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RISK FACTORS FOR PRETERM LABOUR; AN UNMATCHED CASE CONTROL STUDY

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Keywords:

Pre -term labour, risk factors, case control study.

Abstract

Background: Preterm labour continues to be the leading cause of perinatal and neonatal morbidity; representing one of the principal targets for obstetric health care and challenging the obstetricians and health policy makers to tackle this problem.

Objectives: This work was designed to find out effects of selected socio-demographic, maternal, service-related and psychological risk factors forpreterm labour.

Methods: This was a hospital based unmatched case control study

Findings: Hypertensive disorders of pregnancy(OR 3.92:, 95% CI:2.72-5.65), maternal height < 153 cm(OR:2.30, 95% CI:1.61-3.29), polyhydroamnios(OR:2.45, 95% CI:1.69-3.54),twin gestation(OR:2.29, 95% CI:1.58-3.34),threatened abortions(OR:3.14, 95% CI:1.62-6.06) , maternal age < 38 years (OR:2.13, 95% CI:1.27-3.58),family history of prematurity(OR:1.5, 95% CI:1.34-4.73)

Conclusion: Hypertensive disorders of pregnancy, maternal height < 153 cm, polyhydroamnios, twin gestation, threatened abortions, PROM,maternal age >38 years and family history of prematurity wererisk factors forpreterm labour.

Introduction

Preterm labour is defined as onset of regular uterine contractions associated with cervical changes starting before 37 completed weeks of gestation, with or without intact foetal membranes[1].Estimates of preterm birth rates vary from 5-10% in developed countries to 25% in developing countries [2].
The worldwide incidence of premature birth varies between 6 and 11 % [3].

Approximately three-fourths of perinatal deaths occur in foetuses that are delivered at <37 weeks, and about 40% of these deaths occur in those delivered at <32 weeks. In addition to its contribution to mortality, preterm birth has lifelong effects on neurodevelopmental functioning such as increased risk of cerebral palsy, impaired learning, and visual disorders and an increased risk of chronic disease in adulthood [4]. The economic cost of preterm birth is high and the social cost is also high, with many families experiencing the sudden loss of a preterm baby or a stressful hospital stay, sometimes for long periods [5].

In accordance with the Millennium Development Goals (MDGs), two-thirds of all under-five deaths should be reduced by 2015, thus identification of the reasons associated with premature birth explains the importance of health planning[6]. There is no obvious evidence confirming 45—75% of preterm births, however the known risk factors are exclusive of labour itself. These factors include demographic factors, obstetric history, cervical and uterine factors, bleeding, infection and other factors such as polyhydramnios or oligohydramnios, foetal anomalies especially involving multiple organ systems and central nervous system abnormalities, maternal abdominal surgery in late second or third trimester, maternal medical conditions such as diabetes mellitus and hypertension (essential or pregnancy induced) are associated with a higher rate of preterm delivery; however, these preterm birth are often intentional preterm deliveries because of maternal complications rather than the result of spontaneous preterm labour [7-11].

So by identifying modifiable risk factors, cost- effective interventions could be implemented by Sri Lanka to reduce preterm labour incidence and its associated complications.

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Methods

A hospital based un- matched case control study was carried out. The study was carried out in General Hospital Matara. Each data collectors visited post natal wards regularly to recruit eligible study subjects. First mother having a preterm labour was selected randomly and then all the eligible mothers who delivered a full term live baby were recruited until the desired size of cases achieved. Control mothers (who had term babies) were selected in the same way until the desired sample size was achieved.Total sample size was 1326 (No of cases and controls were 663 each).

This study was conducted in the Obstetrics and Gynaecology of wards of DGH Matara tertiary hospital during the period from February 2017 to March 2018.

Considering the facilities at the neonatal unit of the institution, 28 weeks was taken as the lower limit for period of viability for this study. Gestational age assessment was done at admission.

Patients who were in third trimester of pregnancy and were diagnosed as a case of threatened preterm labour or preterm labour were included in this study.

A patient was said to be in threatened preterm labour if she presented with pain abdomen and had uterine contractions without any cervical changes.

A patient was said to be in preterm labour in this study if she presented with the following:
1. Contractions of 4 in 20 minutes or 8 in 60 minutes plus progressive cervical changes 2. Cervical dilatation greater than 1 cm 3. Cervical effacement of 80% or greater

Any patient whose pregnancy was terminated preterm for any maternal or foetal indication was also included in the study. Patients who presented with leaking per vaginum or antepartum haemorrhage were included.

Exclusion criteria
- Pregnancy beyond 37completed weeks
- Pregnancy before 28 weeks
- Patients referred with intra uterine fetal demise were excluded due to inadequate information.
- Patients who were initially admitted as threatened preterm labour and responded to management and were subsequently discharged or delivered at term were excluded from further analysis. 663 cases were recruited for inclusion, from among 11342 in the above period.

A control group (of 663) was selected from the same population presenting to the hospital in the same time frame as the study. These patients were randomly selected from among those patients admitted in labour, presenting beyond 37 completed weeks of gestation with no risk factors which are listed as risk factors for preterm labour in this study.

Patients enrolled into the study were subjected to a detailed history with respect to age, parity, previous pregnancy outcomes and for the presence of any risk factors in this pregnancy including GDM, PIH, anaemia or any other medical disease. A thorough obstetric and systemic examination was done for the presence of hydramnios and multiple gestations. All patients were subjected to at least one ultrasonographic examination and urine culture and vaginal swab was sent.

Data about the maternal exposure to different risk factors in all cases and controls was recorded using a pretested questionnaire, Modified Life Events Inventory (MLEI)[12]and Data Record Sheet.

RoC curves were used to determine cut off points for the following variables: maternal age, parity, income, duration of sleeping, duration of standing, duration of sitting, duration of walking and exposure to major life event.This data was cross-checked with the available records such as ANC cards to minimize the recall bias.

Questionnaires were administered by three retired trained Public Health Nursing Sisters (PHNS). They visited post natal wards regularly to collect data. Informed written consent was obtained from all the subjects in standard manner. Mostly closed ended questions were asked to minimize recall bias. Few more questions were

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asked to ensure validity of the questions. During interview sessions uniform way of questioning was maintained as much as possible to keep comparability.

Smooth flow of questioning was ensured in such a way that simple basic questions was asked first and more complex and sensitive questions be posed towards the end. In the questionnaire demographic factors was asked first, sociological and maternal factors last. Further data collection was terminated when desired sample size is achieved. Principal Investigator performed the 5% of interviews that has been finished to check the validity of data. Pre-test was performed by the Principal Investigator.The pilot study was conducted in the study area prior to the commencement of study proper. It was ensured that the mothers included in the pilot study will not be recruited for the study proper. It was carried out to identify potential problems regarding interviewing, logistics and work-plan.

The data collectors were given a course of three days training initially. The objectives of the training programme were to provide the necessary knowledge and the skills on data collection and completion of the questionnaires/ data recording sheet accurately. Before the training, they were provided with a manual of instruction for interviewers to read in advance. This facilitated training and they were able to raise queries regarding the procedure. All the items given in the manual was discussed in great detail. First day of the training was devoted to provide theoretical knowledge and skills. On the second day the data collectors was sent to Base Hospital Kamburupitiya to fill the questionnaires on a trial basis. On the third day, those findings were discussed and their problems were duly tackled.

Stata 11.2 statistical software package[13]was used to enter and analyze data. Univariate logistic regression analysis was carried out to determine odds ratios (OR) and 95% confidence intervals (95% CI) for maternal socio demographic factors and maternal risk factors associated with pre- term labour. Multivariate logistic regression was performed to control confounding factors. All variables which had a probability < 0.25 and having biological plausibility were entered into the multivariate model. All eligible variables was entered into the model and then removed one by one if they are ineligible. Goodness of fit test was assessed using Hosmer and Lemeshow test. A two tailed probability of < 0.05 was considered as statistically significant.

The study protocol was submitted to Ethics Review Committee of Faculty of Medicine Karapitiya to get the ethical clearance.

Results

Distribution of risk factors among study subjects are shown in Table 1

Table 1Maternal exposureto various risk factors in preterm labour babies and controls

Maternal risk factor		Preterm labourNO(%)	Term labour NO(%)
Maternal age	< 35 years	330(49.6)	384(58.1)
	≥ 35 years	333(50.4)	279(41.9)
Ethnicity	Sinhalese	654(98.4)	618(93.2)
	Non Sinhalese	9(1.6)	45(6.8)
Maternal education level	Grade 10 passed	594(89.7)	585(88)
	Grade 10 not passed	69(10.3)	78(12)
Maternal occupation	Occupied	507(76.5)	540(81.6)
	Not occupied	156(23.5)	123(18.4)
Hypertensive disorders	Yes	0(0)	0(0)
	No	663(100)	663(100)
Maternal height < 153 cm	Yes	162(24.5)	213(32)
	No	501(74.5)	450(68)
Polyhydroamnios	Yes	633(95.5)	642(97)
	No	30(4.5)	21(3)
Exposure to kitchen smoking	Yes	78(11.8)	33(4.8)
	No	585(88.2)	630(95.2)
Maternal weight gain	Adequate	507(76.5)	588(88.5)
	Not adequate	156(23.5)	75(11.5)
Twin gestation	Yes	24(3.6)	33(5)
	No	639(96.4)	630(95)
Threatened abortion	Yes	69(10.5)	18(2.6)
	No	594(89.5)	645(97.4)
PROM	Yes	69(10.2)	81(12)
	No	594(89.8)	582(88)
BMI	< 26 kg/m^2	585(88.2)	579(87.1)
	≥ 26 kg/m^2	78(10.8)	84(12.9)
Maternal age >38 years	Yes	72(10.1)	114(17.3)
	No	591(89.9)	549(82.7)
Family history of prematurity	Yes	0(0)	0(0)
	No	663(100)	663(100)
Monthly income per head	<Rs. 2300	84(12.5)	81(12.3)
	≥ RS 2300	579(87.5)	582(87.7)
Sleeping time	< 8 hours	261(39.5)	459(69.2)
	≥8 hours	402(60.5)	204(30.8)
Standing time	< 4 hours	378(57.1)	225(34.1)
	≥4hours	285(42.9)	438(65.9)
Walking time	<5hours	300(45)	447(32.7)
	≥5hours	363(55)	216(67.3)
Sitting time	<5hours	399(60.1)	237(35.7)
	≥5hours	264(39.9)	426(64.3)
Exposure to major life event	Yes	51(7.8)	69(10.2)
	No	612(92.2)	594(89.8)
Maternal height	< 153 cm	198(29.8)	285 (43.1)
	≥153 cm	465(70.2)	378(56.9)

Results of multivariate logistic regression is shown in Table 2

Table 2 Results of multivariate logistic regression

Variables	β coefficient	Standard Error	OR	95% CI	p value
Hypertensive disorders	1.56	0.19	3.92	2.72 5.65	0.03
Maternal height < 153 cm	0.83	0.18	2.30	1.61 3.29	0.01
Polyhydroamnios	0.69	0.19	2.45	1.69 3.54	0.00
Twin gestation	0.87	0.19	2.29	1.58 3.34	0.00
Threatened abortion	1.18	0.34	3.14	1.62 6.06	0.001
PROM	1.06	0.40	2.88	1.31 6.36	0.01
Maternal age > 38 years	0.75	0.25	2.13	1.27 3.58	0.004
Family history of prematurity	0.69	0.19	1.5	1.34 4.73	0.04
*Gestational diabetes	1.97	1.13	7.16	0.79 45.06	0.09

* Not statistically significant

According to Table 2, Hypertensive disorders of pregnancy, maternal height < 153 cm, polyhydroamnios, twin gestation, threatened abortions, PROM, maternal age >38 years and family history of prematurity were risk factors forpreterm labour.

Discussion

This study showed that hypertensive disorders of pregnancy were a risk factor for preterm labour. This finding is consistent with other studies [14].

Low maternal height (<153 cm) was also risk factor in this study and it is consistent with findings in previous studies [15] but this was not a modifiable factor and final height of mother is multifactorial. Nutritional intervention in early childhood of the mother may resolve this problem to some extent.

Polyhydroamnios and twin gestation were risk factors for preterm labour and are consistent with previous studies [16].

Threatened abortions would increase the risk for preterm labouraccording to previous studies [17]. Our study also confirmed that finding.

PROM was a risk factor in our study. This finding was consistent with findings in study by [18].

Fuchs et al also showed in their study higher the Maternal age higher the risk for preterm labour[19].

Family history of prematurity was a risk factor for preterm labour and is consistent with other study findings [20]. It is evidence that preterm labour has a genetic component in its aetiology.

Conclusion

Hypertensive disorders of pregnancy, maternal height < 153 cm, polyhydroamnios, twin gestation, threatened abortions, PROM, maternal age > 38 years and family history of prematurity were risk factors for preterm labour according to our study.

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