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Decrease in Twinning Rate in a Hospital in Tokyo During World War II

I. Nakamura, K. Nonaka, T. Miura

Department of Hygiene, Teikyo University School of Medicine, Tokyo, Japan

Abstract. In order to investigate changes in twinning rate during World War II and postwar years, when the people in Tokyo suffered from malnutrition, about 80,000 delivery records during 1924-86 at one hospital in downtown Tokyo were examined. The twinning rate decreased from 1.47% in the 1920s to 0.81% in the 1980s. During the 1940s, the rate was 1.03% for 1940-42 and 0.94% for 1948-49, but it dropped down to 0.70% for 1943-47. In 1945, when Tokyo was heavily bombed repeatedly to be burnt out, and the people suffered from severe malnutrition, only one case of twinning was found among 305 maternities at this hospital (0.33%). While the mean birth weight of term singleton babies was 2953 g in 1940-41, it decreased to 2918 g in 1943-47, especially to 2856 g in 1945. This change in birth weight evidenced that the nutritional conditions in Tokyo became worse in 1943-47. This report suggests that the twinning rate decreased also during this period in Tokyo when the people suffered from malnutrition.

Key words: Twinning rate, Malnutrition, Wartime

INTRODUCTION

While many authors have studied the effect of undernutrition during hard years of wars or severe famines on the twinning rate [1,2,6], there is no consensus concerning the effects of food shortage on twinning [2]. Though Japanese had also experienced severe famines and civil wars several times, no historical records on birth data have been found in Japan. In recent years the people in Tokyo had suffered from malnutrition in the latter half of World War II and postwar years. However, it is difficult to examine the change of the twinning rate during these days because even the accurate number of general births in 1945, during the wartime, is not known. During prewar years, the rate of multiple births in the vital statistics was much lower (about 0.3%) than that in the data based on midwives' records (about 0.6%) and that in the hospital data (about 1%)

[5]. This low rate is mainly due to the inaccurate registration of twin births because they had not been welcomed traditionally. Since the legislation of registration of multiple births in live and stillbirth certificate in 1948 (three years after the war), the rate of multiple births in the vital statistics has increased to about 0.6% [3,4]. Consequently, the official records before 1948 in Japan is not adequate to examine the twinning rate.

The inhabitants in Tokyo suffered from severe malnutrition during the latter half of the war. In 1945 this area was heavily bombed to be burnt out and the malnutrition became very severe at the end of the war and during the postwar months. To investigate the twinning rate in this area during this period of severe malnutrition, we examined about 80,000 maternity records in 1924-1986 at one maternity hospital in downtown Tokyo. Changes in birth weight were also examined in order to estimate the period of malnutrition in this area.

MATERIALS

From 79,474 case records of the Hamada Maternity Hospital in downtown Tokyo during the period between 1924 and 1986, date of birth, sex and birth weight of the newborns were examined, including 706 multiple births (698 twins and 8 triplets).

RESULTS

The twinning rate decreased rapidly from 1.47% in the 1920s to 0.87% in the 1940s. After a short period with a high rate (0.93%) in 1950-54, the rate remains stable at about

Table - Changes in twinning rate in 1924-1986

Year	Number of maternities			Rate (%)	
	Total	Twin	Unlike-sexed pairs	Twinning	Unlike-sexed pairs ^a
1924-29	5,578	82	21	1.47	25.6
1930-39	11,850	136	23	1.15	16.4
1940-49	13,261	116	25	0.87	21.6
1940-42	5,038	52	6	1.03	17.3
1943-47	5,565	39	6	0.70	23.1
1948-49	2,658	25	7	0.94	28.0
1950-59	10,718	84	12	0.78	14.3
1950-54	5,265	49	6	0.93	12.2
1955-59	5,453	35	6	0.65	17.1
1960-69	13,608	99	17	0.73	17.2
1970-79	17,045	129	19	0.76	14.7
1980-86	7,414	60	10	0.81	16.7
Totale	79,474	706	127	0.89	18.0

^a Unlike-sexed pairs/total twin pairs.

0.7 or 0.8% until the 1980s (Table, Fig. 1). During the 1940s, the rate was 1.03% for 1940-42, then it dropped down to 0.70% for 1943-47. In 1945, when Tokyo was bombed out and the people suffered from malnutrition most severely, only one case of twinning was found among 305 maternities at this hospital (0.33%). After 1947, twinning increased to 0.94% in 1948-49 and 0.93% in 1950-54.

The rate of unlike-sexed pairs among the total twin pairs was 18.0% for all the period observed and the rate in 1943-47 was 23.1% (Table).

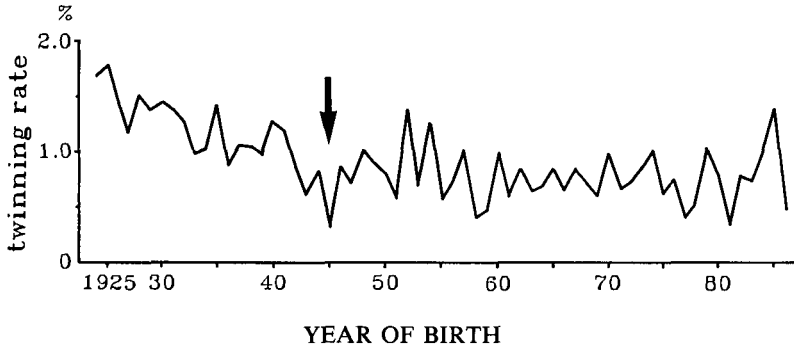


Fig. 1. Twinning rate in one maternity hospital in Tokyo during the period between 1924 and 1986.

The mean birth weight of term singleton babies in the 1920s was about 2900 g and it was improved to about 2950 g before 1940 (Fig. 2). During the 1940s, it was 2953 g in 1940-41 and then decreased to 2918 g in 1943-47, especially to 2856 g in 1945. After 1947 it increased to about 3000 g in 1950 and about 3200 g in the 1980s.

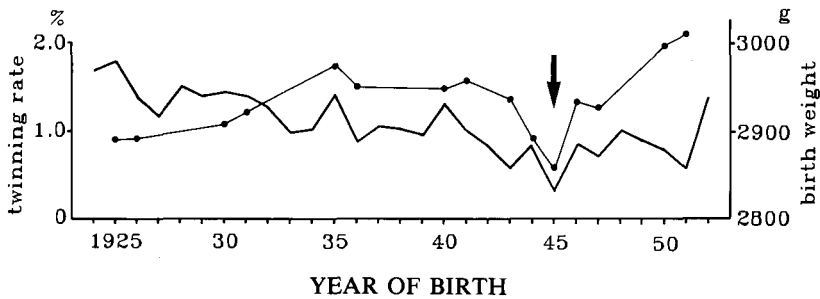


Fig. 2. Twinning rate among total maternities (—) and average birth weight of term singleton maternities (+).

DISCUSSION

Though it is generally known that the people in Tokyo suffered from malnutrition during the latter half of the war and the postwar time, it is difficult to estimate the period of malnutrition accurately. According to the present data, while the mean birth weight

of term singleton babies was 2953 g in 1940-41, it decreased to 2918 g in 1943-47, especially to 2856 g in 1945. This change in birth weight evidenced that the nutritional conditions of mothers in this area became worse in 1943-47, especially in 1945.

The twinning rate at this hospital decreased from 1.47% in the 1920s to 0.78% in the 1950s. This is mainly due to rapid decrease of the rate of higher parity delivery and rapid increase of the hospitalized delivery after 1950. However, the decrease of the twinning rate in 1943-47, especially in 1945, cannot be due to the changes of these two factors. The period of the decreased twinning rate coincides with the period of the low birth weight. The decreased twinning rate must have been caused by the lower nutrition and some other hard conditions in this period.

Bulmer [1] reported a fall in the dizygotic twinning rate in France, Holland and Norway where people suffered from malnutrition during the war. Since the fall was not observed in comparatively well-nourished countries, it was concluded that the fall in the twinning rate was directly caused by malnutrition. On the contrary, Eriksson et al [2] pointed out that low twinning rate are not consistently associated with periods of epidemics, famine or similar nutritional stress according to the longitudinal data in Scandinavia.

Though this study, based on data of one private maternity hospital, cannot be compared directly with these large population-based studies, it indicates that the decrease of the twinning rate occurred during the years when the people suffered from malnutrition in Tokyo. We, however, could not mention whether or not the decrease occurred only in dizygotic twinning because of the small sample size of the present data.

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Correspondence: Dr. Izumi Nakamura, Department of Hygiene, Teikyo University School of Medicine, Kaga, Itabashi-ku, Tokyo 173, Japan.