J R Army Med Corps 1990; **136:** 43–49

A Retrospective Study of All Low Birth-Weight Preterm Babies Born in BMH Rinteln Between 1980–1989

Mary E Crowther
MD, MRCOG
Consultant Obstetrician & Gynaecologist
British Military Hospital, Rinteln, BFPO 29

SUMMARY: A retrospective study was undertaken of all preterm babies born in BMH Rinteln between 1980–88 weighing less than 2500g. The total proportion of low birth weight babies was 7% and 58% of these were preterm (454 babies). Sixty per cent of women presented after the spontaneous rupture of membranes or in established labour. Conservative management of ruptured membranes, whilst not leading to life-threatening sepsis, did not significantly prolong pregnancy.

Sixteen percent of the babies were very low birth weight (under 1500g). Delivery of these infants by Caesarean section when presenting by the breech improved survival, although this was not statistically significant. Thirty percent of all babies were delivered by Caesarean section before 36 weeks, reflecting obstetric emergencies in the mother which predisposed to preterm delivery.

Neonatal survival depended on both gestational maturity and birth weight and was not significantly better in babies who were low birth weight for gestational age. These infants however represented 75% of the still-births and congenital abnormalities.

Sixty percent of the mothers smoked and 50% had other identifiable risk factors for preterm delivery; 20% of the multiparous patients had previously experienced a perinatal death, preterm delivery or had a baby with intra-uterine growth retardation. It is suggested that preterm delivery is a significant problem in an Army population despite full employment, adequate housing and comprehensive medical care. Attempts to stop labour are unlikely to be successful. Effort should be made antenatally to identify those women who may be at risk of "idiopathic" preterm labour, as patient education programmes have been shown to decrease the incidence.

Introduction

Premature birth (before the 37th completed week of gestation) occurs in 6–8% of all pregnancies in the UK, but contributes to 70% of all perinatal deaths[1]. In 40% of cases there is no obvious cause; in 30% the pregnancy is electively terminated because of a serious complication such as hypertension; and in 30% there is an obvious cause such as multiple pregnancy or chorio-amnionitis[2]. Certain risk factors have been identified: race[3], extreme youth, low socio-economic status[4], low pre-pregnancy weight and small stature[5], smoking[6], genital infection[7], bleeding early in pregnancy, previous preterm delivery[8] and stress[9]. Attempts to quantify these risks have been successful in identifying over 60% of those destined to deliver preterm[10].

The morbidity associated with the care and survival of preterm babies, particularly those less than 1500g is significant[11,12,13]. The family repercussions of separation from the infant are far-reaching and may consist of poor bonding, neglect and abuse of the child, difficulties in coping if the child is handicapped, and inappropriate grieving should death occur[14].

A retrospective study of preterm birth in BMH Rinteln resulting in babies less than 2500g was therefore undertaken to investigate both epidemiological factors and outcome.

Methods

Data were obtained from the delivery books at BMH Rinteln which recorded all births from the beginning of 1980 to the end of 1988. It was not possible to identify all preterm births from these books as gestation was sometimes recorded incorrectly. Therefore only babies who weighed less than 2.5 kg at birth were included in the study.

The case notes were then obtained to assess whether the baby was genuinely preterm, or a growth retarded baby born after this time. In 31 cases mother's notes could not be found; however, notes on all babies were obtained from the admission books to the Special Care Baby Unit (SCBU), and on all mothers details of the delivery were obtained from the delivery register.

Results

Between 1980–88, 11,029 babies were born in BMH Rinteln, of which 777 (7.0%) weighed between 500–2500g. Of these, 454 (58.4%) were born preterm to 421 mothers. Medical records could not be traced in 31 cases, leaving notes on 420 babies delivered to 390 mothers. Aspects of delivery are shown in Table 1 for each of the 3-year periods of the study.

Table 2 shows that 255 women (60.5%) presented in early or established labour, or following the spontaneous rupture of membranes (SRM). The remainder had some other medical complication which necessitated terminating the pregnancy. Twins (42 pairs) and 1 case of triplets accounted for 10.2% of all cases.

Table 1

Aspects of Preterm Low Birth Weight Deliveries, BMH Rinteln, 1980–88

	1980–2	1983–5	1986–8	Total
All babies born	3880	3873	3276	11,029
All LBW (% of total)	323 (8.3%)	244 (6.3%)	210 (6.4%)	777 (7.0%)
Proportion of LBW babies born preterm	182 (56.3%)	144 (59%)	128 (60.9%)	454 (58.4%)
Preterm twins	14 (8.2%)	12 (8.8%)	17 (14.9%)*	43 (10.2%)
VLBW babies < 1500gm	29 (15.9%)	26 (18.1%)	21 (16.4%)	76 (16.7%)
Breech presentation	25 (14.6%)	24 (17.6%)	28 (24.6%)	77 (16.9%)
Still-births (SB)	11)	7)	9)	27)
Neonatal-deaths (NND)	15) (14.3%)	11) (12.5%)	5) (10.9%)	31) (12.8%)
Caesarean section	39 (22.8%)	28 (20.6%)	49 (42.9%)	116 (27.6%)
Induction of labour	28 (16.4%)	17 (12.5%)	19 (16.7%)	64 (15.2%)
Iatrogenic prematurity	13 (7.1%)	8 (5.5%)	1 (0.7%)	22 (5.2%)

*1 case of triplets

Percentages are given as proportion of all preterm babies or deliveries

Table 2

Aetiological Factors in the Delivery of Preterm Babies, 500–2500 g

Factor	Number	
Premature onset of labour or spontaneous rupture of membranes	255	(60.5%)
Elective Caesarean section (Rhesus disease, abnormal antenatal CTG, suspected IUGR, previous section, scar tenderness, fibroids, suspected fetal abnormality)	14	(3.3%)
Abruption)) APH	15	(3.6%)
Placenta praevia)	13	(3.1%)
Other complications (hypertension, PIH, intra-uterine death, IUGR)	104	(24.7%)
Iatrogenic induction of labour or Caesarean section	20	(4.8%)
	421	(100%)

IUGR = intra-uterine growth retardation
PIH = pregnancy-induced hypertension
CTG = cardiotocograph
APH = antepartum haemorrhage

Iatrogenic prematurity

Twenty-two cases (5.2%) of prematurity resulted from the elective termination of pregnancy calculated from a mistaken gestation. Induction of labour ("logistic" in 16 cases and following SRM in 2 cases) and elective Caesarean section (4 cases) was done after "38" weeks and resulted in the birth of babies 4–6 weeks smaller than calculated. One neonatal death from respiratory distress occurred. Twenty percent of the mothers had not had a scan, although the proportion of women scanned increased from 66% in the years 1980–2, to 96% from 1986–8.

Management of preterm labour

Ritodrine and steroids were used in 58/255 women (22.7%) who presented in spontaneous labour or after SRM. Pulmonary oedema occurred in one case. Premature SRM was managed conservatively in 37 cases (14.5%) and labour was induced or began spontaneously more than 24 hours later in 27 cases. However, the mean gestation was increased from 32.6 weeks on admission to only 32.9 weeks on delivery (range 26–37 weeks). Eight women (21.6%) had positive vaginal swabs for *E.coli* (1), *Klebsiella* (1) or Group B beta-haemolytic *Streptococcus* (8) but no baby died from sepsis.

Very low birth weight babies (VLBW)

Seventy-six women (16.7%) delivered babies weighing less than 1500g. There were 49 vaginal deliveries (64.5%), including 13 still-births. The mean

gestation was 29.9 weeks (range 25–36 weeks), and the mean length of labour 3.7 hours (range 1–12 hours). Caesarean section was performed for fulminating Pregnancy Induced Hypertension (PIH) (8), Antepartum Haemorrhage (APH) (12) and breech presentation or unstable lie (7) in the remaining women.

Management of breech presentation

The outcome of 77 babies (16.9%) presenting by the breech is shown in Table 3. Twenty-five babies (32.5%) were part of a multiple pregnancy, 18 (23.4%) died in utero or soon after birth and six (7.8%) had gross abnormalities. Caesarean section was performed electively in 8 cases for Intrauterine Growth Retardation (IUGR) or breech-breech presentation; for fulminating PIH (6), APH (7), fetal distress (3) and extreme prematurity, unstable lie or footling presentation (8). The figures are too small to show whether Caesarean section improved the survival of VLBW babies, 2 of whom died from respiratory distress and intraventricular haemorrhage, compared with 6 from sepsis and respiratory distress after vaginal delivery. Difficulty in delivery of the fetal head occurred in one case only. It is not clear from the notes why some VLBW babies delivered vaginally, but the average length of the first stage of labour was 4.5 hours (range 40 minutes – 12 hours) and in 3 cases the mother was admitted at full dilatation.

Induction of labour and Caesarean section

Labour was induced non-logistically in 64 women (15.2%) and Caesarean section performed in 116 (27.6%). In over 80% of cases this was necessitated by an acute obstetric emergency (Table 4) and there was one maternal death in a woman with fulminating PIH. Up to the 36th week 29.3% of pregnancies ended in Caesarean section compared with 16.7% in the 37th week (Fig. 1). This was statistically significant ($p < 0.002$). A classical incision was used to deliver VLBW babies (3 cases) and avoid fibroids in the lower segment[1].

Survival

Figures 2 and 3 illustrate survival in relation to fetal weight and gestational age. This was calculated for one month following delivery but includes one baby who died in SCBU 7 weeks after birth from sepsis and coagulopathy.

Table 5 shows the aetiology of all deaths. When birth weights were plotted against Gairdner-Pearson charts used for paediatric assessment, 152 babies (36.2%) were found to be of low birth weight for gestational age (LGA). This was suspected clinically or by ultrasound in 58 cases (43.9%) and forms the basis of another report. Of babies who died in utero or had congenital abnormalities, 75.9% were LGA.

Table 3

Mortality of Infants Presenting by the Breech According to Birth Weight and Mode of Delivery

							Total Live Births	
Weight	**Number**	**(SB)**	**Twins**	**Mean gest. (weeks)**	**Caesarean**	**NND**	**Vaginal**	**NND**	**Sig.**
less than 1501 g	24	(5)	5	29.8	6 (31.6%)	2 (33.3%)	13 (68.4%)	6 (46.2%)	NS
1501–2500 g	53	(1)	20	34.2	29 (55.8%)	2* (6.9%)	23 (44.2%)	2* (8.7%)	NS
Total	77	(6)	25 (32.5%)		35 (45.5%)	4 (11.4%)	36 (54.5%)	8 (22.2%)	NS

SB = Still-birth

Total mortality 23.4% *all 4 with congenital abnomalies + 2 SB with neural tube defects

Table 4

Indications for Induction of Labour and Caesarean Section in Preterm Low Birth Weight Babies

	IOL n = 64	**CS n = 116**
Elective (IUGR, fibroids, breech, previous CS, Rhesus disease, unstable lie, previous SB)		14 (12.1%)
IUGR	10 (15.6%)	
Fulminating PIH	17 (26.6%)	25 (21.6%)
Antepartum haemorrhage	2 (3.1%)	24 (20.7%)
SRM ± infection	14 (21.9%)	4 (3.4%)
Intra-uterine death	21 (32.8%)	
Fetal distress in labour (6 following induction)		21 (18.1%)
Breech presentation, cord prolapse, unstable lie, failure to progress		28 (24.1%)

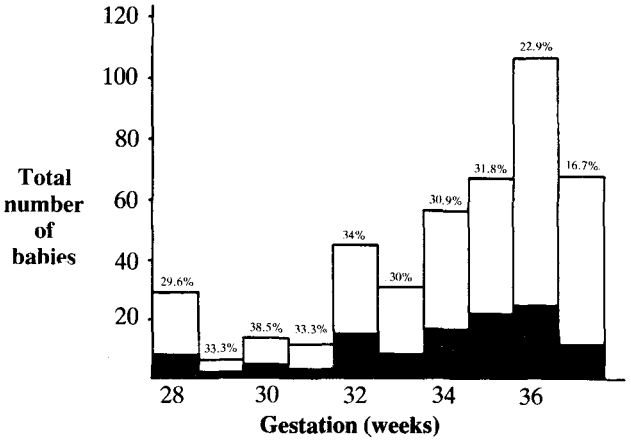

Fig. 1 Caesarean section rate in preterm infants less than 2500g according to gestational age

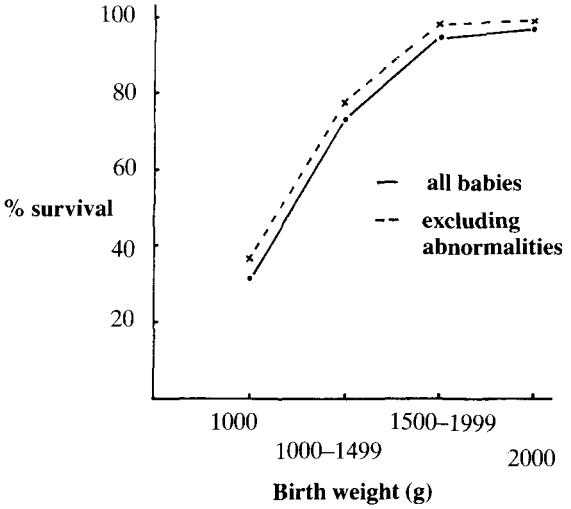

Fig. 2 Survival by birth weight of preterm infants less than 2500g

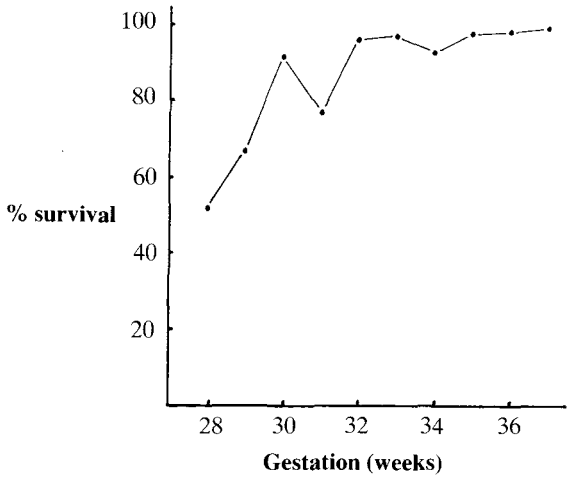

Fig. 3 Survival by gestational age of preterm infants less than 2500g

Table 5

Aetiological Factors in the Mortality of Preterm Infants less than 2500g

Still-births	Number	(proportion LGA)
Intra-uterine death:		
Unknown aetiology	16	(12)
Congenital abnormalities	5	(3)
Abruption	2	(1)
Fulminating PIH	2	—
Intra-partum death:		
Placenta praevia	1	(1)
Congenital abnormality	1	(1)
Total	27	(18)
Neonatal Death		
Congenital abnormalities	10	(9)
Iatrogenic prematurity	1	—
Abruption	4	(1)
Respiratory distress	16	(4)
Total	31	(14)

The survival of LGA babies was similar to that for babies of appropriate weight but the still-birth rate was much higher (Table 6). About 60% of all babies spent more than 6 days in SCBU, but the total length of stay was significantly less for LGA babies.

Table 6

Birth Weight and Gestational Maturity of Still-births and Survivors: Comparison Between Babies Appropriate and Low Birth Weight for Gestational Age

	Appropriate for Gestational Age	Low for Gestational Age	Significance
Still-birth rate	9/302 (2.9%)	18/152 (11.8%)	$p < 0.002$
Mean weight (g)	1748.3 g	1425.6 g	NS
Mean gestation (weeks)	31.8 weeks	34.5 weeks	$P < 0.002$
Survivors			
More than 6 days in SCBU	167/276 (60.5%)	75/120 (62.5%)	
Mean length of stay (days)	26.5 days	18.8 days	$p < 0.001$

Maternal risk factors

Nearly half the mothers in this study were primiparous and of the multiparous women, nearly 20% had previously experienced a preterm delivery, neonatal death or the birth of a LGA infant. Aspects of antenatal health such as smoking and anaemia did not improve significantly during the nine years (Table 7). Nineteen mothers (4.8%) had amniocentesis early in the pregnancy following two raised serum alphafetoprotein estimates (AFP).

Table 7

Identifiable Risk Factors in 390 Mothers Who Delivered Preterm Infants Less Than 2500g

	1980–2	1983–5	1986–8
Scan at any stage	66.2%	84.4%	95.6%
Primiparous	46.8%	50.0%	47.4%
Age less than 20	14.9%	9.0%	10.5%
Smoking	58.4%	51.6%	57.0%
Previous SB, NND, LGA or preterm baby	22.1%	16.4%	17.5%
Height less than 150cm or weight less than 45 kg	11.7%	13.2%	9.6%
Haemoglobin less than 10.5 g/dl.	16.2%	14.7%	22.8%
Breast feeding	29.2%	33.6%	22.8%

Discussion

Between 1980–89, 7.0% of all deliveries in BMH Rinteln resulted in an infant weighing less than 2.5 kg. This compares with the national incidence of 7.21% in 1986 (Office of Population Censuses and Surveys). The proportion of LBW babies in fact fell from 9.1% in 1980 to 6.8% in 1988. Approximately 60% of the babies, or 4.1% of all deliveries, were preterm. This is, however, a retrospective study, and because of inaccuracies in the recording of gestational age, it was necessary to look at an accurate value such as birth weight. The figure of 4.1% therefore underestimates the total number of babies born prematurely in this hospital. In 1988, 8.5% of all deliveries occurred before the 37th completed week of pregnancy.

In most Western countries the incidence of preterm labour is 6–12%[15] and incorporates a significant number of women with risk factors such as race, single motherhood, overt poverty and unemployment[3,4,5,6]. Such factors ostensibly do not exist in the Army population which is predominantly Caucasian and enjoys full employment. However, more subtle associations have been shown between preterm delivery and smoking[6,9], previous preterm delivery[8] and psychological stress in pregnancy[9]. In the latter study, patients were asked about family arguments, death or illness in relatives or friends, worry about the care of children while in hospital, marital conflict, physical violence and debt. Although the relevance of such stresses has been disputed[16], it is the author's subjective impression that many Army wives in Germany suffer one or more of the above stresses, combined with separation from extended family, postings during the pregnancy, and the absence of husbands on exercise.

The aetiological factors involved in preterm delivery in this study are similar to those described elsewhere[2,17]. The proportion of iatrogenically premature babies (5.2%) was greater in the early years when only 66.2% of mothers had a scan compared with over 90% in the

later years. Given the known risks of induction, including preterm delivery[18], it is difficult to defend its use "logistically". Of the 22 babies so delivered, one died from respiratory distress and all the others required intensive neonatal care. The pressure on army obstetricians to "logistically" induce comes from patients and staff alike, in particular when new postings are arranged around the expected time of delivery or if husbands are likely to be on exercise. A further study (Oak, M – unpublished) has also shown that the liberal use of induction would have little influence on the number of women who deliver in local German hospitals.

The conservative management of SRM had little effect and only increased the mean gestational age from 32.6 weeks on admission to 32.9 weeks at delivery. Although there is a risk of infection from this policy, and 21.6% of the cases had positive swabs, none of the babies died from sepsis. Doubt has also been cast on the wisdom of stopping labour with tocolytics after 32 weeks[19,20] other than to allow corticosteroids to be given.

The proportion of VLBW babies in this study was 16.7% and their mortality was 50%. They constituted 0.69% of all births at BMH Rinteln compared with the national figure of 1.05% (OPCS, 1986). The otherwise excellent survival of LBW babies, which is similar to that of the Hammersmith study[19], is a tribute to the neonatal care which they receive. Neonatal rather than perinatal survival was used as it is more realistic for the preterm infant who may well be kept alive by heroic means for longer than the first week of life. It is not clear whether Caesarean section for the VLBW breech baby improves survival, although retrospective studies have shown a decreased risk of asphyxia and intraventricular haemorrhage[21]. Against this must be weighed the morbidity from a classical section (3 cases). How decisions were made with respect to delivery was not clear from the notes, and in many cases labour was far advanced by the time of admission.

The proportion of LGA babies in this study (36.2%) is in keeping with other reports[22]. Seventy five percent of all the babies who died in utero from unknown causes or had congenital anomalies incompatible with life, were LGA. Of these 18 infants, 6 were suspected clinically of being small, but either no further action was taken or ultrasound scans were normal. In 3 cases of neural tube defect, AFP estimations and scans had not been done.

Sixteen infants in the study had lethal abnormalities, and where scans were done all but one showed abnormalities of liquor volume or a small baby. Hence, the finding antenatally of a small baby, either clinically or by ultrasound, should be taken seriously and attempts made to exclude abnormality, for example by high resolution scan or amniocentesis if chromosomal abnormality is suspected. Access to Units with excellent scanning facilities, such as King's College Hospital, is not difficult from Germany. It should also be stressed that 7.8% of the VLBW babies presenting by the breech had congenital abnormalities, and although this is modest compared with other studies[23], emphasizes the need for careful diagnostic tests. Seven of the 16 infants with lethal abnormalities were delivered by Caesarean section for fetal distress, IUGR or breech presentation, and better use of antenatal diagnostic tests might have prevented at least 3 of these (in infants with Potter's syndrome and pulmonary hypoplasia).

It has been shown that babies who are LGA have a better survival than those of appropriate weight[13], but disability and morbidity is greater. This study did not confirm that, but LGA babies spent significantly less time in SCBU, reflecting their greater maturity. Their significantly higher still-birth rate again emphasizes the need for better antenatal diagnosis and action in the face of an abnormal scan. Two patients complained of decreased fetal movements, and scans were abnormal in 4 other cases, where the infant did not have a lethal abnormality. Fear of intervention is based on the risks of prematurity, but these 6 infants had gestational ages between 32–37 weeks, and continued intra-uterine starvation may be more harmful than prematurity.

The cost of preterm delivery is not simply financial; the human suffering associated with a neonatal death, particularly after prolonged resuscitation or neonatal support, is enormous. Infants who survive, especially if very small, may have lifelong neurodevelopmental abnormalities[11,12,13,23]. Separation at birth may predispose to poor relationships between parents and child, neglect and abuse[14]. It therefore behoves us to identify antenatally factors which may predispose to preterm labour, or to act more aggressively when faced with it. The second strategy is not feasible, as labour may be silent and rapid; in this study, the average length of the first stage in VLBW babies was 3.7 hours. Furthermore, prolongation of pregnancy after SRM does not appear to be successful.

Many studies have identified risk factors associated with preterm deliveries[3,4,5,6,7,8,9]. In this study 204 women (52.3%) had at least one suspicious factor such as age under 20 years, small stature, raised AFP level, multiple pregnancy, anaemia or a previous history of a small infant. The high incidence of smoking among these women which did not change over the 9 years of the study, should be a matter of concern, particularly as a prospective study in 1982 in Rinteln pointed out the obstetric dangers of smoking[24]. There is evidence that women in Germany smoke more heavily than in the UK. (Harvey, P – unpublished.)

A program in California has significantly decreased the incidence of preterm labour in a high risk population by intensive antenatal care and patient education to be alert for uterine contractions, backache or vaginal discharge[25]; the other vital aspect of the program was staff training of doctors and nurses. Emphasis was placed on prompt response to patients' complaints of any subtle symptoms, liberal hospitalization and

aggressive treatment of contractions. Patient education is difficult and requires constant reinforcement from both hospital and the medical centres. In theory this is possible, as in the 9 years of the study only 10 women had poor antenatal care. Nevertheless it is this author's impression, on discussion with many women who deliver prematurely or in local German hospitals, that they are given inadequate and inappropriate advice when they contact the medical centre.. This is not surprising, when few general practitioners have post-graduate obstetric experience, and many medical centres have nursing staff who are not trained in midwifery.

The present study has shown that in a population where there is full employment and comprehensive medical care, there is still a relatively high incidence of preterm labour resulting in low birth weight infants. Their excellent survival pays credit to their neonatal care. It is suggested that improvement may only come from patient education and the identification of risk factors, at the booking clinic or during the pregnancy, which predispose to prematurity – smoking, poor nutrition, stress, uterine irritability and a past history of prematurity. A prospective study identifying stresses such as domestic difficulties, and particularly postings during the pregnancy, could be undertaken with discretion. Patient education, however, requires that personnel in medical centres be alert to the subtle symptoms and signs of preterm labour. General practitioners who see pregnant women should have done six months' postgraduate training, and midwives, not general nurses should be available to answer the queries of their patients. Current practice prevents midwives, in those centres fortunate enough to have them, from conducting antenatal clinics and should be reviewed as a matter or urgency. The success of community antenatal care in the UK relies on community midwives who know their patients and their domestic situation, and there is an even stronger case for such a model of care in Germany, given the large distances between medical centres and BMH Rinteln, and the isolation of many young mothers during the course of their pregnancy.

REFERENCES

1. FUCHS F. Prevention of prematurity. *Am J Obstet Gynecol* 1976; **126**: 809–20.
2. RUSH R W, *et al.* Contribution of preterm delivery to perinatal mortality. *Br Med J* 1976; **2**: 965–8.
3. LIEBERMAN E, *et al.* Risk factors accounting for racial differences in the rate of premature birth. *N Engl J Med* 1987; **317**: 743–8.
4. STEIN A, *et al.* Social adversity, low birth weight, and preterm delivery. *Br Med J* 1987; **295**: 291–3.
5. FEDRICK J and ANDERSON A B M. Factors associated with spontaneous preterm birth. *Br J Obstet Gynaecol* 1976; **83**: 342–50.
6. KLEINMAN J C and MADANS J H. The effects of maternal smoking, physical stature, and educational attainment on the incidence of low birth weight. *Am J Epidemiol* 1985; **121**: 843–55.
7. NAEYE, R L. Coitus and associated amniotic-fluid infections. *New Engl J Med* 1979; **301**: 1198–1200.
8. CARR-HILL R A and HALL M H. The repetition of spontaneous preterm birth. *Br J Obstet Gynaecol* 1985; **92**: 921–28.
9. NEWTON R W and HUNT L P. Psychosocial stress in pregnancy and its relation to low birth weight. *Br Med J* 1984; **288**: 1191–4.
10. CREASY R K, GUMMER B A and LIGGINS G C. System for predicting spontaneous preterm birth. *Obstet Gynecol* 1980; **55**: 692–5.
11. NICKEL R E, BENNETT F C and LAMSON F N. School performance of children with birth weights of 1000g or less. *Am J Dis Child* 1982; **136**: 105–110.
12. MARLOW N, D'SOUZA S W and CHISWICK M L. Neurodevelopmental outcome in babies weighing less than 2001g at birth. *Br Med J* 1987; **294**: 1582–6.
13. YU V Y H, *et al.* Outcome of extremely-low-birthweight infants. *Br J Obstet Gynaecol* 1986; **93**: 162–70.
14. KLEIN M and STERN L. Low birth weight and the battered child syndrome. *Am J Dis Child 1971;* **122**: 15–18.
15. PEARCE J M. Management of preterm labour. In, STUDD J. (Ed) The Management of Labour. Blackwell Scientific, Oxford, 1985. Ch. **4**: 40–67.
16. OMER H, *et al.* Life stresses and premature labour: real connection or artefactual findings? *Psychosom Med* 1986; **48**: 362–9.
17. MEIS P J, ERNEST J M and MOORE M L. Causes of low birth weight births in public and private patients. *Am J Obstet Gynecol* 1987; **156**: 1165–8.
18. LEWINS M J, WHITFIELD J M and CHANCE G W. Neonatal respiratory distress: potential for prevention. *Can Med Assoc J* 1979;**120**: 1076–80.
19. LAMONT R F, *et al.* Spontaneous preterm labour and delivery at under 34 weeks' gestation. *Br Med J* 1983; **286**: 454–7.
20. KING J F, *et al.* Beta-mimetics in preterm labour: an overview of the randomized controlled trials. *Br J Obstet Gynaecol* 1988; **95**: 211–22.
21. STEEL S A and PEARCE M. Delivery of the very low birthweight baby. *Br J Hosp Med* 1986; **38**: 328–334.
22. SECHER N J, *et al.* Growth retardation in preterm infants. *Br J Obstet Gynaecol* 1987; **94**: 115–120.
23. NISELL H, BISTOLETT P and PALME C. Preterm breech delivery. Early and late complications. *Acta Obstet Gynaecol Scand* 1981; **60**: 363–6.
24. YOUNG K R. Effect on birth weight of smoking in pregnancy. *J R Army Med Corps* 1983; **129**: 101–3.
25. HERRON M A, KATZ M and CREASY R K. Evaluation of a preterm birth prevention program: preliminary report. *Obstet Gynecol* 1982; **59**: 452–6.

JRAMC

A Retrospective Study of All Low Birth-Weight Preterm Babies Born in BMH Rinteln Between 1980–1989

E Crowther

J R Army Med Corps 1990 136: 43-49
doi: 10.1136/jramc-136-01-07

Notes