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ORIGINAL ARTICLE

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A retrospective study of unplanned out-of-hospital deliveries

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Abstract Our objective was to determine maternal characteristics and perinatal outcome of unplanned unattended deliveries en route to the hospital in comparison to unplanned deliveries attended by medical personnel within the parking facility of the hospital. All singleton deliveries occurring between 1988 and 1999 were analyzed from the computerized perinatal database. Maternal characteristics and pregnancy outcome of unattended, unplanned out-of-hospital births were compared with unplanned deliveries in the hospital parking lot, with the assistance of medical personnel. Out of 2328 out-of-hospital deliveries, 5.7% (n=133) were managed by medical personnel in the parking lot and 94.3% (n=2195) occurred en route to the hospital. The birth weight of newborns from the attended out-of-hospital delivery group was significantly higher than the comparison group (3126.2±516 g vs. 3019±522 g; P=0.023). A significant linear association was found between birth weight and attended out-of-hospital births (Mantel-Haenszel test for linear association; P=0.002). Moreover, these newborns were significantly more likely to be large for gestational age (OR=2.2, 95% CI 1.2–3.9; P=0.004). Parturients who delivered in the parking lot with the assistance of medical personnel, had significantly higher rates of grade 2 perineal tears (OR=8.4, 95% CI 1.1–5.4; P=0.041). Perinatal mortality was non-significantly higher among attended out-of-hospital deliveries (OR=2.8, 95% CI 0.8–8.3; P=0.279) as compared to unattended out-of-hospital deliveries. The attendance of medical personnel in unplanned out-of-hospital deliveries did not influence the birth outcome.

Keywords Unplanned out-of-hospital delivery · Unattended delivery · Perinatal mortality · Large-for-gestational age

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Introduction

Several studies stated that planned out-of-hospital deliveries attended by certified personnel might be as safe as in hospital deliveries [6, 9]. However, unplanned, unattended and out-of-hospital deliveries carry an increased risk of perinatal morbidity and mortality [1, 2, 3, 4, 7, 8, 12, 17, 18, 19].

The purpose of our study was to determine maternal characteristics and perinatal outcome of unattended deliveries en route to the hospital and to compare them with those attended by medical personnel in the hospital parking lot.

Materials and methods

All computerized records of singleton unplanned, unattended out-of-hospital deliveries at the Soroka University Medical Center between 1988–1999 were compared with singleton births occurring in the hospital parking lot, with the assistance of medical personnel. Our institution is the sole hospital in the Negev region, in the southern part of Israel and therefore contains almost the entire obstetric population, consisting of approximately 12,000 deliveries annually.

Data were retrieved from the perinatal database. This database consists of information recorded immediately after delivery by an obstetrician, and is reviewed routinely for accuracy and completeness before entry into the database. The unplanned births that occurred within the hospital parking lot were attended by a midwife equipped with the sterilized birth kit used within the delivery room itself. In those cases of suspected pathology, additional staff were alerted and on hand for continuing emergency care.

Demographic and clinical characteristics collected included ethnicity (Jewish or Bedouin Arabs), family status, maternal age, gravidity and parity, gestational age, birth weight, large for gestat-

ional age (birth weight above the 90th percentile for gestations age and sex using local standards of the Jewish and Bedouins [10]) and small for gestational age (birth weight below the 10th percentile using the same local standards).

The following obstetrical risk factors were evaluated: previous cesarean section (CS), previous perinatal death, chronic hypertension, pregnancy induced hypertension (PIH) and gestational diabetes mellitus. Pregnancy induced hypertension was defined according to Davey and MacGillivary [5]. Patients were defined as having gestational diabetes according to the modified White classification [20].

The following pregnancy and labor complications and birth outcomes were assessed: non-vertex presentations, perineal tears, perinatal mortality, congenital malformations (including structural and chromosomal abnormalities), post-partum hemorrhage, anemia (hemoglobin level <10 mg/dL), neonatal blood transfusion and delayed maternal hospital discharge (more than 3 days after vaginal delivery or 5 days after CS).

Statistical analysis was performed with the SPSS package (SPSS, Chicago, IL). To test the statistical significance of the categorical variables the chi square test, or Fisher's exact test were used as appropriate. The Mantel-Haenszel test for linear association was used for linear correlation between attended and unattended out-of-hospital deliveries and selected risk factors. Odds ratios (OR) and their 95% confidence interval (CI) were calculated using the Mantel-Haenszel technique and a P value of <0.05 was considered statistically significant.

Results

Out of 2328 unplanned out-of-hospital deliveries, 5.7% (133) were managed by medical personnel in the hospital parking lot and 94.3% (2195) occurred en route to the hospital. Table 1 compares demographic and clinical characteristics of attended and unattended out-of-hospital deliveries. Parturients delivered in the parking lot were less likely to be grand-multiparous in comparison to those delivered en route to the hospital. The mean birth weight of the newborn in the attended out-of-hospital delivery group was significantly higher than the comparison group (3126.2±516 g vs. 3019±522 g; P=0.023). A significant linear association was found between birth weight and attended out-of-hospital births (Mantel-Haenszel test for linear association P=0.002). Indeed, out-of-hospital newborns were significantly more likely to be large for gestational age (OR=2.2, 95% CI 1.2–3.9; P=0.004).

Table 2 presents obstetric risk factors for both groups. Pregnancy and labor complications of patients delivered in the hospital parking lot are compared with complications in unattended out-of-hospital deliveries (Table 3). Parturients delivered in the parking lot had significantly higher rates of grade 2 perineal tears (OR=8.4, 95% CI 1.1–5.4; P=0.041). Perinatal mortality was non-significantly higher among attended out-of-hospital deliveries as compared to unattended out-of-hospital deliveries (3.0% vs. 1.1%, respectively; OR=2.8, 95% CI 0.8–8.3; P=0.279).

Since the birth weight of newborn from the attended out-of-hospital delivery group was significantly higher than the comparison group, we investigated perinatal mortality adjusted for birth weight. There was no mortality in the low birth weight newborn (birth weight less than 1500 g) of attended out-of-hospital delivery group. Moreover, all the macrosomic newborn (birth weight above 4000 g) survived.

Table 1 Characteristics of patients delivered out-of-hospital

Characteristics		Attended out-of-hospital (n=133)	Unattended out-of-hospital (n=2195)	P
Ethnicity	Jewish	27 (20.3%)	468 (21.3%)	
	Bedouins	106 (79.7%)	1727 (78.7%)	0.780
Marriage status	Married	133 (100%)	2185 (99.5%)	
	Not married	0	10 (0.5%)	0.737
Maternal age (years)	<20	7 (5.3%)	95 (4.3)	
	20–34	108 (81.2%)	1729 (78.8%)	
	≥35	18 (13.5%)	371 (16.9%)	0.549
Gravidity	1	3 (2.2%)	85 (3.9%)	
	2–4	71 (53.4%)	978 (44.5%)	
	≥5	59 (44.4%)	1132 (51.6%)	0.115
Parity	1	3 (2.3%)	87 (4.0%)	
	2–4	80 (60.1%)	1042 (47.4%)	
	≥5	50 (37.6%)	1066 (48.6%)	0.015
Gestational age (weeks)	<28	2 (1.5%)	6 (0.3%)	
	28–32	0	34 (1.5%)	
	33–36	9 (6.8%)	158 (7.2%)	
	37–42	118 (88.7%)	1923 (87.6%)	
	>42	4 (3.0%)	74 (3.4%)	0.103
Birth weight (g)	<1500	0	29 (1.3%)	
	1500–2499	7 (5.3%)	261 (11.9%)	
	2500–3999	118 (88.7%)	1859 (84.7%)	
	4000+	8 (6.0%)	46 (2.1%)	0.022
Small for gestational age		9 (6.8%)	224 (10.2%)	0.199
Large for gestational age		16 (12.0%)	129 (5.9%)	0.004

Data are presented as numbers and percentages

Table 2 Risk factors in patients delivered out-of-hospital. *CS* cesarean section; *PIH* pregnancy induced hypertension; *GDM* gestational diabetes mellitus

Characteristics	Attended out-of-hospital (*n*=133)	Unattended out-of-hospital (*n*=2195)	*P*
Previous CS	7 (5.3%)	117 (5.3%)	0.973
Previous perinatal death	4 (3.0%)	123 (5.6%)	0.200
Mild PIH	1 (0.8%)	15 (0.7%)	0.926
Severe PIH	0	3 (0.1%)	0.669
Chronic hypertension	0	20 (0.9%)	0.268
GDM A1	4 (3.0%)	41 (1.9%)	0.353
GDM A2	0	7 (0.3%)	0.514

Data are presented as numbers and percentages

Table 3 Pregnancy and labor complications of patients delivered out-of-hospital

Characteristics	Attended out-of-hospital (*n*=133)	Unattended out-of-hospital (*n*=2195)	*P*
Non-vertex presentations	2 (1.5%)	11 (0.5%)	0.167
Perineal tear 1	24 (18.0%)	411 (18.7%)	0.845
Perineal tear 2	2 (1.5%)	4 (0.2%)	0.041
Perineal tear 3–4	1 (0.8%)	3 (0.1%)	0.209
Cervical tear	1 (0.8%)	3 (0.1%)	0.209
Perinatal mortality	4 (3.0%)	25 (1.1%)	0.279
Maternal hemoglobin <10 mg/dL	17 (12.8%)	333 (15.2%)	0.454
Maternal blood transfusion	1 (0.8%)	24 (1.1%)	0.710
Congenital malformations	4 (3.0%)	67 (3.1%)	0.977
Post-partum hemorrhage	0	2 (0.1%)	0.727
Delayed discharge from hospital	45 (34.4%)	866 (40.0%)	0.199

Data are presented as numbers and percentages

Discussion

Our study of unattended and attended out-of-hospital deliveries found that the latter group had a statistically significant higher rate of perineal tears (grade 2), and a non-statistically significant higher rate of perinatal mortality.

The study population consisted mainly of Bedouin Arabs (approximately 80%) who are traditional religious people who attribute great importance to familial and tribal cohesiveness and to fertility [11, 14, 15, 16]. The Bedouins generally live in small communities scattered throughout the desert. Bedouins traditionally live as nomadic tribes, but in the last few decades they have adopted a more urbanized way of life [11]. However, many still live in remote villages and have objective problems of access due to absence of appropriate available transportation. There are also certain cultural barriers and some distrust in the modern medical system so that many women delay their arrival in hospital.

The elimination of unplanned out-of-hospital in the US has been cited as an explicit national health goal [13]. In this study the attendance of medical personnel in accidental out-of-hospital deliveries did not improve outcome.

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