Preterm Delivery Risk in Relation to Maternal HIV Infection, History of Malaria and Other Infections among Zimbabwean Women

April Noble, Yi Ning, Godfrey B. Woelk, Kassam Mahomed, & Michelle A. Williams

MIRT Program, University of Washington, Seattle, WA; USA and University of Zimbabwe Medical School, Harare, Zimbabwe

Methods and Materials

Between July 1998 - March 1999 we were collected from women who delivered at the Harare Maternal Hospital. All 500 eligible patients that were approached agreed to participate in the study. The Medical Research Council, Ministry of Health and Child Welfare, Zimbabwe and the Human Subjects Committee of the University of Washington Medical Center approved this investigation.

Structured interview questionnaires were used to collect information on maternal sociodemographic, medical, reproductive and lifestyle characteristics. Data from medical records of all study participants were abstracted.

Gestational age at delivery was defined as the final estimate recorded by the physician or nurse who attended the delivery. Three subjects had missing data, so 497 remained for analysis.

Frequency distributions of maternal sociodemographic characteristics, medical and reproductive histories according to whether patients delivered at term (≥ 37 completed weeks gestation) versus those who delivered preterm (< 37 completed weeks gestation) was calculated. The odds ratio (OR) was used as a measure of association between exposure covariates and preterm delivery status. Confounding was assessed by entering potential confounders into a logistic regression model one at a time, and by comparing the adjusted and unadjusted ORs.

Final logistic regression models included covariates that altered unadjusted ORs by at least 10%.

Results

Adjusted odds ratios for preterm delivery risk factors are reported in Table II.

Women with any of the non-sexually transmitted infections and who did not report taking iron supplements experienced a 2.36 fold increased risk of preterm delivery (95% CI: 1.14-4.89) as compared with the reference group (women without infection who took iron supplements).

Women that had any of the non-sexually transmitted infections and who reported taking iron supplements during pregnancy had a 2.61 fold increased risk of preterm delivery (95% CI: 1.59-6.43) compared with the reference group.

Women who had any of the non-sexually transmitted infections and who did not report taking iron supplements had an 8.34 fold increased risk of preterm delivery (95% CI: 3.30-21.07) Table III.

Discussion

In this study population, maternal HIV serostatus was not a significant risk factor for PTD. Overall, a positive history of any of the non-sexually transmitted infections (when considered in aggregate) was associated with a 3.20 fold increase risk for PTD. Women with a history of infection and who did not use iron supplements during pregnancy, compared with women without such an history and who used iron supplements, experienced the highest risk for PTD (OR = 8.34) in this population.

In conclusion, our study confirms an association between maternal tuberculosis infection in the previous year and risk of PTD. We noted that the strong association between any non-sexually transmitted infections and PTD risk was modified by maternal use of iron supplements during pregnancy. Efforts aimed towards improving maternal health and the promotion of maternal use of iron and other multivitamin supplements during pregnancy may contribute to a reduction in PTD risk in this and other similar populations. Effective surveillance and treatment programs for STI and other infections should be implemented to reduce the infectious disease burden borne by reproductive age women and their offspring.

Results - Continued

Table II. Adjusted Odds Ratios (OR) and 95% Confidence Intervals for Preterm Delivery According to Maternal History of Sexually Transmitted Infections, Malaria and other Infections, Harare, Zimbabwe, 1998-1999.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Term Deliveries (N = 444)</th>
<th>Preterm Deliveries (N = 53)</th>
<th>Adjusted OR* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV Seroprevalence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>87.3</td>
<td>96.2</td>
<td>Reference</td>
</tr>
<tr>
<td>Positive</td>
<td>12.7</td>
<td>3.8</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis in the Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>99.5</td>
<td>96.2</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>0.5</td>
<td>3.8</td>
<td>10.15 (1.15-89.87)</td>
</tr>
<tr>
<td>Malaria in the Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>91.0</td>
<td>81.1</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>9.0</td>
<td>18.9</td>
<td>2.39 (1.07-53.1)</td>
</tr>
<tr>
<td>Chest Infections in the Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>96.6</td>
<td>92.4</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>3.4</td>
<td>7.6</td>
<td>2.63 (1.76-9.17)</td>
</tr>
<tr>
<td>Herpes Infection (Shingles) in the Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>97.8</td>
<td>94.3</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>2.2</td>
<td>5.7</td>
<td>2.58 (0.56-11.85)</td>
</tr>
<tr>
<td>Any of Non-Sexually Transmitted Infection in the Previous Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>96.5</td>
<td>69.8</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>13.5</td>
<td>30.2</td>
<td>3.20 (1.59-6.43)</td>
</tr>
</tbody>
</table>

*Adjusted for maternal age, gravidity, education, marital status, pre-pregnancy body mass index, and maternal use of iron supplements during the current pregnancy.

# Aggregate of any of the following infections: tuberculosis, malaria, chest infections, meningitis, or shingles.


<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Term Deliveries (N = 444)</th>
<th>Preterm Deliveries (N = 53)</th>
<th>Adjusted OR** (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any of TB, Malaria, Chest Infections, Meningitis, or Shingles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>86.5</td>
<td>69.8</td>
<td>Reference</td>
</tr>
<tr>
<td>Yes</td>
<td>13.5</td>
<td>30.2</td>
<td>3.20 (1.59-6.43)</td>
</tr>
</tbody>
</table>

*Adjusted for maternal age, gravidity, education, marital status, pre-pregnancy body mass index, and maternal use of iron supplements during the current pregnancy.

**Adjusted for maternal age, gravidity, education, marital status, pre-pregnancy body mass index, and maternal use of iron supplements during the current pregnancy.

This research was supported by an award from the Fogarty International Center (T37-TW-00049)

<table>
<thead>
<tr>
<th>Maternal Anthropometric Index</th>
<th>Non-Low Birth Weight (N = 428)</th>
<th>Low Birth Weight (N = 70)</th>
<th>t-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Height (cm)</td>
<td>157.8 ± 0.3</td>
<td>157.3 ± 0.6</td>
<td>0.35</td>
<td>0.726</td>
</tr>
<tr>
<td>Maternal Weight (kg)</td>
<td>71.0 ± 0.5</td>
<td>68.1 ± 0.6</td>
<td>0.95</td>
<td>0.3476</td>
</tr>
<tr>
<td>Maternal BMI (kg/m²)</td>
<td>24.9 ± 0.4</td>
<td>23.6 ± 0.4</td>
<td>0.61</td>
<td>0.5470</td>
</tr>
<tr>
<td>Maternal Mid-Arm Circumference (cm)</td>
<td>25.6 ± 0.1</td>
<td>24.4 ± 0.3</td>
<td>0.76</td>
<td>0.4502</td>
</tr>
</tbody>
</table>

Maternal anthropometric measures (height, weight and mid-arm circumference) were taken during participants' last trimester of pregnancy. Maternal age was calculated from birth dates. Maternal mid-arm circumference and body mass index (BMI), defined as weight (kg) divided by height (m) squared, are simple, useful indices for evaluating pre-pregnancy nutritional status in clinical settings.

Many studies have evaluated the association between various maternal characteristics, risk factors, and infant birth weight in developed countries. However, there are fewer studies of African populations in which the relationship between maternal characteristics and other neonatal anthropometric measurements were studied. In this paper, we examined the association between maternal anthropometric and nutritional characteristics such as pre-pregnancy weight, maternal body mass index, weight gain in pregnancy, and maternal nutritional influence birth weight.

Materials and Methods

Study Population and Data Collection: This study was conducted at Harare Maternity Hospital (July 1998 - March 1999). Women were recruited within 24 hours of delivery. All 498 eligible participants who were approached agreed to participate in the study. This investigation was approved by the Medical Research Council, Harare, Zimbabwe and the Human Subjects Committee of the University of Washington Medical Center.

Patients were interviewed in an in-person interview. The structured interview questionnaire, administered during participant's hospitalization, included maternal characteristics, such as age, marital status, educational level, pre-pregnancy weight, height, and mid-arm circumference, measured at delivery, as well as the three factors that contributed to infant birth size measurements shortly after delivery. Information on maternal weight gain during pregnancy was not available for this study population. In addition to maternal factors, children's birth weight and length were documented.

Statistical Analyses: The frequency distribution of maternal sociodemographic characteristics, medical conditions, and reproductive histories according to whether they delivered low birth weight infants (< 2,500 grams), we examined. The odds ratio (OR) was used as a measure of association between exposed maternal characteristics and low birth weight among the study population, and low birth weight infants were defined as infants weighing less than 2,500 grams. Logistic regression analysis was performed with odds ratios and 95% confidence intervals (CI) for the risk factors identified. The level of statistical significance was fixed at 0.05. All analyses were completed using SPSS statistical software (Chicago, IL, USA).

Results


<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Non-Low Birth Weight (N = 428)</th>
<th>Low Birth Weight (N = 70)</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age (yr)</td>
<td>23.9 ± 0.3</td>
<td>22.7 ± 0.5</td>
<td>0.079</td>
</tr>
<tr>
<td>Maternal BMI (kg/m²)</td>
<td>25.8 ± 0.2</td>
<td>24.9 ± 0.3</td>
<td>0.161</td>
</tr>
<tr>
<td>Maternal Mid-Arm Circumference (cm)</td>
<td>25.6 ± 0.1</td>
<td>24.4 ± 0.3</td>
<td>0.396</td>
</tr>
<tr>
<td>Maternal Education</td>
<td>6.1 ± 0.5</td>
<td>5.9 ± 0.4</td>
<td>0.462</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married 407 (95.5)</td>
<td>Married 84 (12.1)</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>Unmarried 21 (4.5)</td>
<td>Unmarried 26 (3.6)</td>
<td>0.770</td>
</tr>
<tr>
<td>Race</td>
<td>African 310 (72.8)</td>
<td>African 44 (6.3)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Non-African 118 (27.2)</td>
<td>Non-African 26 (3.6)</td>
<td>0.000</td>
</tr>
<tr>
<td>Residency</td>
<td>Urban 222 (51.9)</td>
<td>Urban 36 (5.1)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Rural 206 (48.1)</td>
<td>Rural 34 (4.8)</td>
<td>0.000</td>
</tr>
<tr>
<td>Low density</td>
<td>312 (71.7)</td>
<td>52 (7.4)</td>
<td>0.873</td>
</tr>
<tr>
<td></td>
<td>High density 126 (28.3)</td>
<td>7 (1.0)</td>
<td>0.873</td>
</tr>
</tbody>
</table>

Women in this study with a mid-arm circumference less than 24.0 cm experienced an increased risk in delivering a LBW infant compared to women with a mid-arm circumference greater than 24.0 cm. In this study group, each increase in maternal mid-arm circumference resulted statistically significantly increases in infant birth size (data not shown), which indicates the protective value of increasing maternal fat stores in pregnancy. Thus, in areas where accessing maternal need may be difficult, measuring mid-arm circumference may be useful alternative.

Discussion

The data presented provides a complete understanding of the relationship between maternal anthropometric characteristics, such as maternal mid-arm, weight, BMI, and mid-arm circumference at time of delivery and low birth weight among pregnant women in Harare, Zimbabwe. Previous studies have shown that maternal anthropometric and nutritional characteristics such as pre-pregnancy weight, maternal body mass index, weight gain in pregnancy, and maternal nutritional status at delivery all contribute to infant birth size measurement shortly after delivery.
Syphilis remains a major public health problem that adversely affects pregnancy outcomes among women in sub-Saharan Africa. The prevalence of syphilis among the general population in sub-Saharan Africa is reported to range from 1-2% in Benin to 19% in Ethiopia. Notably, the prevalence of syphilis has consistently been reported to be higher in women than in men. Maternal antenatal syphilis infection has been associated with congenital syphilis, abortion, perinatal mortality, low birth weight, and preterm delivery. The prevalence of syphilis among pregnant women in sub-Saharan Africa has been reported to range from 0.24% to 17%. Among those infected, investigators have noted large increases in risk for congenital syphilis, stillbirths, preterm delivery and low birthweight (LBW) newborns.

Objective

The objective of this study is to evaluate risk factors and outcomes of syphilis during pregnancy.

Methods

Women who came to deliver at Harare Maternity Hospital (Harare, Zimbabwe) between June 1996 and March 1998 were approached to participate in a cross-sectional serological study. Consenting women gave blood samples (2,969) at the time of delivery, which were tested for syphilis by the rapid plasma reagin (RPR) test and the Treponema pallidum hemagglutination assay (TPHA).

Results

Maternal demographics and reproductive histories (Table II, top left)

- Age difference -- Women with a history of syphilis were an average of 2 years older than women without a history (p=0.013).
- Parity and gravidity -- Positively associated with syphilis infection.
- Stillbirths -- Women with a positive history of syphilis more likely than other women to have had a prior stillbirth delivery (7.7% vs. 3.4%, p-value = 0.0007).
- Multigravidas -- increased risk of a positive test.
- No previous booking -- increased risk of being seropositive.

Pregnancy outcomes (Table III, bottom left)

- Low birthweight (< 2500 grams) -- Infants had increased risk of low birthweight born to women with a positive syphilis serostatus.
- Positive test (in infants) -- Women with a positive RPR test at delivery were 48-times more likely to deliver an infant that also tested positive for syphilis (0.9% vs. 43.3%, p-value < 0.001).
- All but one of the 33 infants delivered of women with active syphilis infection appeared to have an active syphilis infection at birth.

Conclusion

We noted that 4.8% (95% CI 4.0% - 5.6%) of women in this study population had a positive history of syphilis at delivery. Risk factors for syphilis include prior stillbirths, multiparity/multigravidity and underutilization of antenatal care services.

Our results suggest that there should be more effective antenatal screening and treatment of syphilis in Harare. Syphilis affects many sub-Saharan countries where effective educational outreach, screening, and treatment should take place to prevent the transmission of this venereal disease, especially among reproductive age and pregnant women.

References

INTRODUCTION
Vietnam’s fertile soils and subtropical climate are conducive for agriculture, with women now accounting for 53% of this workforce due to the out-migration of men to other work sectors.

- Thus, women are now engaged in more arduous farming tasks that were previously performed by men.
- Combined with low caloric intake (common in rural areas of developing countries), mothers who are farmers represent a population at an increased risk for adverse pregnancy outcomes such as low birth weight (LBW).
- LBW infants are of great concern in both developed and developing countries due to their high mortality and morbidity rates.
- In Vietnam, research has demonstrated that female farmers are at a three times increased risk for delivering a low birth weight (LBW) infant (REF). Nevertheless, there have not yet been studies focused on the characteristics of female farmers that may predispose them to LBW deliveries.

OBJECTIVE
This study investigates the characteristics that distinguish farmer from non-farmer mothers.

METHODS
This was a secondary analysis of data collected in 2003 from Dr. Tu Phung’s case-control study of the risk factors associated with LBW in the Thai Nguyen province.

Original Study Design
- Questionnaires were administered to female patients who delivered at the Obstetrics and Gynecology Department ofThai Nguyen Central General Hospital between June and December of 2003.
- Cases were designated as women delivering LBW infants while controls were women delivering infants weighing greater than or equal to 2500 grams. LBW is defined as a birth weight less than 2500 grams (5 pounds, 8 ounces) (WHO standard) at a gestational age of 28 weeks or above.
- Exclusion criteria: women who delivered stillborn infants or infants with congenital birth defects, had feticidal pregnancies, or could not communicate in Vietnamese.
- Total of 182 cases of LBW and 364 controls were interviewed for the study.

Current Study Design
- Exposure was defined as having the occupation of a farmer (n=103) while non-exposure was classified as having occupations other than farming (n=253). These two groups were derived from the control group of the original LBW study, excluding cases (women who delivered LBW infants).
- The variables of interest were socioeconomic status (SES) indicators, maternal anthropomorphic characteristics, environmental hazards, reproductive history, and current pregnancy characteristics.
- STATA (version 8.02) was used for statistical analysis. Either chi-square or Fisher’s exact test were used to compare the characteristics of farmers and non-farmers. Multiple logistic regression procedures were used for adjusted odd ratios and included the potential confounders: age, education, marital status, and residential location. Statistical significance was defined at the alpha level of 0.05.

RESULTS
- Female farmers were less educated, had partners who were also less educated, unmarried, and residing in a rural location compared to non-farmers (Table 1).
- Women who farmed were more likely to be of short stature and more likely to be underweight (BMI < 18.0). Pregnancy intention also differed between farmers and non-farmers, with farmers less likely to have intended this pregnancy. During the pregnancy, farmers were more likely to gain under 10kg, less likely to have unemployed partners, and less likely to take iron folic supplements (Table 2).
- Reproductive history, including parity, history of LBW infants, history of spontaneous abortion or preterm delivery, history of pre-eclampsia, history of stillbirth did not vary statistically between farmers and non-farmers.
- Gestational anemia, exposure to environmental tobacco smoke, number of antenatal visits, and gestational age of infant were similarly distributed among farmers and non-farmers (data not shown).

DISCUSSION
We identified factors that may influence the elevated occurrence of LBW deliveries among farming women. These results may provide preliminary direction for policies and programs implementation.

- Because pregnancy outcomes such as LBW have been shown to be associated with strenuous physical exertion (REF), possible interventions should include reducing the amount of physical labor performed by farming mothers.
- Efforts should also be directed towards increasing the knowledge about healthy diets and appropriate gestational work habits as farmers and their partners were shown to have lower education attainment and may lack this information because health information is often not adequately disseminated to rural areas. These interventions would address the findings that farmers were two times more likely to be classified as underweight, gain less weight during gestation, and less likely to take iron folic supplements.
- This analysis of secondary data (analysis of controls from an original case-control study of LBW and non-LBW infants) may not be representative of the general obstetric population of Thai Nguyen Province. Inferences will be enhanced in future population-based studies of pregnant women in the province.
- Our study is one of the first to analyze characteristics that distinguish farming from non-farming mothers in Northern Vietnam. These results establish a foundation for future perinatal and reproductive health studies in the region.
Descriptive Study of Migraines in a Pregnant Population in Lima, Peru

Kathryn Sinclair, Jose Flores, Julio Perez, Sixto Sanchez, Michelle Williams

Dos de Mayo Hospital, Lima, Peru, Amauta Public Health Practica Program and Department of Epidemiology, MIRT Program, University of Washington, Seattle, Washington

Introduction

Epidemiologic studies in developed countries show that at least 18% of women of childbearing age suffer from migraines disorders and that this population is at increased risk of stroke. Little is known about the prevalence of migraine in Latin American populations. As the burden of disease in Peru shifts from infectious to chronic illnesses, it is essential to characterize the risk factors for vascular disorders in the populations, with an emphasis on women of reproductive age.

The information from this pilot study will provide a basis for future studies of migraine disorders and related disorders of pregnancy and chronic disease in Peru.

Objective

The principal aim of this study was to find, calculate, and assess the prevalence of migraine and study the comorbidity and disability associated with migraine in a pregnant population in Lima, Peru.

Materials and Methods

In this cross-sectional study, 154 pregnant women were recruited from the prenatal care clinic at Dos de Mayo Hospital in Lima, Peru. Eligible patients were between the ages of 18-45 and were less than 37 weeks of gestational age. Hospital personnel approached eligible patients as they checked in for their prenatal consultations, and referred them to the study interviewers to hear more about the study. Sampling was conducted continuously according to the availability of study interviewers.

The interviewers (students from the U.S.) presented the study consent forms to potential participants to read, and then answered any residual questions. Upon consent and enrollment into the study, patients were given a questionnaire and asked to complete it. The questionnaire included questions on demographic information, obstetric history, family history of headache, lifestyle habits, consciousness and disability associated with headache, and physical activity. An interview was conducted with each patient about their pregnancy, with an emphasis on women of reproductive age.

Data were entered and managed in Microsoft Excel and analyzed using SPSS and EpiInfo. Strict and probable migraine cases were determined by applying the International Headache Society classification criteria to the questionnaire responses (Figure 1). Characteristics associated with migraine headaches were tested using chi square tests and logistic regression analysis, with a 5% level of significance.

Results

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Figure 2 shows the difference in headache characteristics among classified headache types. Compared with non-migraine subjects, participants with migraines were four times more likely to report that their pregnancy was harder to manage than expected (p=0.076) and to use pharmaceutical treatment (p<0.01). Compared to controls, participants with migraines had a significantly higher prevalence of aura-like symptoms. All participants with any type of headache attack were equally likely to report associated neck and shoulder pain, nutritional triggers, association with the menstrual cycle, having had clinical testing (e.g. MRI, x-ray, blood testing), and the use of alternative treatments (e.g. massage, compresses). The three groups were also equally likely to experience headache relief in pregnancy.

Discussion

This research was supported by awards from the Amauta Practica Program, Puget Sound Partners for Global Health and the Multidisciplinary International Research Training Program, NIH

Figure 1: International Headache Society Classification Criteria

- Headache attack fulfilling all but one of the above criteria were classified as Probable Migraines
- Attacks fulfilling all but two of the above criteria were classified as Possible Migraines

Table 2: Multivariate Logistic Regression Model – Selected Factors associated with Any Migraine

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unadjusted OR (95%CI)</th>
<th>Adjusted OR* (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Headache History</td>
<td>3.17 (1.54-6.51)</td>
<td>4.17 (1.02-16.8)</td>
</tr>
<tr>
<td>Childhood Migraines</td>
<td>3.51 (1.32-9.57)</td>
<td>2.99 (1.17-7.6)</td>
</tr>
<tr>
<td>Allergies</td>
<td>1.85 (0.73-4.69)</td>
<td>3.72 (0.98-14.1)</td>
</tr>
<tr>
<td>Multiparity</td>
<td>2.99 (1.42-6.31)</td>
<td>2.24 (0.81-6.19)</td>
</tr>
<tr>
<td>Age &lt;18</td>
<td>1.00 (REF)</td>
<td>1.00 (REF)</td>
</tr>
<tr>
<td>18-24</td>
<td>1.38 (0.54-3.52)</td>
<td>1.42 (0.46-4.31)</td>
</tr>
<tr>
<td>25-29</td>
<td>3.68 (1.42-9.52)</td>
<td>3.19 (0.95-10.7)</td>
</tr>
<tr>
<td>30-34</td>
<td>1.80 (0.56-5.83)</td>
<td>1.69 (0.36-8.00)</td>
</tr>
<tr>
<td>35-39</td>
<td>3.44 (1.09-11.05)</td>
<td>2.61 (0.50-13.76)</td>
</tr>
<tr>
<td>40-45</td>
<td>2.61 (0.16-17.6)</td>
<td>2.53 (0.16-41.9)</td>
</tr>
<tr>
<td>Pre-pregnancy Fatigue</td>
<td>1.00 (REF)</td>
<td>1.00 (REF)</td>
</tr>
<tr>
<td>&gt;4 times per month</td>
<td>2.19 (0.91-5.27)</td>
<td>1.20 (0.43-3.59)</td>
</tr>
<tr>
<td>4+ times per month</td>
<td>5.11 (1.87-14.6)</td>
<td>7.07 (2.64-21.4)</td>
</tr>
</tbody>
</table>

Preach variable adjusted for all other variables in the table.
RISK FACTORS ASSOCIATED WITH TERM AND PRETERM LBW IN THAI NGUYEN, VIETNAM

Kelly Bai, Lisa Nguyen, Tu Phung, MD, MPH*, Michelle Williams, ScD

BACKGROUND

Low birth weight (LBW) is the leading cause of perinatal mortality and morbidity in both developed and developing countries. LBW can be a result of term intrauterine growth retardation (TIGR) or preterm delivery. Like other developing nations, Vietnam has a high incidence of LBW, with 25% of all deliveries reported to be LBW and 15% reported as preterm.

PURPOSE

The present study aims to identify and compare the risk factors for term and preterm LBW in Thai Nguyen, Vietnam.

METHOD

This was a secondary analysis of data collected from the Tu Phung case control study of the main factors associated with LBW in Thai Nguyen Hospital. The sample was collected from January 2002 to December 2003.

- Cases: cases were defined as female infants born with birth weights less than 2500 grams and gestational age of 28 weeks or more.
- Controls: controls were defined as female infants of the same age and gestational age who were not born with LBW.

- The study was stratified into the following categories: term (c) and preterm (p) cases. The control group was taken from the original study, but the exclusion criteria were: term LBW (birth weight < 2500 grams) and preterm LBW (birth weight < 2500 grams) as defined in Table 1.

- The data was analyzed using the Statistical Analysis System (SAS) version 9.02.

RESULTS

Term LBW

Among the demographic factors that we investigated, we noted that advanced maternal age, farming occupation, unemployed partner, unmedicated labor, and non-residence were risk factors for term LBW (Table 1). Medical risks during pregnancy for term LBW were also noted: maternal history of pre-eclampsia, reduced or absent visits to an obstetrician, and exposure to environmental tobacco smoke (ETS) (Table 2).

Preterm LBW

The only risk factor for preterm LBW was having an unemployed partner (Table 1). Medical risks during pregnancy for preterm LBW were increased maternal reproductive history of LBW, spontaneous abortion or preterm delivery, and maternal factors (Table 2).

DISCUSSION

This study found that term and preterm LBW had common and non-overlapping risk factors (Figure 2). Overall, our findings suggest that increased attention and awareness are needed for women reproductive health and prenatal care in Vietnam.

Figure 1: Comparison of risk factors for term and preterm LBW.

Figure 2: Comparison of risk factors for term and preterm LBW.

TABLE 1. Adjusted odds ratios and 95% confidence intervals of term and preterm LBW, Thai Nguyen province, Vietnam. January-December 2002

<table>
<thead>
<tr>
<th>Variable</th>
<th>Term LBW Odds Ratios (95%)</th>
<th>Preterm LBW Odds Ratios (95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age</td>
<td>1.19 (0.86-1.65)</td>
<td>1.02 (0.67-1.55)</td>
</tr>
<tr>
<td>Maternal education</td>
<td>1.84 (1.41-2.39)</td>
<td>1.06 (0.74-1.51)</td>
</tr>
<tr>
<td>Maternal occupation</td>
<td>1.19 (0.91-1.62)</td>
<td>1.03 (0.73-1.45)</td>
</tr>
<tr>
<td>Maternal history of pre-eclampsia</td>
<td>2.12 (1.60-2.78)</td>
<td>1.05 (0.73-1.51)</td>
</tr>
<tr>
<td>Maternal history of SMSP</td>
<td>2.05 (1.58-2.63)</td>
<td>1.04 (0.73-1.51)</td>
</tr>
<tr>
<td>Maternal history of ETS</td>
<td>2.05 (1.58-2.63)</td>
<td>1.04 (0.73-1.51)</td>
</tr>
<tr>
<td>Maternal history of smoking</td>
<td>2.05 (1.58-2.63)</td>
<td>1.04 (0.73-1.51)</td>
</tr>
</tbody>
</table>

TABLE 2. Adjusted odds ratios and 95% confidence intervals of term and preterm LBW, Thai Nguyen province, Vietnam. January-December 2002

<table>
<thead>
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</tr>
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<td>1.04 (0.73-1.51)</td>
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<td>1.04 (0.73-1.51)</td>
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<tr>
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</tbody>
</table>

This research was conducted with the Multidisciplinary International Research Training Program. The work was supported by a grant from the Fogarty International Center, NIH to the University of Washington.

http://www.lib.utexas.edu/maps/mobile/sust/asia/vietnam/pal02.jpg

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Courtesy of female patients of the Thai Nguyen Central General Hospital

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 Courtesy of female patients of the Thai Nguyen Central General Hospital

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Risk Factors for Preterm Delivery among Zimbabwean Women

1Ribka Ayana, 2Godfrey B. Woelk, 2Kassam Mohamed, 1Yi Ning, 1Michelle A. Williams
University of Washington School of Public Health and Community Medicine, Seattle USA University of Zimbabwe Medical School, Harare, Zimbabwe.

Table 3: Multivariate Analysis of Risk Factors for Preterm Delivery in Harare Zimbabwe 1998-1999

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Term %</th>
<th>Preterm %</th>
<th>Unadjusted OR (95% CI)</th>
<th>p value</th>
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<tbody>
<tr>
<td>Maternal Age (years)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;18</td>
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<td>5.7</td>
<td>1.00 Reference</td>
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<tr>
<td>18-24</td>
<td>60.0</td>
<td>64.2</td>
<td>0.85 (0.24-2.102)</td>
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<tr>
<td>25-34</td>
<td>30.2</td>
<td>26.4</td>
<td>0.70 (0.18-2.60)</td>
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</tr>
<tr>
<td>&gt;35</td>
<td>5.2</td>
<td>3.8</td>
<td>0.58 (0.09-3.35)</td>
<td></td>
</tr>
<tr>
<td>Maternal Education</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 3</td>
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<td>Grade 4-Form 4</td>
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<td>0.86 (0.18-1.75)</td>
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<td>40.1</td>
<td>0.70 (0.21-2.32)</td>
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<tr>
<td>Marital Status</td>
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<td></td>
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<tr>
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<td>5.2</td>
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<td>3.74 (1.63-8.59)</td>
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<tr>
<td>Residence</td>
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<td>High density</td>
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<tr>
<td>Low density</td>
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<td>70.0</td>
<td>60.4</td>
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<tr>
<td>Owns a Radio</td>
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<td></td>
<td></td>
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<td>45.7</td>
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<tr>
<td>Owns a Television</td>
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<td>Yes</td>
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<tr>
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<td>49.8</td>
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<tr>
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<td>49.8</td>
<td>0.75 (0.42-1.33)</td>
<td>0.152</td>
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<tr>
<td>Employee During Pregnancy</td>
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<td>59.6</td>
<td>1.00 Reference</td>
<td></td>
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<tr>
<td>No</td>
<td>70.0</td>
<td>60.4</td>
<td>0.65 (0.36-1.17)</td>
<td></td>
</tr>
</tbody>
</table>

Methods

We conducted a cross sectional serological study of pregnant women admitted for labor and delivery at Harare Maternity Hospital between June 1998-December 1999. Potential participants were identified by daily surveillance of labor and delivery log book and medical records. Women were recruited within 12 hours of delivery.

After obtaining informed consent, patients were invited to participate in an in-person 20-30 minute interview and provide 20-30ml blood sample. Data analysis was limited to 496 participants due to missing information on some participants. Univariate and multivariate analysis of the data was conducted using SPSS statistical software.

Although preterm birth is the leading cause of neonatal morbidity, its etiologic cause remains largely unknown. Considerable improvements made in neonatal care in medically advanced countries have reduced neonatal morbidity. Nonetheless, even in countries such as the United States, the rate of preterm delivery remains stable and many preventative measures have proven ineffective (Goldenberg 2002).

Developing countries such as Zimbabwe face an even greater challenge due to their poor economic status. In addition, there is a lack of studies which have been able to identify risk factors that are unique to developing populations. This will have a significant impact on the quality and effectiveness of care available to pregnant women.

Objective

To identify risk factors for preterm delivery among urban Zimbabwean women at Harare Maternity Hospital.

Discussion

The frequency of preterm delivery among the 496 women who participated in the study was 10.6%. Single women as well as women who reported not taking any vitamins or folate acid during pregnancy experienced a higher risk of preterm delivery.

Of maternal medical and reproductive factors, before adjusting for covariates, tuberculosis, prior neonatal death, any infection (aggregate of tuberculosis, malaria, chest infection of shingles), and malaria were identified as significant risk factors. The final multivariable analysis showed that independent risk factors for preterm birth include, prior neonatal death, single marital status, vitamin use during pregnancy, and any infection. No direct association was found between any of the socioeconomic variables and preterm delivery.

This study was supported by a grant from the Fogarty International Center, National Institutes of Health, Bethesda, Maryland, USA.