The Hispanic Paradox and Measurement Error:

Recall of Last Menstrual Period & Gestational Age Estimation among Mexican Immigrants

Project supported by funds from the CDC / National Center for Health Statistics (Contract No. UR6/CCU417428-01).
William Kalsbeek, PhD.
Director of the Center for Health Statistics Research, Department of Biostatistics, University of North Carolina at Chapel Hill, NC

Pierre Buekens, MD
Chair, Department of Maternal and Child Health, School of Public Health, University of North Carolina at Chapel Hill, NC

Project supported by funds from the CDC / National Center for Health Statistics (Contract No. UR6/CCU417428-01).
Betzabe Butron-Riveros, M.D., M.Sc.
Department of Maternal and Child Health, School of Public Health, University of North Carolina at Chapel Hill, NC

Robert P. Agans, Ph.D.
Center for Health Statistics Research, Department of Biostatistics, University of North Carolina at Chapel Hill, NC

Natalia Deeb-Sossa, M.A.
Department of Sociology, University of North Carolina at Chapel Hill, NC

Project supported by funds from the CDC / National Center for Health Statistics (Contract No. UR6/CCU417428-01).
BACKGROUND

- Hispanic Population: Demographic characteristics
- Hispanic Paradox Defined
- Hispanic Paradox and LBW
- Measurement Error in GA
HISPANIC POPULATION
Demographic Characteristics

The Hispanic population in the US is growing rapidly.

In March 2000, 32.8 million Hispanics lived in the United States.

12% of the U.S. population is Hispanic
HISPANIC POPULATION
Percent Distribution of Hispanics

- Mexican: 66%
- Puerto Rican: 9%
- Cuban: 4%
- Central and South American: 15%
- Other Hispanic: 6%

Source: US Census Bureau, March 2000
Hispanic & Non-Hispanic White Population by Age & Sex

Source: US Census Bureau, March 2000
HISPANIC POPULATION
Poverty Level by Age & Origin: 1999

Source: US Census Bureau, March 2000
HISPANIC POPULATION
Education by Hispanic Origin: 2000

(Population 25 years and over)

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Hispanic</th>
<th>Non-Hispanic White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 9th grade</td>
<td>27.3</td>
<td>4.2</td>
</tr>
<tr>
<td>9th to 12th grade (no diploma)</td>
<td>15.7</td>
<td>7.3</td>
</tr>
<tr>
<td>High school graduate</td>
<td>27.9</td>
<td>34.1</td>
</tr>
<tr>
<td>More than high school</td>
<td>29.1</td>
<td>54.4</td>
</tr>
</tbody>
</table>

- Hispanic
- Non-Hispanic White
Disadvantaged SES status leads to less favorable health outcomes.
HISPANIC PARADOX DEFINED

Definition:
Health outcomes unexpectedly equal or better than Non-Hispanic whites in the US, in spite of the Hispanics' less favorable socioeconomic status.

Related outcomes:
- Infant mortality (mainly neonatal mortality)
- Birth weight
- Adult mortality
HISPANIC PARADOX DEFINED

Potential Explanations

- Under registration of infant deaths
- Differences in maternal risk profile
- Differences in maternal behaviors
- Effects of social networks
- Healthy migrant hypothesis
HISPANIC PARADOX DEFINED

Potential Explanations

- Under registration of infant deaths
- Differences in maternal risk profile
- Differences in maternal behaviors
- Effects of social networks
- Healthy migrant hypothesis

**Existing literature does not provide definite evidence against or in favor of any of the above**

Less smoking
Less alcohol
Better diet
HISPANIC PARADOX AND LBW

LBW Ratios of different Hispanic groups compared to White population: 1980-1997

Birth weight distribution of Mexicans and Non-Hispanic Whites newborns at Term

Mexican showed lower mean birth weight than NH Whites

Birth weight of Mexican & Non-Hispanic White newborns at 28-31 weeks of gestation

Some “preterm” babies have term birth weight: Suggests errors in gestational age estimation
MEASUREMENT ERRORS IN GESTATIONAL AGE

Potential Sources of Error

Gestational age:
- Term fetus or newborns (37 or more weeks)
- Pre Term (<37 weeks)

Last Menstrual Period:
- Standard to estimate GA
- Subject to error
- Assumption: Most errors are reporting errors
CHSR Study: Factors affecting this process

Potential sources of error

When was the first day of your last menstrual period?

Provider & Client Misinterpretation

Date of LMP

A date is given

A date is NOT given

Provider: Various ways to calculate GA

Gestational Age Recorded in Clinical records and Birth certificate

MEASUREMENT ERRORS IN GESTATIONAL AGE

Potential Sources of Error

Provider-Client Interaction

Women Recall process

Provider: Various ways to calculate GA
METHODS
Overview

• Cultural Factors
  – Unique cultural perceptions
  – Taboo topics or insensitive questions

• Linguistic Factors
  – Conceptual equivalence
  – Linguistic equivalence
METHODS

Overview

• Need to understand cultural and linguistic factors operating within diverse populations.

• The focus group is one such methodological tool.
**METHODS**

**Participants**

<table>
<thead>
<tr>
<th>Sampling Diversity</th>
<th>Number of Focus Groups</th>
</tr>
</thead>
</table>

| Urban Areas         |                         |
| City Neighborhoods  |                         |
| • Catholic church   | 1                       |
| • United Church of Christ | 2 |

| Rural Areas         |                         |
| Rural Towns         |                         |
| • County Health Department | 2 |
| • English as a Second Language | 1 |
| • Migrant Farm Workers | 2 |

Total: 8
## METHODS

### Participants

<table>
<thead>
<tr>
<th>Characteristics of Members</th>
<th>Number of Focus Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Women</td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>1</td>
</tr>
<tr>
<td>Married Women</td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>1</td>
</tr>
<tr>
<td>With children</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
</tr>
</tbody>
</table>
METHODS
Materials

Structured Interview Guide
• Gynecologist Scenario
• Nonthreatening Questions
• Calculation of GA
• Recall of LMP
METHODS

Procedure

• Expenses involved
• Importance of establishing community legitimacy
• Honoring participant preferences
• Useful techniques
METHODS

Procedure

- Transcriptions in Spanish
- Analysis in Spanish
- Codebook w/ 138 codes
- 20 themes emerged
- Interrater reliability 90-98%
- Themes presented today found in all focus groups
FINDINGS

• MISCLASSIFICATION
• GESTATIONAL AGE
• LMP
Focus groups were used to:

- explore the way GA is calculated,
- recall LMP, and
- the factors that might be related to variation in the way Mexican Immigrant women responded.
MISCLASSIFICATION

We expected contextual variability (i.e. rural versus urban) and differences in women’s individual experiences relevant to GA and LMP (i.e. marital status and number of pregnancies) to be related to the variation on the ways these women understood GA and LMP.
MISCLASSIFICATION

The LACK of variability in women’s responses suggests that our results were **not** specific to a particular place (i.e. rural vs urban) or to a particular kind of woman.
MISCLASSIFICATION

Exploring Misclassification: How women calculate GA?
FINDINGS
How did we ask about GA?

When a woman is pregnant, people ask her when her baby will be born.
When / If you were pregnant how did / would you calculate when the baby was due?
What was the day you began counting?
Describe the day.

Cuando una mujer está embarazada, la gente le pregunta cuándo nacerá el bebé.
¿Si ustedes estuvieran/estan embarazadas cómo calcularía el día en que nacerá el bebé?
¿A partir de que día comenzó usted a contar? Describa el día.
FINDINGS
Gestational Age

Of the 29 women interviewed:

• 15 women described how they calculated the DOB;

• 14 women described how their doctors calculated the DOB.
FINDINGS
Gestational Age

How they calculated the DOB:

- Starting Point
- Duration
FINDINGS: GESTATIONAL AGE
Women’s Calculation
Missed Period

• 11 women calculated the date of birth (DOB) using the *missed period* as a reference.

• 10 answered that a pregnancy lasted 9 months; &
• 1 said that pregnancy could last nine months plus or minus eight days.
FINDINGS: GESTATIONAL AGE
Women’s Calculation
Missed Period

As one of the women said:

“Bueno si me tocaba la regla el día cinco y no llegaba, de ahí yo contaba los nueve meses. Yo sé cuando me toca y cuando no viene de ahí empiezo a contar.”

“If the period began the 5th and did not arrive, I begin counting the 9 months. I know when I had to have it, and when it doesn’t come I begin to count.”
FINDINGS: GESTATIONAL AGE
Women’s Calculation
Other Starting Points

4 women used different starting points:

• 1 used the 1st day of LMP
• 1 used the last day of LMP
• 1 used the day of ovulation
• 1 used the day of intercourse
The respondent that used the **last day of her LMP** calculated the DOB by:

“Yo contaría después de mí ultimo día de menstruación. ¿Y cuanto crees que va a durar un embarazo, normalmente? Nueve meses”.

I would count after the last day of my menstruation. And how long would a pregnancy normally last? Nine months.
FINDINGS: GESTATIONAL AGE
Women’s Calculation Misclassification

Given that most OBGYNs calculate DOB 40 weeks after a woman’s first day of LMP,

These women’s ways of calculating DOB are not very different to the way an OBGYN will calculate DOB.
FINDINGS: GESTATIONAL AGE

Of the 29 women interviewed:

• 15 women described how they calculated the DOB;

• 14 women described how their doctors calculated the DOB.
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s calculation

How the doctors had calculated the DOB.

• How they understand the way doctors calculate DOB?

• How they are interpreting the questions health care providers ask them?
FINDINGS: GESTATIONAL AGE
Women’s understanding of Doctor’s calculation
How they understand the way doctors calculate DOB?
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s calculation

Their understanding of the way doctors calculate DOB is typified by the comment below:

“Fui a la clínica, y me dijeron, cuando fue tu última regla. Yo los dije, cuando se me ha terminado mi última regla, y entonces usando la ruedita ellos me enseñaron que eran mas o menos 40 semanas, que sería haciendo 9 meses, ¿no?”

“I went to the clinic, and they asked me, when was your LMP. I told them when my LMP ended, and using the circle they taught me that was approx. 40 weeks, that is 9 months, right?”
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s calculation

Another woman explained:

“Me preguntaron: Cuándo fue el último día de mi regla, y yo les dije, que en tal fecha y miraron en la rueda la fecha en que me iba a aliviar.”

“They asked me: When was the last day of my period, so I told them that is was this date and they looked in the circle the date I would give birth.”
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s questions

How they are interpreting the questions health care providers ask them?
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s questions

It is standard that health care providers ask:

When was the first day of your last menstrual period?
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s questions

Their understanding of the question doctors asked is typified by the comment below.

“Me dijeron, ‘¿Cuándo fue tu última regla?’ Yo los dije, cuando se me ha terminado mi última regla.”

“They asked, When was your last menstruation? I answered when my last menstruation had finished.”
FINDINGS: GESTATIONAL AGE

Women’s understanding of Doctor’s questions & Misclassification

When was the first day of your last menstrual period?

≠

When was your last menstruation?

or

When did your menstruation end?
MISCLASSIFICATION

Exploring Misclassification: Do Mexican Immigrant women recall the date of their LMP?
FINDINGS
Recall of LMP

Some women remember the date of their last menstrual period. Other women have a harder time remembering this date. Do you remember the date, that is month, day, and year, of your last menstrual period?
FINDINGS
Recall of LMP

How do they recall LMP:

- Is a date given?
- Certainty
- Potential Determinants of recall of LMP
FINDINGS
Recall of LMP

22 women provided a date and had no doubts about it (Exact Date)

5 gave date but had some doubts (Approx. Date)

2 were not able to provide any date

1 woman was 52 years of age and had long periods of not having periods, probably due to menopausal changes.
FINDINGS: RECALL OF LMP
Potential Determinants

Potential determinants of women’s LMP recall:

• a woman self-perception of having “regular” or “irregular” menstruation;

• type of family planning method;
Potential determinants of women’s LMP recall:

A woman perceived herself “regular” if:
• her period comes every month and
• approximately the same day every month.

“Regular” if:
• her period always regular or
• as a result of type of birth control (i.e. birth control pills)
FINDINGS: RECALL OF LMP

Potential Determinants

The self-perception of having regular menses helped women recalled the LMP. As one of the woman said,

En mi caso si me baja el día tres de noviembre me tiene que bajar el tres de diciembre. Yo soy siempre exacta.

In my case if it comes the 3rd of November it has to come down the 3rd of December. I am always exact.
FINDINGS: RECALL OF LMP
Potential Determinants

Potential determinants of women’s LMP recall:

A woman perceived herself “irregular”

“Irregular” if:
- her period always irregular or
- as a result of type of birth control (i.e. DEPO).
FINDINGS: RECALL OF LMP
Potential Determinants

8 women provided a date for their LMP despite having irregular menses.

These women were aware of their periods, so were able to provide date despite irregularity.

• 1 associated the date of the LMP with a festivity date

• 2 referred the date of the LMP as a date difficult to forget because it was associated with a personal important event
FINDINGS: RECALL OF LMP
Potential Determinants

As one of the women said:

Yo, si (recuerdo el dia de mi ultima regla). Me case 4 de septiembre, y el 21 de Octubre fue mi ultima regla del 98, hasta ahorita no he vuelto a reglar.

I do remember the date of my LMP. I got married the 4th of September, and the 21 of October I had my last period of 98, and I have not had another menstruation.
FINDINGS: RECALL OF LMP

Misclassification

Most women recalled the date of their last menstrual period
CONCLUSIONS

• Mexican women:
  • Know the date of the LMP
  • Provide the last day of the LMP
  • Certainty level

• Factors that help recall:
  • Having Regular Periods
  • Use of Pills
  • Having increased awareness
CONCLUSIONS

When was the first day of your last menstrual period?

Potential sources of error

Provider-Client Interaction

Provider & Client Misinterpretation

Date of LMP

A date is given

A date is NOT given

Providers:
Various ways to calculate GA

Gestational Age Recorded in Clinical records and Birth certificate

Women Recall process
CONCLUSIONS

What may explain our results?
The context and dynamics of the focus group facilitated the recall process
CONCLUSIONS

• LMP perceived as unreliable for GA estimation, especially for minority women.

• Therefore, other means (i.e. ultrasound) are used to perform additional estimations of GA.

• Our results showed that the majority of Mexican women know their LMP with certainty.
CONCLUSIONS

Possible ways to obtain reliable data on LMP:
• More appropriate set of questions
• Better clinical environment/client-provider interaction

Therefore,

Efforts and resources to estimate GA by other means (such as ultrasound) could be better directed to those who really need them.
CONCLUSIONS
Possible Steps to elicit LMP

When was the date of your LMP?

A date is given  A date is NOT given

Is this the day when your period began?

Yes  No

How do you remember that date?

Women is sure  Woman is not sure

(she is regular, uses pills, had salient event or reasons for increased awareness)

High certainty  Low certainty

Find out the date

FIRST day

Certainty level
Thanks!

Gracias!