

# An obstetric and neonatal study on unplanned deliveries before arrival at hospital

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*Summary: Objective:* To establish the prevalence of unplanned deliveries before arrival at a big metropolitan hospital and to determine the demographic characteristics of the group of women at risk of delivering before arrival.

*Design:* A random case control study. Each baby born before arrival and its mother were compared to the next baby born in the same Department.

*Subjects:* All babies born before arrival at the Department of Obstetrics and Gynecology, University "La Sapienza" in a 10 yr. period (Jan 1983 - Dec 1993).

*Results:* Of 27,274 consecutive deliveries in the study period, 22 (0.8%) babies were born before arrival at hospital. Of the 22 women who delivered before arrival, 16 were Italian, 5 were considered nomad (no fixed address) and 1 was a Polish tourist. No statistical difference was found between groups regarding maternal age, parity, gestational age, birth weight and immediate delivery complications. No mortality cases were observed in the study or control group. Neonatal stay in the neonatal ward was longer in the study group (6.5 vs 3.5 days,  $P < 0.001$ ). Hypothermia was the highest morbidity ( $P < 0.001$ ) and neonatal complications were more prevalent in babies delivered before arrival than born babies ( $P < 0.001$ ).

*Conclusions:* Delivery before arrival to hospital does not seem to carry a higher neonatal mortality risk. However, the prevalence of complications was higher in such babies, with hypothermia being the highest morbidity.

*Key words:* Delivery before arrival, home delivery, neonatal complications, hypothermia.

## INTRODUCTION

Deliveries occurring outside the hospital are not frequent in Italy, since almost all deliveries take place in the hospital

and policies for home delivery do not receive public support. However, deliveries before arrival at hospital do occur also in a social environment that does not favor home births, as happens in other countries (<sup>1, 2</sup>).

The aim of this study was, therefore, to establish in the urban setting of a big academic hospital, i.e., Rome, the number of births occurring before arrival at hospital, the associated perinatal mortality and analysis of the characteristics of women at risk of delivering before arrival.

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## SUBJECTS AND METHODS

We reviewed all the records of babies delivered between January 1983 and December 1993 in the Department of Obstetrics and Gynaecology of the University "La Sapienza" in Rome. We considered as the study group all babies, admitted to the neonatal unit of the Department, who were born before arrival at hospital. The control group was formed by including the next-born baby.

For each baby the mother's marital status, age, parity, ethnic origin, address and place of birth were studied. Neonatal outcome was based on the clinical records as evaluated by the neonatologist staff.

## STATISTICS

For a two group comparison, an unpaired t-test was performed. For a nominal scale group comparison, a Z-test, a Chi-square test or a Fisher exact test were performed when necessary. We considered a  $P < 0.05$  a statistical difference parameter.

## RESULTS

From a total of 27,274 babies born to women admitted to our maternity unit in the period 1983-1993, 22 (0.8%) were born before arrival at hospital. Of the 22 babies born before arrival, 15 were delivered at home (68%), two in the ambulance (9%), and in the others no evidence of place of delivery was available. Table 1 summarizes the characteristics of the study groups. Age was significantly higher in the study group (median 27.5 yrs.; range 18-42 than in the random group (median 21.0 yrs.; range 22-39), while no statistical difference was found in parity between groups ( $\chi^2 = 5.9$ ,  $P = 0.205$ ). In the study group all woman except one were married, while in the random group, all women were married.

When we analysed working status, ten women were housewives; four of whom were graduates (one doctor, two engineers, and one school teacher), three of them were government employees and in the remaining cases no working status was found in the records. Demographic cha-

Table 1. - *Characteristics of women who delivered before arrival at hospital and the random control group (\*)*.

Maternal variable	Study group	Control group	Significance
Age (yrs)	27.5	21	$P < 0.001$
Parity			NS
0	6	9	
1	4	7	
2	3	3	
3	2	2	
>4	7	1	
Ethnic origin			NS
Italian	16	22	
Non-Italian	6		

(\*) Values are median.

acteristics of women delivering before arrival were as follows: 11 were from Rome, six women were foreigners, and five women were born outside Rome; while in the random group all women were Italian (seven were women born outside Rome). For the home address, five women in the study group were considered "nomad", living on the periphery of Rome, one was a tourist, and 16 had a fixed address; the greatest distance for the hospital was 5 km, considering the distance as a straight line from the address to the hospital.

Table 2. - *Obstetrical complications in study and in control groups*.

Complication	Study group *	Random group	Significance
Vaginal tears	9	2	
Post-partum haemorrhage	2		
Manual placental removal	13	1	$P < 0.001^{**}$
Uneventful	2	19	

(\*) A pregnancy could have more than one complication.

(\*\*) Referring to all complications.

Table 3. - Characteristics of neonates born before arrival and of random control group.

	BBA ***	Random group	Significance
Gestational age (wks)	39.3 *	40.1 *	P = 0.41
	range (37.2-38.4)	range (37.8-41.2)	
Birth weight (g)	2,993 (331) **	3,044 (287) **	P = 0.58
Rectal temperature (°C)	34.7 *	37 *	P < 0.001
Stay in hospital (days)	6.5 *	3.5 *	P < 0.001

(\*) Values are mean.

(\*\*) Values are mean (SD).

(\*\*\*) BBA: Born before arrival.

Table 2 shows gestational age and neonatal outcome of the study groups. No difference was found in gestational age ( $P=0.41$ ) no preterm delivery was found in the study groups. Regarding birth weight, no difference was found ( $2993 \pm 331$ ;  $3044 \pm 287$ ;  $P=0.58$ ). Delivery of placenta took place in the hospital in 18 of the cases, of which 13 cases were by manual removal, and in the remaining cases the place of delivery of the placenta was unknown. The study group had more delivery complications (vaginal tears haemorrhage, manual placental removal, see Table 3) than the random control group, and this difference was statistically significant ( $P=0.01$ ). When correlating fixed or non-fixed address with immediate delivery complications in the study group, no statistical difference was found.

Neonatal stay in hospital was longer for babies born before arrival (6.5 days) than for the in-born babies group (3.5 days) ( $P<0.001$ ).

Among neonatal complications, hypothermia, defined as rectal temperature of  $\leq 35.0^\circ\text{C}$  taken during the first neonatal evaluation on arrival at hospital, was the highest morbidity factor, with a statistically significant difference between the BBA (median 34.7) and in-born baby group (median 37) at  $P<0.001$ .

As shown in Table 4, the presence of neonatal complications (jaundice, hypoglycaemia, apnoea) in the study group was higher than in the in-born baby group ( $P<0.001$ ).

## DISCUSSION

In our series mortality was nil in the study group (born before arrival) and in the random control group. This is in contrast with the reports of other authors (<sup>4, 5</sup>) who reported mortality rates ranging from 4.1/1000 to 196/1000. However, the numerosity of our group was limited to 22 cases. Although one cannot assume a perinatal mortality of 0 given the size of the sample examined, it is noteworthy that none of the infants actually died. In addition, comparison with other studies is difficult to perform because of different cohorts and different ethnicity, and dishomogeneity of the data collection systems utilized (<sup>6</sup>).

The frequency of neonatal complications, including hypothermia and jaundice was significantly higher in babies born before arrival: this was however unrelated to immaturity or low birth weight.

Table 4. - Neonatal complications in babies delivered before arrival and random control group.

Complication	Study group *	Random group
Hypothermia	15	
Jaundice	5	2
Parietal diastasis	2	
Hypoglycemia	1	
Apnea	1	1
Uneventful	6	19

(\*) A neonate could have more than one complication.

(\*\*) Referring to all complications.

The longer stay in hospital for the study group can be considered as an "excess" of neonatal care, given the higher incidence of perinatal complications expected or feared by the neonatologist. The incidence of neonatal complications was higher in the control group than in the random group probably because of the lack of immediate care to the newborn. The same applies for obstetric complications occurring to the mothers, such as perineal lacerations, and postpartum hemorrhage, the latter due to the lack of administration of uterotonic agents in the immediate postpartum period. Manual removal of placenta, required by a majority of BBA mothers, can probably be related to the failure of women bearing down in the effort of delivery, because of the lack of an assisting nurse and as a consequence of a retracted cervix.

In the case of women who deliberately decide to have home deliveries, socioeconomic or educational differences could account for the decision to deliver at home<sup>(7,8)</sup>.

However, this fact does not account for women obliged to have an emergency delivery outside the hospital. In fact, excluding the six nomads in the BBA group, the remaining were demographically similar to the control group. We

conclude that even though of minimal incidence, deliveries before arrival at Hospital are potentially dangerous for the mother and the neonate, posing a risk that is difficult to prevent.

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