Period prevalence and anthropometric predictors of premature rupture of membranes in Mexican women, 2009-2012

Dear editor: The premature rupture of membranes (PROM) represents a health problem with an increased risk of infection and complications to mother and baby. PROM may result from various reasons including low socioeconomic status (SES), intra-amniotic infection, second and third-trimester bleeding, nutritional disorders of copper and ascorbic acid, connective tissue disorders, cervical conisation or cerclage, pulmonary diseases, uterine overdistention, amniocentesis, previous preterm birth, short cervical length in the second trimester, women with preterm labor or symptomatic contractions in the current pregnancy.1

In this letter to the editor we show the results of a case-control study on the association between anthropometric characteristics and PROM in Mexican pregnant women attending the emergency room of Mónica Pretelini Hospital in Toluca, Estado de México between 2009 and 2012. A total of 13 681 women were seen with an overall PROM prevalence of 4.5% (620 cases with PROM, and 13 061 controls without PROM nor conditions associated with PROM). The preterm PROM (PPROM) prevalence was 5.5%. Cases and controls were similar with regard to mean age, height, respiratory rate, heart rate, body temperature and blood pressure (table I). PROM cases were 32% more likely to have a pregnancy of less than 37 weeks of gestation compared to controls. A 1-Kg lower maternal weight was associated with 1% increased risk of PROM in all women and for each gestational week less, the risk increased 5% (p<0.05, tables II and III).

A previous Mexican study from Sinaloa2 showed PPROM prevalence of 8.9% which is higher than our 5.5% estimate. The differences in estimates of prevalence might be partially explained by selection bias or sample size, for instance, the control group in our study was about ten times larger than the control group in the Sinaloa’s study. Our report is the first study showing the association between lower maternal weight during pregnancy and PROM in Mexican pregnant women. Previous studies showed that PPROM cases were more likely to have gained less than 21 pounds as compared to controls.3 These findings may indicate suboptimal nutritional status with deficiencies that put pregnant women at risk of PROM. For instance, low plasma levels of copper4 or vitamin C have been associated with the presence of PROM. Vitamin C plays an important role in collagen metabolism and increases resistance maintenance of the chorioamniotic membranes. At the molecular level, PROM appears to result from diminished collagen synthesis, altered collagen structure, and accelerated collagen degradation, possibly in association with concurrent cellular changes within the fetal membranes.

In the present study, SES indicators were not available, which represent a potential confounder, however, a previous Mexican study2 showed no differences due to SES between PROM cases and controls. This may be explained by the type of population, in both Mexican studies pregnant women seeking attention usually come from the low SES because both hospitals are government hospitals under the Ministry of Health which serve the underserved. Future studies in Mexican women are needed to determine whether patients with PROM have specific deficiencies of vitamin C, copper or other nutritional disorders.

Table I

| Characteristics of PROM cases and controls, mean (standard deviation) and range |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  | Cases (PROM)    | Control          | p-value         | Total            |
|                  | n=620           | group n=13 061   | by t-test       | n=13 681         |
| Age (years)      | 23.7 (6.1) 14-44 | 23.3 (6.2) 13-44 | 0.08            | 23.3 (6.2) 13-44 |
| Height (meters)  | 1.55 (0.06) 1.40-1.73 | 1.55 (0.06) 1.40-1.76 | 0.55            | 1.55 (0.06) 1.40-1.76 |
| Weight (kilograms) | 67.2 (10.3) 45-101.5 | 67.9 (10.5) 45-104 | 0.07            | 67.9 (10.5) 45-104 |
| Weeks of gestation | 37.0 (2.97) 28-42 | 37.5 (2.93) 28-42 | <.001           | 37.5 (2.9) 28-42 |
| Respiratory rate (per min) | 20.8 (2.2) 16-32 | 20.6 (2.2) 15-40 | 0.12            | 20.7 (2.2) 15-40  |
| Heart rate (per min) | 82.3 (9.4) 58-140 | 81.7 (8.8) 50-168 | 0.14            | 81.1 (8.9) 50-168 |
| Body temperature (°C) | 36.3 (0.37) 35-38 | 36.3 (0.37) 35-40 | 0.58            | 36.3 (0.37) 35-40 |
| Systolic blood pressure (mm Hg) | 115 (13.8) 80-170 | 114 (13.5) 60-170 | 0.12            | 114 (13.5) 60-170 |
| Diastolic blood pressure (mm Hg) | 71.8 (10.4) 40-110 | 71.4 (10.3) 40-136 | 0.37            | 71.4 (10.3) 40-136   |

*Premature rupture of membranes

Source: Electronic database of the Emergency Department, Mónica Pretelini Sáenz Hospital

Univariate analysis of women characteristics and seasonality by group

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Cases (PROM\textsuperscript{a})</th>
<th>Controls</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>n=620</td>
<td>n=13 061</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>31+</td>
<td>100</td>
<td>5.0</td>
<td>1.910</td>
<td>95.0</td>
<td>0.30</td>
<td>1.12</td>
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<td></td>
<td>2.010</td>
<td>1.47</td>
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<tr>
<td>13-30</td>
<td>520</td>
<td>4.3</td>
<td>11 151</td>
<td>95.5</td>
<td>1.00</td>
<td>referent</td>
</tr>
<tr>
<td></td>
<td>11 671</td>
<td>85.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Weeks of gestation</td>
<td>&lt;37</td>
<td>217</td>
<td>5.5</td>
<td>3 757</td>
<td>94.5</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td>3 974</td>
<td>29.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥37</td>
<td>403</td>
<td>4.2</td>
<td>9 304</td>
<td>95.8</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>9 707</td>
<td>71.0</td>
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Body mass index

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<tr>
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<th>n</th>
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<th>%</th>
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<td>Underweight (&lt;18.5)</td>
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<td>7</td>
<td>87.5</td>
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<tr>
<td>Normal (18.5-24.9)</td>
<td>146</td>
<td>4.9</td>
<td>2 815</td>
<td>95.1</td>
<td>1.17</td>
<td>0.93-1.46</td>
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<tr>
<td>Overweight (25-29.9)</td>
<td>298</td>
<td>4.5</td>
<td>6 294</td>
<td>95.5</td>
<td>0.50</td>
<td>0.99-1.01</td>
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<tr>
<td>Obese (≥30)</td>
<td>175</td>
<td>4.2</td>
<td>3 945</td>
<td>95.8</td>
<td>1.00</td>
<td>referent</td>
</tr>
<tr>
<td>Obese I (30-34.9)</td>
<td>144</td>
<td>4.3</td>
<td>3 168</td>
<td>95.7</td>
<td>0.47</td>
<td>0.76-1.77</td>
</tr>
<tr>
<td>Obese II (35-39.9)</td>
<td>27</td>
<td>3.8</td>
<td>692</td>
<td>96.2</td>
<td>1.00</td>
<td>referent</td>
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<tr>
<td>Obese III (40+)</td>
<td>4</td>
<td>4.5</td>
<td>85</td>
<td>95.5</td>
<td>0.72</td>
<td>0.96-1.05</td>
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Year of visit to ER\textsuperscript{c}

<table>
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<th>Year of visit to ER</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
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<tr>
<td>2009</td>
<td>130</td>
<td>4.2</td>
<td>2 996</td>
<td>95.8</td>
<td>0.87</td>
<td>1.02</td>
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<tr>
<td>2010</td>
<td>192</td>
<td>5.3</td>
<td>3 444</td>
<td>94.7</td>
<td>0.01</td>
<td>1.30</td>
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<tr>
<td>2011</td>
<td>161</td>
<td>4.5</td>
<td>3 402</td>
<td>95.5</td>
<td>0.37</td>
<td>1.11</td>
</tr>
<tr>
<td>2012</td>
<td>137</td>
<td>4.1</td>
<td>3 219</td>
<td>95.9</td>
<td>1.00</td>
<td>referent</td>
</tr>
<tr>
<td>All years</td>
<td>620</td>
<td>4.3</td>
<td>13 061</td>
<td>95.7</td>
<td>1.00</td>
<td>referent</td>
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</tbody>
</table>

Season

<table>
<thead>
<tr>
<th>Season</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>190</td>
<td>5.0</td>
<td>3 594</td>
<td>95.0</td>
<td>0.12</td>
<td>1.18</td>
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<tr>
<td>Winter</td>
<td>130</td>
<td>4.6</td>
<td>2 718</td>
<td>95.4</td>
<td>0.55</td>
<td>1.07</td>
</tr>
<tr>
<td>Spring</td>
<td>146</td>
<td>4.3</td>
<td>3 289</td>
<td>95.7</td>
<td>0.98</td>
<td>0.997</td>
</tr>
<tr>
<td>Summer</td>
<td>154</td>
<td>4.3</td>
<td>3 460</td>
<td>95.7</td>
<td>1.00</td>
<td>referent</td>
</tr>
</tbody>
</table>

\* Premature rupture of membranes
\dagger Emergency Room

Source: Electronic database of the Emergency Department, Mónica Pretelini Sáenz Hospital

Multivariable analysis showing associated factors of PROM

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>OR\textsuperscript{a}</th>
<th>95% CI</th>
<th>p-value</th>
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<tbody>
<tr>
<td>1.01</td>
<td>1.00</td>
<td>1.026</td>
<td>0.058</td>
</tr>
<tr>
<td>Height (meters)</td>
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<td>\textsuperscript{----}</td>
</tr>
<tr>
<td>Weight (kilograms)</td>
<td>0.99</td>
<td>0.98</td>
<td>0.998</td>
</tr>
<tr>
<td>Weeks of gestation</td>
<td>0.95</td>
<td>0.93</td>
<td>0.977</td>
</tr>
<tr>
<td>Respiratory rate (per min)</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
</tr>
<tr>
<td>Cardiac rate (per min)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.015</td>
</tr>
<tr>
<td>Body temperature (°C)</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
</tr>
<tr>
<td>Systolic blood pressure (mmHg)</td>
<td>1.01</td>
<td>1.00</td>
<td>1.011</td>
</tr>
<tr>
<td>Diastolic blood pressure (mmHg)</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
<td>\textsuperscript{----}</td>
</tr>
<tr>
<td>Fall</td>
<td>1.15</td>
<td>0.96</td>
<td>1.370</td>
</tr>
<tr>
<td>Year of 2010</td>
<td>1.22</td>
<td>1.02</td>
<td>1.451</td>
</tr>
<tr>
<td>&lt;37 weeks of gestation\textsuperscript{d}</td>
<td>1.32</td>
<td>1.11</td>
<td>1.558</td>
</tr>
</tbody>
</table>

\* aOR adjusted odds ratios using backward elimination procedure set to 0.2 significance level
\dagger A separated multivariable logistic regression analysis including weeks of gestation as an indicator variable (< 37 weeks=1; else =0) after controlling by all other variables in the model.

Source: Electronic database of the Emergency Department, Mónica Pretelini Sáenz Hospital

References


Violencia de pareja en la gestación y el perfil del autor de la agresión

Señor editor: La violencia contra la mujer es un problema complejo que compromete el desarrollo pleno e integral de las mujeres en Brasil y en el mundo, la cual llega a ser aún más grave cuando ocurre en mujeres durante el periodo de gestación, lo que trae un riesgo adicional para la vida intrauterina de su hijo.\textsuperscript{1}