

# Biological Studies on the Newborns from Maternity Hospitals (II).

## —On the Still-births and Twin Births—

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### 産院分娩兒에 對한 生物學的 研究 (II)

—死産 및 雙生兒産에 對하여—

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#### 摘 要

韓國內 數個 都市에 있는 産院에서 資料를 얻을 수 있던 15,830의 生兒 및 死産의 記錄을 가지고 死産率 및 雙生兒産率을 考察하였다.

死産率은 3.525%로 일어나고 있으며 母親의 年齡이 36세 이상에서는 平均 死産率보다 약 2배에 가까운 高率을 보여주고 있다. 死産兒의 性比는 生兒出産의 性比보다 훨씬 높아 136.06이었다. 産院에서의 雙生兒産도 一般雙生兒産에 비해 더 빈번히 일어나고 있다. 即 韓國人 集團의 平均 雙生兒産의 率이 0.872%인데 대하여 産院에서는 1.299%를 보여 주고 있다. 母親의 年齡이 增加하여 감에 따라 雙生兒産의 率이 上昇하는 傾向은 産院의 경우에서도 관찰할 수 있었다. 雙生兒의 性組成에 따른 比率은 大體로 一般 集團에서나 産院의 것에서나 비슷하여 1.49 男男 : 1 男女 : 1.09 女女이 었다. 이는 日本의 2 : 1 : 2나 歐州人系의 0.9 : 1 : 0.9의 中間의 比率을 나타내고 있다. 二卵性雙生兒에 대한 一卵性雙生兒의 比率은 産院에서 0.79 : 1 一般 集團에서 0.75 : 1이었다. 이 率도 結局 日本의 1.5 : 1, 歐州人系의 0.5 : 1의 거의 中間을 나타내고 있는 것이다.

#### INTRODUCTION

Recently, authors have gathered the materials from the maternity hospitals located in larger cities and towns for the purpose of the study on the population genetics, especially of the biological studies on the newborns. A number of the authors have introduced for several times the results of other studies on the newborns such as the secondary sex ratio in both general and hospital maternities, twinning rate in general population. A particular attention was given to the results that Korean bears boys with the higher rate than girls; that is, while the well-known rate of the boys born is about 105 to 107 to 100 girls in the other populations in general, that of Korean is much higher as 113 to 115. Such a high ratio is established by the observation of the newborns labored in the maternity hospitals which was introduced by authors on the present Journal appeared in Vol. V, No. 1 (1962). In the present paper, using the materials which were described on its origin in the former publication, rates of still-birth and twinning seen in the maternity hospitals are compared with those seen in the general population.

#### MATERIAL

The data were obtained from the delivery records of 15,830 live and still-births giving information on sex and

other details. The births shown in this paper covered the period 1956--1961.

In this paper, the subjects are based on the materials as quite similar used in the former reports which is one of the serial studies on the new-borns. Then the materials are gathered from the larger hospitals established by the public and national funds since we are convinced that the records of such the hospitals are reliable in many aspects.

## RESULTS AND DISCUSSION

### 1. Still-birth rate

In addition to the 15,272 live births for which the age of the mother had been recorded there were 558 still-births either at full term or of prematurely aborted conceptuses with information available on maternal age. Of 558 still-births, 67 were unclear their sex because of the miss of the describing or prematurely delivered.

In the following table (Table 1) the details on the still-births are set.

Table 1. Still-birth rate, maternal age and sex ratio.

Maternal age	No. of births	No. of still-births				Still-births rate	Sex ratio
		♂	♀	?	Total		
25 & less	4,492	70	54	12	136	3.028±0.222	129.63
26—35	9,331	143	103	37	283	3.033±0.177	138.83
36 & more	2,007	70	51	18	139	6.926±0.566	137.25
Total	15,830	283	208	67	558	3.535±0.146	136.06

As shown in Table 1, there is a significantly higher frequency of still-births among births from the maternal age group of 36 years and above as compared to younger age groups. The mean rate is 3.525 per 100 total births, a low rate particularly if it is considered that hospital deliveries in Korea are probably selectively favored in case of complications of pregnancy or labor. Comparing the recent data on the birth wastes of the general population (Kang *et al.*, 1962) with the above results, the former is apparently higher; rate of the birth wastes shown to be 5.326% in which is included the rate of artificial abortion as high as 2.673%. Then the rate of the birth wastes excluded the artificial abortion reaches at 2.653%. If the opinion that the public hospitals have inhibited generally the artificial abortion unless the medical diagnosis is considered is agreeable, it may be said that in hospital maternity the still-births are more frequently occurred than in home maternities

The mean sex ratio of the still-births was 136.06, a ratio much higher than in live births but similar to sex ratios among still-births reported from other countries for man as well as animals.

Schultz (1918) once reported the rates of neonatal births of three month, four month and five month embryos as 123.7, 110.5 and 108.1 respectively and he claimed that the still-births occurred every four of a total of hundred births of 8 to 10 months, nine of 4 to 7 months and fourteen of 100 embryos developed less than 3 months.

Hertwig (1927) estimated the sex ratio of still-births of some populations as 128.3 in German, 142.2 in France, 131.1 in Italy and 132.2 in Australia.

Ciocco (1938) also found out the sex ratio of still-births of American population occurred for 10 years covered from 1925 to 1934. The summary of the results is tabulated in Table 2.

### 2. Twin births

Data on the frequency of twin births and their zygosity are rare for Mongoloid populations. Komai and Fukuoka (1936) reported on Japanese and Chinese on Formosa, and Inouye (1957) added to the information on Japanese. Millis (1959) presented data on Chinese in

Table 2. The sex ratio of the still-birth.(Ciocco; 1938)

Months	Sex ratio
Less than 2 months	228.0
2 months	431.1
3 months	361.0
4 months	201.1
5 months	139.6
6 months	122.7
7 months	112.4
8 months	114.8
9 months	134.7
10 months	133.3

Singapore. Of all Mongoloid populations, the Japanese is the only one for which extensive data on the frequencies of twins are available (Komai and Fukuoka, 1936). In Japan, the frequency of twin births is approximately 0.6–0.7% of all births. Identical twin births account for nearly two-thirds of all twin births. In their 1936 paper, Komai and Fukuoka also reported on the rate of twin births of Koreans. They selected the records of outstanding public hospitals, located in several large towns and cities. These records showed a frequency of 1.349% of twin births. This rather high frequency can not be considered as representative of the Korean general populations, since, in Korea, most births occur at home, the hospital deliveries contain a selectively high proportion of cases of difficult labor and these are frequently associated with multiple pregnancies. The present authors obtained new data on the rate of twinning from two different samples (Table 3).

In the hospital population among 15,166 live births, 1.299% were twin births, a frequency very similar to that obtained by Komai and Fukuoka. In the general population, among 44,972 live births occurring mostly at home and reported through an inquiry in 1959, 0.872% were twin births. This is a much lower frequency than the one from the maternity hospitals. It is somewhat higher than that in the Japanese but lower than the frequencies found in Caucasians and American Negroes which are considerably above 1%.

Table 3. Twinning rate and maternal age.

Maternal age	Hospital maternity			Home maternity		
	No. of births	Twin births	Twin rate	No. of births	Twin births	Twin rate
25 & less	4,319	53	1.227±0.166	17,242	95	0.551±0.056
26–35	8,996	107	1.189±0.125	22,183	230	1.037±0.068
36 & more	1,851	37	1.999±0.100	5,542	67	1.209±0.147
Total	15,166	197	1.299±0.072	44,972	392	0.872±0.044

When the twin data are subdivided into three classes according to maternal age, a rise is observed in frequency of twin births with increasing maternal age. This rise is highly significant in the general population sample ( $X^2=34.84$ ,  $P<0.01$ ). In the smaller hospital population the rise is not so strikingly significant statistically ( $X^2=8.112$ ,  $P<0.05$ ). The phenomenon of an increase in twinning rate with increasing maternal age is well known from non-Korean populations.

Komai and Fukuoka (1936), Bulmer (1959), and Millis (1959) reported that the twinning rate increases below 35–39 years of mother's age. Almost researchers have reached the opinion that the increase of total twinning rate might be responsible only to the increase of dizygotic twin births, not to that of monozygotic.

The proportions of different sex combinations among the twin pairs of the hospital population are 1.49 ♂♂ : 1 ♂♀ : 1.09 ♀♀. These proportions are intermediate between those of the Japanese which are close to 2 : 1 : 2 and Caucasian groups which are close to 0.9 : 1 : 0.9.

Applying Weinberg's differential method to the twin data, the hospital group yields 0.79:1 as the ratio of identical to fraternal twins while those of the home group yield 0.75:1. These ratios are lower than that among Japanese which is about 1.5:1. They are higher than those among Caucasians which are approximately 0.5:1, and of American Negroes for whom the ratio is close to 0.4:1. Thus, the overall ratio of identical to non-identical twins among Koreans is intermediate between that of Japanese and those of other populations.

It remains for the future to make more detailed analysis of these phenomena. The ratios of the two types of twinning are not only dependent on genetic factors but are influenced by maternal age. There is a strong correlation between occurrence of fraternal twins and maternal age, a correlation which is positive up to the maternal age group 35–39 years and then becomes negative. There is a weaker positive correlation between occurrence of identical twins and maternal age. Moreover, maternal age and number of previous pregnancies are positively correlated and, independently, are correlated with the frequencies of twinning. These interrelations need to be taken into account when different populations with different reproductive patterns are compared.

## SUMMARY

Based on the data from the delivery records of 15,830 live and still-births in the maternity hospitals located several large towns and cities covered the period 1956—1961, the rate of still-births and the frequency of the twin births are discussed in the present paper.

The still-births were occurred 3.535 in every 100 total births in the hospital, and those from the mothers aged more than 36 years were seen as high as twice of those from the younger mother groups. The sex ratio of the still-birth is much higher (136.06) than normal birth (113—115).

Twinning rate is also high in the hospital maternities comparing with the rate in the general population; that is, the former reveals 1.299 per 100 total births, while the latter shows 0.872. The tendency of rising of the twinning rate as the maternal age increase is seen in both hospital and general maternities. The proportions of different sex combinations among the twin pairs of both hospital and general populations are intermediate between those of the Japanese which are close to 2:1:2 and Caucasian groups which are close to 0.9:1:0.9. The ratios of identical to fraternal twins are 0.79:1 in the hospital and 0.75:1 in the general populations. These ratios are also intermediate between those of Japanese which are revealing as 1.5:1 and those of Caucasian which are approximately 0.5:1.

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