Associations of drinking water access, household water and food insecurity, and mental well-being of pregnant women in low-income, urban neighborhoods of Beira, Mozambique

Lilly O'Brien, MPH; Jedidiah Snyder, MPH; Joshua Garn, PhD, MS; Rebecca Kann, MSPH; João Luis Manuel, MPH; Sandy McGunegill, RN, MPH; Antonio Júnior; Bacelar Muneme; Karen Levy, PhD, MPH; Rassul Nala, MPH; Matthew Freeman, PhD, MPH

BACKGROUND

- **Water and food insecurity are clear drivers of adverse physical health impacts**, but increasing evidence has also identified **linkages to mental well-being.**

- **The mental well-being implications of water insecurity are higher for women** as they bear disproportionate burdens for household water management.

- Prenatal stress and poor mental well-being have been associated with **negative impacts on fetal and child development.**

STUDY SETTING

- Beira is a growing port city and experiences frequent natural disasters.

- Half of the 600,000 population lives in dense informal settlements.
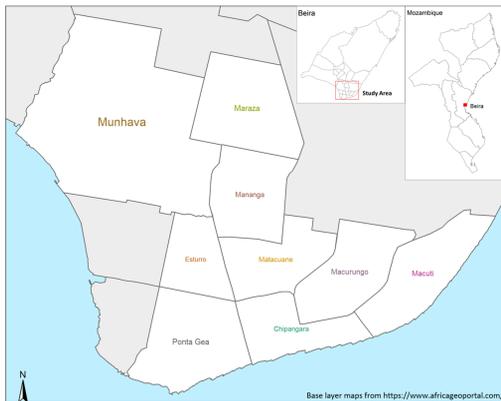
RESEARCH QUESTIONS

To comprehensively explore the **relationships of drinking water access, water and food insecurity, and mental well-being** amongst pregnant women in low-income, urban neighborhoods of Beira, Mozambique, we investigated the following questions:

1. Is household drinking water access associated with prenatal mental well-being?

2. Are food and water insecurity associated with prenatal mental well-being?

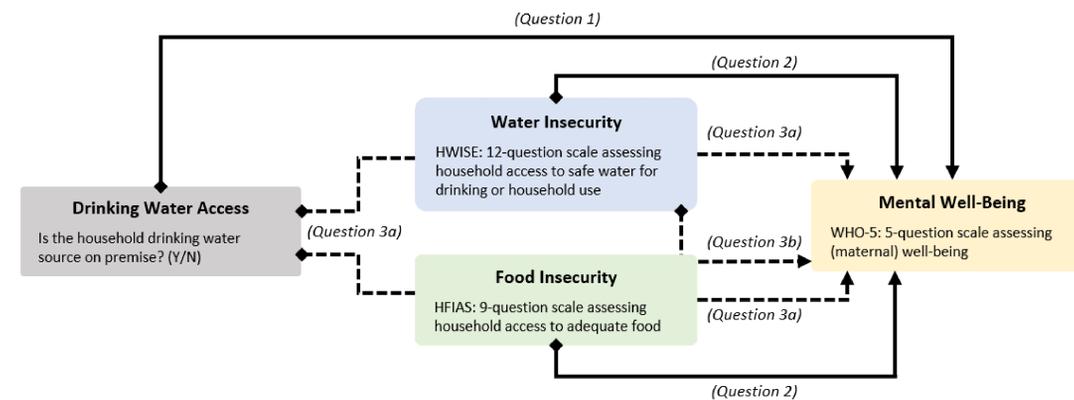3. Is there potential mediation by food and water insecurity on prenatal mental well-being?

This work was conducted in collaboration with:

METHODS

Data: Collected from November 2021 to September 2022 as part of the PAASIM Study.
Surveys from **740 third-trimester pregnant women** met the inclusion criteria for this analysis.

Statistics: **Generalized estimating equations** estimated associations in Questions 1 and 2.
Causal mediation analysis was used to determine mediating effects in Questions 3a and 3b.

RESULTS

Question 1: **Drinking water was not associated with mental well-being**

Drinking Water Access → OR=1.00 (0.73, 1.38) → Mental Well-Being

Question 2: **Water insecurity and food insecurity were associated with adverse mental well-being**

Water Insecurity → OR=1.42 (0.99, 2.03) → Mental Well-Being

Food Insecurity → OR=2.23** (1.51, 3.32) → Mental Well-Being

Question 3a: **Mediation analysis could not take place on pathways related to drinking water access** because drinking water access was not found to be associated with any other factor
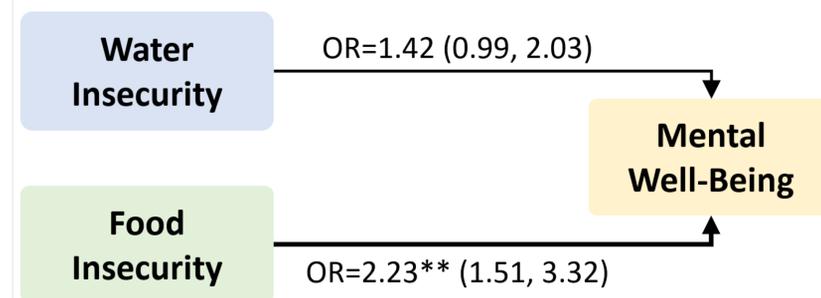
Question 3b: **Food insecurity fully mediated the pathway between water insecurity and mental well-being**

Water Insecurity → c: OR=1.44* (1.02, 2.02) → Mental Well-Being

a: OR=8.40** (4.62, 16.90) → Food Insecurity

b: OR=2.17** (1.48, 3.23)

Water Insecurity → c': OR=1.18 (0.83, 1.69) → Mental Well-Being

Causal Mediation Analysis
The lack of significant direct association (path c') but presence of overall association (path c) and significant indirect associations (paths a and b) suggests the presence of **full mediation by food insecurity.**
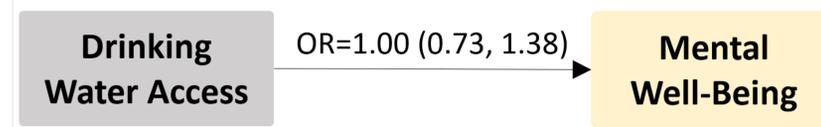
KEY TAKAWAYS

- **Food insecurity mediated the association between water insecurity and mental well-being in pregnant women**—this aligns with existing literature among other populations.

- Participants with moderate or severe **food insecurity (74%) were 2.23 times more likely** to have adverse mental well-being.

- Pregnant women are a **vulnerable population and should be specially considered** in programs and policies related to our study topics.

- Having a **drinking water source *on-premise* may not be a good indicator for access to drinking water in *urban area*s** as 95% of participants ha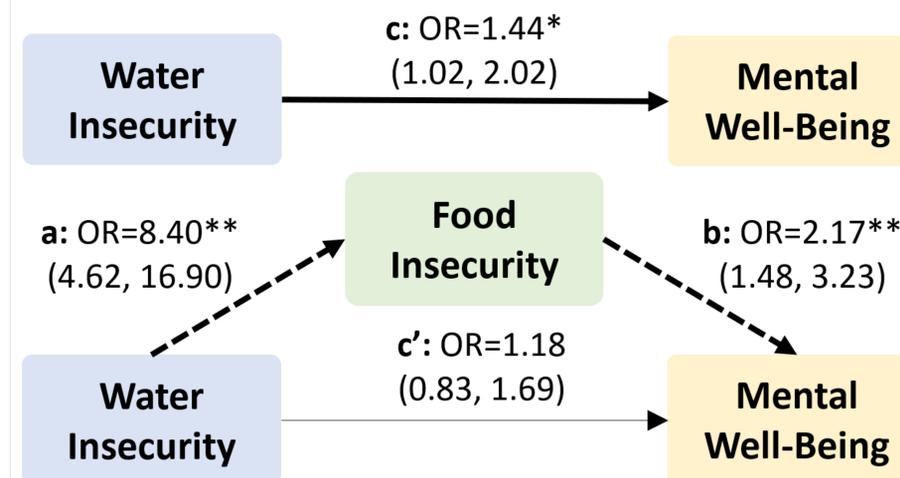d access to other improved sources.