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Nutrition in Twin Pregnancy

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The urinary nitrogen output appears to be related to both protein and energy intake, so that women having heavier babies probably eat more, although this may simply mean that they are larger women. Women with twin pregnancies have been found to have a lesser urinary nitrogen output, but it seems unlikely that this be due to lower intakes. They might simply utilize their diet more efficiently – a hypothesis that is now being tested.

Key words: Nutrition, Twin pregnancy, Urinary nitrogen, Birth weight

INTRODUCTION

The importance of maternal nutrition in relation to fetal growth has been debated for the past 50 years. This question has not yet been settled with regard to singleton pregnancies, in spite of all the studies that have been undertaken. Much less is known about nutrition in twin pregnancies, although in general it is thought that a better diet is required for the mother carrying a twin pregnancy. The levels of nutrition for singleton pregnancies have been rather arbitrarily determined at about 2,400 kilocalorie per day and 65/70 g of protein. These amounts are thought to be too low for a twin pregnancy, but no actual amounts have been recommended for twin pregnancies.

Most of the work that has been carried out in singleton pregnancies has been concerned with undernutrition and the possibilities of supplementation of diets. The well-known League of Nations study arbitrarily recommended 1.5 g of protein per kg body weight per day for the pregnant woman. Further early studies, such as the People's League of Health [7] in the Rhonda Valley in 1933 and the Toronto experiment [3] in 1942, found no difference in the weight of the babies from mothers taking a supplement, compared to those on a pure diet during pregnancy. The belief then was that a woman had to be actually starving before any serious impression was made on the weight of the baby and that the fetus was an ef-

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ficient parasite. The starvation of the Dutch people in Holland in 1944-45 during the occupation showed [6] that such a reduced diet caused baby weights to be lower. In the Guatemala study [4] the birth weights of the babies were increased by supplementing the diet. This was increased whether the extra energy was provided by carbohydrate supplement or by protein supplement.

It is generally conceded that intrauterine growth retardation is very common in twins. The reason for this growth retardation is not clear, but it is possibly due to an inadequate diet being taken by the mothers. In order to study the dietary intake of mothers with second pregnancies, the measurement of total urine nitrogen in 24 hour urine was utilised. In a study carried out in the metabolic research unit in Aberdeen [5], we have found a high correlation between the 24-hour urinary nitrogen and the protein intake (Table I). It was also found that there was a correlation between energy intake and the urinary nitrogen. This seemed then to be a useful practical method of assessing the dietary intake in singleton pregnancies, and it was felt that this could be used to assess the dietary intake in twin pregnancies. The ratios of urea/nitrogen to total nitrogen, urea/nitrogen to creatinine, and total nitrogen to creatinine, can also be used as predictors of dietary intake, although they are not quite so accurate as the total 24-hour urinary nitrogen in assessing the protein intake.

In 30 twin pregnancies the 24-hour urinary nitrogen between 30 and 38 weeks was found to be 8.88 g, whereas in 74 singleton pregnancies of the same gestation it was 10.0 g (Table 2). There is a statistically lesser amount of urinary nitrogen in the twin pregnancies ($P < 0.01$). There was, however, no significant difference between 17 singleton and 25 twin pregnancies in the urea/nitrogen, urea/creatinine, and nitrogen/creatinine ratios (Table 3).

The 24-hour urinary nitrogen output was related to the birth weight centile and, although the difference was not significant, there was a trend towards a greater urinary nitrogen output and increasing birth weight (Table 4). This same trend was found in the combined twin birth weights. The centile birth weight tables for twins are devised on the basis of a study of 1308 twin pregnancies [2] (Table 5).

TABLE 1. Urinary Nitrogen and Protein and Energy Intake in Singleton Pregnancies

Correlation between protein intake and 24-hour urinary nitrogen	r = 0.93
Correlation between energy intake (kilocalorie) and urinary nitrogen	r = 0.55

TABLE 2. 24-Hour Urinary Nitrogen

Singleton pregnancies	(n = 74)	10.00 g	
			P < 0.01
Twin pregnancies	(n = 30)	8.88 g	

TABLE 3.

		Urea nitrogen/ total nitrogen	Urea nitrogen/ creatinine	Total nitrogen/ creatinine
Singleton pregnancies	(n = 17)	0.77	6.19	7.99
Twin pregnancies	(n = 25)	0.78	5.73	7.32

TABLE 4. 24-Hour Urinary Nitrogen and Birth Weight Centile For Singletons (N = 74)

Birth weight centile	<25	<25	<75	⩾ 75	
Urinary nitrogen	8.53	9.54	10.00	10.44	ns

TABLE 5. Urinary Nitrogen and Birth Weight Centiles for Twins (N = 30)

Birth weight centile	<25	25–75	⩾ 75	
Urinary nitrogen	7.3	9.0	9.8	ns

On the basis of the urinary nitrogen output being related to both protein and energy intake, it appears that women having heavier babies eat more. This may simply mean that they are larger women and does not necessarily imply that their babies are bigger *because* they eat more. This would also appear to apply in women having twin pregnancies. However, the women having twin pregnancies had a lesser urinary nitrogen output than the women having singleton pregnancies. This can be interpreted as meaning that they have a lower protein and energy intake than the women with singleton pregnancies, but this seems unlikely. It is more probable that the women with twin pregnancies utilise their diet more efficiently and thus excrete less nitrogen. In order to assess this, a study has been commenced to compare the protein and energy intakes by a weighed dietary survey with the urinary nitrogen output in twin pregnancies.

It is interesting to speculate that, as women having dizygotic twin pregnancies tend to be heavier than average [1], they are able to provide more nutrition for their babies. This might explain why dizygotic twins are in general heavier than monozygotic twins. However, much larger numbers of cases will require to be done on dietary intakes of mothers of twins of the two zygosity classes.

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