

Twinning in Nigeria

P.P.S. Nylander

SUMMARY

Twinning rates in Nigeria are much higher than in Europe and USA, and appear to be highest in its western and eastern parts. The twinning incidence in a representative population in a town in Western Nigeria, Igbo-Ora, is approximately four times that in Europe and USA.

Zygoty determination has shown that only 8.6% of newborn twin pairs in Ibadan are MZ, compared to approximately 30% in Caucasian populations. Studies in Igbo-Ora have also given similar results, confirming the view that high twinning incidence in Nigeria is due to a very high DZ twinning rate, the MZ rate being the same as in Europe and USA.

The proportion of twins with monochorionic placentae in Ibadan is about 5%, against approximately 20% in UK and USA. The twinning rates in the two populations are 45‰ and 11‰ respectively. This inverse relation (between the twinning rate and the proportion of monochorionic placentae) may be used in calculating the twinning incidence in a population in which the proportion of twins with monochorionic placentation is known.

The pattern of twinning in Nigeria is markedly different from that in Europe and North America not only in the incidence, which is much higher, but also in other features such as zygoty and placentation. This paper, which analyses these differences, results from a long-term study of twinning in Western Nigeria which was begun in 1965.

Incidence

The high twinning rate among the Yorubas of Western Nigeria has already been noted (Bulmer, 1960; Knox and Morley, 1960; Cox, 1964; Nylander, 1967 etc.), but this may not be typical of all ethnic groups in the country. Furthermore, most of the data from which the twinning rates have so far been calculated are derived from hospital statistics, which are often biased by selective factors.

It should be borne in mind that hospital deliveries in developing countries are a filtrate from a much larger number of pregnancies, most of which end in home delivery unless some complication supervenes. Thus, twinning incidences are only representative when the figures have been calculated from the total births in a defined population. Hospital twinning rates may be representative if they are calculated from booked patients only, that is, patients accepted for antenatal care usually several weeks prior to delivery, before the diagnosis of twins has been made.

Tab. I shows the incidence of twinning in different parts of Nigeria. Some of the data refer to total hospital populations, i.e., patients booked for confinement in hospital and those admitted in emergencies.

Tab. I. Twinning rates in some populations in Nigeria, UK and USA *

Population	Main ethnic group	Date of investigation	Number of twin maternities	Incidence %	References
WESTERN PART OF NIGERIA					
Adeoya Hospital, Ibadan	Yoruba	1967-1968	305	45.9	Nylander, 1969a
Igbo-Ora	Yoruba	1964-1968	216	45.1	Nylander, 1969a
Wesley Guild Hospital, Illesha	Yoruba	Between 1940 and 1957	158	53.2	Knox and Morley, 1960
EASTERN PART OF NIGERIA					
Methodist Hospital, Ama Achara	Ibo	1958-1960	117	55.7	Cox, 1964
Queen Elizabeth Hospital, Umuahia	Ibo	1958-1960	112	34.1	Cox, 1964
St. Luke's Hospital, Anua	Ibo and Ibibio	1956-1958	35	33.4	10th and 12th Annual Reports
Maternity Hospital, Calabar	Efik	1964	44	50.5	Waboso, 1966
NORTHERN PART OF NIGERIA					
Kano General Hospital	Hausas and Fulanis	1965-1966	174	30.2	Imam, 1967
Zaria General Hospital	Hausas and Fulanis	1968	44	27.9	Lister, 1969
ENGLAND AND WALES		1966	8952	11.2	Registrar General, 1967
USA		1922-1958	59893	10.6	Shipley et al, 1967

* The figures for Igbo-Ora refer to total population. Those for Ibadan, Umuahia, Anua and Calabar refer to booked hospital cases only. The figures for the other Nigerian populations include booked and unbooked hospital cases.

Since complications (necessitating emergency admissions into hospital) occur far more frequently in patients with twin pregnancies than in those with singleton pregnancies, total hospital populations will have higher twinning rates than would be found in the general population. When data for booked patients only are used, as in Adeoyo Hospital, this bias is minimized and it will be seen that the twinning rate for this hospital is in close agreement with that in Igbo-Ora. Igbo-Ora, is a town in Western Nigeria in which data on births have been collected from the whole community by regular fortnightly visits to every household by family visitors employed by the University of Ibadan's Ibarapa Project (Director: Prof. T. Ogunlesi). The twinning incidence in this community is therefore free from bias and is considered to be representative of the incidence in Western Nigeria.

The twinning rates shown in Tab. I for populations in Western and Eastern Nigeria appear to be higher than in the North. Similarly, the rates among the Yorubas, Efiks and Ibos appear to be higher than those among the Hausas and Fulanis. Furthermore, the twinning rates in any of the sectors of the country or ethnic groups mentioned are much higher than the rates found in Europe and USA. However, the degree of selection in the various hospital populations in Nigeria is not completely known and further studies have recently been initiated to elicit the true incidence of twinning in all these ethnic groups.

Zygoty and Sex Distribution

The proportion of MZ and DZ twins in a population may be found by determining the zygoty of individual twin pair. This has been carried out in a research project recently initiated in Ibadan (Western Nigeria), in which zygoty of all twins delivered in the three major hospitals in the city has been determined by the use of genetically determined markers (Nylander, 1969*b*; Nylander and Corney, 1969).

The markers used were: blood groups (ABO; Rh, using antisera C, c, D, E, e; and MNSs); red cell enzymes (G6PD); placental enzymes (peptidase A and B, phosphoglucomutase 1, 2 and 3 and haemoglobin genotype). The rarer blood groups (including Kell, Kidd, Duffy) made practically no contribution to zygoty determination, on account of the close similarity of individuals in this population with respect to these markers, and their use was therefore discontinued after the initial part of the project. Out of 1052 pairs of twins delivered in the three hospitals over a period of about 18 months, it was found that 89 (8.5%) were MZ (Nylander, 1969*b*).

Tab. II shows the sex distribution of twins in some populations in Nigeria, UK and USA. The proportion of unlike sex twins among the three Yoruba populations studied in Nigeria appears to be much higher than that in the British and American twin populations. The finding is in agreement with the fact that a much higher proportion of twins in Nigeria are DZ.

If the sex distribution of twins in a population is known, it is possible to calculate the number of MZ and DZ twins, by using Weinberg's formula (1902) which states that the number of DZ twins in a population equals twice the number of unlike sexed twins.

This method has been used in calculating the numbers of MZ and DZ twins in some twin populations in Nigeria and the results are shown in Tab. III. It would appear, from this table, that MZ twinning rates vary in the different populations from 3.9 to 10.1⁰/₁₀₀, however, all but one of these data are derived from hospital populations, in which the above mentioned selective factors may have affected the sex distribution of twins, thereby altering the MZ twinning rate calculated by Weinberg's method.

For example, in the twinning research being conducted in three hospitals in Ibadan (Western Nigeria), the proportion of MZ twins in the population, as calculated by Weinberg's method, was found to be 13.4% (Tab. IV). However, from data

Tab. II. Sex distribution of twins in some populations in Nigeria, UK and USA

Population	Unlike sex (♂♀)	Like sex (♂♂-♀♀)	Ethnic group	References
NIGERIA				
Igbo-Ora (1965-1968)	81 (45.8%)	96 (54.2%)	Yoruba	Nylander, 1969a
U. C. H., Adeoyo and Oke-Offa Hospital Ibadan (1967-1968)	454 (43.3%)	595 (56.7%)	Yoruba	Nylander, 1969b
Wesley Guild Hospital Ilesha (between 1940 and 1957)	68 (45.6%)	81 (54.4%)	Yoruba	Knox and Morley, 1960
Queen Elizabeth Hospital Umuahia (1958-1960)	38 (34.9%)	71 (65.1%)	Ibo	Cox, 1964
ENGLAND AND WALES (1965)	2999 (33.5%)	5953 (66.5%)	—	Registrar General, 1967
USA (1922-1958)				
Caucasian	18919 (31.6%)	40974 (68.4%)	—	
Negro	1217 (36.9%)	2080 (63.1%)	—	Shibley et al, 1967

obtained by actually determining zygosity of individual pairs of twins, as mentioned earlier, the proportion of MZ twins in the same population was found to be 8.5%, which is the same as in Igbo-Ora (Tab. IV) where the sex distribution of twins has not been affected by hospital selection.

As mentioned earlier, the twinning rate in Igbo-Ora (45‰) is considered to be representative of the incidence in Western Nigeria. Since 8.5% of the twins in this community (and in Ibadan) are MZ, the MZ twinning rate in Western Nigeria is $\frac{8.5}{100} \times 45 = 3.8\%$.

This figure for the MZ twinning rate is in close agreement with those recorded for other parts of the world, e.g., UK: 3.7‰ (Registrar General 1967), USA: 3.9‰

Tab. III. MZ and DZ twinning rates in some Nigerian populations
(Calculated by Weinberg's method)

Population	Total maternities	Number of MZ twins	Number of DZ twins	Incidence ‰		References
				MZ	DZ	
Igbo-Ora	3829	15	162	3.9	42.3	Nylander, 1969a
Ibadan Hospitals	18400	141	911	7.7	49.5	Nylander, 1969b
Wesley Guild Hospital, Ilesha	2973	14	144	4.7	48.4	Knox and Morley, 1960
Queen Elizabeth Hospital, Umuahia	3252	33	76	10.1	23.4	Cox, 1964

Tab. IV. Proportion of MZ and DZ twins in some Nigerian populations

Population	Total number of twin maternities	Percentage of MZ twins	Percentage of DZ twins	Method used in zygosity determination
Igbo-Ora	177	8.5	91.5	Weinberg's
Ibadan Hospitals	1052	8.5	91.5	Sex and genetic markers in individual twin pairs
Ibadan Hospitals	1049*	13.4	86.6	Weinberg's
Wesley Guild Hospital Ilesha	158	8.7	91.3	Weinberg's
Queen Elizabeth Hospital, Umuahia	109	30.3	69.7	Weinberg's

* Three pairs of twins whose sex constitution was unknown (e.g., *foetus papyraceous*) have been excluded.

(Shipley et al, 1967), and confirms the view that the MZ twinning rates in different populations all over the world vary very little. The high twinning rate in Western Nigeria is therefore due to an increase in the DZ twinning rate. It seems likely that this pattern also applies to other parts of Nigeria, where studies to determine zygosity have recently been initiated.

Placentation

In twin investigations carried out in Europe and USA, in which placentation has been studied, the pattern of placentation, while showing slight differences, has on the whole been similar.

However, in the current twinning survey in Ibadan, the pattern has shown some marked differences from that in UK and USA, as shown in Tab. V. It will be seen that about 20% of twins in UK and USA have monochorionic placentae, compared to 5% in Ibadan. On the other hand, 50% of the Nigerian twins have dichorionic single placentae, compared to 34% in the other studies. However, in spite of these differences, the proportion of twins with double (or separate) placenta is approximately the same in all the studies.

When placentation and zygosity are considered together, certain similarities and differences between the Nigerian and other twin studies emerge, as given below:

- 1) All the twins with monochorionic placentae in the Nigerian and other populations studied are alike in sex and all the markers used can therefore be considered MZ;
- 2) In the Nigerian study, 3.6% of twins with dichorionic placentae are MZ, whilst the corresponding figures in the British and American studies vary between 6% and 14% (Potter, 1963; Corney et al, 1968; Nylander, 1969b);

Tab. V. Placentation of twins in Nigeria (Ibadan), UK and USA

	Ibadan study (Nylander, 1969b) %	Aberdeen study (Nylander, 1970) %	Oxford study (Strong and Corney, 1967) %	Chicago study (Potter, 1963) %	Birmingham study (Edward et al, 1967) * %
Single and fused	55.3	53.2	55.5	54.5	
Monochorionic	5.0	18.7	22.5	20.6	19.6
Dichorionic	50.3	34.5	33.0	33.9	
Double (or separate) dichorionic	41.5	41.0	42.5	42.2	80.4
Placentation unknown	3.2	5.6	2.0	3.3	—
Number of twins investigated	1052	608	200	567	592

* Quoted by Strong and Corney (1967).

3) Approximately 60% of MZ twins in the Nigerian survey have monochorionic placentae. The corresponding figures in the other surveys vary between 60% and 80%;

4) Any of the placental forms (single or separate placentae) may be found in association with MZ or DZ twins, but in Ibadan only 1% of all twins with separate placentae are MZ (Nylander, 1969b);

5) The proportions of single and double placentae are practically the same in the Nigerian and other twin studies (Tab. V), in spite of the marked differences in sex distribution, zygosity and placentation. It seems likely, therefore, that the factors governing the arrangement of the placentae in the uterus in twin pregnancies are independent of the sex or zygosity of the babies.

The very low proportion of twins with monochorionic placentae in Nigeria (Ibadan) is consistent with the fact that the higher twinning rate is mainly due to an increase in DZ twins. In fact, there appears to be an inverse relation between the twinning rate and the proportion of monochorionic placentae in a twin population: thus, if the twinning rate is high, then the proportion of twins with monochorionic placentae is low, and viceversa.

It would appear, therefore, that this relationship can be used in calculating the twinning rate in a general population, where the proportion of twins with monochorionic placentation is known. For example, in UK and USA the twinning rate is approximately 11‰ and the proportion of monochorionic placentae is approximately 20%. If this inverse relation is applied to Western Nigeria, where the proportion of monochorionic placentae is 5%, the twinning rate in the general population can be calculated as follows: twinning rate = $\frac{20}{5} \times 11 = 44\%$, which is in close agreement with the rate in Igbo-Ora (Western Nigeria), 45‰. Application to other parts of the world would show whether this can be accepted as a unique formula.

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RIASSUNTO

Le nascite gemellari in Nigeria sono molto più frequenti che in Europa e negli Stati Uniti, e raggiungono il massimo nelle regioni occidentale e orientale. La frequenza di nascite gemellari in una popolazione rappresentativa (Igbo-Ora, Nigeria occidentale) è di circa quattro volte superiore a quella riscontrata in Europa e negli Stati Uniti.

Solo l'8,5% dei gemelli nati negli ospedali di Ibadan (Nigeria occidentale) sono risultati MZ, contro il 30% circa delle popolazioni caucasiche. Indagini condotte nella zona di Igbo-Ora hanno dato risultati analoghi, confermando che l'elevata frequenza di gemelli nella Nigeria è dovuta ad un aumento di DZ, il tasso di MZ essendo lo stesso dell'Europa e degli Stati Uniti.

La proporzione di gemelli monocoriali a Ibadan è del 5% circa, contro il 20% della Gran Bretagna e degli Stati Uniti, mentre il tasso di nascite gemellari nelle due popolazioni è del 45% contro l'11%, rispettivamente. Questa relazione di placente monocoriali può essere usata per calcolare l'incidenza gemellare in una popolazione in cui sia nota la proporzione di gemelli monocoriali.

RÉSUMÉ

Les naissances gémellaires en Nigéria sont bien plus fréquentes qu'en Europe et aux Etats Unis, avec un maximum dans les régions occidentale et orientale. La fréquence de naissances gémellaires chez une population représentative (Igbo-Ora, Nigéria occidental) est d'environ quatre fois plus élevée qu'en Europe ou aux Etats Unis.

Seulement 8,5% des jumeaux nés dans les hôpitaux d'Ibadan (Nigéria occidental) sont résultats MZ — leurs incidence étant par contre de 30% chez les populations caucasiennes. Des recherches dans la région de Igbo-Ora ont produit les mêmes résultats, confirmant ainsi que la fréquence élevée de jumeaux en Nigéria est due à une augmentation des DZ, la fréquence des MZ étant la même qu'en Europe et aux Etats Unis.

La proportion de jumeaux monochoriaux à Ibadan est de 5% environ, contre 20% en Grande Bretagne et aux Etats Unis, tandis que les taux de naissances gémellaires dans les deux populations sont de 45‰ et 11‰ respectivement. Cette relation inverse entre le taux de naissance gémellaires et la proportion de placentas monochoriaux peut être usée pour calculer la fréquence des jumeaux dans une population, la proportion de jumeaux monochoriaux étant connue.

ZUSAMMENFASSUNG

Zwillingsgeburten sind in Nigeria viel häufiger als in Europa und in den Vereinigten Staaten, mit einem Maximum in den West und Ostregionen des Landes). In der Stadt Igbo-Ora in Westnigeria ist das Vorkommen von Zwillingsgeburten in einer repräsentativen Bevölkerung ungefähr viermal so hoch als in Europa und in den Vereinigten Staaten.

Nur 8,5% der in den Krankenhäusern von Ibadan (Westnigeria) geborenen Zwillinge sind EZ (bei den kaukasischen Bevölkerungen beträgt der Anteil ca. 30%). Ähnliche Ergebnisse brachten die Untersuchungen in der Gegend von Igbo-Ora; es bestätigt sich somit, dass die hohe Zwillingsfrequenz in Nigeria auf einem Anstieg der ZZ beruht, da der Prozentsatz der EZ der gleiche ist wie in Europa und den Vereinigten Staaten.

Der Anteil der EZ beträgt in Ibadan ca. 5%, in Gross-Britannien und den Vereinigten Staaten hingegen 20%; die Zwillingsgeburten in diesen beiden Bevölkerungen belaufen sich auf 45‰ bzw. 11‰. Dieses umgekehrte Verhältnis der monochorialem Plazenta-Fälle kann zur Berechnung der Zwillingshäufigkeit in einer Bevölkerung dienen, bei der die Proportion der monochorialen Zwillinge bekannt ist.

Dr. P.P.S. NYLANDER, Senior Lecturer, Dept. of Obstetrics and Gynaecology, University of Ibadan, Nigeria.