

# Tortillas tell the story of folate deficiency in Mexico: study

September 17 2019

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A new study led by researchers at the Columbia University Mailman School of Public Health in collaboration with that National Institute of Public Health, Mexico, that accounts for folic acid (FA) fortification in staple foods made from wheat and corn, such as bakery bread and tortillas, found that large proportion of women of childbearing age have FA intake below levels recommended by the World Health Organization, potentially raising the risk for neural tube defects in their offspring. The study is one of a few to investigate FA intake after fortification, and the first such report for Mexico. Results are published in the *American Journal of Clinical Nutrition*.

In Mexico, wheat and corn flour fortification with FA was implemented in 2001 and mandated in 2008, but without direct enforcement. Current Mexican nutrient content tables do not account for FA in bakery bread and corn masa-based foods which are dietary staples in Mexico.

Researchers measured FA and folate content in bakery bread and tortillas collected from geographically diverse areas in Mexico. They then extrapolated these data to the larger population, adjusting FA intake tables from a 2012 national health and nutrition survey—Mexico's equivalent of U.S. National Health and Nutrition Examination Survey. They found that overall folate intake improved, but between 9 and 32 percent of girls ages 14-18 and between 9 and 28 percent of women ages 19-39 continue to have intakes that are below the WHO recommended levels. They also found that between 5 and 12 percent of children 1-8 years (up to 1.9 million children) are at risk of ingesting FA at levels

above the WHO age-specific tolerable upper intake limit. In children, the effects of high exposure are unknown, but in adults, high exposure has been associated with risk for cancer.

Even though flour fortification has been mandatory in Mexico for the last 10 years, the researchers found a great variability in the use of fortified flours. These differences correspond with geography, with exposure to fortified flour increasing with population size. In [rural areas](#), women are more likely to eat tortillas and corn masa-based foods made by small manufacturers with unfortified flour, putting them at greater risk for insufficient FA intake.

"Our findings suggest that more regulation and oversight related to monitoring and evaluation of fortification of corn and wheat flour may avoid health risks from overexposure of vulnerable segments of the population, as well as insufficient intake in the population initially targeted by the [fortification](#) program," says first author Manuela Orjuela-Grimm, MD, assistant professor of Epidemiology and Pediatrics at the Columbia Mailman School at the Columbia University Irving Medical Center.

**More information:** *The American Journal of Clinical Nutrition* (2019). [DOI: 10.1093/ajcn/nqz224](https://doi.org/10.1093/ajcn/nqz224)

Provided by Columbia University's Mailman School of Public Health

Citation: Tortillas tell the story of folate deficiency in Mexico: study (2019, September 17) retrieved 27 April 2024 from <https://medicalxpress.com/news/2019-09-tortillas-story-folate-deficiency-mexico.html>

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