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# Cost of Care and Prevention of Preterm Births in Twin Pregnancies

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This study describes a 5-year survey of activity in a single institution, and the effects of a change of policy for prevention of preterm birth in twin pregnancies. The results show the advantages and drawbacks from the financial and medical viewpoints.

**Key words:** Prevention, Preterm birth, Twin pregnancies, Cost of care

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## The Medical Aspect

Preterm births occurring before 37 weeks of gestation are considered to be the main complication of twin pregnancies. Twins represent 10–20% of preterm babies [2,4–7,9].

Twin pregnancies are responsible for a significant part of perinatal mortalities. Mortality is most often caused by complications due to prematurity. The causes of preterm birth itself can be explained by different factors such as the age of the mother, monozygote pregnancies, and other complications such as high blood pressure and the absence of an early enough diagnosis [2,9,10]. But our opinion is that preterm birth may be reduced by a specific preventive policy, as proposed by different teams [7,11,13].

## The Economic Aspect

Preterm births represent a financial and economic burden for society. The financial costs involve avoiding deaths or, for newborns in distress, taking care of the critically ill neonates in intensive care units. One should also include the cost of taking care of handicapped infants in whom a deep abnormality in development appears [14,15,18]. Financial costs for the mother should take into account the cost of prenatal hospitalization of many weeks duration which is proposed as a routine prevention for preterm labor [13], and the cost of taking care of handicapped mothers. The economic costs involve the loss in productivity due to the inactivity of the women and the cost of nonproductivity by those citizens growing up as handicapped children and adults [19].

## The Sociological Aspect

The risk of preterm births is unequally distributed on the social scale. The risk is greater for women belonging to underprivileged groups [3,16,17].

## Contents of Both Methods of Prevention

Before 1978, a traditional method was used without systematic prenatal hospitalization. A new method appeared based on four principles: early recognition of twinning; early work leave and avoidance of physical effort for the woman; weekly home visit by a midwife; and follow-up of the woman by a hospital team specifically in charge of all twin pregnancies. This new method was applied by the same team of researchers to those women giving birth in 1978 and 1979, and was applied by all members of the Department to 1980 births.

## MATERIALS AND METHODS

Since a randomized trial was extremely difficult to perform, the method chosen to compare both policies was the historical evolution of the results involving the 5 years 1976–1980.

The sample chosen involves all women pregnant with twins whose delivery took place at the Hôpital Bécélère during this period.

The subjects we considered as “followed” were those pregnant women who were observed early in pregnancy at this prenatal clinic and who had had two or more prenatal consultations before 28 weeks pregnancy. We classed as “nonfollowed” pregnant mothers of twins who were sent to this clinic because of a complication arising during pregnancy.

This analysis is based on the information provided by the medical and accounting records. The accounting department in this institution calculated the precise cost for each hospital stay, as well as providing the exact cost for each separate item of medical care.

The definition of “preterm” used here was less than 37 weeks since beginning of last menstrual period.

The cost of care for newborns transferred to a neonatal intensive care unit was related to the proportion of newborns transferred to this unit, to the duration of hospitalization, and to the medical care, laboratory examinations, and therapies used for each child. Table 2 shows the number of newborns transferred from a maternity ward to a neonatal intensive care unit. We did not take into account infant transfers to a newborn nursery taking care of babies weighing more than 1,800 g and out of life-threatening danger. Table 2 presents details relating to the intensive care unit treatment of babies weighing less than 1,800 g, and of those who are in serious danger. Cost analysis reflects the precise expenses observed for each child, the mean cost of hospitalization per child, and the standard deviation. The total cost is also figured, and the cost per twin birth, the total of expenses being divided by the number of newborns.

## RESULTS

Between 1976 and 1977, the sample doubled while the proportion of hospitalizations of children remained the same. About 45% of the twins were transferred to a newborn nursery unit, and 21.5% to an intensive care unit (Table 2).

TABLE 1. Prenatal Hospitalization for Pregnant Twin Mothers\*

	1976	1977	1978	1979	1980
No. of pregnancies	19	32	39	43	35
Prenatal (n)	17	28	26	34	25
Hospitalization (%)	90	87	66	79	73
Mean duration of hospital stay	21 ± 11	12 ± 11	9.7 ± 9	13 ± 13	8.7 ± 8.5
Mean cost of hospital stay (thousand French francs)	13.3 ± 8.9	10.4 ± 8.0	7.0 ± 6.9	10.3 ± 9.8	6.7 ± 6.0

\*Almost four out of five pregnant twin mothers were offered a prenatal hospital stay, with the aim of preventing preterm birth or another complication of their pregnancy. The mean duration of stay decreased slightly but not significantly.

TABLE 2. Cost of Care for Newborns Transferred to a Neonatal Intensive Care Unit\*

	1976	1977	1978	1979	1980	Total
No. of twin births	64	68	72	86	68	358
Newborns transferred to an intensive neonatal care unit (n)	14	17	19	13	14	77
unit (%)	22	25	16	15	21	21.5
Mean duration of stay in intensive care unit (days)	34	28	6	16.5	14.5	
+ SD	± 19	± 36	± 5.7	± 12.6	± 12.5	
Mean cost of stay ± SD (French francs, 1980)	56,600 ± 31,000	55,000 ± 22,000	6,600 ± 4,500	26,000 ± 24,600	18,000 ± 17,300	
Total cost (French francs, 1980)	722,400	935,000	125,400	338,000	263,200	2,383,600
Cost per birth (French francs, 1980)	12,287	13,750	1,736	3,930	3,870	6,658

\*This table presents the number of newborns transferred, the proportion of total twin births they represent, and the mean duration of stay in intensive care unit, including standard deviation, and the mean cost per stay—including the precisely observed costs of the various laboratory or x-ray examinations, the cost of drugs, and so forth. Total cost for each twin is calculated, as well as the cost per twin birth.

This table shows a difference between the cost observed during 1976 and 1977, as compared to the cost observed during the period 1978–1980 ( $p < 0.01$ ). As part of the reduction of cost per birth observed in the latter period, the reduction of the proportion of transfers of newborns, and the reduction of days of stay in the intensive care unit are important factors.

Fewer mothers were hospitalized in 1978 than in 1976–1977 but there was a slight increase in hospitalizations in 1979–1980 compared to 1978. There is no significant difference between the two defined periods (Table 2).

Table 2 shows that in 1978 the main effort of prevention was targeted at very serious preterm births. Therefore, a positive result was achieved.

### Hospital Care of the Newborn Babies: Neonatal Intensive Care Unit

The decrease in the average cost and duration of hospital care means a decrease of the very serious cases.

The decrease in standard deviation of cost and duration means that the same logic applies to a majority of cases.

The decrease in cost, which is greater than the decrease in duration, means that the cost of care tends to decrease per day and per child.

The high level of the median line of duration after the drop in 1978 means that serious cases increase as a whole.

Discussion about the cost of care is now on the market since it has become obvious that neonatal intensive care is extremely expensive [14,15]. Evaluation of results of that care has not been done well [18]. Preventive programs also have to be evaluated, even if the cost/benefit ratio is often positive.

## DISCUSSION

Most studies propose preventive programs based on hospital bed rest for women pregnant with twins, with a mean duration of stay which can be very long. Mean duration of stay can be about 2 months, even though proof for the causal relationship between bed rest and avoidance of preterm births has not been given for twin pregnancies [8,12].

Our program combines several proposals, such as reduction of physical activity [11] and close management of the pregnancy at a specifically designed twin clinic.

## CONCLUSION

Prevention of twin pregnancies is an interesting criterion for all policies of prevention: it can be used as an indicator for single pregnancies since twin pregnancies are evenly distributed in France.

Since the concern of society toward twin pregnancies is greater than for single ones, more attention is paid to this phenomenon. Furthermore, the indicators observed and the means of prevention applied are common to both types of pregnancies. Thus, both problems could be solved simultaneously.

Therefore, a policy of prevention of preterm twin birth constitutes an asset, considering that the demand for a protection from risks due to preterm births will continue to increase in the future. This kind of organized preventive policy is the only way able to obtain a reduction in the possible end result of preterm twin births, which is the risk of a handicapping condition in the twin newborns [19].

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