Proyecto Puentes de Salud (Project Health Bridges): High Rates of Depression and Cardiovascular Risk Factors in Rural Mexico


University of North Carolina at Chapel Hill
Background

- CVD and depression
  - 1st & 2nd largest contributors to the global burden of disease by 2030.¹
- Depression is an independent risk factor for developing CVD:
  - Relative risk of developing cardiovascular disease increased by 1.5 – 2.4.²

Association between Depression & CVD

- Increased sympathetic nervous system activity – altered autonomic tone:¹
  - Depressed patients show heightened activation of sympathetic nervous system
  - Decreases heart rate variability
- Increase in inflammatory biomarkers:²
  - Depressed patients have elevation of CRP and IL-6 found.
  - Elevation of these inflammatory biomarkers associated with development of CVD

Impact of migration

- Latinos are the largest and fastest growing minority in the United States.
  - The immigration flow remains constant
- Many of Latinos in the US emigrate from rural Mexico.
- Migration of rural Latinos can impact the prevalence of depression among family members that remain in their home country.
- Understanding health care issues in migrant populations is important to improve care and target specific problems.
  - Widespread impact of these diseases
  - Growing influence of migration on global health
Objective

- We sought to assess the prevalence of cardiovascular disease risk and depression among nine rural communities in Guanajuato, Mexico.
Methods – Proyecto Puentes de Salud

- Ongoing Medical Student research and service project in Guanajuato, Mexico since 2006
- Participants are recruited at health fairs located in rural communities that have limited access to health care providers
- Participants are offered free screenings which include:
  - measurements of serum lipid levels, glycemia, blood pressure, body weight, height and waist circumference
- Blood samples are analyzed with Cholestech LDX® System to measure serum glucose, HDL-C, and total cholesterol.
Methods

For the purpose of the current analysis, a convenience sample of 432 participants was recruited from nine rural communities in Guanajuato during June and July of 2007.

These participants underwent:

- Depression Screening:
  - Nine-question Primary Care Evaluation of Mental Disorders Brief Patient Health Questionnaire (PHQ-9)
  - PHQ-9 is validated for use in this population
  - Patients scoring >10 on the PHQ-9 are considered depressed.

- Lifestyle Screening
  - Interviews using the standardized Personal Wellness Profile™ that includes:
    - demographic information
    - past medical history and family history
    - dietary and lifestyle behaviors
# Cardiovascular Screening Results

<table>
<thead>
<tr>
<th>Variables (n=432)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Mean (±SD)</td>
<td>46 (±16)</td>
</tr>
<tr>
<td>Range</td>
<td>18-88</td>
</tr>
<tr>
<td><strong>Female Sex</strong></td>
<td>79%</td>
</tr>
<tr>
<td><strong>Elevated BP (&gt;140/80 mmHg)</strong></td>
<td>38%</td>
</tr>
<tr>
<td><strong>Impaired fasting glucose (&gt;100 mg/dL)</strong></td>
<td>21%</td>
</tr>
<tr>
<td><strong>Elevated total cholesterol (&gt;200 mg/dL)</strong></td>
<td>17%</td>
</tr>
<tr>
<td><strong>Low HDL</strong></td>
<td>82%</td>
</tr>
<tr>
<td>(&lt;40 mg/dL males, &lt;50 mg/dL females)</td>
<td></td>
</tr>
<tr>
<td><strong>Elevated Waist Circumference</strong></td>
<td>62%</td>
</tr>
<tr>
<td>(&gt;102 cm for men, &gt;88 cm for women)</td>
<td></td>
</tr>
<tr>
<td><strong>Metabolic Syndrome</strong></td>
<td>43%</td>
</tr>
<tr>
<td>(ATP III-R criteria)*</td>
<td></td>
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</tbody>
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*Grundy et. al *Circulation* 2006;112 (17):2735
Methods

- All participants were counseled about CVD risk factors.
- Immediate counseling and free follow up with local physicians:
  - Offered to all participants who screened positively for depression (defined as a score of >10 on the PHQ-9) or one or more CVD risk factors
- Source of Funding
  - UNC Latino Healthy Heart Initiative
  - Department of Family Medicine, UNC
  - UNC CAMPOS (Comprehensive Advanced Medical Program of Spanish)
  - US Dept of Health and Human Services
    - HRSA award 5-D56HPO213
  - UNC Center of Global Initiatives
Prevalence of Metabolic Syndrome

Modified ATP III Criteria: Any 3 of the following*

1) Abdominal Obesity
   Men: waist >40 inches
   Women: waist >35 inches
2) Low HDL Cholesterol
   Men: <40 mg/dL
   Women: <50 mg/dL
3) Blood Pressure
   ≥130/≥85 mmHg
4) Triglycerides
   ≥150 mg/dL
5) Fasting Glycemia
   >100 mg/DL

Results

*Grundy et. al Circulation 2006;112 (17):2735
Prevalence of Depression by Severity

Results

- PHQ-9 score >10: 46%
- PHQ-9 score 5-9: 28%
- PHQ-9 score 10-14: 14%
- PHQ-9 score 14-19: 8%
- PHQ-9 score 20-27: 4%

Subjects

<table>
<thead>
<tr>
<th>PHQ 9 Score</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Depression (1-4)</td>
<td>46%</td>
</tr>
<tr>
<td>Mild Depression (5-9)</td>
<td>28%</td>
</tr>
<tr>
<td>Moderate Depression (10-14)</td>
<td>14%</td>
</tr>
<tr>
<td>Moderately Severe Depression (14-19)</td>
<td>8%</td>
</tr>
<tr>
<td>Severe Depression (20-27)</td>
<td>4%</td>
</tr>
</tbody>
</table>
# Depression and Cardiovascular Risk Factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Depressed (n=112)</th>
<th>Not Depressed (n=320)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age*</td>
<td>50 ± 17</td>
<td>44 ± 16</td>
</tr>
<tr>
<td>Female Gender</td>
<td>85%</td>
<td>78%</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>134 ± 23</td>
<td>132 ± 20</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>80 ± 11</td>
<td>81 ± 12</td>
</tr>
<tr>
<td>Waist-to-hip ratio</td>
<td>0.91± 0.14</td>
<td>0.90 ± 0.11</td>
</tr>
<tr>
<td>Fasting Glycemia (mg/dL)</td>
<td>92 ± 30</td>
<td>93 ± 39</td>
</tr>
<tr>
<td>Total Cholesterol (mg/dL)</td>
<td>169 ± 35</td>
<td>171 ± 35</td>
</tr>
<tr>
<td>HDL Cholesterol (mg/dL)</td>
<td>35 ± 10</td>
<td>37 ± 11</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>46%</td>
<td>42%</td>
</tr>
</tbody>
</table>

\*p<=0.05
Conclusions

- There is a high prevalence of cardiovascular risk and depression among rural Mexicans.
- Remarkable findings:
  - High rates of metabolic syndrome and low HDL in this relatively young cohort of mostly women.
- Although previous studies have suggested that rates of cardiovascular risk are higher among those who are depressed, our study found no correlation between CVD and depression.
  - Longitudinal study needed to assess association between depression and CVD.
Conclusions

- The high rates of cardiovascular disease risk and depression are important considerations for the care of migrants and locals from rural communities in Mexico.
- Further research is needed to fully evaluate the relationship between depression and cardiovascular risk in the rural Mexican and Latin American populations exposed to a high migration rates.
- Our results highlight the need for further longitudinal studies and early preventative interventions and therapy in this population.
Limitations

- High rates of metabolic syndrome and depression compared with previous studies:

<table>
<thead>
<tr>
<th></th>
<th>Prev Studies</th>
<th>PPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic Syndrome</td>
<td>25% (^1)</td>
<td>43%</td>
</tr>
<tr>
<td>Depression</td>
<td>5% (^2)</td>
<td>26%</td>
</tr>
</tbody>
</table>

- It is possible that our study was underpowered to detect significant differences in CV risk factors according to depression
  - Using 80% power to detect a change of 0.25, would have needed a sample size of 1564 individuals. (n=432)

- Convenience sample
- Cross-sectional design
- Limitations of PHQ-9