

THE FREQUENCY OF MULTIPLE BIRTHS IN CENTRAL ANATOLIA*

İzzet Duyar**, Nilüfer Güntay - Ayaz***

SUMMARY: Duyar İ, Güntay - Ayaz N. (Department of Physical Anthropology, Ankara University Faculty of Language and History-Geography, and the Ministry of Environment, Ankara, Turkey). The frequency of multiple births in central Anatolia. Turk J Pediatr 1993; 35: 257-265.

The purposes of the present study were to contribute additional data regarding the frequency of multiple births in Ankara, and to reassess both the relation between maternal age and twinning, and the inter-relation between twinning and seasonality. The frequency of twinning was found to be 0.0084858 ± 0.00028 (0.85%), triplets 0.0001087 ± 0.000031 (0.011%), and quadruplets 0.000009 (0.0009%). It is observed that there is a correlation between the frequency of twinning, maternal age and parity, and that the rate of twinning increases with maternal age. The twinning rate varies according to the month of the year in which birth takes place. Accordingly, the frequency of twin births is greater between May and August, and lower between September and December. *Key words: multiple births, frequency, Ankara.*

In Turkey, research on multiple birth frequency began with Tunakan's two studies^{1,2}, in which we see that only the incidence of twinning was examined. Later, Atabey and Gizer³, Önder⁴, Çanga and Yavuz⁵, and Bilgin and Yılmaz⁶ studied the influence of maternal age and parity on twinning, in addition to its frequency. Research separating dizygotic (DZ) and monozygotic (MZ) twinning was done by Topçuoğlu and Serim⁷, Kişnişçi and Ayhan⁸, and Say et al⁹. In Say et al's study, DZ and MZ rates were determined with the help of blood group, placentas, chorions and amnions. In former research, it was not stated how the DZ and MZ rates were ascertained. Finally, a common and important aspect of the above-mentioned studies is that they were done only in one health center.

The main purpose of this study was to determine the frequency of multiple births in Ankara. Also, we examined the relationship between twin births and maternal age, parity and seasonality.

Material and Methods

The data for the study was obtained from five state and three maternity hospitals in Ankara and mostly dated back to 1987 and 1988 (Table I). In these health

* From the Department of Physical Anthropology, Ankara University Faculty of Language and History-Geography, and the Ministry of Environment, Ankara.

** Physical Anthropologist, Ankara University Faculty of Language and History-Geography.

*** Physical Anthropologist, Ministry of Environment.

Table I: Multiple Births From Hospitals

Hospitals	Period	Number of Pregnancy	Twins		Triplets		Quadruplets	
			n	(%)	n	(%)	n	(%)
Gülhane	1970 - 88*	23905	223	0.93	2	0.008	—	—
Numune	1984 - 88	2915	43	1.47	2	0.07	—	—
Zübeyde Hanım Maternity	1986 - 89**	33364	278	0.83	2	0.006	—	—
SSK Ulucanlar Maternity	1987 - 89**	23462	118	0.50	—	—	—	—
Ankara	1987 - 88	2933	28	0.95	1	0.03	—	—
Gazi University	1987 - 88	1164	21	1.80	—	—	—	—
Dr. Z.T. Burak Maternity	1988	21370	217	1.01	5	0.02	1	0.005
Ankara University	1988	1306	9	0.69	—	—	—	—
			110419	937	0.85	12	0.011	1 0.0009

* The data for 1984 cannot be obtained.

** The first three months of 1989 is included.

institutions, 110,419 deliveries were studied with respect to multiple births. As for geographical distribution, 60.94% of the twin births were delivered by mothers born in Central Anatolia. If we consider the province of Çorum, from which migration to Ankara is still quite intensive, this ratio increases to 66.7%.

In this study, to determine the rate of DZ and MZ, the mathematical formula of Gittelson and Milham developed in 1964 was used¹⁰ :

$$\hat{\theta} = \frac{2b}{1 - (a - c)^2}$$

According to this formula, $\hat{\theta}$ is DZ, a male-male twins, b male-female twins, and c female-female twins. Rate of MZ is derived from the formula:

$$MZ = 1 - DZ.$$

Results and Discussion

1. Twin Births

Of 110,419 pregnancies, 937 resulted in twins. According to this figure, the frequency of twin births is 0.0084858 ± 0.0028 . In other words, the percentage of twinning is 0.85%. Among studied twins, the probability of DZ is 0.6368, and MZ probability is 0.3632. As for total births in the sample, the ratio of DZ is 0.54%, while MZ is 0.31%. Only one *conjoined twin* was found among the 937 twin births. The distribution of twinning according to health institutions is given in Table I.

The results of twin research already done in Turkey is shown in Table II. If we consider the frequency of twinning in general, the value we found is the lowest ratio except in the study of Atabey and Gizer³. However, discordant values are

Table II: The Data of Monozygotic (MZ) and Dizygotic (DZ) Twinning Frequencies in Turkey

Region	Period	n	Twins (%)	DZ	MZ	Researcher
Marmara	1945 - 56	26174	1.27	—	—	Tunakan 1959
Marmara	1955 - 65	21241	1.74	1.45	0.29	Topçuoğlu and Serim 1967
Marmara	1957 - 65	47509	0.74	0.53	0.21	Atabey and Gizer 1965
Central Anatolia	1952 - 54	17460	1.35	—	—	Tunakan 1955
Central Anatolia	1947 - 62	9802	1.35*	1.03	0.32	Çanga and Yavuz 1967
Central Anatolia	1956 - 65	8592	1.21*	0.97	0.24	Önder 1966
Central Anatolia	1965 - 66	10000	1.49	—	—	Say et al. 1967
Central Anatolia	1971 - 75	7617	1.21	0.85	0.36	Kışnişçi and Ayhan
Aegean	1975 - 85	35964	0.98	—	—	Bilgin and Yavuz 1985

* Rates of DZ and MZ were calculated by the authors.

seen among the results of these studies. It can be said that MZ twinning, in general, is clustered about 0.30, however, DZ twinning rates vary widely.

When the results from other populations are compared to our results (Table III), the values for India and Spain are approximately the same as ours. As we can see in Table III, the highest value of twinning and the highest ratio of DZ is found among people of African descent. The lowest twinning rate was found in Japan¹¹, where the DZ rate is lower than in the other populations, but the MZ rate is higher. Imaizumi and Inouye¹² pointed out that this phenomenon is peculiar to the Japanese.

1.1. *The Correlation Between Maternal Age and Twinning* : The distribution of 937 twin births according to maternal age is given in Table IV and Figure 1. From mothers between the ages of 20 and 29 delivered 69.16% of twins. It is observed

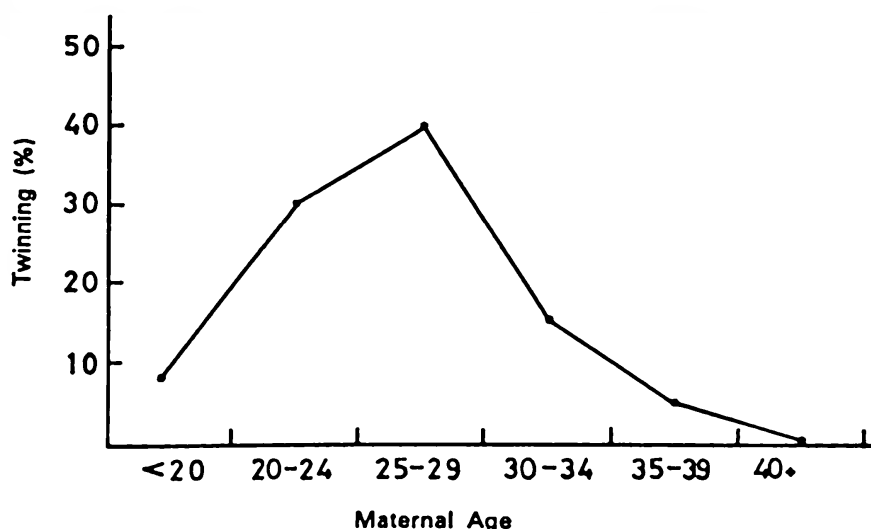


Fig. 1: Twinning rates according to maternal age.

Table III: The Rate of Twinning in Various Populations*

Country	Period	Twins		
		(%)	DZ	MZ
Romania	1936 - 38	1.56	—	—
Turkey	1965 - 66	1.49	—	—
Denmark	1946 - 55	1.42	—	—
Germany	1950 - 55	1.24	0.91	0.33
Italy	1949 - 55	1.23	0.86	0.37
Norway	1946 - 54	1.21	0.83	0.38
Belgium	1960 - 61	1.20	0.78	0.42
Sweden	1946 - 55	1.17	0.86	0.32
Switzerland	1943 - 48	1.17	0.81	0.36
USA (Whites)	1922 - 36	1.13	0.74	0.39
USA (Whites)	1922 - 30	1.13	—	—
Austria	1952 - 56	1.09	0.75	0.34
Belgium	1950	1.09	0.75	0.34
France	1946 - 51	1.08	0.71	0.37
Spain	1951 - 53	0.91	0.59	0.32
Nigeria	—	4.49	3.99	0.50
South Africa	—	2.72	2.23	0.49
USA (Blacks)	1922 - 54	1.36	0.98	0.38
China	1950 - 53	1.085	0.42	0.67
India	1950 - 53	0.86	0.52	0.34
Japan	1926 - 31	0.71	0.27	0.43

* Source: Susanne and Corblisier 1967.

Table IV: The Distribution of Twinning According to Maternal Age

Age Groups	Twins	.(%)	Percentage of DZ in
			Each Age Group
x - 20	76	8.11	0.48
20 - 24	282	30.10	0.64
25 - 29	366	39.06	0.65
30 - 34	152	16.22	0.68
35 - 39	50	5.34	0.76
40 - x	11	1.17	0.18
Total	937	100.00	

that the frequency of twin-bearing mothers increases until age 30, and rapidly decreases after this age. It is important to note that the frequency of birth overall also decreases to a great extent in mothers older than 30. In the study of Topçuoğlu and Serim⁷, the rate of twin pregnancy reached its highest point in the 25-30 year age range. Atabey and Gizer³, who used ten-year interval grouping, stated that a large proportion of twinning occurred in women between the ages of 26 and 35. If we examine the subject with respect to DZ twinning, the rate increases until the age of 40, and after this age it decreases sharply (Fig. 2). The reason for the increase in the rate of DZ with age is not clearly understood, but a possible reason may be the stimulation of FSH (follicle stimulating hormone) from the pituitary gland in aging females^{13,14}.

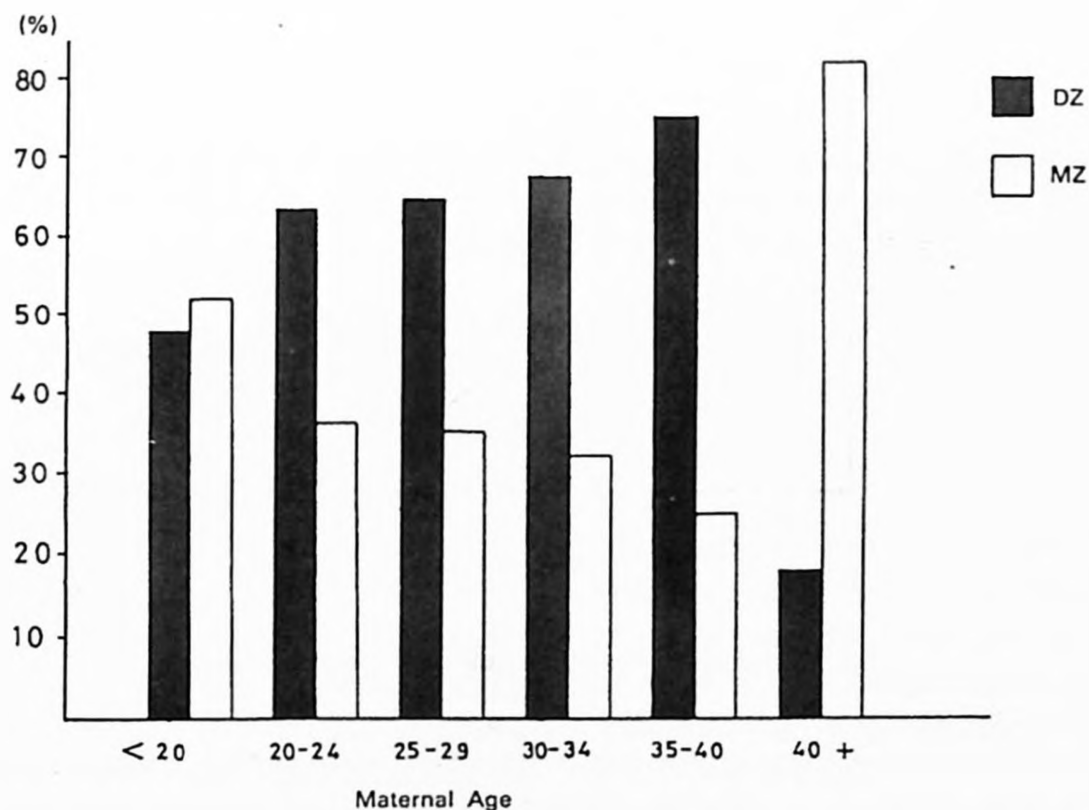


Fig. 2: The rates of DZ and MZ twinning in each maternal age groups.

1.2. Maternal Parity and Twinning : Some researchers have pointed out that there is a relation between twinning and parity^{10,14,15}. In our study we were able to collect the data on this subject only from Gülhane and Numune hospitals, where 26.3% of 226 studied twin mothers were primiparous but 73.7% were multiparous (Fig. 3). The results of various research on maternal parity are summarized in Table V. Excluding the study of Önder⁴, the values are similar. If we consider this table, we can see that the probability of twin pregnancy is higher in multiparous females, and peaks in the third pregnancy.

Table V: The Results on Maternal Parity in
The Research in Turkey

Researcher	Primiparous	(%)	Multiparous	(%)
Atabey and Gizer 1965	104	29.9	244	70.1
Topçuoğlu and Serim 1966	94	25.4	277	74.6
Önder 1966	46	43.8	59	56.2
Çanga and Yavuz 1967	30	28.4	104	77.6

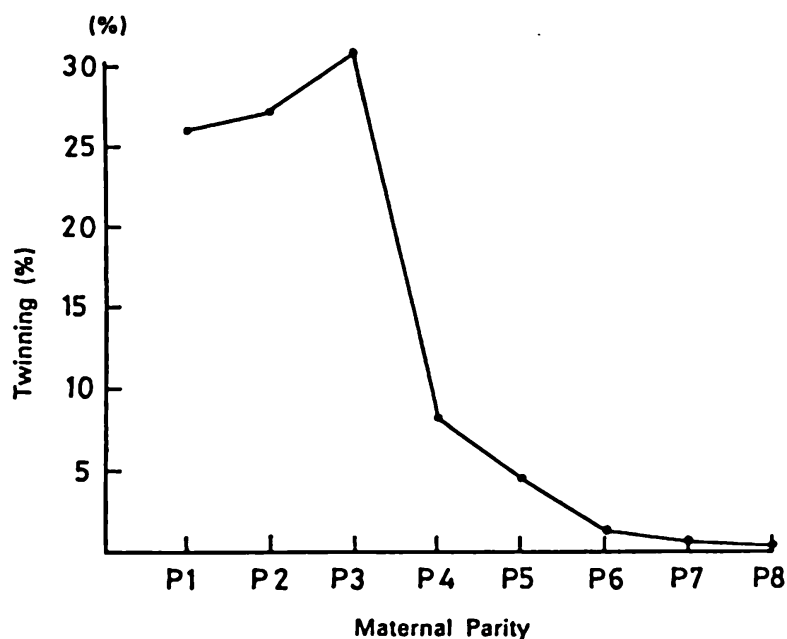


Fig. 3: Twinning rates according to maternal parity.

1.3. *The distribution of twinning according to birth months* : Some researchers suggest that there is a relation between change of season and twinning¹⁴. According to these researchers, exposure to continuous sunlight (for six months), e.g. in Finland, causes multiple ovulation. Regarding the distribution of twinning according to months (Fig. 4), it is observed that the ratio increases between May and August, and decreases to the lowest level between September and December. There is a discrepancy between the months in which twinning occurs most frequently and the months in which deliveries are most frequent.

According to the results of "1966-1967 Demographic Survey"¹⁶, in urban areas the occurrence of births is at its lowest level between May and July. However, it reaches its highest level between February and April. James¹⁷ has reported a similar situation: In England, deliveries occur frequently in March, while twin births peak in October.

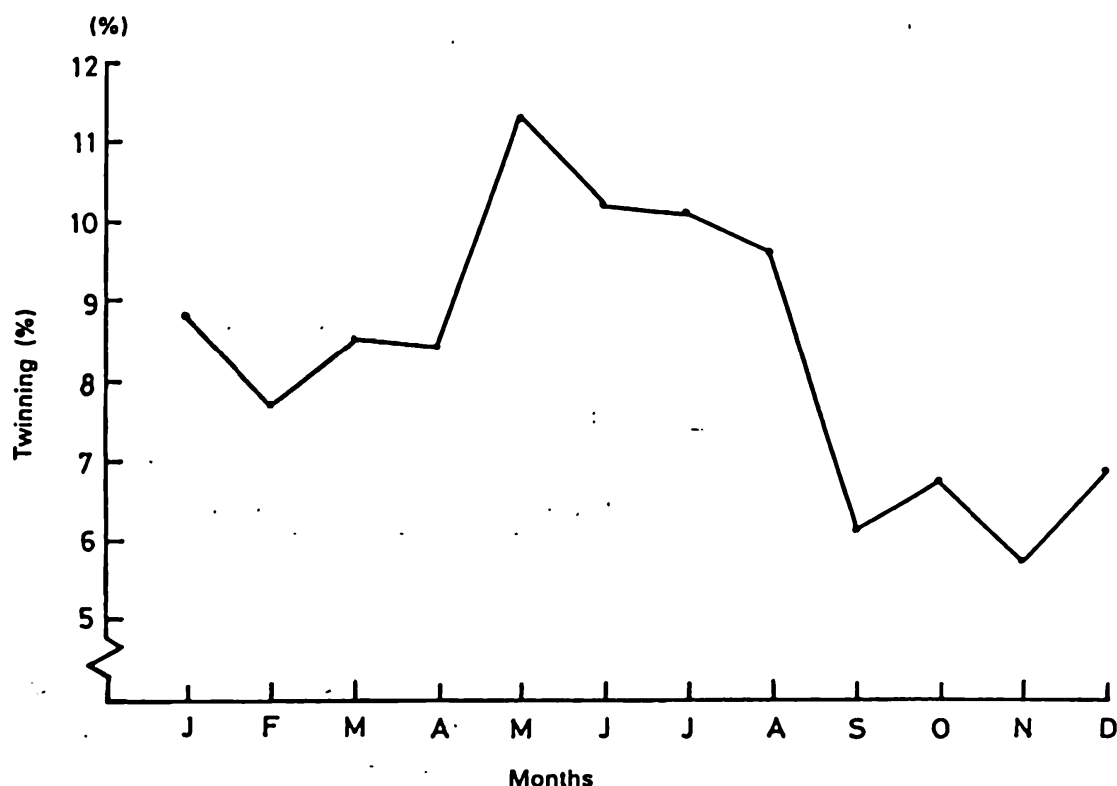


Fig. 4: Seasonal trends in twin births.

2. Triplets and Quadruplets

Table I displays the frequency of triplet and quadruplet births in the present study. The frequency of triplets was 0.0001087 ± 0.000031 (0.011%) and the frequency of quadruplets was 0.000009 (0.0009%). In other words, one out of 2901 pregnancies resulted in triplets, and one out of 110,419 pregnancies yielded quadruplets. If we compare our figures with Hellin's rule*, we may observe that our triplets were rarer, and quadruplets were more frequent.

Among the studies on the frequency of triplets in Turkey, our results have values similar to Topçuoğlu and Serim⁷ and Önder⁴, as shown in Table VI.

If we consider the number of pregnancies and triplets together with the data of previous researchers and recalculate the frequency of triplets, the resulting rate is

$$(50 / 323,203) = 0.0001547.$$

* According to this rule, one of every 80 births is twin; if the frequency of twin pregnancy is shown as a , triplets $1/a^2$, quadruplets $1/a^3$, quintuplets $1/a^4$ and so on.

Table VI: The Data From Research on Triplets in Turkey

Region	Pregnancies	Triplets	(%)	Researcher
Marmara	26460	10	0.038	Tanakan 1959
Marmara	47509	8	0.017	Atabey and Gizer 1965
Marmara	21241	2	0.009	Topçuoğlu and Serim 1966
Central Anatolia	17460	5	0.029	Tanakan 1955
Central Anatolia	8592	1	0.012	Önder 1966
Central Anatolia	9802	2	0.020	Çanga and Yavuz 1967
Central Anatolia	7617	3	0.039	Kişnişçi and Ayhan 1977
Aegean	35964	7	0.019	Bilgin and Yılmaz 1985

Acknowledgments

We are grateful to the hospital directors for providing data that have been analyzed here. We also thank Yılmaz Selim Erdal and Şebnem Pala for their technical assistance during the writing of this paper.

REFERENCES

1. Tanakan S. Memleketimizde ikiz doğumu çoğunluğu üzerine ilk deneme. *Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi* 1955; 13: 17.
2. Tanakan S. Memleketimizde ikiz doğumları üzerine ikinci araştırma. *Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi* 1959; 17: 513.
3. Atabey F, Gizer D. Uterus bicornis unicollis'de ikiz gebelik vak'ası münasebetiyle. *Türk Jinekoloji ve Obstetrik Mecmuası* 1965; 2: 172.
4. Önder İ. Bir üçüz doğum münasebetiyle çoğul gebeliklerin sıklığı, husulü, patolojik anatomik teşhis ve klinik. *Ankara Üniversitesi Tıp Fakültesi Mecmuası* 1966; 19: 376.
5. Çanga Ş, Yavuz H. Multiple (çoğul) gebelikler. *Ankara Üniversitesi Tıp Fakültesi Mecmuası* 1967; 20: 85.
6. Bilgin O, Yılmaz H. Çoğul gebeliklerde maternal mortalite ve morbidite. *Ege Üniversitesi Tıp Fakültesi Dergisi* 1985; 24: 775.
7. Topçuoğlu S, Serim GB. Çoğul gebelikler. *İstanbul Tıp Fakültesi Mecmuası* 1966; 29: 504.
8. Kişnişçi HA, Ayhan A. Beş yıllık doğum materyalinin klinik değerlendirilmesi. *Hacettepe Üniversitesi Tıp Fakültesi Cerrahi Bülteni* 1977; 10: 301.
9. Say B, Güngör E, Durmuş Z. The incidence of twin births in Turkey. *Turk J Pediatr* 1967; 9: 32-6.
10. Susanne C, Corbisier JV. Les naissances gé'mellaires en Belgique (1960-1961). *Acta Genet Med Gemellol* 1969; 18: 294.
11. Cavalli-Sforza LL, Bodmer WF. The Genetic of Human Populations. San Francisco: Freeman, 1971, p. 566.
12. Imaizumi Y, Inouye E. Multiple birth rates in Japan: further analysis. *Acta Genet Med Gemellol* 1984; 33: 107-14.

13. James WH. Maternal age dizygotic twinning rates and age at menopause. *Ann Hum Biol* 1979; 6: 481.
14. Savona-Ventura C, Grech ES. Multiple pregnancy in the Maltese population. *Int J Gynecol Obstet* 1988; 26: 41-50.
15. Parisi P. Methodology of twin studies. In Johnston FE, Roche AF, Susanne C, (eds). *Human Physical Growth and Maturation: Methodologies and Factors*. New York: Plenum Press, 1980, pp. 243-264.
16. Heperkan Y, Rumford JC, Avrallıoğlu Z, et al. Vital Statistics from the Turkish Demographic Survey, 1966-67. Ankara: Sağlık ve Sosyal Yardım Bakanlığı, Hıfzısıhha Okulu, 1970, p. 49.
17. James WH. Secular changes in twinning rates in England and Wales. *Ann Hum Biol* 1980; 7: 485-7.

