



Perinatal Outcome after Leave of Absence from Work for Twin-Pregnant Women

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Abstract. *Aim.* To evaluate the association between the incidence of leave of absence from work and perinatal outcome for the twin-pregnant woman.

Material and methods. A 20.2% sample of all twin-pregnant women between 1982 and 1988 (1,331/6,602) was taken at random from the entire material of twin deliveries in Sweden, archived at the Medical Birth Registry (MBR), National Board of Health and Welfare. For each woman in the sample, information on period(s) and reasons for leave of absence from work during pregnancy was obtained by inquiry to all Regional Health Insurance Offices throughout Sweden. A comparison of perinatal outcome was also made with information from the Danish Fertility Database and the Norwegian Medical Birth Registry.

Results. Duration of leave from work increased from 58 days in 1982 to 97 days in 1988 (trend analysis; $t = 7.9$, $p < 0.001$). No association was seen between perinatal mortality for twins weighing $< 1,500$ g and changes in the incidence of leave of absence. The incidence of twins with a birthweight $< 1,500$ g varied among the three countries, increasing significantly only in Sweden (trend analysis $\chi^2 = 20.3$, $p < 0.0001$).

Conclusion. Although the number of days of leave of absence increased by 60%, there was no obvious association with perinatal mortality for twins weighing $< 1,500$ g. The incidence of Swedish twins with a birthweight $< 1,500$ g increased significantly, indicating that the effect of leave of absence from work on perinatal outcome may be less effective than previously thought.

Key words: Gestational duration, Leave of absence, Perinatal mortality, Twins

INTRODUCTION

There is an increased risk of premature birth and perinatal mortality in twin pregnancy compared with singleton pregnancy [6, 13]. Measures to improve the prognosis in twin pregnancy have included routine hospital care [8]. Other prophylactic treatment modali-

ties for twin-pregnant women lacking a proven effect on the incidence of preterm delivery have included cervical cerclage [16], progesterone treatment [4], and orally administered terbutalin [1]. To evaluate the effects of routine hospital care, a randomized study of 800 twin-pregnant women was performed in Australia [8]. The investigation was stopped, however, after 128 women had been enrolled; the hospitalised women were found to have a poorer prognosis in terms of perinatal mortality, a higher incidence of low birthweight infants and a shorter gestation than the women who were not admitted [8].

Little is known about the effects of leave of absence from work for the twin-pregnant woman and her fetuses. No randomized study on a sufficient number of women has ever been performed. In an observational study on 78 women with prophylactic leave of absence and 78 controls without such treatment, it was impossible to discern any difference in outcome. The end points included perinatal death, delivery <32 gestational week, or a birthweight <1,500 g [12]. However, the number of women in that study was too few to allow definite conclusions.

Since 1985, every twin-pregnant woman in Sweden is entitled to take prophylactic leave of absence from work during the last trimester, in the hope of preventing a preterm birth. The aim of the present study was to ascertain whether this change in attitude to the twin-pregnant woman has improved the perinatal outcome.

MATERIALS AND METHODS

Information regarding duration of pregnancy of <32 completed weeks, a birthweight <1,500 g, and perinatal mortality for twins weighing <1,500 g was collected from the Medical Birth Registry (MBR) at the National Board of Health and Welfare, Stockholm. All twins born in Sweden in the period 1982-1988 were included. The MBR holds the records of all pregnancies with a gestational duration of at least 28 weeks, or less if the newborn shows signs of life. Compared with the official statistics (Statistics Sweden), 3-4% of all twin deliveries are missing from the MBR [11].

In a quality study of the MBR, Cnattingius et al. examined an 0.5% random sample of deliveries from 1974 and 1986 [3]. Copies of the original medical records were provided by the hospitals and compared with data held at the MBR. Scores 1-3 were subjectively rated as 1 = poor; 2 = acceptable, can be used with some care; 3 = good, with a low rate of errors. Compared with the original medical records, the data in the MBR were informative (score = 3) regarding birthweight; data on gestational duration were rated as acceptable (score = 2). The information on perinatal mortality held at the MBR is cross-checked annually with information available in the official vital statistics (Statistics Sweden).

A 20.2% sample (1,331/6,602 women) was extracted at random from the whole material of twin deliveries (MBR) in Sweden between 1982 and 1988. For each woman selected, information on period(s) and reason(s) for leave of absence from work during the pregnancy was obtained by an inquiry made to all Regional Health Insurance Offices throughout Sweden. This can be done by using the unique personal identification number allocated to every newborn in Sweden shortly after birth. Of the 1,331 women with a twin pregnancy, information was obtained on 1,172 (88.1%). Due to incomplete information (no definite diagnosis, difficulty in reading the doctor's handwriting on the photo-

copy) regarding 120 periods of leave of absence for 73 women; these data (120/2,246; 5.3%) could not be used for further analysis.

The twin-pregnant women were dichotomized into two groups: those with a serious diagnosis, and those without. The serious diagnoses in the present study are the same as those listed in a similar smaller study of 1988, which included cervical cerclage, cervical insufficiency, hemorrhage, hydramnion, pre-eclampsia, partus prematurus imminens, placenta praevia, and premature rupture of the membranes [12].

A comparison was also made with perinatal outcomes for twins born in Denmark and Norway. Data from Denmark (co-author L.B.K.) were obtained from the Fertility Database, established by Statistics Denmark in 1990-92 [7]. Data on perinatal outcome in the Fertility Database originate from the Danish Medical Birth Registry.

The Danish MBR included all pregnancies with a gestational duration ≥ 28 weeks, or less if the newborn is alive at birth. Data from Norway (co-authors L. B and P. M.) were obtained from the Norwegian Medical Birth Registry, National Institute of Public Health, Oslo. In Norway, registration of pregnancy starts from 16 gestational weeks. This is why Norway has a higher incidence of perinatal mortality, pregnancies < 32 weeks and twins weighing $< 1,500$ g.

To test whether the changes during the period were significant, a trend analysis was made (Stat Exact, Cytel Software Corporation). A two-sided test with a p -value < 0.05 was considered significant.

RESULTS

Leave of absence from work estimated from a 20.2% sample ($n = 1\,331$) of Swedish twin pregnancies between 1982 and 1988.

During the study period the average number of days on leave of absence for each woman increased significantly (trend analysis; $t = 7.9$, $p < 0.001$), from 58.3 days in 1982 to 96.9 days in 1988 (Table 1). The number of days with leave of absence from work for women with a serious diagnosis, including prophylactic leave of absence, varied between 53 and 63 days and, apart from the situation in 1982 (40 days), did not increase to any extent during the study period (Table 1). A decreasing number of women during the study period took no such leave whatever (Table 2). It is evident that it is the extended leave of absence ≥ 56 days from work that predominates (Table 2). In 1982, 45% of the women took leave for more than 56 days; this proportion had risen to 73% by 1988 ($\chi^2 = 30.6$, $p < 0.001$).

The lowest mean of leave of absence was found for women with a maternal age < 20 years (49 days). For all other women, the leave of absence varied from 75 to 88 days. Regression lines for different age groups are found in Figure 1. For all maternal age groups, except those < 20 years, the average number of days increased during the study period.

Perinatal outcome for the whole material of twins ($n = 6,602$) born in Sweden between 1982 and 1988; a comparison with the corresponding groups in Denmark and Norway during the same period.

Perinatal mortality for Swedish twins $< 1,500$ g reached its lowest value (16.3%) in 1987, and its highest value (34.2%) in 1986 (Table 3). No obvious correlation was seen

Table 1 - Duration of leave of absence during pregnancy. Figures are for the whole sample of Swedish twin mothers with known information (1,172 of 6,602 women), for the women with at least one serious diagnosis, and for the women on prophylactic leave of absence from work

Year	Number of women n	Total sample, no. of days mean (SEM)	Women with at least one serious, diagnosis, no. of days mean (SEM)	Women with prophylactic leave of absence, no. of women, no. of days	
				n	m (SEM)
1982	155	58.3 (3.5)	40.4 (3.5)	10	48.3 (8.1)
1983	117	68.7 (3.0)	56.0 (3.8)	8	51.0 (11.6)
1984	161	79.0 (3.8)	61.1 (3.7)	11	87.4 (11.6)
1985	177	73.4 (4.1)	53.2 (3.7)	23	54.4 (7.4)
1986	177	89.5 (3.2)	63.6 (4.0)	36	66.1 (7.5)
1987	167	92.6 (2.4)	62.8 (3.4)	31	63.7 (7.3)
1988	218	96.9 (5.9)	62.4 (3.8)	59	65.6 (4.6)

Calculations after standardization for maternal age in 1982

Table 2 - Distribution of Swedish twin pregnant women on leave of absence from work, correlated year of delivery

Year	Days			
	0 n (%)	1-13 n (%)	14-55 n (%)	≥ 56 n (%)
1982	36 (23)	13 (9)	36 (23)	70 (45)
1983	16 (14)	7 (6)	21 (18)	73 (62)
1984	17 (11)	12 (7)	30 (19)	102 (63)
1985	28 (16)	13 (7)	30 (17)	106 (60)
1986	14 (8)	8 (4)	28 (16)	127 (72)
1987	18 (11)	7 (4)	20 (12)	122 (73)
1988	16 (7)	17 (8)	25 (12)	160 (73)

Table 3 - Number of newborns <1 500 g (N), and perinatal mortality (%)

Country	1982 % (N)	1983 % (N)	1984 % (N)	1985 % (N)	1986 % (N)	1987 % (N)	1988 % (N)
Sweden	25.0 (68)	26.8 (49)	24.1 (83)	34.1 (91)	34.2 (14)	16.3 (129)	20.3 (138)
Norway	63.3 (109)	57.7 (78)	56.5 (69)	42.4 (99)	57.5 (87)	46.4 (97)	47.2 (106)
Denmark	37.2 (78)	33.9 (56)	34.1 (88)	30.8 (65)	23.2 (69)	31.8 (88)	29.5 (78)

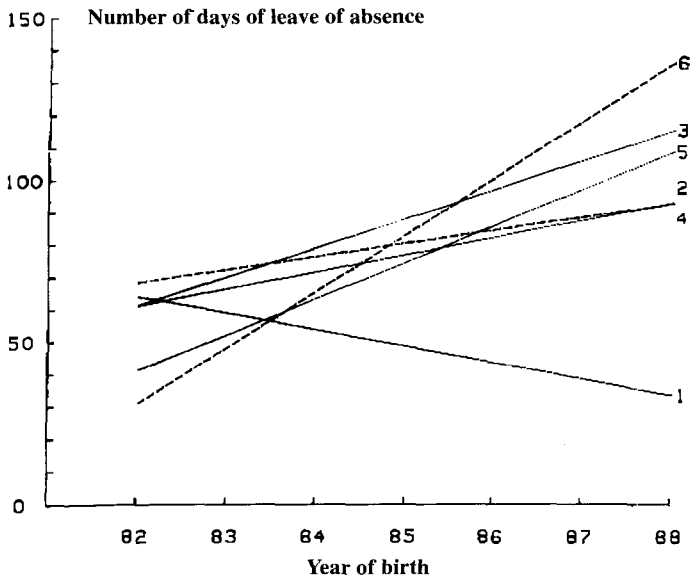


Fig. 1 - Change in leave of absence from work from 1982 to 1988 for the different maternal age groups. Each line represents the calculated regression line. 1 = <20 years, 2 = 20-24 years, 3 = 25-29 years, 4 = 30-34 years, 5 = 35-39 years and 6 = 40+.

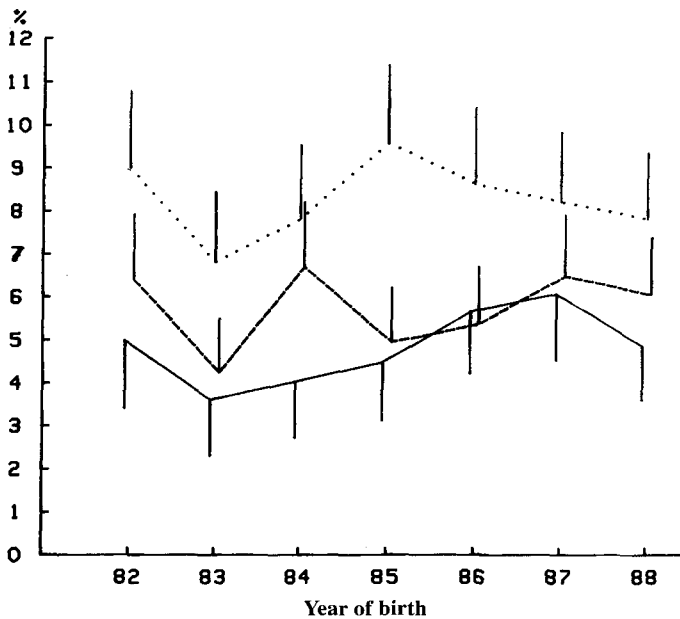


Fig. 2 - Percentage of twins <32 weeks' gestation in Norway (.....), Denmark (-----), and Sweden (——), between 1982 and 1988. 95% confidence interval.

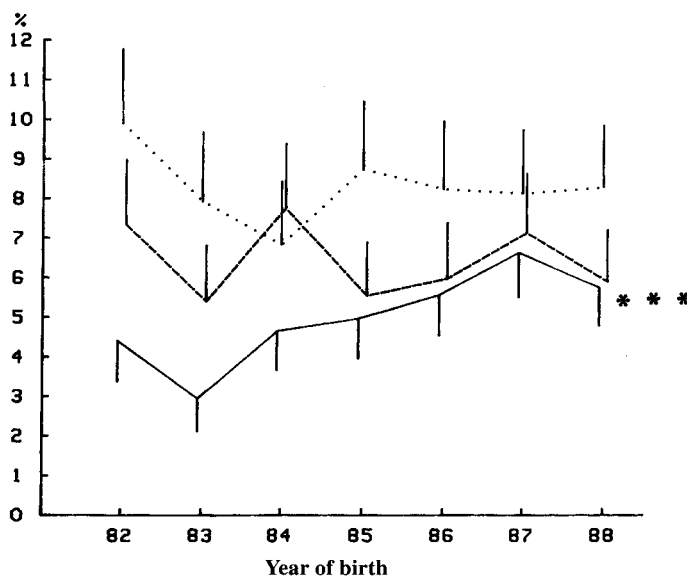


Fig. 3 - Percentage of twins with a birthweight <1,500 g in Norway (.....), Denmark (-----), and Sweden (———), between 1982 and 1988. 95% confidence interval. *** indicates an increase in Sweden $p < 0.001$.

with changes in the incidence of leave of absence. A decreasing perinatal mortality was evident for the corresponding category of twins in Denmark, and for Norway the trend was significant (trend analysis; $\chi^2 = 4.2$; $p = 0.04$).

A trend analysis applied to the incidence figures of pregnancies in Sweden not progressing beyond 32 weeks indicated a non-significant increase from a minimum of 3.6% in 1983 to 6.1% in 1987 (Fig. 2). For the corresponding category of twin pregnancies in Denmark and Norway, no definite tendency was evident.

The incidence of twins weighing <1,500 g in all three countries decreased from 1982 to 1983 (Fig. 3). In Denmark and Norway, no further consistent decrease was seen after 1983, whereas in Sweden a significant increase was then seen from 2.9% to 6.6% in 1987 (trend analysis; $\chi^2 = 20.3$; $p < 0.001$).

DISCUSSION

The purpose of prophylactic leave of absence from work during twin pregnancy is not explicitly defined, although the general assumption is that leave of absence will help to prolong gestation and hence birthweight. However, leave of absence from paid employment might merely mean increased work in one's home, including looking after other, older children [2].

The results of the present study may be used to argue that a 60-70% increase in leave of absence from work did not seem to improve the perinatal prognosis for Swedish twins. Neither did the proportion of twins born before 32 weeks gesta-

tion, nor twins with a birthweight less than 1,500 g decrease. On the contrary, both increased.

However, one explanation for this result may be that the woman who previously aborted, now, because of prophylactic leave of absence, delayed abortion and delivered prematurely. Indeed, improved perinatal care for twin pregnancies could have resulted in livebirths also before the 28th week. With the introduction of obstetric ultrasound during the last decade, twins are most often diagnosed in the first or early second trimester. An early diagnosis may indicate earlier referral to hospitals with neonatal intensive care, thereby also increasing the number of twins with a birthweight <1,500 g, or a short gestational duration.

Perinatal mortality in Sweden changed without any obvious association with the changes seen in the incidence of leave of absence from work. It is also noteworthy that in Norway and Denmark an improvement was seen regarding perinatal mortality. A reduction was also found in these countries in the proportion of twins born before 32 weeks and twins with a birthweight less than 1,500 g. Neither in Norway, Denmark or Sweden is routine hospital care for all twin pregnant women available. In Denmark, sick-leave has been prescribed on an individual basis. It is believed that the majority of twin pregnant women take leave of absence after 24-26 weeks gestation (unpublished information). For Norway, no definite information is available.

It is interesting to find that only a limited number of women (Table 1) were in fact on prophylactic leave of absence in Sweden, even after 1985. This most probably reflects the previous "animosity" that existed between the obstetric profession and the regional insurance offices. Prophylactic leave of absence was not an accepted diagnosis during pregnancy before 1985. Consequently, diagnoses such as *partus prematurus imminens* or cervical insufficiency were incorrectly used. The figures clearly indicate that a misclassification occurred before, but probably also after 1985, when prophylactic leave of absence became legal.

For singleton pregnancy, employment itself does not seem to be a risk factor, though physically strenuous work, prolonged standing or walking, and carrying heavy weights can adversely affect pregnancy outcome [5, 15]. The results of previous studies on singleton pregnancy have even indicated that pregnancy outcome was more favourable among employed women than among housewives [9, 14]. In a recent Finnish study, Myllynen concluded that physically strenuous work is associated with certain pregnancy complications but not with adverse perinatal outcome [10]. On the whole, therefore, evidence from recent research on singleton pregnancy tends to believe in a beneficial rather than an adverse effect of work on pregnancy outcome, as measured by the duration of gestation and birthweight [14].

In the Scandinavian countries, probably few occupations are so arduous as to pose a real threat to a twin pregnant woman and her fetuses. In this context it is important to emphasize that the biological basis and exact mechanism for the onset of labor, term or preterm, are still unknown. Until these circumstances have been elucidated, definite conclusions regarding the most effective (prophylactic) treatment for premature labor in twin (or in singleton) pregnancy, cannot be drawn.

Some factors in the present study may confound the results. It would have been desirable to obtain information on exposure (leave of absence) for the whole population and calculate absence to mortality and morbidity on an individual basis. For practical

reasons this was not possible. It is also conceivable that the information from the Regional Offices was incomplete. We are not in a position to cross-check this with information from other sources. A certain drop-out rate was confirmed, however. For over 11% of sample, all information was lacking and for 5.3% of all periods of leave of absence, data could not be interpreted. It must also be remembered that the lower limit for inclusion in the MBR differs between the three countries. In Sweden the MBR records all twins (infants) from 28 weeks gestation, and only livebirths before 28 weeks gestation. Therefore exact comparison of figures between the three countries is not meaningful. Another confounder may be an increasing number of twin pregnancies because of in vitro fertilisation (IVF) during the study period, with a per se worse prognosis. However, up to 1988, few twin pregnancies resulting from IVF were seen in Sweden (unpublished observation).

The interpretation of non-experimental, observational studies must be conservative and cautious, especially in view of non significant results such as those in the present study. It is evident that for practical reasons some twin-pregnant women have to abstain from work, sometimes simply because the uterus and its contents become burdensome. However, from a scientific, financial and human point of view it would be desirable to know whether leave of absence from work is beneficial, of no value, or might even have deleterious effects such as those found in women prophylactically treated in hospital [8]. A valid way to resolve this issue is to conduct a prospective, randomised study. An interesting hypothesis is to test whether the treatment is of benefit and reduces the perinatal mortality in Sweden for twins whose birthweight is less than 1,500 g. To test this, with $\alpha=0.05$ (the risk of rejecting the hypothesis even though it is true) and $\beta=0.2$ (the risk of accepting the hypothesis even though it is false), and a reduction of more than 5%, from 25% to 20%, the study base would need to include 3,000 twin pregnant women. For ethical and practical reasons we do not believe that it is possible to perform such an investigation in any of the Scandinavian countries.

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