CITIES CHANGING DIABETES: A REPRESENTATIVE SURVEY OF DIABETES IN MEXICO CITY.

Edgar Denova Gutiérrez, MSc., DrSc.
HEAD, HEALTHY ENVIRONMENTS AND CHRONIC DISEASE PREVENTION CENTER ON NUTRITION AND HEALTH RESEARCH, NATIONAL INSTITUTE OF PUBLIC HEALTH

@EDenovaG
MORTALITY ATTRIBUTABLE TO DIABETES: GLOBAL BURDEN OF DISEASE

PREVALENCE OF ADULTS WITH GLUCOSE LEVELS ABOVE NORMAL LIMITS.

- 13.9% have Diabetes*

- 17.1% have Pre-diabetes **

- 69% have normal glucose levels***

* Newly diagnosed (glucose ≥126 mg/dL) (4%) + previously diagnosed (9.9%)

** Glucose ≥100 mg/dL and <126 mg/dL

*** Glucose <100 mg/dL

PREVALENCE OF DIABETES: REPRESENTATIVE SURVEY OF DIABETES MELLITUS IN MEXICO CITY 2015.

13.9% of adults have Diabetes Mellitus

86.1%

13.9%

28.8%

71.2%

Previously Diagnosed (9.9%)

Newly diagnosed (4%)

GLYCEMIC CONTROL IN ADULTS PREVIOUSLY DIAGNOSED WITH DIABETES MELLITUS.

Glycemic control in other populations*:

- Canada (DICE)\(^1\) .............. 51%
- USA (NHANES)\(^2\) ........... .57%
- ENSANUT-12\(^3\) ........... .....25%

DICE = Diabetes in Canada Evaluation; NHANES = National Health and Nutrition Examination Surveys; RECAP-DM = Real-life Effectiveness and Care Patterns of Diabetes Management.

QUALITATIVE EVALUATION OF VULNERABILITY: A DV-A QUESTIONNAIRE ADAPTED TO THE MEXICAN POPULATION.

**External elements of vulnerability**
- Origin of the attention
- Equity in health access
- Health care providers
- Health care needs are met
- Generalities

**Community elements**
- Community
- Customs and traditions
- Nutrition
- Infrastructure
- Physical activity / exercise

**Perceptions of vulnerability**
- Understanding / Interpreting the disease
- Standard indicators of vulnerability
- Security
- Trust
QUALITATIVE EVALUATION OF VULNERABILITY: PHASES OF ANALYSIS

Phase 1. Preliminary analysis: Urban stories
Identification of dimensions and properties

Phase 2. Vulnerability in Mexico: Social and cultural factors
Analysis of interviews: density and thematic consistency.

Phase 3. Deepening of thematic variation
Thematic variation by sex, age and place of residence.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Details</th>
</tr>
</thead>
</table>
| Gender, culture and diabetes: care and management | • a) Gender violence and dependence of women on their husbands for healthcare.  
• b) Traditional role of women and men: self care. |
| Health as a human right                    | a) Difficulty accessing health services.                                
• b) Lack of trust and confidence in public health services. |
| Available treatments and care              | • a) Pharmacies rather than ‘public’ care.                               
• c) Perceived side effects of medication. |
| Slight knowledge of diabetes               | • a) Denial of Disease.                                                 
• b) Dietary recommendations as punishment. 
• c) Perception that healthy food is expensive. |
PHASE 2. VULNERABILITY IN MEXICO: SOCIAL AND CULTURAL FACTORS

The dimensions of vulnerability were resumed by thematic density, in order to identify social and cultural determinants.

- Family context (uses and custom).
- Mistrust in public health services.
- Poor self-care ability.
- Financial difficulties to buy medicines and food.
- Unawareness of support networks.
- No supply of medication in health services.
- Emotional and economic dependence.
- Traditional diets.

SOCIOECONOMIC INDEX OF VULNERABILITY AND DIABETES IN MEXICO: A ESTRUCTURAL EQUATION MODELING APPROACH.

\[ \beta_1 = 0.194^{***} \]

\[ \beta_2 = 0.109^{**} \]

\[ \beta_3 = -0.071^* \]

\[ \beta_4 = -0.050 \]

\[ \beta_5 = 0.91^{**} \]

\[ \beta_6 = -0.056^* \]

\[ \beta_7 = 0.159^{***} \]

\[ \beta_8 = 0.187^{***} \]

* P <0.05, ** P <0.01, *** P <0.001.

• To evaluate risk factors associated with the incidence of diabetes.

• To understand the relation between diabetes and the urban environment, in a panel of pre-diabetic and diabetic participants living in Mexico City recruited in 2015.

• To develop and test a mobile application to improve food choices and physical activity levels among Mexico City residents.
STUDY DESIGN: CITIES CHANGING DIABETES IN MEXICO II

Component 1

GIS Shapefiles collection

Data collection

Feb-Jul 2018

Component 2

Field data collection

May-Nov 2018

Component 3

Development & Testing

Jan-Nov 2019

Measurement of the environment for physical activity and diet mobile application
1. **Geographic information system**: A method to assess the physical environment in order to reflect the immediate environment of individuals.

- Analyzed variables:
  - Population density.
  - Land use diversity.
  - Connectivity.
  - Recreational facilities (accessibility, proximity, quality).
  - Public transport systems.
2. Audits of public places: Used to measure the characteristics of the built and social environment at micro-scale.

- **MAPS Global:**
  - Land use.
  - Public transport availability.
  - Aesthetic.
  - Quality of sidewalks.
  - Vegetation, etc.

Audit of a route segment in a 400-m buffer
3. **Self-report questionnaires**: Used to measure the perception of the participants about certain characteristics of the environment.

- **Analyzed variables**:
  - Residential density.
  - Proximity & access to destinations.
  - Street and crime safety.
  - Pedestrian infrastructure.
  - Aesthetics.
  - Availability and access to parks.
  - Park safety.
Conclusions and next steps…

1. 1 of 3 adults has abnormal glucose levels. Of these, 13.9% have diabetes mellitus, and 17.1% are pre-diabetic.

2. The preliminary analysis of vulnerability identified 4 main thematic dimensions. Additional analyses by sex, age and place of residence are necessary.

3. There is little evidence of the built environment and the presence of diabetes in Mexico. CCD II in Mexico City, will contribute to understand relations between diabetes and the urban environment.
RESEARCH TEAM: REPRESENTATIVE SURVEY ON DIABETES MELLITUS IN MEXICO CITY

INSP:
PRINCIPAL INVESTIGATORS:
Simón Barquera
Ruy López Ridaura

Co-investigators:
Lizbeth Tolentino
Alejandra Jauregui
Catalina Medina
Lucía Hernández
Aurora Franco
Martín Romero
Andrey Ryo Shiba
Liliana Bahena
Elizabeth Hernández
Izchel Cosio
Anna-María Volkmann

SCIENTIFIC COMMITTEE:
Prof. David Napier, PhD.
Director, Science, Medicine and Society Network
University College London

Carlos Aguilar-Salinas, MD, PhD.
Jefe de la Clínica de Lípidos del Instituto Nacional de Ciencias Médicas y Nutrición

ACKNOWLEDGEMENTS:
Ministry of Health, Mexico City
Committee on Cities Changing Diabetes
National and International Advisory Scientific team

This study was made possible thanks to the unrestricted funding provided by NovoNordisk to National Institute of Public Health (INSP). This study was approved by the research ethics and safety committee at INSP.
Thank you!

Edgar Denova, MSc., DrSc.

@EDenovaG

email: egar.denoVa@insp.mx