

Prolonged Labour in Rural Ethiopia: A Community-Based Study

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ABSTRACT

Obstructed or prolonged labour is one of the major causes of maternal death, and it is associated with poor child survival in developing countries. The aim of this study was to determine the risk factors for, and outcome of, prolonged labour among rural women giving birth at home. A prospective community-based study of pregnant women in rural communities of south central Ethiopia was conducted using lay female interviewers. Labour of more than 24 hours was observed in 181 (14.7%) women, 17.2 per cent among primipara and 14.2 per cent among multipara. The incidence rates of poor pregnancy outcome were stillbirth (19/1000 births), perinatal mortality (45/1000 births) and neonatal mortality (37/1000 live births). Poor birth outcomes were higher among women with labour > 24 hours than for women with labour < 12 hours. Among primipara, stillbirth [RR 2.21, (95% CI 0.89, 5.52)], perinatal mortality [RR 3.10; (95% CI 1.84, 5.23)] and neonatal mortality [RR 3.10, (95% CI 1.70, 5.65)]. Among multipara, stillbirth [RR 2.15; (95% CI 0.95, 4.85)], perinatal mortality [RR 4.03; (95% CI 2.86, 6.06)], and neonatal mortality [RR 4.61; (95% CI 3.20, 6.63)]. Also, 36.7% of all perinatal deaths among primiparas and 16.7% among multiparas were associated with prolonged labour. Maternal height and low birth weight were associated with prolonged labour among primipara. Prolonged labour is a serious reproductive health problem contributing significantly to the risk of perinatal death. (*Afr J Reprod Health* 1999; 3(2):33-39)

RÉSUMÉ

L'accouchement prolongé en Ethiopie rurale: une étude basée sur la communauté. L'accouchement obstrué ou prolongé est une des causes principales de la mortalité maternelle et elle est associée à une mauvaise qualité de la survie de l'enfant dans les pays en voie de développement. Cette étude avait comme tche de déterminer les facteurs à risque ainsi que les conséquences de l'accouchement prolongé chez les femmes rurales qui accouchent à la maison. Une étude perspective sur les femmes enceintes dans les communautés de l'Ethiopie du sud-centre a été menée en servant des enquêteuses laïques. L'incidence d'accouchement qui durait plus de 24 heures a été observée chez 181 (14,7%) femmes, 17,2% parmi les primipares et 14,2% parmi les multipares. Les taux de fréquence du mauvais résultat de la grossesse étaient la mortinatalité (19/1000 naissances), la mortalité prénatale (45/1000 naissances) et la mortalité néonatale (37/1000 naissances vivantes). Les incidences de mauvais accouchements étaient plus élevées parmi les femmes qui ont eu un accouchement de plus de 24 heures que parmi celles dont l'accouchement durait moins de 12 heures. Parmi les primipares on a constaté la mortinatalité [(RR 2,21 (95% CI 0,89, 5,52)), la mortalité prénatale [RR3,10: (95% CI 1,84, 5,23)] et la mortalité néonatale [RR3,10: (95% CI 1, 70, 5, 65)]. Parmi les multipares, on a noté la mortinatalité [RR 2, 15: (95% CI 4, 61 (95% CI 3,20, 6,63)]. La taille maternelle et le faible poids de naissance ont été liées à l'accouchement prolongé parmi les primipares. L'accouchement prolongé est un problème important de la santé reproductive qui contribue d'une manière significative au risque de la mortalité prénatale. (*Rev Afr Santé Reprod* 1999:3(2):33-39)

KEY WORDS: Labour, foetal death, home, childbirth, rural population, Ethiopia

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Introduction

Prolonged labour in developing countries occurs mainly due to cephalopelvic disproportion. Other causes include inefficient uterine action and abnormal foetal presentation.^{1,2} Primipara women experience prolonged labour more often than multipara women.¹ In poor countries, prolonged labour contributes significantly to maternal and perinatal morbidity and mortality.³⁻⁶ Prolonged obstructed labour and ruptured uterus may account for 70% of all maternal deaths,¹ and 7-15% of perinatal mortality has been attributed to obstructed labour.⁷ Vesico-vaginal fistula, a severe consequence of prolonged labour, occurs at a rate of 55-80 per 100,000 live births in developing countries.^{6,8}

The occurrence of distorted and/or small pelvis resulting from stunted growth, due to severe childhood malnutrition, is a major cause of cephalopelvic disproportion. Early childbearing accentuates the risk of disproportion if pregnancy occurs before completion of a woman's growth. For these reasons maternal height has been considered as a predictor of outcome and complications of delivery.^{9,10}

In sub-Saharan Africa, studies carried out to assess the outcome of pregnancy are mainly hospital-based and located in urban centers.^{7,11,12} However, a majority of births occur at home without the assistance of trained personnel.¹ This community-based study was carried out with the objective of determining the risk factors and outcome of prolonged labour among rural women giving birth at home.

Subjects and Methods

The study was undertaken in nine rural villages around Butajira town in south central Ethiopia. The furthest village is about 20km from Butajira. There is no public transport to any of these villages. People living in these villages often come to the town on foot or mule/horse. The population in the nine villages has been under continuous demographic surveillance by the Butajira Rural Health Project (BRHP) since 1987. The BRHP collects data on mortality, birth and migration by visiting households monthly. The district population is estimated to be 250,000, based on the 1994 national census, while the population in the study

villages is estimated to be 30,500.¹³ The government/public facilities in the district comprises one health centre and two health stations. The nearest referral hospital for the district is 100 km south of Butajira town on a gravel road.

Pregnant women in the rural villages were identified through house-to-house visits by trained enumerators. During the visits all women in the reproductive age group were asked to report if they were pregnant. All women residing in the nine peasant associations that are under demographic surveillance, and who reported to be pregnant between March and December 1997, were enrolled in the study. Following the initial registration a monthly surveillance was carried out on all households, to follow the registered pregnant women and at the same time register new pregnancies. Trained female enumerators visited each pregnant woman monthly until confinement. Enumerators were required to fill out monthly follow-up sheets and advise women reporting illness to seek medical advice in the nearest health institutions.

Data were collected on questionnaires separately prepared for recording required information at baseline, monthly follow-up, abortion, delivery and postpartum. Socio-demographic characteristics of the mother, past obstetric history, current pregnancy and delivery conditions, and the condition of the mothers and newborn were collected by questionnaire. Anthropometric measurements (height and mid-arm circumference) of the women, and birth weight of the neonates were taken.

Female high school graduates were recruited and trained for ten days to collect the data. Additionally, a field supervisor was assigned to check the consistency and completeness of the filled questionnaires at the field level. Incorrectly filled questionnaires were sent back to the enumerators for correction. Researchers monitored the overall quality and conduct of the study by regularly visiting enumerators in the field and through meetings held on weekly basis.

Questions were asked in such a way that the rural women would understand them. They were asked to describe duration of labour as taking one day (12 hours), one day and night (24 hours) and more than one day and night (>24 hours). The question regarding complications following labour

was open-ended. Neonatal mortality rate is defined as deaths occurring within 28 days after birth per 1000 live births. Perinatal mortality rate is defined as stillborn and deaths within the first seven days of life per 1000 births. Primipara refers, in this paper, to the women who gave birth for the first time.

Data entry, data cleaning and analysis were carried out using *Epi Info* version 6.3 statistical package.¹⁴ Relative risks with 95% confidence interval are calculated to determine association. Etiologic fraction is expressed as the proportion of the outcome of interest attributable to the risk factor. In this case the proportion of perinatal deaths is attributable to prolonged labour.

Results

A total of 1267 pregnant women were registered and followed up in the study. Only three women were lost to follow-up, 31(2.4%) had abortion (one induced and 30 spontaneous), and the remaining 1233(97.3%) completed the follow-up through 28 days postpartum. Among women followed till delivery, the mean age was 26.9(\pm 6.2) years, 1094(88.7%) were illiterates, 941(76.3%) were Muslims, and 1227(95.0%) were married.

The overall perinatal and neonatal mortality rates were 45 and 37 per 1000 respectively. Two mothers died from postpartum haemorrhage. Duration of labour was 12–24 hours in 130(10.5%) and over 24 hours in 181(14.7%) of the women. Prolonged labour was observed in 33 of the 192(17.2%) primipara women and in 148(14.2%) of the 1041 multipara women.

Primipara women in the age group 15-19 years had almost twice the risk of prolonged labour, compared with women aged 20-29 years [RR=1.97; (95% CI 0.94, 4.16)]. Maternal height less than 150 cm was also associated with prolonged labour, with primipara women showing a two-fold increased risk of prolonged labour, compared with taller mothers [RR=2.10; (95% CI 0.92,4.79)]. Mothers with mid-arm circumference of less than 23 cm had a 30-40% increased risk of prolonged labour with RR=1.46 (95% CI 0.79, 4.79) in primipara and RR=1.32 (95% CI 0.97, 1.77) in multipara. These associations were not statistically significant, but it showed a tendency to association.

Previous history of stillbirth and infant death had no association with duration of labour. Illiteracy tended, but not significantly, to be a risk factor among the primipara women [RR=2.31 (95% CI 0.60, 1.56)] but not among the multipara women. Among measured babies, low birth weight (<2500 grams) showed increased risk of prolonged labour among primipara with RR= 3.33 (95% CI 1.50, 7.42). A similar tendency of lower degree was observed among multipara women. The association between high birth weight (\geq 4000 grams) and prolonged labour was not statistically significant [RR=1.47 (95% CI 0.54, 3.97)]. Mothers of 148 (12.0%) babies who did not consent to birth weight measurement were more likely to have had prolonged labour [RR=3.14 (95% CI 1.59, 6.22)] (Table 1).

A two-fold increase in the rate of stillbirth was observed among women who experienced prolonged labour, but the association was not statistically significant [RR=2.21 (95% CI 0.89, 5.52)] for primipara and [RR=2.15 (95% CI 0.95, 4.85)] multipara. Perinatal mortality showed a significant 3–4-fold increased risk in women with prolonged labour [RR=3.10 (95% CI 1.84, 5.23)] for primipara, and [RR=4.03 (95% CI 2.68, 6.06)] multipara. A similar significant increased risk was observed for neonatal mortality rate with RR= 3.10 (95% CI 1.70, 5.65) in primipara and RR=4.61 (95% CI 3.20, 6.63) in multipara (Table 2). The etiologic fraction of perinatal death associated with prolonged labour was 36.7% for primipara and 16.7% for multipara (Table 3).

Of the 181 women who had labour for more than 24 hours, only 16(8.8%) were referred to the health center: three of 33(9.1%) primipara and 13 of 148(8.8%) multipara. Among the 922 women with less than 12 hours of labour 22(2.3%) were referred to the health centre: seven of 129(5.4%) primipara and 15 of 793(1.9%) multipara in this category.

According to self-reports, 66 women (5.4%) had excessive vaginal bleeding, 91(7.4%) had fever and 21(1.7%) had urinary incontinence after delivery. There was no statistical significant difference in the occurrence of these complications between women who had normal duration of labour and those who had prolonged labour.

Table 1 Risk Factors for Prolonged Labour among Primipara (primi; n: 192) and Multipara (multi; n: 1041) in Butajira, Ethiopia, 1998

		Duration of labour (hours)						
		<12	12-24	RR	95% CI	>24	RR	95% CI
Age								
20-29	Primi	58	8	1.0		14	1.0	
	Multi	440	42	1.0		78	1.0	
15-19	Primi	70	22	1.97	0.94, 4.16	19	1.10	0.59, 2.03
	Multi	24	4	1.64	0.63, 4.25	6	1.33	0.63, 2.80
30-39	Primi	—	—	—	—	—	—	—
	Multi	320	50	1.55	1.05, 2.28	62	1.08	0.79, 1.46
40 +	Primi	—	—	—	—	—	—	—
	Multi	9	4	3.53	1.49, 8.39	2	1.21	0.34, 4.30
Height								
= 150	Primi	123	22	1.0		29	1.0	
	Multi	690	85	1.0		130	1.0	
< 150	Primi	6	8	3.77	2.08, 6.83	4	2.10	0.92, 4.79
	Multi	103	15	1.16	0.69, 1.94	18	0.94	0.60, 1.48
MUAC (cm)								
= 23	Primi	92	22	1.0		20	1.0	
	Multi	541	61	1.0		90	1.0	
< 23	Primi	37	8	0.92	0.44, 1.92	13	1.46	0.79, 2.69
	Multi	252	39	1.32	0.92, 1.93	58	1.32	0.97, 1.77
Obstetric History								
Only live birth	Primi	—	—	—	—	—	—	—
	Multi	482	58	1.0		90	1.0	
Previous infant death	Primi	—	—	—	—	—	—	—
	Multi	263	37	1.10	0.84, 1.45	49	1.0	0.78, 1.28
Previous stillbirth	Primi	—	—	—	—	—	—	—
	Multi	60	4	0.58	0.22, 1.55	13	1.14	0.65, 2.00
Education								
Literate	Primi	19	5	1.0		2	1.0	
	Multi	89	8	1.0		16	1.0	
Illiterate	Primi	110	25	0.89	0.38, 2.09	31	2.31	0.60, 8.94
	Multi	704	92	1.40	0.70, 2.80	132	1.04	0.64, 1.67
Birth Weight								
2500-3999	Primi	95	19	1.0		15	1.0	
	Multi	617	72	1.0		107	1.0	
< 2500	Primi	6	2	1.50	0.42, 5.33	5	3.33	1.50, 7.42
	Multi	39	6	1.28	0.59, 2.77	8	1.15	0.60, 2.22
4000 +	Primi	16	5	1.43	0.60, 3.40	5	1.75	0.71, 4.29
	Multi	51	6	1.01	0.46, 2.21	11	1.20	0.68, 2.11
Missing	Primi	12	4	1.50	0.58, 3.85	8	2.93	1.44, 5.99
	Multi	86	16	1.50	0.91, 2.48	22	1.38	0.91, 2.08

Table 2 Perinatal Outcome for Prolonged Labour among Primipara (primi; n: 192) and Multipara (multi; n: 1041) in Butajira, Ethiopia, 1998

		Duration of labour in hours						
		<12 hr	12-24 hr	RR	95% CI	>24hr	RR	95%CI
Live birth	Primi	125	28	1.0		30	1.0	
	Multi	785	96	1.0		144	1.0	
Stillbirths	Primi	4	2	1.82	0.56, 5.93	3	2.21	0.89, 5.52
	Multi	8	4	3.06	1.34, 6.96	4	2.15	0.95, 4.85
Perinatal death	Primi	6	3	1.82	0.68, 4.87	9	3.10	1.84, 5.23
	Multi	21	6	2.04	0.98, 4.23	10	4.03	2.68, 6.06
Neonatal death	Primi	4	1	1.09	0.18, 6.51	6	3.10	1.70, 5.65
	Multi	20	4	1.53	0.61, 3.82	10	4.61	3.20, 6.63

Table 3 Etiologic Fraction, Stillbirths and Neonatal Deaths Associated with Increased Risk of Prolonged Labour (>24 hours) by Parity in Butajira, Ethiopia, 1998

	Death rate among exposed	Death rate among unexposed	Etiologic cases	Etiologic fraction
Primipara	27.3% (9/33)	5.7% (9/159)	7	36.7
Multipara	6.8% (10/148)	3.0% (27/893)	6	16.7

Discussion

During the study period, repeated visits were made to identify all pregnant mothers residing in the rural study sites, and few term pregnancies should have been unrecorded. However, the low abortion rate suggests that not all early pregnancies were identified. As the onset of labour is accompanied by the call on experienced women, or the traditional birth attendants (TBAs), and some rituals at home, the women's report of duration of labour was considered as fairly reliable. The small sample size could have hampered a proper interpretation of results, for example, insignificant risk increases were associated with bad obstetric history and sub-nutrition, but could not be established as definitive risk factors. Since about 12% of the mothers disagreed to the weight measurement of their babies, it was difficult to properly assess the effect of the birth weight on prolonged labour. The main reason for their disapproval was baby's sickness.

About 15% of the women in this study experienced prolonged labour, comparable with rates (13 and 14% respectively) observed in Zimbabwe and Malawi.¹ The observed increased risk of prolonged labour in short stature and sub-nourished women with mid-arm circumference of less than 23, and having low birth weight babies, is consistent with other studies. It may be related to a poorly developed pelvis, due to childhood malnutrition as well as present sub-nutrition.^{9,10}

This study demonstrated a strong association between prolonged labour and perinatal and neonatal deaths. Regardless of parity, perinatal and neonatal mortality rates were high for children born after a prolonged labour. The etiologic fraction, attributing about one-fifth to one-third of perinatal deaths to prolonged labour, indicates its public health impact. A hospital-based study from India found 75% of perinatal deaths associated with obstructed labour,¹⁵ while a community-based

study from Ghana reported that 7% of perinatal deaths were due to obstructed labour.⁷

Although 21 women reported incontinence after delivery, it was not possible to ascertain whether this was due to fistulae. Full evaluation of the complication requires a fairly large sample and a longer duration of follow-up to determine whether this incontinence is a temporary phenomenon or a true incontinence caused by vesicovaginal fistula.²⁵

The strategy adopted to prevent prolonged labour and its complications is to organise and strengthen a network of essential obstetric service facilities starting from the primary care level.¹ The use of partograph in preventing prolonged labour has also been shown to be effective in Zimbabwe and Malawi.¹ A reliable referral system, appropriately trained personnel at all levels, and effective communication and transport systems are part of the essential obstetric services.¹⁶⁻²⁰ However, in many African countries where the problem is more prevalent, such services are not readily accessible for the rural population and most are not well-equipped in facilities or manpower. Expansion of operative services at the first referral level, to rural areas by training midwife surgeons,²¹ improving availability of transport facilities,²² and establishing a maternity waiting home near the center providing operative delivery for women at high risk^{23,24} can be effective in reducing maternal and perinatal mortality.

In conclusion, prolonged labour is a serious public health problem for rural women, contributing to a large proportion of perinatal deaths. Prolonged labour has shown a tendency to be associated with maternal under-nutrition and age (teenagers giving birth to low birth weight children), and the scope of the problem appears to be wider than that which can be solved by essential obstetric package alone.

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