

## SHORT COMMUNICATION

### SEASONAL VARIATION IN TWIN BIRTH RATES IN BRAZIL

B. Beiguelman and H.O. Villarroel-Herrera

#### ABSTRACT

A significantly higher incidence of monozygotic twins was observed in both summer and winter among 31,732 deliveries at a maternity hospital in Campinas, State of São Paulo, Brazil (*Maternidade de Campinas*). No evidence of seasonality was detected for dizygotic twins. This hospital serves about 70% of the parturients of all social classes of this city, which now has more than one million inhabitants and may be considered as representative of the southeastern Brazilian population.

#### INTRODUCTION

Data on seasonal variation in twin birth rates are conflicting. While some authors found no evidence of seasonality in twinning (Erhard *et al.*, 1971; Selvin and Janerich, 1972; Zahalkova, 1974), others presented figures suggesting that such variations do exist (Edwards, 1938; Timonen and Carper, 1968; Czeizel, 1974; Kamimura, 1976; James, 1976, 1980; Elwood, 1978; Bonnelykke *et al.*, 1987; Picard *et al.*, 1990). However, even among the latter the results are not coincident.

Thus Edwards (1938) found two distinct peaks in multiple conceptions in Liverpool, one in the winter and another in the autumn, while Timonen and Carper (1968) in Finland, and Czeizel (1974) in Hungary found a spring peak in twin births. An autumnal peak in dizygotic twinning was reported by James (1976, 1980) in England and Wales,

and by Elwood (1978) in Canada. Kamimura (1976) in Japan, and Bonnelykke *et al.* (1987) in Denmark detected a peak in twin births in the early winter, but in the Danish data a higher rate in twin births was also observed in the spring. Picard *et al.* (1990), who examined the Jewish and Bedouin populations living in southern Israel, observed that both disclosed a peak for the birth of monozygotic twins in early autumn. Moreover, in the Jewish population there was also in autumnal peak for dizygotic pairs.

Since seasonality in twin births has not been investigated in countries of the southern hemisphere, we decided to develop a pilot study in a population in southeastern Brazil.

## SUBJECTS AND METHOD

A total of 31,732 deliveries (26,796 from Caucasoid and 4,936 from Negroid mothers) which included 379 twin pairs (302 born to Caucasoid and 77 to Negroid mothers) was analysed retrospectively. These deliveries referred not only to live births but also to still-born children. All parturients were cared for at a maternity hospital (*Maternidade de Campinas*) which serves about 70% of the mothers belonging to all social classes of the city of Campinas, State of São Paulo, Brazil. This large city may be considered as representative of the southeastern Brazilian population.

## RESULTS

Table I shows the distribution of the incidence of monozygotic and dizygotic twins according to season and racial group of the mothers. A higher rate of monozygotic twin births is observed in both summer and winter among children born either to Caucasoid ( $\chi^2 = 10.322$ ; 3 d.f.;  $0.01 < P < 0.02$ ) or to Negroid mothers ( $\chi^2 = 9.740$ ; 3 d.f.;  $0.02 < P < 0.05$ ) and, of course, in the total sample ( $\chi^2 = 16.729$ ; 3 d.f.;  $P < 0.001$ ). Concerning the dizygotic pairs, no evidence for seasonality was detected either among Caucasoids ( $\chi^2 = 0.334$ ; 3 d.f.;  $0.95 < P < 0.98$ ) or Negroids ( $\chi^2 = 4.370$ ; 3 d.f.;  $0.20 < P < 0.30$ ). The same was true for the total sample ( $\chi^2 = 1.160$ ; 3 d.f.;  $0.50 < P < 0.70$ ).

## DISCUSSION

As seasonal differences in Campinas are not very striking, the detection of seasonal variation in twin births in this city was indeed surprising. More surprising was the finding that the two peaks for twin births concerned monozygotic pairs, since seasonal variation of twinning usually affects twins of the dizygotic type.

Table I - Incidence per 1,000 of monozygotic (MZ) and dizygotic (DZ) twins according to season and racial group of the mothers.

Season	Caucasoids			Negroids			Total		
	Deliveries	MZ	DZ	Deliveries	MZ	DZ	Deliveries	MZ	DZ
Spring	6,568	3.20	6.70	1,154	4.33	6.93	7,722	3.37	6.73
Summer	6,472	5.56	7.42	1,160	7.76	10.34	7,632	5.90	7.86
Autumn	6,877	2.91	6.69	1,282	-	15.60	8,159	2.45	8.09
Winter	6,879	5.67	6.98	1,340	6.71	10.45	8,219	5.84	7.54

Dizygotic twins are considered as a normal form of littering, but monozygotic twinning is regarded as an accident of early embryogenesis. Such an accident may occur between 60 hours and 15 days after fertilization, having the highest frequency between the third and the eighth days after conception (Bernirschke, 1981). Since monozygotic twinning can be considered as a developmental malformation due to environmental factors which act exclusively during the earliest stages of embryogenesis (Doherty and Lancaster, 1986), an increase in its incidence requires further investigation. A detailed prospective study which takes into account the month of conception as well as variables that may influence monozygotic twinning is therefore urgently needed.

### ACKNOWLEDGMENTS

This study was supported by grants from the CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico).

Publication supported by FAPESP.

### RESUMO

Em um total de 31.732 partos atendidos em uma maternidade de Campinas, Estado de São Paulo, Brasil (*Maternidade de Campinas*) observou-se uma incidência significativamente mais alta de gêmeos monozigóticos no Verão e no Inverno. Os gêmeos dizigóticos não mostraram variação sazonal. A Maternidade de Campinas atende a cerca de 70% das parturientes de todas as classes sociais dessa cidade, a qual tem, atualmente, mais de um milhão de habitantes, os quais podem ser considerados como representativos da população do Sudeste brasileiro.

## REFERENCES

- Benirschke, K. (1981). The pathophysiology of the twinning process. In: *Principles and Practice of Obstetrics and Perinatology* (Iffy, L. and Kaminetzky, H.A., eds.). John Wiley and Sons, Inc., Ch. 67: 1165-1170.
- Bonnelykke, B., Sogaard, J. and Nielsen, J. (1987). Seasonality in twin birth rates, Denmark, 1936-84. *J. Epidemiol. Community Health* 41: 338-343.
- Czeizel, A. (1974). Unexplainable demographic phenomena of multiple births in Hungary. *Acta Genet. Med. Gemellol.* 22 (Suppl.): 214-218.
- Doherty, J.D.H. and Lancaster, P.A.L. (1986). The secular trend of twinning in Australia, 1853-1982. *Acta Genet. Med. Gemellol.* 35: 61-76.
- Edwards, J. (1938). Season and rate of conception. *Nature* 142: 357.
- Elwood, J.M. (1978). Maternal and environmental factors affecting twin births in Canadian cities. *Br. J. Obstet. Gynecol.* 85: 351-358.
- Erhard, C.L., Nelson, F.G. and Pakter, J. (1971). Seasonal patterns of conception in New York City. *Am. J. Publ. Health* 61: 2246-2258.
- James, W.H. (1976). Seasonality in twin births. *Ann. Hum. Biol.* 3: 193-195.
- James, W.H. (1980). Seasonality in twin and triplet births. *Ann. Hum. Biol.* 7: 163-175.
- Kamimura, K. (1976). Epidemiology of twin births from a climatic point of view. *Br. J. Prev. Soc. Med.* 30: 175-179.
- Picard, R., Fraser, D., Hagay, Z.J. and Leiberman, J.R. (1989). Twinning in southern Israel; secular trends, ethnic variation and effects of maternal age and parity. *Europ. J. Obstet. Gynecol. Reprod. Biol.* 33: 131-139.
- Selvin, S. and Jancrich, D.T. (1972). Seasonal variation in twin births. *Nature* 237: 289-290.
- Timonen, S. and Carper, E. (1968). Multiple pregnancies and photoperiodicity. *Ann. Chir. Gynaecol. Fenn.* 57: 135-138.
- Zahalkova, M. (1974). Multiple births in Southern Moravia. *Acta Genet. Med. Gemellol.* 22 (Suppl.): 210-213.

(Received March 1, 1992)