The Impact of Social Determinants of Health on Type 2 Diabetes in Indigenous Communities

Melissa L. Walls, & Sidnee Kellar
Contact: mwalls3@jhu.edu

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Boozhoo from Duluth, MN
Overview of Our Time

• 1) Overview: Social Determinants of Health (SDH) & Indigenous SDH

• 2) SDH & Type 2 Diabetes: Lessons from Community-Based Participatory Research (CBPR)

• 3) Application: Together Overcoming Diabetes
Figure 2. Life expectancy at birth, by Hispanic origin and race: United States, 2019–2021
Yet, this was not always the case. . .

Such inequities are rooted in experiences of colonization and marginalization including disproportionate exposure to stressors, disruption of Indigenous families and food systems, and attacks on cultural practices and community values.
SDH & Indigenous SDH
### NIMHD Minority Health and Health Disparities Research Framework

Adapted to reflect historic and socio-cultural influences for American Indian and Alaska Native Nations

Spero M. Manson, Ph.D.,
University of Colorado Denver’s Anschutz Medical Center

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Health Disparity Populations: Race/Ethnicity, Low SES, Rural, Sexual/Gender Minority
Other Fundamental Characteristics: Sex/Gender, Disability, Geographic Region
Fundamental Determinants of AIAN Health Inequities

*Historical Trauma*
Pathways from Historical Trauma (HT) to Social, Mental Health, Physical Health, and Cultural Disruption

- HT as an Etiological Agent: Lived Experience, Survivor Impacts
- HT as a Catalyst for Intergenerational Transmission
- HT as an Anchor for Ongoing Marginalized Status(es)
  - HT Related Stressors
  - Structural Racism → Policy, Funding, Practice
  - Historical Oppression & Contemporary Issues
Historical Trauma & Oppression - Obesity & Food Systems
Catastrophic Nutrition (and activity) Transitions

Modern “Western” Lifestyle
“You go to the nutritionist, she tells you what you’re supposed to eat, and especially up in (our village), we can’t have those foods all the time. We go to (town) to buy our groceries, and we might buy our fruits and vegetables, but they don’t last for two weeks until the next payday. We can’t follow the right diet, because we can’t get the right foods.”

“That’s why we got it really bad now. . .the way our ancestors ate. Now the way we eat, with all this processed food.”

“Trying to tell the people (at ceremony/feast) that you can’t handle cake, you can’t handle that much food, you can’t eat this, you can’t eat that. And then they feel like "oh, well you're not participating, or you're not really being involved with it.”
Type 2 Diabetes (T2D) Mellitus

• American Indian (AI) communities have the highest premature mortality in the nation

• Type 2 Diabetes (T2D) is a significant contributor to this inequity
  – AIs over 2x more likely to be diagnosed with T2D than other Americans
    • AIs aged 10 – 19 years = 9x more likely
  – T2D a leading cause of death for AIs
Stress & Diabetes Mellitus

This we know: that diabetes is sometimes caused in man by mental anxiety. . . (H. Maudsley, 1899)

. . . the transient or intermittent glycosuria (type 2 diabetes) met with in stout overfeeders, or in persons who have undergone a severe mental strain, is very amenable to treatment. (W. Osler, 1892)

But if the degenerate, or the depraved nervous liquor doth continually flow into the blood, it produces sometimes the unbloody dysentery, such as we have already described, sometimes the diabetes. . . (T. Willis, 1679)
**Project Details**

**Phase 1: Year 1**

- **Qualitative**
  - Focus Groups (FG)
    - FG #1
      - General Stress Discussion
    - FG #2
      - Review Survey Measures

- Participants Selected by Convenience Sampling

**Phase 2: Years 2-5**

- **Quantitative**
  - All Participants will be asked to consent to 3 things:
    1. **Survey:** Completed with Interviewers
    2. **Chart Reviews:** Completed by Clinic Staff
    3. **Salivary Cortisol:** Saliva Collected by Participant @ Home

Participants Selected from Clinic Records, Probability Sample
Conceptual Model: A Stress Process Model of Disease

STRESSORS

Risk Factors for T2D Complications:
- HbA1c
- Lipids
  - Total cholesterol
  - LDL
  - HDL
  - Triglycerides
- Blood pressure
- Acute MI/stroke
- Amputation
- Retinopathy

Treatment Compliance & Denial
- Dietary Guidelines
- Denial/Acceptance
- Exercise
- Weight
- Glucose monitoring
- Medication compliance

Mental Health/Substance Use Disorders
- Anxiety disorder
- Posttraumatic stress disorder
- Major depression
- Alcohol abuse
- Drug abuse
- Positive Mental Health

Coping Resources & Responses
Indigenized (Anishinaabe) Study Model
Colonization, Poverty & Genocide were viewed as factors underlying the above stressors.
Diabetes-related Stress
- Diabetes Distress Screener; Fisher et al., 2005
- Possible range 1 to 6 with higher scores for more diabetes-related emotional distress
- Mean 2.57, S.D. 1.39

Family Criticism
- Family Emotional Involvement adn Criticism Scale; Shields et al., 1994
- Possible range 0 to 3 with higher scores for more family criticism
- Mean 1.04, S.D. 0.44

Daily Hassles
- Survey of Recent Life Experiences; Kohn & Macdonald, 1992
- Possible range 0 to 24 with higher scores for more daily hassles
- Mean 6.02, S.D. 3.44

Microaggressions
- Walters, 2008
- Possible range 0 to 2 with higher scores for more micro-aggressions
- Mean 0.70, S.D. 0.48

Financial Events
- Negative Financial Events; Dohrenwend et al., 1978
- Possible range 0 to 9 with higher scores for more events
- Mean 1.63, S.D. 1.48

Life Events Checklist
- Possible range 0 to 14 with higher scores for more events
- Mean 5.07, S.D. 3.12
A

HbA1c

Stressors

B

Hip-to-waist ratio

Stressors

C

PHQ-9

Stressors

D

MMAS-4

Stressors

E

Diet (days/week)

Stressors

Note: X-axis displays the count in above average exposure to stressors. Box A: A1c. Box B: Waist-to-hip ratio. Box C: Patient Health Questionnaire 9-item depressive symptoms scale. Box D: 4-item Morisky Medication Adherence Scale. Box E: Average days/week following a healthy diet plan.
Coping

• Today, our focus is on **Coping Resources** or the things available to people to help them cope with stress.
Who Supports Participants the Most (Wave 1)?

Results of OLS Regression Analyses: Standardized Coefficient Effect Sizes Adjusted for Age, Gender, and Income
Stress-Buffering & Mediating Effects: Culture & Community

- Communal Mastery Mediates the Negative Impact of Food Money Shortage on Diabetes Empowerment
- Diabetes Support Mediates the Harmful Impacts of Role Strains on Diet & Diabetes Empowerment
- Cultural Spiritual Activities & Social Support Moderate Associations b/w ACEs and Physical & Mental Health
Translating these Findings into Programming: Together Overcoming Diabetes (TOD)

Niwii-shaagoojitoomin izhi-maamawi

This project is supported by a grant from the National Institutes of Health: DK091250
The goal of this research is to evaluate the impact of a culturally tailored, intergenerational, home-based type 2 diabetes intervention for American Indian adult diabetes-related, holistic health outcomes including HbA1c, mental health, social cohesion, etc. We will also evaluate the impact of the program on enrolled adult’s children (aged 10-16 years) in terms of diabetes risk and protective factors.

The program is delivered by Family Health Coaches and evaluated by Independent Evaluators.
Lesson 1: Diabetes 101 and Goal Setting
Lesson 2: More Information on Diabetes
Lesson 3: Historical Trauma and Diabetes
Lesson 4: Stress and Diabetes
Lesson 5: Nutrition Knowledge 101
Lesson 6: Exercise Effects and Safety
Lesson 7: The SPIRIT Approach to Problem Solving
Lesson 8: Mindful Eating
Lesson 9: Building Self-Esteem and Positivity
Lesson 10: Not All Foods are Created Equal
Lesson 11: Let’s Get Moving
Lesson 12: Communication
Lesson 13: Putting Nutrition Knowledge Into Practice
Lesson 14: Focus on Family and Community

Intervention Curriculum:
Delivered by home visitors called **Family Health Coaches**
Additional acknowledgements

- Healing Pathways, Mino Giizhigad and Gathering for Health Project Teams, CRCs, RAs and study coordinators
- National Institutes of Health (R01DA13580, R01 MH67281, Whitbeck, PI; and R21 MH0525, R01 DA039912, DK091250, Walls, PI). The contents of this presentation do not represent the official views of the NIH.