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# Duration of labor with spontaneous onset at the University of Ilorin Teaching Hospital, Ilorin, Nigeria

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## Abstract

**Background/Objective:** Duration of labor varies from one pregnancy to another and a period of less than 12 hours is regarded as normal. Modern obstetric practice involves active management of labor with the aim of preventing prolonged labor and its sequelae. The main objective of this study was to determine and compare the average duration of labor of spontaneous onset between nulliparas (Po) and multiparas ( $P \geq 1$ ) and to determine factors affecting duration of labor.

**Materials and Methods:** This study was a prospective study carried out between 15 May and 14 June 2004 at the Labor Ward of the University of Ilorin Teaching Hospital, Ilorin, Nigeria. Two hundred and thirty-eight women who satisfied the inclusion criteria were studied. The inclusion criteria were term pregnancy with vertex presentation, labor with spontaneous onset, live fetus at presentation and spontaneous vertex delivery.

**Results:** The mean  $\pm$  SD admission-delivery interval in labor ward was shorter ( $3.77 \pm 2.88$  hours) among multiparas than that of nulliparas ( $5.00 \pm 3.17$  hours) ( $P = 0.235$ ). The mean  $\pm$  SD duration of labor (from the onset of labor to delivery) was shorter among multiparas ( $8.73 \pm 4.17$  hours) than that of nulliparas ( $11.23 \pm 4.29$  hours) ( $P = 0.426$ ). The differences were not significant (t-test,  $P > 0.05$ ). Maternal age and individual parity had significant correlation with the duration of labor in this study (Pearson correlation =  $-0.019$ ,  $-0.027$ , respectively,  $P < 0.05$ ).

**Conclusion:** Interestingly, duration of labor was not significantly different among multiparas and nulliparas although it was shorter. Correlation existed between duration of labor and maternal age and individual parity.

**Keywords:** Duration, multipara, nullipara, spontaneous labor

## Résumé

**Contexte/objectif:** Durée du travail varie d'une grossesse à l'autre et une période de moins de 12 heures est considérée comme normale. La pratique obstétrique moderne implique une gestion active du travail dans le but de prévenir un travail prolongé et ses séquelles. L'objectif principal de cette étude était de déterminer et de comparer la moyenne de la durée du travail de l'apparition spontanée entre nulliparas (Po) et multiparas ( $P \geq 1$ ) et de déterminer les facteurs affectant la durée du travail.

**Matériaux et procédés:** Cette étude est une étude prospective menée entre le 15 mai et le 14 juin 2004, à la Labor Ward de l'hôpital universitaire de l'Université d'Ilorin, Ilorin, Nigeria. Deux cent trente-huit femmes qui satisfaisaient les critères d'inclusion ont été étudiées. Les critères d'inclusion étaient grossesse à terme avec présentation de vertex, Labor avec apparition spontanée, vivant les fœtus à la présentation et la livraison de vertex spontanée.

**Résultats:** L'intervalle d'admission-delivery moyenne  $\pm$  SD ward du travail a été plus courte ( $3,77 \pm 2,88$  heures) chez les multiparas que celle de nulliparas ( $5,00 \pm 3,17$ ) ( $P = 0,235$ ). La durée moyenne  $\pm$  et du travail (dès le début du travail de livraison) a été plus courte chez les multiparas ( $8,73 \pm 4,17$  heures) que celle de nulliparas ( $11,23 \pm 4,29$  heures) ( $P = 0,426$ ). Les différences ne sont pas des principales conventions (test t,  $P > 0,05$ ). Âge de la mère et à la parité individuelle avaient une signifi dévers corrélation avec la durée du travail dans cette étude (corrélations de Pearson =  $-0,019$ ,  $-0,027$ , respectivement,  $P < 0,05$ ).

**Conclusion:** Fait intéressant, la durée du travail n'était pas significativement différentes entre les multiparas et les nulliparas bien que Elle est plus courte. Il existe de corrélation entre la durée du travail et l'âge de la mère et à la parité individuelle.

**Mots clés:** Durée, multiparagraphe, nullipara, travail spontané

## Introduction

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Neglected labor and its attendant complications contribute immensely to the unacceptably high maternal deaths recorded in the developing countries, including Nigeria.<sup>[1,2]</sup> Although there is a wide variation in the duration of labor, it has been found that there is an acceptable period that is considered normal. Usually, the range for the duration of labor is from 3 to 12 hours. Labor lasting less than 3 hours is classified as precipitate labor while that exceeding 12 hours is said to be prolonged.<sup>[3-6]</sup> Various studies have been conducted on labor duration, with recent studies suggesting that the duration is on the decline in recent decades.<sup>[3,5]</sup>

Duration of labor is affected by various maternal and fetal factors including maternal age, parity, maternal pain threshold, number of fetuses, fetal weight and fetal position. It is also affected by interventions like induction of labor, augmentation of labor and instrumental vaginal deliveries.<sup>[7]</sup>

Modern obstetric practice involves active management of labor with the use of partograph as the monitoring tool. The aim of active management of labor is to prevent prolonged labor. This is borne out of the fact that prolonged labor is associated with increased maternal and perinatal morbidity and mortality.<sup>[1,2,5]</sup> Identified maternal morbidities include maternal exhaustion, electrolyte derangement, hypoglycemia, a risk for obstructed labor and its attendant sequelae such as uterine rupture, primary postpartum hemorrhage and obstetric fistula. Some of the associated perinatal complications include fetal distress, risk for perinatal asphyxia, increased risk for neonatal resuscitation and admission into neonatal intensive care unit as well as hypoxic ischemic encephalopathy and cerebral palsy.<sup>[2,4,5]</sup>

Of importance is the issue of labor dystocia, generally referred to as a slow or difficult labor; but it is known to be a poorly specific diagnosis, usually misappropriated due to impatience and poor definition of labor progress in a parturient. This misdiagnosis has contributed to increase in cesarean section rate.<sup>[8]</sup>

The aim of the study was to determine the duration of labor with spontaneous onset at the University

of Ilorin Teaching Hospital, Nigeria. The specific objectives were the following: to determine admission–delivery time interval for nulliparas and multiparas; to compare admission–delivery time interval among nulliparas and multiparas; to determine the duration of labor for nulliparas and multiparas; to compare the duration of labor among nulliparas and multiparas; and to determine the relationship between parity, birth weight, maternal age and fifth minute apgar score on duration of labor.

University of Ilorin Teaching Hospital (UIITH) is located in Ilorin in the middle belt of Nigeria.

## Materials and Methods

The study was conducted at the Obstetrics and Gynaecology Department of the University of Ilorin Teaching Hospital between 15 May and 14 June 2004. Approval was obtained from University of Ilorin Teaching Hospital's ethical and research committee and informed consent was obtained from the patients as well.

It was a prospective observational study involving data collection and analysis of 238 consecutive women in labor who satisfied the inclusion criteria. The inclusion criteria were as follows: term pregnancy (gestational age equal or greater than 37 weeks but less than 42 weeks) with vertex presentation, labor with spontaneous onset, live fetus at presentation and spontaneous vertex delivery. Patients with pre-labor rupture of fetal membranes, breech presentation, fetal death at presentation, instrumental vaginal deliveries, induction of labor or abdominal deliveries were excluded from the study. All the women in labor were followed from the admission till delivery.

Admission into the labor ward was in the active phase of labor, defined as cervical dilatation of at least 4 cm. Labor was actively managed with the aid of partograph with amniotomy performed as soon as possible and vaginal examination repeated at 4 hours interval unless otherwise indicated. Fetal heart rate monitoring was by intermittent auscultation every 15 minutes using Pinnard fetal stethoscope.

Augmentation of labor was done by addition of 10 IU of oxytocin into 1 L of intravenous infusion and

titrated against uterine contractions until adequate uterine contractions were achieved. Analgesic agent used was intramuscular Pethidine or Pentazocine, as required.

The exact time of onset of labor is difficult to determine and is subjective. Onset of labor was defined as the occurrence of painful regular uterine contractions less than 10 minutes apart in this study. Admission–delivery interval refers to how long it took from the time of admission in the labor ward to the time of delivery, while the duration of labor means the time it took from the onset of labor to delivery.

This maternity hospital provides comprehensive emergency obstetric services. Everyday, there are two or three midwives on each duty-shift, an intern, a registrar, and a senior registrar in-charge of labor ward under the supervision of a consultant obstetrician.

Patients’ demographic data, labor history and intrapartum events were recorded on information data sheet and subsequently analyzed. Central tendency, Pearson correlation and *t*-test were performed for data analysis using SPSS 14.0 software. A *P* value <0.05 was taken as significant.

## Results

Of the 317 deliveries that occurred during the study period, 248 women had spontaneous vertex delivery, 27 had cesarean section, 20 had assisted breech delivery and 8 had induction of labor.

A total of 238 deliveries met the inclusion criteria and were analyzed. The age range was 16–38 years with

a mean ± SD of 28.34 ± 4.17 years. Nulliparas (P0) and multiparas (*P* ≥ 1) accounted for 75 (31.51%) and 163 (68.49%) cases, respectively. Of the 163 multiparas, primiparas (P1) and grandmultiparas (*P* ≥ 5) had the highest [70 (42.94%)] and lowest [4 (2.45%)] frequencies, respectively. Fifty-three women (22.3%) had augmentation of labor and 46 (19.33%) women received analgesia.

The mean ± SD of gestational age and cervical dilatation for nulliparous women at presentation in the labor ward were 39.51 ± 1.39 weeks and 5.40 ± 1.84 cm, respectively, while that of multiparous women were 39.63 ± 1.49 weeks and 6.45 ± 2.06 cm, respectively (*t*-test *P* = 0.342, *P* = 0.381, respectively; *P* > 0.05).

The mean ± SD admission–delivery time interval for nulliparas was 5.00 ± 3.17 hours and for multiparas was 3.77 ± 2.88 hours (*t*-test *P* = 0.235; *P* > 0.05).

The mean ± SD duration of labor for nulliparous women was longer than that for multiparous women (11.23 ± 4.29 hours vs. 8.73 ± 4.17 hours; *t*-test *P* = 0.426; *P* > 0.05); the difference was not statistically significant. One hundred and seventy-four (73.11%) patients delivered within 12 hours of the onset of labor.

There were significant differences in blood loss and fifth minute apgar scores between nulliparas and multiparas (*t*-test *P* = 0.016, *P* = 0.025, respectively; *P* < 0.05). Details of the results are given in Table 1.

Negative correlation existed between maternal age and duration of labor as well as individual parity and duration of labor (Pearson correlation = -0.019 and

**Table 1: Parity against maternal age and labor variables**

	Age (years)	Gestational age (weeks)	Cervical dilatation at presentation (cm)	Admission–delivery interval (hours)	Duration of labor (hours)	Birth weight (kg)	Fifth minute apgar score	Estimated blood loss (mL)
<b>Nulliparas (Po)</b>								
Mean	25.96	39.51	5.40	5.00	11.23	3.00	8.32	213.24
Standard deviation	4.26	1.39	1.84	3.17	4.29	0.44	0.87	56.74
Median	26.00	39.71	5.00	5.05	10.41	3.00	8.00	200.00
<b>Multiparas (<i>P</i> &gt; 1)</b>								
Mean	29.43	39.63	6.45	3.77	8.73	3.23	8.28	243.66
Standard deviation	3.66	1.49	2.06	2.88	4.17	0.54	0.93	307.51
Median	30.00	39.29	6.00	3.13	7.75	3.15	8.00	200.00
<b>Overall</b>								
Mean	28.34	39.59	6.12	4.19	9.57	3.16	8.29	234.02
Standard deviation	4.17	1.46	2.05	3.03	4.37	0.52	0.91	256.26
Median	28.00	39.57	6.00	3.75	8.70	3.10	8.00	200.00

-0.027, respectively;  $P < 0.05$ ), while there was positive correlation between parity and birth weight (Pearson correlation = 0.032;  $P < 0.05$ ). There was no correlation between gestational age at delivery and duration of labor or between duration of labor and fifth minute apgar scores (Pearson correlation = 0.237, 0.296, respectively;  $P > 0.05$ ).

## Discussion

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The passage of the fetus through the birth canal during labor can be unpredictable and hazardous. The understanding and management of labor have evolved at a rapid pace, especially with the introduction of the partograph and active management of labor which have led to reduction in the incidence of prolonged labor.<sup>[9-11]</sup>

The observed mean admission cervical dilatation for multiparas (6.45 cm) was more than that for nulliparas (5.40 cm) and the mean admission-delivery time interval was shorter in multiparas (3.77 hours) than in nulliparas (5.00 hours). This is in keeping with the findings of Duignan *et al.*<sup>[12]</sup> However, due to late presentation of our parturients to the hospital, the suggested admission time as the starting point of labor by Hendricks could not be adopted.<sup>[13,14]</sup> Therefore, onset of regular uterine contractions was used as the starting point of labor in this study, although it is subjective.

The overall average duration of labor was 9.57 hours which is comparable to 9.7 hours recorded at New Mexico, USA,<sup>[15]</sup> but is lower than 12.47 hours recorded at Lagos, Nigeria.<sup>[16]</sup> Multiparas had a significantly lower mean duration of labor (8.73 hours) than nulliparas (11.23 hours). This is consistent with the findings of other researchers.<sup>[12,16,17]</sup> The difference between nulliparas and multiparas is likely due to better sensitivity of the multiparas' uteri to both endogenous and exogenous oxytocin, which results in early response and more intense uterine contractions with its attendant faster cervical dilatation and early delivery. This also contributed to the difference in the admission-delivery time interval experienced and not only the difference in admission cervical dilatation as observed by Duignan *et al.* in their study.<sup>[12]</sup>

With active management of labor, the duration of labor is not expected to exceed 12 hours.<sup>[10,18]</sup> In this study, 73.1% of parturients delivered within this time range. This is comparable to 80% reported by Bergsjo *et al.*<sup>[6]</sup> and 75% reported by Roger in New Mexico, USA,<sup>[15]</sup> but is less than 97.2% reported by Impey *et al.*<sup>[17]</sup>

This study shows that the higher the parity, the

higher the birth weight and the shorter the duration of labor. However, birth weight and duration of pregnancy as independent variables have no effect on the duration of labor; this is contrary to Nesheim's finding in Norway where there was positive correlation between these factors and duration of labor.<sup>[9]</sup>

Controversy exists on the effect of active management of labor on the rate of cesarean section.<sup>[11,15]</sup> O'driscoll *et al.* in Ireland showed a reduction in cesarean section rate.<sup>[18]</sup> This was supported by Roger *et al.*, but the difference observed in the latter study was not statistically significant,<sup>[15]</sup> while Frogoletto *et al.* showed no reduction in cesarean section rate in Boston, USA.<sup>[11]</sup> Recent study on the trend of cesarean section at this center showed a rising cesarean section rate, but the annual number of cesarean section is about the same. This was attributed to a decrease in uncomplicated labor cases presenting at the center in recent times.<sup>[19]</sup>

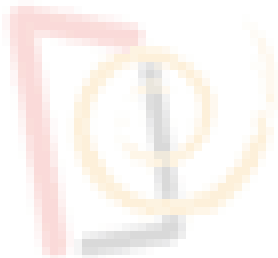
In conclusion, duration of labor was not significantly different among multiparas and nulliparas although it was shorter in multiparous women than nulliparous women. The individual number of deliveries and maternal age were the only variables that influenced the duration of labor in our study.

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