± 7.60	15.03 ± 8.74
24-28	(80)	50.45 ± 6.25	17.21 ± 5.59	(110)	49.51 ± 7.06	15.75 ± 5.38
36-40	(175)	52.18 ± 6.21	15.20 ± 5.10	(187)	52.71 ± 6.31	15.52 ± 5.59

second trimester followed by reversal to the original thickness in third trimester. Similar pattern has been reported in the triceps skinfold thickness in pregnant women in more affluent countries (Pipe *et al*, 1979; Traggart *et al*, 1967). More significant was the observation that even in women of PSES showing mean weight gain of 6 kg., triceps skinfold in the third trimester was not thinner than in the first trimester (Table II). These observations contradict the view (based on measurements of body water) that a substantial loss of body fat occurs in pregnancy (Seitchik and Alper, 1954; Venkatachalam *et al*, 1960). Foetal parasitism seems to be limited mainly to the utilization of those nutrients normally deposited in the maternal stores by the mother. Experimental observations in animals have shown ;that under conditions of severe dietary restrictions imposed during pregnancy, the mother does not use a significant amount of her own tissues to support foetal growth (Roso, 1977).

Summary

1200 random observations in bodyweight and triceps skinfold thickness were made in women in 8-12, 24-28 and 36-40 weeks of pregnancy. The mean weight of women of average socio-economic status in the third trimester was greater than those in the first trimester by 9 kg in primiparae and 11 kg in multiparae. In women of poor socio-economic status, mean weight in the third trimester was greater than that of women in the first trimester by 6 kg only in both primi- and multi-parae. Even in the poor women the skinfold in the third trimester was not significantly thinner than that of women in the first trimester.

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