Association of Farm-Related Occupations with Psychological Distress & Mortality

Ahmed A. Arif, MBBS, PhD
James N. Laditka, DA, PhD
Sarah B. Laditka, PhD
Oluwaseun Adeyemi, MBBS, MPH

University of North Carolina at Charlotte
National Rural Health Association
June 19, 2020
480,130 people work in farming, fishing, and forestry occupations

It includes agricultural workers, fishing and hunting workers, forest and conservation workers, and logging workers

The Agriculture, Forestry, and Fishing sector has approximately 2.3 million workers

It is one of the lowest paid occupational groups
Psychological distress

- State of emotional suffering characterized by symptoms of depression and anxiety
- Mental health problems
- Prevalence – 5%-30% in general population
- 1 out of 5 worker
- K-6 scale
Occupational factors contributing to psychological distress

- Occupational stress, limited control at work
- Economic factors: low pay or inadequate health insurance
- Transient work increases unemployment and makes income less consistent
- Low occupational prestige
- Lack of valued respect in the workplace
- Long work hours
- Social isolation at work
- Mental health problems
Objectives and Hypotheses

We studied associations between occupations with psychological distress & all cause mortality in the United States using nationally representative National Health Interview Survey (NHIS), the largest ongoing cross-sectional health survey in the U.S. We used NHIS Public-use Linked Mortality Files (LMF).

Hypotheses:

1. People in farm occupations have higher mortality
2. People in farm occupations are more likely to develop psychological distress
National Health Interview Survey

- The largest in-person household health survey in the U.S.
- Started in 1957
- Cross-sectional household interview survey
- Provides information on the health of the U.S. civilian noninstitutionalized population through confidential interviews conducted in households.
- Complex stratified multistage cluster probability design
- NHIS sample is drawn from each state and the District of Columbia
- ~35,000 Households, ~85,000 individuals
- It is conducted by National Center for Health Statistics
National Health Interview Survey ↔ Linked-Mortality File Public-use

- **Family Core component**: All adult members of the household
- **Sample Adult Core component**: One randomly selected adult member
- **Sample Child Core component**: One randomly selected child

1997-2014

- Demographic
- Occupations
- Chronic diseases

Mortality, Underlying cause of mortality

n=413,035
Outcome variables

- Mortality

- Psychological distress – K6 scale
  - Kessler et al. (2002) K6 index of psychological distress
  - Score of $\geq 13$ indicator of psychological distress
  - Separate questions asked, “How often in the past month did you feel:” “nervous;” “hopeless;” “restless or fidgety;” “everything was an effort;” “so sad nothing could cheer you up;” and “worthless.” Responses from “1. All the time” to “5. None of the time.” Responses scored in that order from 4 to 0 points, $\geq 13 = \text{distress}$
Exposure: Defined in two ways

**Binary variable**

- Worked in Farming, Forestry, Fishing occupations at time of NHIS interview, coded as 1
- Worked in other occupations at time of NHIS interview, coded as 0

**Categorical/Nominal variable:**

- Worked in low-risk occupations at time of NHIS interview, coded as 0
- Worked in Farming, Forestry, Fishing occupations at time of NHIS interview, coded as 1
- Worked in other high-risk occupations at time of NHIS interview, coded as 2
Low risk occupations

- Managers and administrators, except public administration
- Officials and administrators, public administration
- Management related occupations
- Engineers
- Architects and surveyors
- Natural mathematical and computer scientists
- Health diagnosing occupations
- Health assessment and treating occupations
- Teachers, librarians, and counselors
- Writers, artists, entertainers, and athletes
- Other professional specialty occupations
- Technologists, technicians, except health
- Supervisors and proprietors
- Sales representatives, commodities, and finance
- Computer equipment operators
- Police and firefighters
- Construction laborers
Other High-risk occupations

- Health technologists and technicians
- Other sales
- Mail carriers, ba
- Secretaries, stenographers, and typists
- Financial records processing occupations
- Other administrat
- Private household occupations
- Other protective service occupations
- Food service
- Cleaning and building service
- Health service
- Personal service
- Mechanics and repairers
- Construction and extractive trades
- Precision production occupations
- Machine operators and tenderers, except precision
- Fabricators, assemblers, inspectors, and samplers
- Motor vehicle operators
- Other transportation, except motor vehicles
- Material-moving equipment operators
- Freight, stock and material handlers
Covariates

Age, sex, race/ethnicity, poverty level, marital status, insurance, body mass index, lung diseases, cancer, hypertension, diabetes, and heart disease
Statistical analysis

- Frequency distribution
- Age-adjusted mortality rates
- Age-adjusted psychological distress rates
- Age standardized cause-specific mortality rates
- Cox proportional hazards regression
- Logistic regression
- Stata Statistical software (version 16.1) - complex survey design
## Results: Descriptive

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Weighted %</th>
<th>Farm-Related Occupations Weighted %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Groups</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-34</td>
<td>30.5</td>
<td>35.2</td>
</tr>
<tr>
<td>35-49</td>
<td>30.4</td>
<td>29.7</td>
</tr>
<tr>
<td>50-64</td>
<td>23.8</td>
<td>21.7</td>
</tr>
<tr>
<td>65+</td>
<td>15.3</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td><strong>47.6</strong></td>
<td><strong>76.8</strong></td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>73.3</td>
<td>62.7</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>11.8</td>
<td>6.8</td>
</tr>
<tr>
<td>Non-Hispanic Other/Multirace</td>
<td>4.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>10.5</td>
<td>28.1</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Weighted % All</td>
<td>Farm-Related Occupations Weighted %</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Below Poverty Level</td>
<td>12.2</td>
<td>26.6</td>
</tr>
<tr>
<td>No Insurance</td>
<td>14.8</td>
<td>35.7</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>36.4</td>
<td>40.6</td>
</tr>
<tr>
<td>Obese</td>
<td>24.8</td>
<td>22.9</td>
</tr>
<tr>
<td>Lung diseases</td>
<td>14.7</td>
<td>11.3</td>
</tr>
<tr>
<td>Cancer</td>
<td>7.6</td>
<td>5.1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>27.0</td>
<td>24.0</td>
</tr>
<tr>
<td>Diabetes</td>
<td>8.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Heart disease</td>
<td>11.0</td>
<td>9.4</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>2.9</td>
<td>3.5</td>
</tr>
<tr>
<td>Assumed Dead</td>
<td>7.6</td>
<td>10.5</td>
</tr>
</tbody>
</table>
Age-Standardized Mortality Rates by Gender, 1997-2014

<table>
<thead>
<tr>
<th></th>
<th>All% (95% CI)</th>
<th>Male % (95% CI)</th>
<th>Female % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall mortality</td>
<td>8.4 (8.2-8.5)</td>
<td>9.8 (9.6-10.0)</td>
<td>7.2 (7.0-7.3)</td>
</tr>
<tr>
<td>Farm-Related Occupations</td>
<td>11.9 (11.1-12.8)</td>
<td>13.1 (12.1-14.1)</td>
<td>8.4 (7.1-10.0)</td>
</tr>
<tr>
<td>Non-Farm-Related Occupations</td>
<td>8.3 (8.2-8.4)</td>
<td>9.7 (9.6-9.9)</td>
<td>7.1 (7.0-7.3)</td>
</tr>
</tbody>
</table>

*Standardized to U.S. 2000 standard population using Direct method*
Age-Standardized Mortality Rates (%) of Leading Causes of Death, 1997-2014

*Standardized to U.S. 2000 standard population using Direct method
## Age-Standardized Psychological Distress Rates by Gender, 1997-2014

<table>
<thead>
<tr>
<th></th>
<th>All % (95% CI)</th>
<th>Male % (95% CI)</th>
<th>Female % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological distress</td>
<td>2.9 (2.8-3.0)</td>
<td>2.2 (2.2-2.3)</td>
<td>3.5 (3.4-3.6)</td>
</tr>
<tr>
<td>Farm-Related Occupations</td>
<td>3.5 (3.1-4.0)</td>
<td>3.0 (2.6-3.6)</td>
<td>5.1 (4.1-6.3)</td>
</tr>
<tr>
<td>Non-Farm-Related Occupations</td>
<td>2.9 (2.8-2.9)</td>
<td>2.2 (2.1-2.3)</td>
<td>3.5 (3.4-3.6)</td>
</tr>
</tbody>
</table>

*Standardized to U.S. 2000 standard population using Direct method*
Age-Standardized Psychological Distress Rates by Gender, 1997-2014

<table>
<thead>
<tr>
<th></th>
<th>All % (95% CI)</th>
<th>Male % (95% CI)</th>
<th>Female % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Risk Occupations</td>
<td>1.5 (1.5-1.6)</td>
<td>1.2 (1.1-1.3)</td>
<td>1.9 (1.8-2.0)</td>
</tr>
<tr>
<td>Farm-Related Occupations</td>
<td>3.5 (3.1-4.0)</td>
<td>3.0 (2.6-3.6)</td>
<td>5.1 (4.1-6.3)</td>
</tr>
<tr>
<td>Other High-Risk Occupations</td>
<td>3.8 (3.7-3.9)</td>
<td>3.0 (2.6-3.6)</td>
<td>4.5 (4.4-4.7)</td>
</tr>
</tbody>
</table>

*Standardized to U.S. 2000 standard population using Direct method*
## Hazard Ratios - Mortality

<table>
<thead>
<tr>
<th>Category</th>
<th>Unadjusted HR (95%CI)</th>
<th>Adjusted HR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm vs. Non-Farm</td>
<td>1.48 (1.41-1.55)</td>
<td>1.04 (0.94-1.45)</td>
</tr>
<tr>
<td>Low-risk occupations</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Farm-related occupations</td>
<td>1.70 (1.62-1.79)</td>
<td>1.21 (1.09-1.33)</td>
</tr>
<tr>
<td>Other high-risk occupations</td>
<td>1.24 (1.23-1.27)</td>
<td>1.30 (1.26-1.35)</td>
</tr>
</tbody>
</table>

Adjusted for age, gender, race/ethnicity, poverty level, marital status, insurance status, lung diseases, cancer, hypertension, diabetes, heart disease, and psychological stress.
## Odds Ratios - Psychological distress

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted OR (95%CI)</th>
<th>Adjusted OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm vs. Non-Farm</td>
<td>1.20 (1.05-1.38)</td>
<td>1.11 (0.95-1.29)</td>
</tr>
<tr>
<td>Low-risk occupations</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Farm-related occupations</td>
<td>2.26 (1.95-2.62)</td>
<td>1.83 (1.55-2.15)</td>
</tr>
<tr>
<td>Other high-risk occupations</td>
<td>2.48 (2.36-2.61)</td>
<td>1.89 (1.79-2.00)</td>
</tr>
</tbody>
</table>

Adjusted for age, gender, race/ethnicity, poverty level, marital status, insurance status, lung diseases, cancer, hypertension, diabetes, heart disease, and psychological stress.
Limitations

- Data did not measure specific workplace risk factors associated with distress and mortality, e.g., chemicals
- No information on duration of employment
- No employer characteristics, e.g., size, number of employees, benefits
- Based on self-reports of principal occupation; people increasingly work in more than one occupation at given time
Conclusions

- Farm related occupations were associated with high risk of overall and cause specific mortality
- Farm related occupations were associated with high risk of psychological distress
- Providers of health care and social services should ask patients or clients about distress associated with work
- Distress can greatly affect productivity, workplace climate, employee satisfaction and retention
- Employers would benefit from programs that address workplace characteristics linked with distress
Gateway provides easy and timely access to research conducted by the Rural Health Research Centers

ruralhealthresearch.org

This free online resource connects you to:

- Research and Policy Centers
- Products & Journal Publications
- Fact Sheets
- Policy Briefs
- Research Projects
- Email Alerts
- Experts
- Dissemination Toolkit

Thank you