Examination of Glyphosate Exposure among Latinx Farmworkers in Idaho

Dr. Carly Hyland
University of California, Berkeley
Environmental Health Sciences

NOHC Presentation
October 19, 2023
Background - Farmworker Health

- Farmworkers face numerous chemical, physical, and biological threats from their occupation.
- Unique threat is exposure to pesticides, which have been associated with adverse outcomes such as cancer, neurologic disorders, and respiratory diseases.
Background - Glyphosate

- Farmworkers exposed to increasing levels of glyphosate (active ingredient in Roundup)
- Over 280 million pounds of glyphosate-based herbicides (GBHs) applied annually in U.S.
  - Use of GBHs increased 15-fold in past two decades
- Little information on levels of exposure in occupational populations
  - Data gaps in how protective behaviors, risk perceptions impact exposure
Women Farmworkers – Understudied & Higher Exposure?

- Latinx farmworkers > 80% of US workforce – most studies on men
- Women increasing proportion in agriculture & higher rates of Acute Pesticide Poisoning
Study Aims

Examine **urinary glyphosate concentrations** and **predictors of exposure** among Latino and Latina farmworkers in Idaho.

Assess differences in **pesticide protective behaviors**, **perceived risk**, and **perceived control** by gender.
METHODS
Participant Recruitment

- Six months of study period engaging with community organizations
- Recruited participants from mobile health clinics, food distribution events, housing authorities, snowball sampling, farmworker events
Data Collection

- Urine samples collected from 62 Latinx farmworkers and analyzed for glyphosate

- Quantitative surveys ($n=62$) and qualitative interviews ($n=18$)
  - Occupational history, risk perception, perceived control, protective behaviors, pesticide exposure in last 3 days
Data Collection – Urine Samples

- Data collection during pesticide spray season (April-June 2022)
- Two study visits within 7 days; urine sample collected at each visit
- Urine samples aliquoted and stored within 24 hrs of collection
- Composite sample stored at -80°C; shipped on dry ice to National Institute of Public Health Quebec
Pesticide Analysis

- Originally analyzed for 5 organophosphate metabolites, 5 pyrethroid metabolites, and 3 herbicides

- PTOP funding to analyze Glyphosate and AMPA concentrations
RESULTS
62 participants first visit
30 men, 32 women (9 applied pesticides in last 3 days)

57 participants second visit
92% of participants

18 interviews
7 men, 11 women
Demographic Characteristics

- Married: 84%
- <$50K household income: 82%
- Born in Mexico: 95%
- Worked as farmworker for 10+ years: 60%
- H2A Worker: 24%
- 2+ Ag workers in home: 71%
Applied pests in last 3 days:
- Men: 40%
- Women: 20%

Typically wear mask while working:
- Men: 70%
- Women: 30%

Don't wear PPE b/c too hot:
- Men: 50%
- Women: 30%

Attended pesticide safety training:
- Men: 80%
- Women: 70%

Self-reported APP:
- Men: 60%
- Women: 40%

Significance levels:
- Applied pests in last 3 days: p < 0.01
- Typically wear mask while working: p < 0.01
- Don't wear PPE b/c too hot: p = 0.04
- Attended pesticide safety training: p = 0.89
- Self-reported APP: p = 0.25
Urinary Pesticide Concentrations (GM) by Gender

- Glyphosate
  - All: 0.2
  - Men: 0.2
  - Women: 0.1

- AMPA
  - All: 0.3
  - Men: 0.3
  - Women: 0.2
Urinary Pesticide Concentrations (GM) by Applicator Status

- Glyphosate
- AMPA

Comparison by applicator status:
- All
- Applicator
- Non-Applicator
Determinants of Exposure

- Women more likely to wear most types of PPE
- Did not identify consistent trends in predictors of exposure, including use of PPE, risk perceptions, perceived control
- Inferences could be limited due to small sample size
Perceived Risk of Herbicides

- Multiple participants shared perceptions during interviews and informal conversations that “pesticides” are synonymous with “insecticides”

- Perceived that herbicides were categorically safer than insecticides
  - Particularly among pesticide applicators
  - Appeared to influence protective behaviors, such as lower use of PPE while applying herbicides

- Perceptions appeared to stem from training at work – disconnects with WPS training
Acknowledgements

Research reported in this presentation was supported by the National Institute for Occupational Safety and Health (NIOSH) under Federal Training Grant T42OH008433. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIOSH.
Study Team

Carly Hyland, Public Health
Cynnie Curl, Public Health
Lisa Meierotto, School of Public Service
Rebecca Som Castellano, Dept. of Sociology

Alejandra Hernandez, student

Irene Ruiz, IORC
Questions?

chyland@berkeley.edu
- Reported individual-level results to participants
- Met in person or mailed results, depending on preference of participant