Precipitating Factors in the Development of Iron Deficiency Anemia (IDA) in HIV-Positive Women

D Shahvarani, S Sheps, N Pick, D Johansen, and MW Tyndall
BACKGROUND

- **IDA definition:**
  - Anemia (Hgb<120 g/L in women)
  - Low levels of iron status markers
  - In women with HIV, prevalence of IDA is 20% (US)

- **IDA prevalence and associated dietary and non-dietary factors in women with HIV have not previously been studied in the Canadian context**
Predictors of Anemia in HIV (US)

- No ARV
- ZDV
- VL
- CD4 <200
- OI
- Low BMI
- Black
- Age
- IDU

Anemia

Semba et.al. *CID* 2002; 34: 260-266.
Despite advances in antiretroviral therapies, IDA continues to persist in this population. Untreated IDA is a contributor to viral disease progression and an independent predictor of mortality.
IDA and the Cycle of Poverty

Food Insecurity

Poverty

Education/Employment

Endurance/Performance

O₂ carrying capacity

Work capacity

Fatigue

STUDY QUESTIONS

- What are some potential predictors of IDA in HIV-positive women?
- Is a newly designed diet survey for iron able to predict iron status?
METHODS

- **Study Design**
  - Multi-centre, cross-sectional pilot study
  - Subjects recruitment
    - St. Paul’s Hospital (acute)
    - Oak Tree Clinic (community)
    - Vancouver Native Health (community)
    - Downtown Community Health Clinic – MAT (community)
  - Sample size goal is 100 women
METHODS

Diet Survey Design:
- Commonly consumed iron-rich foods, based on a smaller pilot study
- Abbreviated
  - Memory recall
  - Ease of administration
  - Busy clinic schedule
  - Increase participation
- 65 food items, standard portion sizes
- 10 supplemental questions
- Respondent indicated number of times food item consumed in past 7 days
METHODS

- **IDA diagnosis:**
  - Ferritin level < 30 mcg/L
  - and
  - Hemoglobin level < 120g/L
    - Ferritin levels were only taken if hemoglobin levels were sub-optimal
    - otherwise, assumed absence of IDA

- **Chart review:**
  - To identify medical and social factors associated with IDA
METHODS

- Inclusion Criteria:
  - Confirmed HIV-positive status
  - Female
  - Age > 19 years
  - Not currently pregnant
  - Not palliative

- $10 honorarium for participation
## RESULTS

**Table 1. Baseline Characteristics**

<table>
<thead>
<tr>
<th></th>
<th>IDA Present</th>
<th>IDA Absent</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects (n = 91)</td>
<td>17 (19%)</td>
<td>74 (81%)</td>
<td>--------</td>
</tr>
<tr>
<td>Age (years)</td>
<td>40.1 (7.8)</td>
<td>40.4 (9.0)</td>
<td>NS</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.2 (5.5)</td>
<td>24.4 (5.5)</td>
<td>NS</td>
</tr>
<tr>
<td>Hgb (g/L)</td>
<td>110.6 (10.9)</td>
<td>127.6 (13.2)</td>
<td>0.00</td>
</tr>
<tr>
<td>CD4 (cells/µL)</td>
<td>320 (235)</td>
<td>427 (235)</td>
<td>NS</td>
</tr>
<tr>
<td>Estimated Iron Intake (mg/d)</td>
<td>13.3 (4.6)</td>
<td>13.2 (6.7)</td>
<td>NS</td>
</tr>
</tbody>
</table>
MEDICAL PREDICTORS OF IDA

Figure 3. Adjusted OR and 95% CI for Medical Predictors
Figure 3. Adjusted OR and 95% CI for Nutritional Predictors
Figure 4. Food Insecurity (FI)* by Ethnicity

*FI = # who did not seek assistance/ # who could not afford food*100%
### Predictive Value

<table>
<thead>
<tr>
<th></th>
<th>IDA (1)</th>
<th>IDA (0)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fe Intake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 8.1mg (1)</td>
<td>2</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>≥ 8.1mg (0)</td>
<td>15</td>
<td>58</td>
<td>73</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>74</td>
<td>91</td>
</tr>
</tbody>
</table>

Sensitivity = TP/(TP+FN) = 2/17 = 12%
Specificity = TN/(TN+FP) = 58/74 = 78%
PPV = 11%
NPV = 79%
CONCLUSIONS

- Predictors of IDA:
  - Ethnicity other than Caucasian
  - Menstruation
  - HIV stage (CD4)

- Ethnicity:
  - Aboriginal women and food assistance programs
  - African/Caribbean women and stigma
  - South Asian women and vegetarianism

- IDA in HIV: a socio-cultural condition
CONCLUSIONS

- Diet alone may not be adequate predictor of IDA

- IDA is multi-factorial and may be culturally-driven

Importance of:
- Screening and follow up
- Culturally appropriate nutrition education
- Culturally appropriate food assistance programs
- Timely treatment
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- Vancouver Native Health Society
- Downtown Community Health Clinic Maximally-Assisted Treatment Program