



Maternal Factors Associated with Small-for-Dateness Among Twins

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The maternal risk factors that correlate with small-for-dateness among twins have been analyzed using a sample of 659 twin pairs and a matched sample of singletons. Non-marital status, job involvement, and the previous delivery of a low-birth weight (<2,500g) infant present a negative interaction with twinning, as low gestational age-adjusted birth weight does not correlate significantly with these risk factors among twin gestations, while it does among singleton gestations. On the other hand, the effects of parity, habitual maternal weight, smoking during pregnancy, and twinning are additive on gestational age-adjusted birth weight. Indeed, the decrease in adjusted birth weight associated with these risk factors is of the same magnitude among twins and singletons and is statistically significant in both cases. These findings suggest that exposure of twin pregnancies to these latter risk factors, and particularly to smoking during pregnancy, can lead to the delivery of newborns with extremely low birth weights.

Key words: Twins, Birth Weight, Epidemiology, Smoking

INTRODUCTION

On the average, twins are 900 g underweight at birth compared to singletons in the populations for which relevant data have been reported [4,16]. Moreover, like-sex twins on the average are 70 g lighter at birth than unlike sex twins [4,6,8,12,16]. Part of the lower birth weight (BW) of twins can be attributed to the fact that twin pregnancies on the average are 3 weeks shorter than singleton pregnancies [3]. Indeed, adjustment of gestational age (GA) at delivery reduces the average difference in BW between twins and singletons to 600 g [3,4]. This figure, however, does not account for the fact that the reduction in BW of twins as compared to singletons is practically null at 32 weeks after the last menstrual period, and then increases progressively to more than 700 g after 44 weeks of gestation [2].

Perinatal mortality among twins is greater than among singletons and is closely associated with the lower BW of twins [5,7,10,14–18]. A knowledge of risk factors associated with small-for-dateness among twins is thus of particular interest to clinicians. Some information is available showing that low parity [1,3,13] and young maternal age [1,13] are significantly associated with low BW among twins. In addition, there is some suggestion that low maternal weight correlates with low BW among twins [13]. Altogether, however, available information on the risk factors that correlate with small-for-dateness

TABLE 1. Average Crude Birth Weight, Gestational Age, and Adjusted Birth Weight Among Twins and Singletons

Type of birth	Singletons	Like-sex twins	Unlike-sex twins
Crude birth weight	3,247 ± 19 (679)	2,400 ± 25 (452)	2,489 ± 36 (207)
Gestational age	39.3 ± 2.3 (645)	36.6 ± 3.3 (442)	36.9 ± 3.2 (198)
Adjusted birth weight	3,251 ± 18g (645)	2,659 ± 17g (435)	2,712 ± 26 (197)

The figures given in each cell are the mean ± standard error and number of deliveries (in parentheses). Weights are expressed in grams and gestational age in weeks after last menstrual period.

TABLE 2. Average Adjusted Birth Weight of Twins and Singletons According to Parity, Habitual Maternal Weight, and Smoking Status During Pregnancy

		Singletons	Twins
Parity	0	3,188 ± 24 (349)	2,588 ± 21 (291)
	1	3,324 ± 31 (214)	2,734 ± 24 (222)
	≥2	3,329 ± 59 (82)	2,770 ± 32 (129)
Habitual maternal weight (kg)	≤49	3,100 ± 36 (151)	2,586 ± 28 (129)
	50–54	3,212 ± 32 (173)	2,626 ± 27 (180)
	55–59	3,315 ± 39 (136)	2,706 ± 32 (146)
	≥60	3,382 ± 37 (172)	2,763 ± 28 (171)
Smoking during pregnancy	No	3,267 ± 23 (401)	2,700 ± 19 (411)
	Yes	3,140 ± 47 (101)	2,579 ± 38 (79)

The figures given in each cell are the mean ± standard error in grams and the number of gestations (in parentheses).

among twins is limited. Indeed, conditions are seldom met where information on BW, GA, and a variety of potentially related risk factors is available for a large number of twin pairs. For this reason, we examined several potential risk factors associated with small-for-dateness and their interaction with twinning in a sample of 659 twin deliveries and 679 singleton deliveries.

MATERIALS AND METHODS

The study population already has been described in detail [11]. In short, the 659 twin deliveries occurred in 23 French maternity hospitals between October, 1976, and December, 1978. For each twin delivery, the

preceding singleton delivery in the same maternity hospital was matched. Data concerning the mother, father, infant(s), and prior gestations were obtained by an interview of the mother shortly after her delivery. The mother of each specific pair of twins and that of the matched singleton were visited the same day by the same interviewer.

In order to estimate the average birth weight (\overline{BW}_{GA}) corresponding to a given GA, a second-degree polynomial regression of BW over GA among singletons was performed. Then, for each individual newborn, singleton, or twin, adjusted birth weight (ABW) was computed as the difference between observed BW and the estimated value based on the regression equation: $ABW = (BW - \overline{BW}_{GA}) + 3,257$ g, where the value 3,257 g corresponds to the \overline{BW}_{GA} among singletons of known GA. Adjusted BW of twins in the same pair displayed a large and highly significant intraclass correlation ($r = +0.482$; $p < 0.001$). For this reason, the ABW ascribed to a pair of twins was the average of the two individual adjusted values.

RESULTS

The average BW, GA, and ABW, of singletons, like-sex, and unlike-sex twins are given in Table 1. In this sample, twins are, on the average, 825 g lighter than singletons ($p < 0.001$), and like-sex twins weigh on the average 89 g less than unlike-sex twins ($p < 0.05$). Twin gestations are, on the average, 2.7 weeks shorter than singleton gestations ($p < 0.001$). After adjustment for GA, the \overline{BW}_{GA} of like-sex and unlike-sex twins was not significantly different, and the difference in \overline{BW}_{GA} of twins and singletons was reduced to 575 g ($p < 0.001$).

Among singletons, low ABW correlates independently and significantly with low parity, low habitual weight, smoking during pregnancy (Table 2), non-marital status, job involvement and previous delivery of a low-BW newborn (Table 3). Among twins, low ABW correlates independently and significantly with low parity, low habitual weight, and smoking during pregnancy (Table 2). Also, none of these three last risk factors presents a significant interaction with twinning as far as their relationship with ABW is concerned. On the other hand, non-marital status, job involvement, and the previous

TABLE 3. Average Adjusted Birth Weight of Twins and Singletons According to Marital Status, Job Involvement, and Previous Delivery of a Low-Birth Weight Newborn

		Singletons	Twins
Married	No	3,107 ± 51 (98)	2,634 ± 43 (98)
	Yes	3,277 ± 19 (547)	2,682 ± 15 (544)
Job involvement	No	3,319 ± 34 (213)	2,681 ± 26 (211)
	Yes	3,218 ± 21 (432)	2,672 ± 18 (431)
Previous low-birth weight newborn ^a	No	3,364 ± 28 (261)	2,761 ± 20 (304)
	Yes	2,995 ± 95 (30)	2,650 ± 67 (38)

The figures given in each cell are the mean ± standard error in grams and the number of gestations (in parentheses).

^aMultiparous women are excluded from these figures.

delivery of a low-BW newborn do not correlate significantly with low ABW among twins (Table 3). Moreover, the interaction of the first two of these risk factors with twinning is just below statistical significance ($p < 0.10$), and the interaction between twinning and the antecedent of a low-BW newborn is statistically significant ($p < 0.01$).

DISCUSSION

The average BW, GA, and ABW of twins in this study were, respectively, 825 g, 2.7 weeks, and 575 g smaller than that of singletons. These data are in agreement with corresponding figures reported previously [3,4,16]. It is also shown that the BW of twins from primiparous women is significantly smaller than that of multiparous women, an observation which has already been reported [1,3]. The correlation between maternal weight and ABW among twins is highly significant in this sample; this observation confirms the previous report of a positive, although not statistically significant relationship [13].

Other risk factors which are well-known for their correlation with small-for-dateness among singletons (smoking during pregnancy, non-marital status, job involvement, and previous delivery of a low-BW newborn) are significantly correlated with ABW of singletons in this sample. To our knowledge, however, their correlation with the BW of twins has not been investigated so far. Of these four risk factors, smoking during pregnancy is the only one to correlate significantly with a reduction in average ABW in our study. The analysis of the interactions between twinning and the risk factors correlated with small-for-dateness among singletons reinforce the conclusion that non-marital status, job involvement, and previous delivery of a low-BW newborn do not correlate with ABW among twins as they do among singletons (Table 3). On the other hand, the additive effects of twinning and parity, maternal weight, and smoking during pregnancy (Table 2) focus attention on the fact that the exposure of twin gestations to these risk factors may be associated with the birth of newborns with extremely low weight. This is particularly true in the case of smoking during pregnancy. According to Fabia, smoking during pregnancy interacts positively with twinning as far as perinatal mortality is concerned [9]. This observation can be considered to be substantiated by the present results.

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