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**Boletín de
Seguridad y
Salud en el
Trabajo del
Sector
Agrícola**



**Instituto Andaluz de Prevención
de Riesgos Laborales**
Consejería de Empleo, Empresa
y Trabajo Autónomo

**Laboratorio-Observatorio Andaluz de
Condiciones de Trabajo en el Sector Agrícola
(LASA)**

<https://www.juntadeandalucia.es/organismos/iaprl/areas/investigacion/lasa.html>

FINALIDAD DE ESTE DOCUMENTO

Este boletín, realizado desde el Laboratorio-Observatorio Andaluz de Condiciones de Trabajo en el Sector Agrícola (LASA), engloba diferentes artículos científicos sobre Seguridad y Salud en el Trabajo (SST) en el sector de la agricultura. Recoge trabajos que han sido publicados en revistas del Journal Citation Reports en el tercer cuatrimestre del año 2024. Se expone el título y resumen en inglés de cada artículo junto con su información principal. Además, en todos se presenta un breve resumen en español de los aspectos más destacados. Este boletín pretende facilitar la revisión de los artículos publicados en este ámbito en el período de tiempo indicado y el acceso a las revistas correspondientes.

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REVISTAS QUE CONTIENEN ARTÍCULOS EN ESTE BOLETÍN

JOURNAL OF AGRICULTURAL
SAFETY AND HEALTH



BMC MUSCULOSKELETAL
DISORDERS



INTERNATIONAL JOURNAL OF
OCCUPATIONAL SAFETY AND
ERGONOMICS



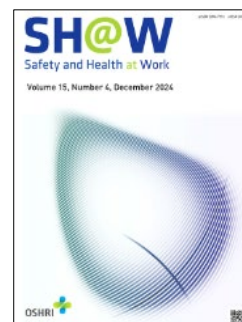
JOURNAL OF AGROMEDICINE



JOURNAL OF SAFETY
RESEARCH



SAFETY AND HEALTH AT WORK



WORKPLACE HEALTH &
SAFETY



ARCHIVES OF
ENVIRONMENTAL &
OCCUPATIONAL HEALTH



SAFETY



JOURNAL OF AGRICULTURAL SAFETY AND HEALTH

ARTÍCULO 1: Factors Influencing Worker Safety in Grain Handling: An Advisory Panel Perspective

Out-of-condition grain has been identified as a primary causal factor in grain entrapments and engulfments. The quality of grain also has implications for grain dust explosions. Limited research has examined exactly which elements of grain condition influence worker safety in grain handling. This research project aimed to establish an advisory panel to examine and provide input on how elements of grain condition relate to worker safety risks in grain handling. A purposeful sampling technique was used to obtain a sample of grain handling and storage experts to function in an advisory role for the project. A primary aim of this research was to understand the problem further, provide input on tested variables, and guide educational and dissemination efforts. As is true for qualitative methodologies, those selected as part of the targeted sample cannot be generalized to other experts in the field of grain handling. The final sample contained six industry representatives, five academic professionals, and two insurance/regulatory professionals. Participants interviewed had varied expertise with grain-based safety events. Of those interviewed, 23% of participants had personal experience, 54% had bystander or investigator experience, and 23% had training experience. Semi-structured interviews were conducted to further understand the problem, provide input on important elements in safe grain handling, and guide educational and dissemination efforts. Interviews were analyzed with a primary objective to identify elements of grain condition that play a role in the incidence of grain entrapment, grain engulfments, or grain dust explosions. NVivo 14 was used to conduct a thematic analysis, and four overall themes were identified, which included challenges to worker safety in the grain handling industry, areas where improved communication is needed, grain quality indicators that may play a role in safety incidents, and available mitigation strategies. The themes are the opinions of the advisory panel and may not reflect those of the entire grain handling industry.

Factores que influyen en la seguridad de los trabajadores durante la manipulación de grano: la perspectiva de un panel asesor

Se investigaron los riesgos laborales a los que se exponían los agricultores que trabajaban con grano en mal estado. Se estableció un panel asesor con el fin de determinar cómo la calidad del grano influía en atrapamientos o explosiones. Se entrevistaron a 13 profesionales expertos en manipulación y almacenamiento, que además contaban con experiencia en incidentes. Los resultados identificaron cuatro temas: desafíos para la seguridad de los trabajadores, mejora de la comunicación, indicadores de calidad del grano relacionados con incidentes y estrategias para eliminación. Estos temas constituyeron opiniones del panel asesor, pero no representaban a todo el sector.

AUTORES	Elzerie Derry, Gretchen A. Mosher, Kingsly Ambrose
DOI	https://doi.org/10.13031/jash.15915
PUBLICACIÓN	Journal of Agricultural Safety and Health, 2024, Volumen 30, Número 4, pp. 163-180
TEMÁTICA	Seguridad y Salud General

ARTÍCULO 2: Testing the Feasibility of Selected, Commercially Available Wearable Devices in Detecting Agricultural-Related Incidents

A study was conducted to test a selection of commercially available wearable devices to determine their feasibility for triggering incident detection during a variety of simulated agricultural incidents with high risk of causing injury. The goal was to ultimately increase survivability outcomes for victims by enhancing notification and reducing response time from emergency services. A 50th percentile adult male anthropomorphic test device (ATD). was fitted with a convenient selection of commercially available wearable smart technologies to measure the responsiveness of the technology's incident detection software. Devices used for this testing were: (1) Garmin Vivoactive 4 smartwatch; (2) Apple Watch Series 7 (Bluetooth only and cellular models); and (3) Movesense Active tracking device. A Samsung Galaxy S22 smartphone and an Apple iPhone 12 smartphone were used to connect the wearable devices and measured impact through their internal inertial measurement unit (IMU) sensors. Simulated ejections from equipment, vertical falls, and vehicle overturns were performed with the ATD. Side upsets were simulated with the ATD positioned in the operator station of a 52-drawbar horsepower (dbp), two-wheel drive, standard front axle, diesel tractor, weighing 6500 pounds. The tractor was equipped with an approved ROPS. Side upsets were also simulated using a 22-horsepower zero-turn mower, with the ATD positioned in the operator seat. Falls were simulated from heights of up to 4.57 meters. After each simulated incident, devices were examined to determine whether or not incident detection was successfully triggered. Data was then collected from an internal sensor logging application installed on the selected devices. It was found that the incident detection feature on the identified wearable devices only triggered in specific scenarios. Only 2 of the 27 simulated incidents successfully triggered incident detection on one device. Only the Garmin Vivoactive 4 smartwatch triggered incident detection. No device was triggered during the ATD impact in simulated tractor upset testing or in simulated zero-turn mower upset testing. It was concluded that these devices, in their current form, are not reliable for use in detecting serious agricultural-related injuries, especially considering the lack of adequate cell phone coverage in the areas in which these incidents are most likely to occur.

Prueba de viabilidad de dispositivos portátiles seleccionados y disponibles comercialmente para detectar incidentes relacionados con la agricultura

Se estudió la viabilidad de diferentes dispositivos portátiles existentes en el mercado para detectar incidentes en el sector de la agricultura. Se empleó un dispositivo antropomórfico de prueba que representaba a un hombre adulto promedio y se le colocaron estos dispositivos: reloj inteligente Garmin Vivoactive, Apple Watch Series 7 y el dispositivo de seguimiento Movesense Active. Se simularon varios incidentes (expulsiones de maquinaria, caídas verticales y vuelco de vehículos) y se comprobó si dichos dispositivos los detectaban. Los resultados mostraron que solamente se identificaron 2 de los 27 accidentes simulados y únicamente por el Garmin Vivoactive. Se concluyó que estos dispositivos no eran fiables para esta función.

AUTORES	Aaron James Etienne, William E. Field, Shawn G. Ehlers, Roger Tormoehlen, Noah Joel Haslett
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DOI	https://doi.org/10.13031/jash.15985
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PUBLICACIÓN	Journal of Agricultural Safety and Health, 2024, Volumen 30, Número 4, pp. 181-204
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TEMÁTICA	Seguridad y Salud General
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ARTÍCULO 3: Perspective: Closing the Regulatory Gap: Addressing Challenges for Autonomous Agricultural Equipment in California

As of August 2024, California's agricultural tractor safety regulations, developed over half a century ago, are still focused on classic tractors with human operators. These regulations are problematic when applied to autonomous equipment. Since agricultural equipment has advanced, producers have faced challenges in complying with existing regulations for autonomous machinery in California

A petition (No. 596) was submitted in December 2021 to the State of California Department of Industrial Relations and reviewed in March 2023. The petition requesting modification of the agricultural tractor's traditional regulation was recently submitted to the Occupational Safety and Health Standards Board (OSHSB). The OSHSB denied both petitions. This article discusses more details related to California agricultural tractor safety regulations, the petition to modify the traditional regulations, discussions on OSHSB meetings regarding the petition, and several suggestions to resolve the current issue.

Perspectiva: Cerrando la brecha regulatoria: Abordando los desafíos para los equipos agrícolas autónomos en California

Las normativas de seguridad de California para tractores agrícolas todavía se basan en tractores tradicionales con operarios que los conducen. Por tanto, para los trabajadores es un problema cumplir con dichas normativas cuando emplean equipos autónomos. En este estudio se identificaron las regulaciones existentes sobre seguridad para tractores agrícolas, la petición que se realizó con anterioridad para modificar estas normas, las discusiones en reuniones sobre dicha petición y recomendaciones para solucionar este inconveniente.

AUTORES	Farzaneh Khorsandi, Kent E. Pinkerton, Minyoung Hong
DOI	https://doi.org/10.13031/jash.16112
PUBLICACIÓN	Journal of Agricultural Safety and Health, 2024, Volumen 30, Número 4, pp. 155-161
TEMÁTICA	Vehículos y Maquinaria Agrícola

ARTÍCULO 4: Artificial Intelligence-Driven All-Terrain Vehicle Crash Prediction and Prevention System

All-Terrain Vehicle (ATV) crashes have become a public health concern in the U.S. over the past decades, resulting in numerous fatalities and hospitalizations. Most of those incidents could have been prevented if riders could better assess their ability to handle risks. Currently, risk factors associated with ATV incidents have already been studied. However, little effort has been made toward developing practical applications that assist the rider in preventing crashes. Commercial ATV safety systems, such as Farm Angel, focus on post-crash detection and emergency medical services (EMS) alerting rather than preventive measures. Machine learning prediction models can be used to assist riders in taking preventive measures to avoid an imminent crash. In this study, we developed a system that leverages the predictive power of machine learning algorithms to assess the likelihood of a crash in real-time and alert the riders, thus allowing them to prevent the crash. To the best of our knowledge, this is the only system ever developed for ATVs specifically that can predict rollover incidents. The crash likelihood is estimated by a deep neural network that considers the ride parameters (e.g., ATV speed, turning radius, and roll and pitch angles), ATV characteristics (e.g., width, length, wheelbase), and human factors (i.e., presence of a rider). The ATV characteristics and the presence of a rider are retrieved from the rider's input through a smartphone application developed specifically for this study. The ride parameters are retrieved from an embedded system (attached to the ATV). Validation and performance tests indicated that: (1) the proposed device has a rollover prediction system with an accuracy superior to 99%; (2) the system can detect roll and pitch angles with average errors of 0.26 and 0.54 degrees, respectively; and (3) the system can detect the ATV's speed with an average error of 0.75 m s⁻¹.

Sistema de predicción y prevención de accidentes en vehículos todoterreno impulsado por inteligencia artificial

Se desarrolló un sistema para analizar en tiempo real la probabilidad de que se produjera un accidente con un vehículo todoterreno (principalmente un vuelco) y avisar a los conductores para que pudiera prevenirse. Esta probabilidad se conseguía obteniendo los parámetros de conducción (velocidad, ángulos de inclinación, etc.), características del vehículo (ancho, distancia entre ejes, etc.) y factores humanos. Entre otros resultados, se concluyó que el sistema planteado permitía una predicción de vuelcos con una precisión mayor al 99%.

AUTORES	Farzaneh Khorsandi, Guilherme De Moura Araujo, Fernando Ferreira Lima dos Santos
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DOI	https://doi.org/10.13031/jash.16079
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PUBLICACIÓN	Journal of Agricultural Safety and Health, 2024, Volumen 30, Número 4, pp. 139-154
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TEMÁTICA	Vehículos y Maquinaria Agrícola
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BMC MUSCULOSKELETAL DISORDERS

ARTÍCULO 5: Sociodemographic differences in low back pain: which subgroups of workers are most vulnerable?

Background: Low back pain (LBP) is a common health problem in workers that contributes to work disability and reduces quality of life. However, studies examining vulnerable groups in relation to sociodemographic differences in LBP remain scarce. Therefore, the current study investigates which sociodemographic groups of workers are most affected by LBP.

Methods: Data from the 2018 BIBB/BAuA employment survey were used (N=16252). Age, education, occupational group, income, working hours, atypical working time, relationship status, and having children were used as sociodemographic predictors. Gender-stratified logistic regression analyses and intersectional classification tree analyses were conducted.

Results: A higher prevalence of LBP was observed for women compared to men. Significant differences in LBP emerged for age, working hours, atypical working time, occupational group and education, with some gender differences in the importance of predictors: Age was a significant predictor mostly in men as compared to women, atypical working hours had a slightly greater effect in women, whereas differences in LBP according to the occupational group were more pronounced for men. Vulnerable groups were found to be women who work in occupations other than professionals or managers, work atypical hours and have an intermediate or low educational level as well as men who work as skilled agricultural workers, craft workers, machine operators, or elementary occupations and are between 35 and 64 years old.

Conclusions: Thus, workers with certain occupations and lower levels of education, middle-aged men and women with unfavourable working time characteristics are most affected by low back pain. These groups should be focused on to potentially increase healthy working life and prevent work disability.

Diferencias sociodemográficas en el dolor lumbar: ¿qué subgrupos de trabajadores son más vulnerables?

Se investigó en qué trabajadores era más común el dolor lumbar según características sociodemográficas. Se emplearon los datos de la encuesta BIBB/BAuA, en concreto edad, nivel educativo, trabajo, ingresos, horas de trabajo, horario laboral, estado civil y si tenían hijos. Los grupos que más sufrían lumbago fueron mujeres trabajadoras en puestos diferentes a profesionales o gerentes, con horarios laborales atípicos y un nivel educativo medio o bajo. También los hombres agricultores, artesanos, operarios de máquinas o que realizaban trabajos elementales, con una edad comprendida entre 35 y 64 años.

AUTORES Johannes Beller, Stefanie Sperlich, Jelena Epping, Batoul Safieddine, Janice Hegewald, Juliane Tetzlaff

DOI <https://doi.org/10.1186/s12891-024-07970-5>

PUBLICACIÓN BMC Musculoskeletal Disorders, 2024, Volumen 25, 852

TEMÁTICA Riesgo Físico

INTERNATIONAL JOURNAL OF OCCUPATIONAL SAFETY AND ERGONOMICS

ARTÍCULO 6: Occupational health and safety portrait of lobster fishers from a St. Lawrence Gulf community

Lobstering industry workers are known to have poor overall health and low safety records, but there is still a gap in information concerning Canadian lobster fishers. This study aimed to report occupational health and safety characteristics of an Atlantic Canada community of lobster fishers and to assess differences between captains and deckhands. Twenty-eight participants (10 captains, 18 deckhands) were questioned and self-reported on lifestyle, general health status, work-related musculoskeletal disorders and traumatic injuries. The data collected reveal both groups' high prevalence of cardiometabolic and musculoskeletal health issues. Captains reported more occupational exposition and health issues, and showed poorer lifestyle habits than deckhands. Fishers reported potential solutions to reduce occupational risks, presented as three types: lifestyle, working behaviours and leadership. This study evaluated a community of Canadian lobster fishers regarding their occupational health and safety. Potential avenues for mitigating occupational risk specific to this community will nurture future implementation.

Retrato de la seguridad y salud en el trabajo de los pescadores de langosta de una comunidad del Golfo de San Lorenzo

Se evaluó la seguridad y salud en el trabajo de pescadores de langosta en Canadá. Para ello, se entrevistó a 28 trabajadores, de los cuales 10 eran capitanes y 18 tripulantes. Se recogió información sobre su estado de salud, estilo de vida, trastornos musculoesqueléticos de origen laboral y lesiones traumáticas. Los resultados mostraron que para ambos grupos de trabajadores eran comunes los problemas de salud cardiometabólica y los trastornos musculoesqueléticos. El grupo que presentaba más problemas de salud derivados del trabajo fue el de los capitanes.

AUTORES	Mathieu Tremblay, Dave Bergeron, Andrée-Anne Parent, Jérôme Pelletier, Daniel Paré, Martin Lavallière
DOI	https://doi.org/10.1080/10803548.2024.2366634
PUBLICACIÓN	International Journal of Occupational Safety and Ergonomics, 2024, Volumen 30, Número 3, pp. 907-915
TEMÁTICA	Seguridad y Salud General

JOURNAL OF AGROMEDICINE

ARTÍCULO 7: Telling Tales: Using Vignettes to Overcome Optimism Bias in Farm Health and Safety Attitudinal Studies

Objective: Measuring attitudes of farmers to safe farming practices using quantitative causal relationship approaches is central to improving understanding of (un)safe practices. This knowledge is important in the development of effective farm safety interventions. However, the accuracy of quantitative attitudinal studies in explaining farmers' decision-making faces a potential measurement challenge, i.e. a high level of optimism bias. In this paper, we present research that develops and tests farm safety attitudinal questions that are framed around "real-life" farming practices with the objective of reducing optimism bias.

Methods: We apply construal level theory (CLT) to support the design of vignettes that reflect common risk scenarios faced by farmers. Applying qualitative analysis of 274 fatal farm incidents that occurred in Ireland between 2004 and 2018 we identify the occupational behaviors (what farmers do), social (who are farmers), spatial (where farming takes place), and temporal (when farming happens) dimensions of risks resulting in most deaths. The results informed subsequent co-design activities with farm safety experts and farm advisors to develop "real-life" scenarios, attitudinal questions, and response options. The questionnaire was piloted and subsequently implemented to collect data from a sample of 381 farmers with either tractors or livestock. The results of the survey were compared to previous attitudinal research on farmer's attitudes to safety in Ireland to establish if there was as follows: i) increased variance in the responses, and ii) a statistically significant difference in the attitudes of respondents compared to the results reported in previous studies.

Results: The findings established that when farmers were provided with real-life scenarios, their responses were less optimistic and more varied, i.e. there was a greater range of responses, compared to previous studies.

Conclusion: Applying CTL to the development of attitudinal survey instruments anchors attitudinal questions within farming specific occupational, social, spatial, and temporal contexts. The use of vignettes that draw on real-life scenarios offers the potential for improved design of surveys that seek to understand farmer/worker practices. The results suggest that this approach can improve the measurement of attitudes to farm safety.

Contando historias: Uso de viñetas para superar el sesgo de optimismo en estudios actitudinales sobre la salud y seguridad en el ámbito agrícola

Se desarrolló un cuestionario de preguntas actitudinales acerca de la seguridad de los trabajadores en el sector de la agricultura centradas en casos reales con el objetivo de disminuir el sesgo de optimismo. Se crearon viñetas que representaban situaciones frecuentes de riesgo para los trabajadores de la vida real. Se diseñaron las preguntas y diferentes opciones de respuesta. Participaron 381 agricultores y los resultados obtenidos se compararon con estudios previos. Se identificó que cuando a los trabajadores se les mostraban situaciones de la vida real, las respuestas eran menos optimistas y más variadas en comparación con investigaciones anteriores.

AUTORES	Mohammad Mohammadrezaei, David Meredith, John McNamara
DOI	https://doi.org/10.1080/1059924X.2024.2365638
PUBLICACIÓN	Journal of Agromedicine, 2024, Volumen 29, Número 4, pp. 531-546
TEMÁTICA	Seguridad y Salud General

ARTÍCULO 8: Farmworker-Relevant Heat Exposure in Different Crop and Shade Conditions

Objectives: Agricultural workers are at risk of heat-related illness, which is preventable. Few field studies have compared farmworker-relevant heat exposure in different conditions. We examined heat exposure over time in different potential shade and work locations to inform future occupational heat prevention approaches.

Methods: We assessed heat exposure in Eastern Washington State (WA) cherry and grape fields in August 2022. QUESTemp° monitors recorded Wet Bulb Globe Temperature (WBGT) and Black Globe Temperature (BGT) every 10 min from approximately 07:00–14:00 for threedays in the center of crop rows (mid-row), under portable shade structures (shade), and in open field (open) locations. Linear mixed effects regression (LMER) models compared WBGT and BGT among field locations. Hourly time-weighted average WBGT and comparisons with occupational exposure limits (OELs) were computed for different hypothetical work-rest cycles during the hottest sampling hours, assuming different worker effort levels, rest locations (mid-row versus shade), and acclimatization statuses.

Results: Across all crops and locations during the study period, the mean/SD air temperature was 31°C (88°F)/3.9°C (6.9°F), with a maximum temperature of 39°C (102°F) and a mean/SD relative humidity of 30%/9.6%. LMER models suggested no significant difference in mid-row versus open WBGT but significantly lower WBGT in shade versus open locations for both cherries (main effect –5.14: 95% confidence interval [CI] –6.97,–3.32) and grapes (–6.20: 95%CI –7.73,–4.67), though this difference diminished over the course of the day. BGT was significantly higher in the mid-row than the shade (cherries main effect 14.33: 95%CI 9.52,19.13 and grapes 17.10: 95%CI 13.44,20.75). During the hottest sampling hour, the exceedances of OELs were reduced with assumptions of increased shaded break lengths, reduced effort level, and acclimatization.

Conclusions: Shade canopies, but not the crops studied, provided significant reductions in heat exposure. We observed increased protection from heat assuming longer shaded breaks and reduced effort levels. Results highlight the need for additional field research on the effectiveness, feasibility, and acceptability of different shade types and work-rest cycles to guide employer optimization of best practices for worker protections, including acclimatization before high heat, sufficient shaded rest time, reduced effort levels as the day warms, and avoiding work in peak heat.

Exposición al calor relevante para los trabajadores de la agricultura en diferentes condiciones de cultivo y sombra

Se analizó la exposición al calor de trabajadores de la agricultura, en concreto de cultivos de cerezas y uvas situados al este de Washington. Se midió la temperatura de globo húmedo y la temperatura de globo negro en tres ubicaciones: en el centro de la fila de cultivo, debajo de estructuras de sombra portátiles y en campo abierto. Las mediciones se realizaron durante tres días, cada 10 minutos desde las 07:00h hasta las 14:00 h. Se identificó que la temperatura de globo húmedo se reducía en la sombra para ambos cultivos a lo largo del día. La temperatura de globo negro fue superior en el centro de la fila que en la sombra. En las horas más calurosas, la exposición se redujo cuando se realizaron descansos en la sombra de mayor duración, menor esfuerzo en las tareas y aclimatación.

AUTORES	John C. Flunker ,June T. Spector, Maria Blancas, Nicole L. Briggs, Miriam Flores, Carolyn Reeb- Whitaker, Todd Schoonover, Tamre Cardoso
DOI	https://doi.org/10.1080/1059924X.2024.2365647
PUBLICACIÓN	Journal of Agromedicine, 2024, Volumen 29, Número 4, pp. 547-560
TEMÁTICA	Temperatura

ARTÍCULO 9: "I Do Not Have the Time of Being sick": Para-Occupational Exposure and Women's Health Risk Perception in an Agricultural Community

Introduction: Few studies have explored the relationship between para-occupational exposure and risk perception in farmers' families. Women are indirectly involved in agricultural activities, even though their roles most of the time are hidden. Women's para-occupational exposure and risk perceptions are important to describe, since women have a key gender role in the family's health care and possibly in the impact of acting regarding pesticide safety education. Furthermore, in farmer families, the impact of para-occupational pesticide exposure on women's health has been neglected.

Aim: Analyze pesticide para-occupational exposure scenario, knowledge, and health risk perception among women living in a farmer community.

Methods: A mixed methodology was used. Two groups of women were identified to screen the exposure scenario: Women living in a farming family and women not living in a farming family. Data on para-occupational pesticide exposure and intradomicile practices were collected by questionnaire and semi-structured interviews to identify health risk perception and risk practices.

Results: We observed a complex pesticide exposure scenario. All women were potentially exposed to pesticides through several pathways. One-third of the participants lived near a farming family or in proximity to neighbors that used pesticides at home, and one of every three women referred to spending time in a farmer's home. Among the group of women in a farming family (n=18) stored pesticides inside the home was common; having the "safety practice" of storing pesticides in high places to avoid children being exposed. Women not living in farming families (n=11) felt overexposed due to living in an agricultural community and agricultural drift exposure. Women from this group also mentioned feeling fear of developing cancerous diseases as well as fertility problems.

Conclusions: Knowledge and risk perception of pesticide exposure are similar between groups; however, women living in farming families were less willing to attend preventive health check-ups or educational programs than women not living in a farming family.

"No tengo tiempo para estar enferma": Exposición indirecta relacionada con el trabajo y la percepción del riesgo para la salud de las mujeres en una comunidad agrícola

Se evaluó la exposición indirecta a fitosanitarios relacionada con el trabajo de mujeres que vivían en zonas agrícolas, se analizó su percepción del riesgo para la salud y los conocimientos que tenían sobre este tema. Participaron dos grupos de mujeres: las que vivían con una familia dedicada a la agricultura y las que no. Se utilizaron cuestionarios y entrevistas. Los resultados mostraron que todas las mujeres estaban expuestas a fitosanitarios. Un tercio de las mujeres que vivían en una zona próxima a una familia agrícola o a vecinos que realizaban tratamientos fitosanitarios. En casa de algunas mujeres se almacenaban estos productos. Las mujeres que no tenían relación con la agricultura, indicaban sentirse muy expuestas por vivir en zona de agricultura e indicaban su miedo a sufrir enfermedades por este motivo.

AUTORES	Mayra Vera-Aviles, Teresa Castillo-Burguete, Norma Pérez-Herrera
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TEMÁTICA	Tratamientos Fitosanitarios

ARTÍCULO 10: A Qualitative Enquiry of On-Farm Rules About Quad Bikes (ATVs): How Rules Are Determined and Implemented at a Farm Level in Rural Australia

Objective: Quad bikes are a leading cause of death and incident-related injury on farms, yet little is understood about rules used by farmers to ensure their safe operation. This study explored rules about quad bikes set by those who live or work on farms. Through the case of quad bikes, this study sought to understand how rules are determined and implemented at the farm level.

Setting: A mix of farm types and locations in rural Australia including Queensland, South Australia, and New South Wales.

Participants: Eight farmers were interviewed and recruited from information sheets at farmers' markets, through a local health organisation, and a media release.

Design: Thematic analysis was used to transform data from eight semi-structured interviews with farmers in rural Australia.

Results: Data were distilled into two themes – "Rule content" described the explicit rules farmers had set on their properties, while the theme "Underlying rule principles" explored the values and norms which underpinned the creation and implementation of these rules.

Conclusions: Through the case of quad bike rules, this study illustrated how rules are determined and implemented at the farm level. Perceptions of risk were tied to farmers being experts in their own environment and therefore able to mitigate risk. In contrast to injury data, reckless use of quad bikes was perceived to cause incidents, and this was the basis of rules for adults and children.

Una investigación cualitativa sobre las normas en terrenos agrícolas relacionadas con los vehículos todoterreno: cómo se determinan e implementan las normas en las zonas rurales de Australia

Se investigaron las reglas de seguridad que seguían los agricultores durante el uso de los vehículos todoterreno en Australia. Se realizaron entrevistas a ocho trabajadores. A partir de esta información se concluyó que las normas de seguridad que adoptan los agricultores están determinadas por su percepción del riesgo, asociada a su experiencia laboral. También indican que la principal causa de accidentes es el uso imprudente de estos vehículos.

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TEMÁTICA Vehículos y Maquinaria Agrícola

ARTÍCULO 11: Mental Health Among LGBTQ+ Farmers in the United States

Objectives: The objective of the current study is to describe mental health among lesbian, gay, bisexual, transgender, and queer (LGBTQ+) people who work in agriculture in the U.S.

Methods: This study uses a survey of LGBTQ+ adults who work in agriculture in the U.S. (N=148), including questions about LGBTQ+ identity, farming background, depression symptoms (PHQ-8) and diagnosis, anxiety symptoms (GAD-7) and diagnosis, suicide risk, and stress. Data were analyzed using SPSS, including descriptive statistics, chi-square tests, and Mann-Whitney U tests.

Results: Over one-third (36.1%) had probable depression (PHQ-8 \geq 10), and 71.9% were experiencing mild to severe depression symptoms. Nearly half (46.2%) had probable anxiety disorder (GAD-7 \geq 8), and 69.7% experienced mild to severe anxiety symptoms. Over half (51.7%) were at significant risk for suicide. Greater proportions of men had probable anxiety disorder, probable depression, and suicide risk compared to non-men. Greater proportions gay participants had probable depression, as did beef producers. Perceived stress was higher for men, lesbian and gay participants, transgender participants, and those in beef production. Resilient coping was highest among participants who were genderqueer or genderfluid, bisexual, and those in field crop production.

Conclusion: LGBTQ+ farmers in the current sample experienced depression and anxiety at higher rates than general farming or general LGBTQ+ samples, although suicide risk was lower than for general LGBTQ+ samples. Future research should explore how working in agriculture may be protective against suicide risk for LGBTQ+ farmers, as well as how specific farm stressors are related to LGBTQ+ farmer mental health.

Salud mental entre agricultores LGBTQ+ en los Estados Unidos

Este estudio analizó la salud mental de trabajadores LGBTQ+ (Lesbianas, Gays, Bisexuales, Transgénero, Queer y otras identidades) del sector de la agricultura en Estados Unidos. Se realizó una encuesta a 148 trabajadores con preguntas sobre identidad, antecedentes en la agricultura, síntomas y diagnóstico relacionados con la depresión, ansiedad, estrés y riesgo de suicidio. Los datos se analizaron mediante estadísticas. Entre otros resultados, se identificó que un 36,1% de los participantes probablemente padecían depresión y el 71,9% tenían síntomas de depresión de diferente gravedad. Casi la mitad de los trabajadores encuestados tenían ansiedad y el 69,7% síntomas. Además, más de la mitad estaban en riesgo de suicidio.

AUTORES Courtney Cuthbertson, Dane Rivas-Koehl, Anisa Codamon, Alyssa Billington, Matthew Rivas-Koehl

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TEMÁTICA Riesgo Salud Mental

ARTÍCULO 12: Age Group-Wise Burden of Non-Communicable Diseases Among Shrimp Cultivators in India: A Retrospective Analysis of Disability-Adjusted Life Years Method

Objective: Despite generating huge employment opportunities and profitable business, fishing is considered a dangerous occupation due to challenging weather conditions and exposure to unhealthy occupational factors and lifestyles, which contribute to various health issues. However, few studies have examined the health status of shrimp cultivators. Consequently, this study aims to estimate the age group-wise burden of non-communicable diseases (NCDs) among shrimp cultivators.

Methods: Simple random sampling was employed for collecting data. The sample size was 357 shrimp cultivators. Disability-adjusted life years (DALY) and relative risk (RR) methods were used to measure the burden of NCDs among shrimp cultivators. This study reported the burden of NCDs per 100,000 shrimp cultivators.

Results: The top five prevalence of NCDs per 100,000 shrimp cultivators were mental disorders (85,434), musculoskeletal diseases (26,325), digestive diseases (9,803), diabetes (5,882), and cardiovascular diseases (4,481). DALY per 100,000 shrimp cultivators was 33,407.59, while at the national level, it was 24,775.99 per 100,000 people across all age groups. The RR of NCDs among shrimp cultivators in terms of DALY was 1.35, indicating a 0.35 times higher burden of NCDs among shrimp cultivators than at the national level. The largest RR of NCDs was found among shrimp cultivators aged 15–49 years (1.85), followed by 50–69 years (1.09). The highest percentage changes in the burden of NCDs among shrimp cultivators, resulting from changes in the methods of estimating DALY, was observed in the age group of 70 years and above (–48.36%) followed by 15–49 years (–46.08%) and 50–69 years (–40.33%) when compared to the baseline method of estimating DALY without utilizing age weightage and discount rate.

Conclusions: Focus should be given to improving the lifestyle and occupational factors of shrimp cultivators to mitigate the burden of NCDs.

Carga de enfermedades no transmisibles por grupo de edad entre los pescadores de camarones en la India: un análisis retrospectivo del método de Año de Vida Ajustado por Discapacidad

Se analizaron las enfermedades no transmisibles de pescadores de camarones en función de la edad. Participaron 357 trabajadores y se emplearon dos métodos: AVAD (Año de Vida Ajustado por Discapacidad) y RR (Riesgo Relativo). Las cinco enfermedades más frecuentes fueron trastornos mentales, trastornos musculoesqueléticos, enfermedades digestivas, diabetes y enfermedades cardiovasculares. Además, los pescadores de camarones presentan una carga de enfermedades no transmisibles superior que la media nacional, encontrándose principalmente en los trabajadores de entre 15 y 49 años.

AUTORES	Chandan Kumar Swain, Himanshu Sekhar Rout
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TEMÁTICA	Accidentes y Enfermedades Laborales
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ARTÍCULO 13: Examining the Relationship Between Stress, Barriers to Healthcare, and Alcohol Use in the US Agricultural Community

Objective: Farming is a high-risk, physically challenging occupation. Considering farmers report high stress and barriers to seeking healthcare, it is important to understand factors influencing alcohol use to tailor interventions and healthcare resources for alcohol use in rural areas.

Methods: An online survey was distributed to the agricultural community in the United States (n=1045). Data was collected through QualtricsXM, and SPSS 28.0 was used for data analysis.

Results: Both formal healthcare challenges ($\beta=0.112$, $p=.004$) and stigma ($\beta=0.328$, $p<.001$) were identified as predictors of increased perceived stress, while resilience ($\beta=-0.137$, $p<.001$) was identified as a protective factor against perceived stress. Higher perceived stress was identified as a predictor of binge drinking behavior ($\beta=0.151$, $p<.001$), and formal healthcare challenges were associated with higher drinking volume ($\beta=0.174$, $p<.001$), and engaging in more frequent alcohol consumption ($\beta=0.123$, $p=.004$) over the last three months. Resilience was identified as a protective factor against increased alcohol consumption ($\beta=-0.084$, $p=.032$). Stigmatization of help-seeking for mental health challenges was associated with fewer instances of alcohol consumption over the last three months ($\beta=-0.169$, $p<.001$).

Conclusion: Interventions to address stress and alcohol consumption should focus on promoting resilience, reducing stigma, and encouraging peer support to address cultural norms around mental health and alcohol use. Rural practitioners should develop cultural competence to better serve agricultural communities to prevent alcohol use disorders. To discuss ways to reduce stigma and encourage peer support to address alcohol and mental health disorders in rural farming populations.

Análisis de la relación entre el estrés, las barreras al acceso a la atención médica y el consumo de alcohol en la comunidad agrícola de los EE. UU.

Se investigó la relación entre el estrés y la dificultad para acceder a la atención médica con el consumo de alcohol en trabajadores del sector de la agricultura en Estado Unidos. Se llevó a cabo una encuesta online a 1045 participantes y se analizaron los datos mediante estadísticas. Los resultados indicaron que un mayor estrés y los problemas para conseguir atención médica, tenían como consecuencia un mayor consumo de alcohol. La resiliencia se determinó como un factor que podría hacer frente a este consumo.

AUTORES	Christina Proctor, Noah Hopkins
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TEMÁTICA	Atención Sanitaria
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ARTÍCULO 14: Pilot Evaluation of a Co-Designed Gamified Farm Injury Prevention Educational Resource for Adolescents

Objectives: Adolescents are at-risk of fatal and non-fatal injuries in the farm environment. School-based agricultural safety and farm injury prevention education is likely to be more effective when utilizing co-designed and gamification principles; however, this needs to be tested. This study examined data from a pilot evaluation of a co-designed farm injury prevention gamified educational resource for adolescents.

Methods: Online, anonymous surveys were conducted with students studying agriculture in regional Australia who had previously participated in the co-design process to develop “Calm Your Farm”. Three courses were developed (vehicles, workshop, and water safety) and before and after playing each of the courses for the first time, students completed survey questions regarding self-reported knowledge on the course topic, and assessment of content, design, ease of play, and how much they learned. Survey data were analyzed using descriptive statistics, chi square tests of association, and independent sample t tests.

Results: We analyzed 66 responses (66.7% male; 60.6% aged 13years). Staged course release meant all respondents assessed the vehicle and workshop courses, while 58% assessed the water safety course. Vehicle and workshop courses were rated 7.64 out of a possible 10 (SD=1.85) and 7.65 (SD=1.78), respectively, for the information presented, slightly higher than water safety (7.47 [SD=1.91]). Statistically significant improvements in self-reported knowledge post play were seen among boys for the water safety course (63% said knowledge improved; $X^2=4.98$; $p=.026$) and 13-year-olds for vehicles (35%; $X^2=4.31$; $p=.038$) and workshop safety (50%; $X^2=4.29$; $p=.038$). Respondents indicated being more likely to replay the game at school ($M=6.62$ [SD=2.96]) than at home ($M=5.57$ [SD=3.07]). Of respondents, 61% ($n=40$) agreed that “Calm Your Farm” taught them more about farm safety and was more fun than other farm safety education previously received. Tractor safety (62%), chemical safety (58%), and firearm safety (58%) were the most popular topics suggested to be added to the game.

Conclusion: The co-design and gamification approach taken with “Calm Your Farm” appeared to be successful in improving self-reported knowledge around farm injury prevention and was perceived by 62% of the respondents as being fun and educational. Future expansion should incorporate student suggested topics.

Evaluación piloto de un recurso educativo gamificado, codiseñado, para la prevención de lesiones en granjas dirigido a adolescentes

Se investigó el éxito de un recurso educativo titulado “Calm Your Farm”, basado en gamificación y principios de codiseño, destinado a la educación sobre prevención de lesiones en agricultura para adolescentes. Se llevaron a cabo encuestas online a estudiantes que habían participado. Los resultados mostraron que con este recurso mejoraron sus conocimientos sobre seguridad en agricultura y que era más divertido que el empleo de otras metodologías. Se indicó que se añadieran al juego diferentes temas nuevos, como por ejemplo, la seguridad en tractores.

AUTORES	Amy E Peden, Faye McMillan, Dennis Alonzo, Richard C Franklin
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TEMÁTICA	Formación

ARTÍCULO 15: Wisconsin Farmers Share Their Stressors and Mental Healthcare Needs Through Focus Groups

Objectives: In this study, the project team was interested in learning from Wisconsin farmers and farm families about: (1) the unique stressors farmers face, (2) the barriers that exist for farmers to seek help for mental and physical health, and (3) coping strategies that could be implemented to help farm families cope with stress.

Methods: The project team collected qualitative data utilizing standardized questions during three focus groups held via Zoom. The 10 participants were from various Wisconsin farm enterprises including dairy, beef, and produce farms. Data were coded into five codes: stressors, farmers as a unique subculture, barriers to seeking help, coping strategies, and strategies for addressing barriers to seeking help.

Results: Participants emphasized the need for healthcare professionals to better understand farming is more than a job; it is their life. The top stressor was time pressure and the top barrier to seeking care was workload, which make it challenging to get off the farm. Stigma and self-reliance are additional barriers in the farming community. Participants offered strategies to address these barriers, including learning how to effectively communicate with farmers and raising awareness of mental health issues in rural communities.

Conclusion: The insights from this study can inform rural healthcare professionals on strategies to better support the mental and physical well-being of farmers and their families in Wisconsin and rural communities in the United States.

Los agricultores de Wisconsin comparten sus factores de estrés y necesidades de atención mental a través de grupos focales

Se investigaron los factores de estrés en agricultores de Wisconsin, el motivo por el que estos trabajadores no buscaban ayuda en relación a su salud mental y las recomendaciones para reducir su estrés. Se crearon grupos focales con 10 participantes, a los que se les realizaron diferentes preguntas mediante Zoom. El factor de estrés más relevante era el tiempo. La principal razón por la que no buscaban ayuda era la carga de trabajo, ya que no podían dejar sus tareas. Como recomendaciones destacó mejorar la comunicación con los agricultores y concienciarse sobre la salud mental.

AUTORES	Heather Schlessner, Jayne Krull, Katie Wantoch, Alana Voss, Stef Morrill, Joy KirkPatrick
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TEMÁTICA	Riesgo Salud Mental
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ARTÍCULO 16: The Use of Injury and Fatality Narratives to Convey Agricultural Safety and Health Messages and to Develop Effective Resources Through Collaborative, Multi-Disciplinary Approaches (Tell a Story, Save a Life)

Objective: Storytelling engages audiences, passes down traditions and history, educates, and helps people understand and interpret their environment. Many of those who work in agriculture have been part of the storytelling tradition since childhood. Research has demonstrated the emotional impact of personal stories and how prevention information is conveyed effectively “farmer to farmer” through this method of communication.

Methods: Since 2016, the Telling the Story Project has provided a space for those directly or indirectly involved in an agricultural incident to share their story and unique perspectives on how similar incidents can be avoided.

Results: This collaborative project, developed between the National Institute for Occupational Safety and Health (NIOSH) Agriculture Safety Centers, has resulted in 11 stories on a dedicated website, safety and health resources, and educational guides. The stories and educational guidelines have been marketed extensively through traditional and social media sources, employed in safety training, and embraced by educators in agricultural programs. The website has provided a national and international reach with more than 35,000 visits.

Conclusion: Qualitative thematic analysis of the stories provided data on the circumstances leading up to each incident, valuable information on how the storytellers interpreted the aftermath, and a novel perspective on how safety professionals can create messaging that will resonate with the farming community.

El uso de narrativas de lesiones y muertes para transmitir mensajes sobre seguridad y salud en la agricultura y desarrollar recursos efectivos mediante enfoques colaborativos y multidisciplinarios (Cuenta una historia, salva una vida)

En 2016 se llevó a cabo un proyecto titulado “Telling the Story”, desarrollado por los Centros de Seguridad Agrícola del Instituto Nacional de Seguridad y Salud en el Trabajo (NIOSH). Consistió en que aquellas personas que hubieran sufrido de forma directa o indirecta un accidente en el sector de la agricultura contaran y compartieran sus historias y opiniones para evitar incidentes similares. En total, se publicaron 11 historias en una web, en la que también había recursos educativos y guías de seguridad y salud.

AUTORES	Melissa Ploeckelman, Scott Heiberger, Risto Rautiainen, Anthony Johnson, Devon Charlier, Aaron Yoder, Ellen Duysen
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TEMÁTICA	Seguridad y Salud General
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ARTÍCULO 17: Seasonal Patterns of Injury Characteristics Among Farmers and Ranchers in the U.S. Central States

Objective: In high-risk agricultural environments, tasks, weather, and work conditions vary throughout the year. Also, injuries peak during certain periods. The primary objective of this study was to examine operator- and farm-level characteristics as risk factors for injuries within each of the four seasons. The secondary objective was to examine seasonal differences in the incident location and primary cause of these injuries.

Method: We analyzed data from the 2018 and 2020 Farm and Ranch Health and Safety Surveys (FRHSS), conducted in seven U.S. states by the Central States Center for Agricultural Safety and Health (CS-CASH), which were collected using a stratified random sampling approach to ensure representativeness. The survey data were merged with operation-level data from the Farm Market iD database. We employed Generalized Estimating Equations (GEE) to examine the association of seasonal injuries with individual and operation-level characteristics. The chi-square test of independence was used to assess the association between injury incident location and season, as well as injury cause and season. Pairwise Z-tests of proportions were conducted to evaluate the differences in the proportions of injuries due to specific combinations of injury location and cause across each pair of seasons.

Results: Surveys conducted in 2018 and 2020 yielded a combined response rate of 15.9%, with 5,428 responses and 7,915 unique operators. Of these, 903 operators reported at least one injury during the past 12 months. Seasonally, most injuries occurred in spring (34.2%), followed by summer (24.7%). Male operators had higher injury odds in the spring (adjusted OR=1.42) and summer (aOR=2.41). Those managing both a farm and a ranch reported increased injury risks in winter (aOR=1.73) and spring (aOR=1.48). Operators in cow-calf operations faced higher springtime injury risks (aOR=1.45). High stress and exhaustion were consistent risk factors across all seasons. The highest proportion of injury incidents occurred in the farmyard (43.6%), and livestock were the most common cause of injury (24.9%).

Conclusion: Results highlight the need for season-specific prevention and intervention strategies, considering farmers' and ranchers' risk characteristics, injury locations, and causes. These findings can inform targeted measures for high-risk populations at optimal times and locations.

Patrones estacionales de las características de las lesiones entre agricultores y ganaderos en los estados centrales de EE. UU.

Se analizaron los factores de riesgo de lesiones de trabajadores del sector de la agricultura en las diferentes estaciones del año, mediante datos recopilados de encuestas ya realizadas en 2018 y 2020, en siete estados de Estados Unidos. Entre los resultados principales se identificó que la mayor parte de lesiones se produjeron en primavera (34,2%) y en verano (24,7%). El estrés y el agotamiento fueron factores de riesgo de lesiones en las cuatro estaciones. La principal causa fue el trabajo con ganado.

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TEMÁTICA Accidentes y Enfermedades Laborales

ARTÍCULO 18: Toward a Public Health Approach to Farmer Suicide Prevention: The Potential Power of Systems Change

Objective: Suicide among farmers has, over the past 20 years, garnered attention from scholars around the world. The purpose of this paper is twofold. First, this paper will present a framework for considering farmer suicide that builds upon the Interpersonal-Psychological Theory of Suicidal Behavior and extends our current explanations of suicide to include a multilevel, multifactorial focus on individual, interpersonal, community and systemic factors at the root of stressors contributing to suicide among farmers. Secondly, a blueprint for farmer suicide prevention, leveraging the Water of Systems Change Model, is proposed.

Method: In the spirit of conveying multi-layered influence on farmer suicide while highlighting relevant levels for prevention a parsimonious, prevention-based model of farmer suicide is presented.

Results: The Water of Systems Change (WSC) model incorporates research to bring attention to the community, organizational, and societal conditions that keep a problem, such as farmer suicide, from being eradicated.

Conclusion: Suicide is a societal issue that requires a multi-level response. Farmer suicide is a particular concern, as farmers provide for and support all of us. It is incumbent upon public health and the community-at-large to improve our policies, systems, and contexts to create an environment in which farmers are also provided for and supported.

Hacia un enfoque de salud pública para la prevención del suicidio entre agricultores: El potencial poder del cambio de sistemas

Se propuso un enfoque multinivel para abordar el suicidio entre agricultores y se desarrolló un plan para su prevención, empleando el modelo “Water of Systems Change”. Destacó la necesidad de mejorar políticas, sistemas y contextos para apoyar a estos trabajadores, ya que es un problema social que debe ser responsabilidad de la salud pública.

AUTORES	Sara Kohlbeck, Katherine Quinn, Terri deRoos-Cassini, Stephen Hargarten, David Nelson, Laura Cassidy
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TEMÁTICA	Riesgo Salud Mental
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ARTÍCULO 19: An Evaluation of Living Conditions and Dietary Habits of Seasonal Migrant Agricultural Workers: The Example of Turkey

Objective: The nutritional status of seasonal migrant agricultural workers is negatively affected by problems with working conditions, wages, accommodations, and living conditions. This study aimed to investigate the living conditions, dietary habits, and food consumption frequency of seasonal migrant agricultural workers in Turkey.

Methods: This descriptive, cross-sectional study was conducted in July and August 2022 in the neighborhoods of Akçadağ district in Malatya Province, Turkey. The sample of the study consisted of 262 seasonal migrant agricultural workers aged 15 and over who came to the region for the apricot harvest. The data were obtained using the face-to-face interview technique via a two-part questionnaire including questions on socio-demographic characteristics, living conditions, dietary behaviors and food consumption frequency.

Results: The mean age of the seasonal migrant agricultural workers was 24.16 ± 0.75 , and they worked 12.01 ± 0.10 hours per day on average. It was determined 74.8% of the workers had access to clean water, and 50.4% did not think they had an adequate and balanced diet. It was found only 57.3% of the workers had a normal body mass index, 80.2% never ate fish, 53.8% never ate red meat, and 67.2% never drank milk, while only 34.4% were able to eat seasonal vegetables.

Conclusion: The findings of the study show that seasonal migrant agricultural workers in Turkey do not have suitable conditions in terms of food and accommodations, and their working conditions, wages, and health conditions are inadequate. These deficiencies have a negative effect on workers' quality of life and health status.

Una evaluación de las condiciones de vida y los hábitos alimenticios de los trabajadores agrícolas migrantes estacionales: El ejemplo de Turquía

Se investigaron las condiciones de vida, hábitos alimenticios y frecuencia de consumo de alimentos de trabajadores del sector de la agricultura que eran migrantes estacionales en Turquía. Se realizaron entrevistas a 262 agricultores de albaricoques. Entre otros resultados, el 50,4% de los agricultores indicaron no tener una dieta equilibrada y únicamente el 57,3% tenían un índice de masa corporal normal. Se concluyó que no tenían una alimentación óptima, siendo consecuencia de sus malas condiciones laborales, sueldos y estado de salud.

AUTORES	İlksen Orhan, Hatice Serap Koçak
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TEMÁTICA	Seguridad y Salud General
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ARTÍCULO 20: Social Vulnerabilities Among Hired Migrant and Seasonal Farmworkers During COVID-19: The Need for Employment-Based Indicators

Objectives: This study aimed to explore farmworkers' experiences of social vulnerability during the peak period of the COVID-19 pandemic.

Methods: Telephone surveys of 63 migrant and seasonal farmworkers across three major agricultural areas in Florida were conducted. The survey, designed and disseminated with critical support from a statewide farmworker membership and advocacy organization, included items related to social and occupational precarity and a suite of demographic conditions, including specific employment-based indicators and categories. Data were analyzed with SPSS using a series of statistical significance tests including Pearson's Chi-Square, Fisher's Exact, T-tests, and Mann-Whitney U. An open-ended question regarding employment precarity was also analyzed for frequencies of responses pertaining to a set of descriptive categories.

Results: Survey findings demonstrated a high degree of social vulnerability among the farmworker sample, with notable variation in the type and severity of vulnerability and risk exposure across employment-based indicators and occupational categories. For example, a cross-industry comparison between vegetable field workers and greenhouse nursery workers revealed a disparity in COVID-exposure risk through commuting characteristics, as 43% of vegetable field workers used shared, employer-provided transport, while 68% of nursery workers used personal vehicles.

Conclusion: While previous research has broadly established the extreme precarity of migrant and seasonal farmworkers during the peak COVID-19 period, the variability of experience, exposure to risk, and social vulnerability between farmworkers representing distinct employment-based indicators and occupational categories demonstrated in this study contributes to widening awareness of the importance of assessing farmworker experiences at a more granular level. In addition to delineating social vulnerability across key demographic categories, cross-industry comparisons between farmworkers revealed significant discrepancies in risk and vulnerability to COVID-19. Future research that further explores this variability may reveal opportunities to improve disaster-relief planning and mitigate social vulnerability in future disaster scenarios. The importance of surveying the vulnerability of worker populations, aside from geographic communities, is highlighted.

Vulnerabilidades sociales entre los trabajadores agrícolas migrantes y estacionales contratados durante la COVID-19: La necesidad de indicadores basados en el empleo

Se analizó la vulnerabilidad social de los agricultores migrantes y estacionales de Florida durante la pandemia de COVID-19. Se llevaron a cabo encuestas por teléfono a 53 trabajadores. Tras el análisis de la información se detectó un elevado nivel de vulnerabilidad social, que podía variar según el empleo y la categoría de trabajo. Por ejemplo, el riesgo de exposición a esta enfermedad era mayor para trabajadores del campo (un 43% empleaban transporte compartido y proporcionado por su jefe) que para los trabajadores de viveros (un 68% utilizaban vehículos personales). Se concluyó la necesidad de disminuir la vulnerabilidad social en un futuro.

AUTORES	Miranda Carver Martin, Jose Perez Orozco, J. Antonio Tovar-Aguilar, Maria C Morera, Cody Gusto, Linda S. Forst, Paul Monaghan
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TEMÁTICA	Seguridad y Salud General
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JOURNAL OF SAFETY RESEARCH

ARTÍCULO 21: Barriers and facilitators to adopting safe farm-machine related behaviors: A focus group study exploring older farmers' perspectives

Background: Tractors and quad bikes pose a significant risk of fatal injuries among farmers, particularly affecting older farmers. This study aimed to explore the barriers and facilitators to the adoption of machine related safety behaviors among older farmers in Irish farm settings.

Method: Four focus groups were conducted via Zoom in February 2021. Nineteen Irish farmers from four farm types participated. The discussions were audio-recorded, transcribed verbatim, and analyzed using an inductive, reflexive thematic analysis approach. The themes identified were then mapped to the COM-B (Capability-Opportunity-Motivation) model, providing a systematic theoretical basis for designing a future intervention to reduce machine-related accidents. **Results:** The analysis identified five inductive themes that encompassed both barriers and facilitators in farm safety practices: (1) Capability to manage competing responsibilities; (2) Characteristics of the farm and its work environment; (3) Availability and affordability of resources; (4) Prevailing sociocultural opportunities; and (5) Perceived likelihood and cost-benefit analysis in safety decision-making. These themes captured the complex interplay of capability, opportunity, and motivation in farmers' decision-making processes. The study also revealed limitations in existing interventions, such as voluntary guidelines and educational methods, in effectively addressing these barriers.

Conclusions: Farmers' abilities (capability), prevailing sociocultural factors, resource availability (opportunity), and their perceived consequences and benefits (motivation) affect how safely they work with machines. The study emphasizes the need for comprehensive, theory-driven approaches that consider the interplay of capability, opportunity, and motivational factors that may support or impede machine safety. Understanding the challenges faced by Irish farmers highlights potential strategies for safety intervention, and these strategies should be co-designed with farmers and attentive to the local context. Practical applications: The study provides a template for understanding farmers' perspectives using the COM-B model. The findings can inform the development of theoretically informed intervention strategies based on the Behavior Change Wheel framework.

Barreras y facilidades para adoptar comportamientos seguros relacionados con las máquinas agrícolas: Un estudio de grupos focales explorando las perspectivas de los agricultores mayores

Se analizaron los obstáculos y las facilidades para adoptar prácticas seguras relacionadas con el uso de máquinas en agricultores mayores de Irlanda. Se crearon cuatro grupos focales mediante Zoom, participando un total de 19 trabajadores. Los temas obtenidos se mapearon al modelo COM-B (Capacidad-Oportunidad-Motivación) y se emplearían para diseñar una intervención futura con el fin de reducir los accidentes derivados de maquinaria. Los resultados determinaron cinco temas principales que englobaban tanto obstáculos como facilidades en las prácticas de seguridad: capacidad para gestionar responsabilidades, características del lugar de trabajo y su entorno, disponibilidad y adquisición de recursos, oportunidades socioculturales, percepción de probabilidad y análisis del coste-beneficio en la toma de decisiones sobre seguridad.

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DOI <https://doi.org/10.1016/j.jsr.2024.05.009>

PUBLICACIÓN Journal of Agromedicine, 2024, Volumen 90, pp. 19-30

TEMÁTICA Vehículos y Maquinaria Agrícola

SAFETY AND HEALTH AT WORK

ARTÍCULO 22: Agricultural Health and Safety: Evaluating Farmers' Knowledge, Attitude, and Safety Behavior in Northern Thailand

Background: Agriculture is vital for economic growth and livelihoods in northern Thailand, yet it is challenged by hazardous practices such as improper chemical use and machinery accidents. This study aimed to evaluate the risk and determine the relationship between pesticide exposure and knowledge, attitudes, and safety behaviors.

Methods: This cross-sectional study was conducted between October and December 2017 in the San Pa Tong district of Chiang Mai, Thailand. Data were collected through structured questionnaires and face-to-face interviews with 280 farmers.

Results: The findings indicated that knowledge and safety behavior scores varied significantly with educational attainment and training received. Farmers with higher education levels or those who had undergone training exhibited better knowledge and safer behavioral practices, whereas income levels did not significantly affect knowledge or safety behaviors. The pesticide exposure risk level was associated with the study variables, with those recognizing a 'normal' risk level demonstrating greater knowledge and safer behaviors than those who reported the risk level as safe or at risk. A strong positive correlation between knowledge and safety behavior was observed, indicating that increased awareness can result in more cautious practices. These findings suggest that educational and training programs are crucial for promoting safer pesticide use among farmers. Although attitudes toward pesticide safety varied based on income, education, and training positively influenced knowledge and behavior.

Conclusion: The study concludes that understanding farmers' perceptions of pesticide risks is essential for designing and implementing effective educational interventions.

Seguridad y salud en la agricultura: evaluación del conocimiento, actitud y comportamiento de seguridad de los agricultores en el norte de Tailandia

Se analizó la relación entre la exposición a fitosanitarios y el conocimiento, las actitudes y los comportamientos de seguridad de los agricultores. Se emplearon cuestionarios y entrevistas que se realizaron a 280 participantes de Tailandia. Los resultados mostraron un mejor conocimiento y prácticas más seguras cuando los trabajadores tenían un mayor nivel educativo y habían recibido formación. También, cuando los agricultores percibían un nivel de riesgo normal. Además, los profesionales con mayor conciencia del riesgo mostraron comportamientos más seguros.

AUTORES Anurak Wongta, Nootchakarn Sawarng, Phannika Tongchai, Pichamon Yana, Surat Hongsihsong

DOI <https://doi.org/10.1016/j.shaw.2024.09.005>

PUBLICACIÓN Safety and Health at Work, 2024, Volumen 15, Número 4, pp. 435-440

TEMÁTICA Tratamientos Fitosanitarios

ARTÍCULO 23: Metabolic Syndrome and Cardiovascular Risk Factors in a Fishing Community in Southern Italy

Background: Work organization and psychosocial factors influencing sleep patterns may be significant risk factors for developing obesity and metabolic syndrome (MetS). However, the impact on the health of working patterns in the fishing sector is not well characterized. The aim of the study is to determine the prevalence of MetS and its components in fishermen and to analyze occupational-specific risk factors contributing to metabolic alterations.

Methods: One hundred forty-three male fishermen from Apulia (Southern Italy) and 93 male university workers age-matched and from the same geographical area were included in this cross-sectional study. A questionnaire was administered to investigate socio-demographic variables, work activity, health status, and dietary habits. All subjects underwent clinical evaluation and blood sampling to depict their metabolic profile.

Results: A higher body mass index (BMI), waist circumference (WC), and waist-to-hip ratio ($p < 0.001$) were observed in fishermen than in university workers. No significant difference between the two groups was observed in the prevalence of MetS (15.4% fishermen vs 16.1% university workers) and its relevant diagnostic criteria, except abdominal obesity (42.7% fishermen vs 29.0% university workers, $p = 0.021$). The Castelli risk index, the monocyte/c-HDL ratio, and the Sokolow index were significantly greater in fishermen ($p < 0.001$). In the fishermen group, the total number of sleeping hours on working days was negatively correlated with WC ($r = -0.17$; $p = 0.04$), low-density lipoprotein cholesterol (c-LDL) ($r = -0.21$; $p = 0.02$), and the homeostasis model assessment (HOMA) index ($r = -0.19$; $p = 0.02$).

Conclusion: The higher prevalence of obesity and the imbalance of the metabolic profile observed in fishermen could be related to occupational factors, including the specific working pattern that influences their sleeping hours and sleeping-waking rhythms.

Síndrome metabólico y factores de riesgo cardiovascular en una comunidad pesquera del sur de Italia

Se analizó el síndrome metabólico y sus factores de riesgo en pescadores. Participaron 143 profesionales y 93 trabajadores universitarios del sur de Italia mediante la realización de un cuestionario, una evaluación clínica y un análisis de sangre. No hubo prácticamente diferencias entre ambos grupos de trabajadores respecto al síndrome metabólico, pero sí en la obesidad abdominal, siendo menor en los universitarios. La obesidad y el desequilibrio metabólico podían ser consecuencia de factores de trabajo que afectaban a las horas de sueño de los pescadores.

AUTORES	Angela Stufano, Simona D'Amore, Valentina Schino, Paolo Danza, Ivo Iavicoli, Piero Lovreglio
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PUBLICACIÓN	Safety and Health at Work, 2024, Volumen 15, Número 4, pp. 464-471
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TEMÁTICA	Seguridad y Salud General
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WORKPLACE HEALTH & SAFETY

ARTÍCULO 24: Respiratory Symptoms and Psychological Distress in Farmers Living With Chronic Obstructive Pulmonary Disease

Background: Farmers with chronic obstructive pulmonary disease (COPD) often face both respiratory issues and psychological distress, which can exacerbate their condition. However, no prior research has examined how the frequency of respiratory symptoms is associated to psychological distress in these individuals. Therefore, this study aimed to explore this relationship among U.S. farmers living with COPD.

Methods: A cross-sectional study involved 101 participants, a mix of on-site and online recruits, assessing respiratory symptoms and psychological distress in farmers with COPD. The study employed standard self-reported measures and utilized both simple and multiple linear regression to analyze the association between respiratory symptoms and psychological distress.

Findings: Participants reported notably higher levels of respiratory symptoms (61.6 [SD = 13.3]) compared to the reference score of 12, along with elevated psychological distress (25.9 [SD = 10.6]). Factors like COPD duration, income, smoking, and emergency department (ED) visits correlated with respiratory symptoms, while age, COPD duration, income, smoking, pesticide exposure, and farm type were associated to psychological distress. Notably, even after accounting for age, smoking, and pesticide exposure, a significant association remained between respiratory symptoms and psychological distress ($\beta = 0.46$, $p < .001$).

Conclusion: Respiratory symptoms were significantly associated to psychological distress, even when considering other factors. While this aligns with existing research, a future longitudinal study is crucial to establish the cause-effect relationship between these variables. Understanding this relationship could inform the development of targeted interventions to alleviate psychological distress in individuals with respiratory symptoms.

Implications for Occupational Health Nursing Practice: The correlation between COPD symptoms and psychological distress in farmers emphasizes the need for integrated nursing care. Occupational health nurses should prioritize combined respiratory and mental health assessments.

Síntomas respiratorios y malestar psicológico en agricultores que viven con enfermedad pulmonar obstructiva crónica

Se investigó la relación entre los síntomas respiratorios y el malestar psicológico de agricultores que padecían enfermedad pulmonar obstructiva crónica (EPOC). Participaron 101 trabajadores de Estados Unidos y se concluyó una relación significativa, incluso teniendo en cuenta otros factores como edad, consumo de tabaco y exposición a fitosanitarios. Se expuso la necesidad de estudios futuros que expliquen la relación causa-efecto, con el fin de desarrollar intervenciones específicas.

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TEMÁTICA Accidentes y Enfermedades Laborales

ARTÍCULO 25: Impact of Pesticide Training on Safety Climate Perception Among French Cereal Farmers

Background: The training of farmers in pesticide safety is of prime importance for reducing pesticide use and exposure through the implementation of sustainable management practices. This study aimed to assess the impact of compulsory training on the knowledge and perceptions of cereal farmers, with the help of a safety climate scale.

Method: We approached cereal farmers throughout France during compulsory training and certification procedures for pesticide-related activities. Trainees were asked to complete a safety climate questionnaire at the start and end of the course. In total, 733 cereal farm managers or workers completed the questionnaire at the start of the study, 131 of whom declined to complete the questionnaire at the end of the training session, leaving 602 subjects available for pre-training/post-training comparisons. Statistical analyses were based on paired t-tests and mixed models for repeated measures.

Findings: The mean safety climate score increased from 82.37 to 88.22 after the training course (7.1 %, $p < .001$) in both univariate and multivariate analyses. Mean increases were also found for each of its seven dimensions ($p < .001$), ranging from 2.8% for “rules and best practices” to 12.4% for “communication and feedback.” Few covariate-by-time interactions were found to be significant.

Conclusion/Application to Practice: This study demonstrates that pesticide training is highly effective in increasing safety climate perception among cereal farmers and provides hints for improving the design of educational programs. Promoting the development and facilitation of lifelong learning with continuously updated training programs should be a top priority for minimizing pesticide exposure.

Impacto de la formación sobre fitosanitarios en la percepción del clima de seguridad entre los productores de cereales franceses

Se estudió el impacto de una formación obligatoria de fitosanitarios en agricultores franceses dedicados a cereales. Un total de 602 participantes rellenaron un cuestionario de clima de seguridad antes y después de recibir la formación. La puntuación media del clima de seguridad aumentó de 82,37 a 88,22. Se concluyó la necesidad de programas educativos bien diseñados y formación continua para disminuir la exposición a fitosanitarios.

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TEMÁTICA Tratamientos Fitosanitarios

ARCHIVES OF ENVIRONMENTAL & OCCUPATIONAL HEALTH

ARTÍCULO 26: Evaluation of tomato farmworker upper limb ergonomic risk factors

Research on musculoskeletal disorders among tomato farmworkers is limited. This pilot study aims to generate insights and preliminary data on tasks performed by tomato farmworkers at a demonstration test plot, evaluating associated ergonomic risk factors. A demonstration test plot was constructed to simulate tasks performed by tomato farmworkers. Muscle activity in the anterior deltoid and upper trapezius was measured using surface electromyography (sEMG) and compared among tasks. The intensity of physical activity during stake pounding, bucket tossing, and tying tasks was monitored using a GT9X activity monitor. Non-parametric ANOVA revealed that the upper trapezius exhibited the highest muscle activity in all tasks ($p < 0.05$). Stake pounding showed the highest muscle activity, peak loads, and the most intense physical activity. Future studies will focus on assessing tomato farmworker activities over longer shifts and evaluating the impact of posture, fatigue, and energy expenditure on the risk for musculoskeletal disorders.

Evaluación de los factores de riesgo ergonómicos de extremidades superiores en trabajadores agrícolas de tomate

Se simularon las labores llevadas a cabo por agricultores de tomate para evaluar los riesgos ergonómicos asociados. Se empleó electromiografía de superficie para medir la actividad muscular del deltoides anterior y del trapecio superior. Este último presentaba una mayor actividad muscular en todas las labores. También se empleó un monitor GT9X para medir la intensidad física durante las tareas.

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DOI <https://doi.org/10.1080/19338244.2024.2419122>

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TEMÁTICA Riesgo Físico

ARTÍCULO 27: Different types of pesticide exposure and lung cancer incidence in the Agricultural Health Study cohort: A systematic review and meta-analysis

Lung cancer is the dominant cause of worldwide cancer mortality. The relationship between pesticide exposure and lung cancer risk has shown mixed results epidemiologically. We hypothesized this discrepancy could arise from the varying effects of different pesticides and conducted this meta-analysis by using three pesticide classification schemes to examine the implications of diverse pesticide exposure types on lung cancer risk. We collected 23 studies to assess the risk of lung cancer with pesticide exposure in the Agricultural Health Study cohort (AHS), and our analysis indicated a surplus incidence of lung cancer associated with organochlorine pesticides (OR = 1.35, 95% CI = 1.04-1.74). However, no significant association was found between exposure to a general set of 33 pesticides and lung cancer risk (OR = 1.04, 95% CI = 0.96-1.13). We anticipate these findings will influence future pesticide application, promoting improved occupational health.

Diferentes tipos de exposición a fitosanitarios e incidencia de cáncer de pulmón en la cohorte del Estudio de Salud Agrícola: Una revisión sistemática y metaanálisis

Se investigó la relación entre la exposición a diferentes fitosanitarios y el riesgo de cáncer de pulmón. Se realizó un metaanálisis que recopiló 23 estudios de la cohorte del Estudio de Salud Agrícola y se determinó una mayor incidencia de esta enfermedad con fitosanitarios organoclorados. No se encontró relación significativa entre la exposición a 33 fitosanitarios y el riesgo de este tipo de cáncer.

AUTORES	Yu Wang, Jingxuan Yang, Xialian Hu, Jingyi Shi, Jiaxin Deng
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TEMÁTICA	Tratamientos Fitosanitarios

SAFETY

ARTÍCULO 28: An Analysis of Occupational Hazards Based on the Physical Ergonomics Dimension to Improve the Occupational Health of Agricultural Workers: The Case in Mayo Valley, Mexico

The occupational health and safety of agricultural workers is a topic that has a direct impact on the agricultural sector worldwide. For this reason, investigations into ergonomic factors are relevant to the health and safety of agricultural workers. In this study, nine variables of the physical–ergonomic dimension were analyzed to determine which factors represent occupational risks for agricultural workers in Mayo Valley, Mexico. A sample of 200 people was considered. The sample was separated by gender and divided into groups according to age. A closed-ended survey was developed and validated to assess physical ergonomics variables using a five-level Likert scale. Using Principal Component Analysis, it was found that there are physical ergonomic variables that affect male agricultural workers more than female workers (the risk of carrying heavy objects, PE3, and the risk of performing repetitive movements, PE4). It was also found that certain physical ergonomic variables are not perceived as hazardous by agricultural workers (the risk of using inappropriate materials, PE9). In addition, various research findings are discussed to determine the implications and recommendations for improving the occupational health and safety of agricultural workers in Mayo Valley, Mexico.

Un análisis de los riesgos laborales basado en la dimensión de la ergonomía física para mejorar la salud en el trabajo de los agricultores: El caso del Valle de Mayo, México

Se estudiaron nueve variables de ergonomía física para identificar qué factores suponían riesgo para los agricultores del Valle de Mayo (México). Participaron 200 trabajadores, divididos por género y edad, que realizaron una encuesta. Los resultados mostraron que el riesgo de manipular cargas pesadas y de realizar movimientos repetitivos afectaba más a los hombres. Por otra parte, el riesgo de emplear materiales inadecuados no era percibido por los trabajadores como peligroso.

AUTORES	Víctor Manuel Ramos-García, Josué Aarón López-Leyva, Ana Paola Balderrama-Carmona, Iván Ochoa-Vázquez, Juan José García-Ochoa, Manuel de Jesús Espinoza-Espino
DOI	https://doi.org/10.3390/safety10030061
PUBLICACIÓN	Safety, 2024, Volumen 10, Número 3, pp. 61
TEMÁTICA	Riesgo Físico

ARTÍCULO 29: Insights into Agricultural Machine Injuries in Pakistan: An Orthopedic Surgeons Survey (2022–2023)

As one of the most perilous industries, agriculture presents both fatal and non-fatal risks to farmers. Pakistan, a notable Asian nation, heavily depends on agriculture, which constitutes 23% of its GDP and employs 37.4% of its workforce. The study investigates the challenges within Pakistan's agriculture sector and enriches the existing literature by gathering data on agricultural machine-related injuries in Pakistan during 2022–2023. The survey, conducted from November 2022 to April 2023, involved 55 respondents, predominantly from Sindh and Punjab. The findings indicate a total of 507 injuries, with approximately a quarter being fatal (121 incidents). Sindh emerges as a significant hotspot, with the majority of injuries documented there. With respect to the key sources of injuries, the fodder cutter is a primary source of injuries with 201 injuries documented, accounting for approximately 40% of all injuries. Threshers contributed to 197 injuries, approximately 39% of the total, and about 52 are tractor-related injuries, making up about 10% of machine injuries. Regarding the severity and demographics of injuries, about 38% of cases involve amputation, with a higher incidence among males (77%) and individuals aged 15–34 years (65%). It is important to acknowledge the study's limitations, including a small participant pool and a brief data collection period. This research advocates for safety regulations, accident reduction measures, and increased safety awareness among farmers, aiming to foster a safer and more sustainable agricultural environment in Pakistan.

Información sobre lesiones causadas por maquinaria agrícola en Pakistán: una encuesta a cirujanos ortopédicos (2022-2023)

Se recopilaron los incidentes asociados con maquinaria agrícola que habían tenido lugar entre 2022 y 2023 en Pakistán. Se realizó una encuesta a 55 participantes. Los resultados mostraron que se produjeron 507 lesiones, la mayoría documentadas en Sindh. 121 de estos incidentes fueron muertes. Las máquinas que produjeron un mayor número de lesiones fueron: cortadora de forraje (201), trilladoras (197) y tractores (52). Además, los incidentes se producían más en hombres (77%) y en personas con edades comprendidas entre 15 y 34 años (65%).

AUTORES	Mian Muhammad Sajid Raza, Zamir Hussain Tunio, Ikram Din Ujjan, Salah F. Issa
DOI	https://doi.org/10.3390/safety10030055
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TEMÁTICA	Vehículos y Maquinaria Agrícola
