The Organic Farmer Safety, Health & Life Questionnaire (OFSHLQ)

A Tool for an Expanded Paradigm on Occupational Safety and Health

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Objective: Develop and validate a multidimensional tool consistent with an expanded occupational safety and health (OSH) paradigm. **Methods:** Systematic development process; cross-sectional survey design for psychometric properties. Exploratory factor analyses (EFA) and reliability estimates on key theoretical constructs. **Results:** The Organic Farmer Safety, Health & Life Questionnaire (OFSHLQ) is a population-specific, theory-based, multilevel tool that integrates work and life dimensions. The development process contributed to face and content validity. The EFA identified 11 scales with acceptable factor loadings. Reliability estimates across scales ranged from 0.58 to 0.92. **Discussion:** OFSHLQ integrates traditional dimensions of OSH and other intrapersonal, interpersonal, and contextual factors that contribute to overall workers' health and well-being. **Conclusion:** OFSHLQ constitutes a resource for traditional OSH surveillance and research, and is also consistent with an expanded paradigm of OSH.

Keywords: occupational safety and health, work-life continuum, multidimensional perspective, validated questionnaire

LEARNING OUTCOMES

After going through the article, the reader should be able to:

- Describe the basis for an expanded occupational safety and health (OSH) paradigm
- Explain the principles of an expanded occupational safety and health (OSH) paradigm
- Criticize the Organic Farmer Safety, Health & Life Questionnaire (OFSHLQ)

There is agreement among occupational safety and health (OSH) researchers that the safety, health, and well-being of workers are influenced by factors that extend beyond the workplace, including individual, social, and contextual factors.[1,2] International and United States (US) agencies have proposed holistic models that represent the multilevel factors that contribute to workers' safety and health, both within and outside the workplace. The World Health Organization's *Global Plan of Action on Workers Health* emphasizes the need to address broader social and environmental determinants of workers' health and the role of community and society in workers' safety and health.[1] The European Union has supported a work-life balance, the protection of "outside work" rights, and the personal and intellectual development of workers. This is reflected in Directive (EU) 2019/1158 of the European Parliament.[3] In the US, the National Institute for Occupational Safety and Health (NIOSH) and their *Total Worker Health*® model recognizes that work is a social determinant of health. NIOSH refers to the importance of work-life balance and the need to consider workers in their family and community contexts.[4]

There is broad agreement that the concept of "worker well-being" encompasses a holistic quality of life, and therefore, it must incorporate factors both within and outside the workplace.[1–4] Psychosocial and contextual factors determine health and well-being throughout the working life continuum, and more attention should be paid to the multilevel factors that contribute to OSH.[2,5–9] However, researchers agree on the lack of studies exploring the "complex interaction between work and nonwork influences."[2] This also applies to the tools designed to accurately reflect this perspective and measure multilevel factors, especially worker-specific validated questionnaires, which are limited.

The literature on OSH instruments is extensive. However, compressive tools that measure multilevel factors are limited. A 2008 study looked at available instruments assessing work stressors at the individual, group, and organizational levels; they identified 26 questionnaires, but only a handful included off-work indicators such as "recreation," "social relations/support," or "lifestyle."[10] A recent review on workplace mental health instruments selected 109 tools that met the inclusion criteria; however, only 10 were relevant to multiple domains.[11]

Two popular instruments that take a more holistic OSH approach are the Copenhagen Psychosocial Questionnaire (COPSOQ) and the Worker Well-Being Questionnaire (WellBQ). COPSOQ was first developed in 1997 to measure psychosocial factors within the work environment.[12] This version was later revised to address limitations on relevant work-related factors, such as reward, justice, trust and discrimination. Certain scales on the original version were deleted and others added.[13] To further expand the coverage of psychosocial dimensions, a third version was reported in 2019. COPSOQ III

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Notice: The OFSHLQ is public domain and can be found at the University of New Mexico College of Population Health—Assessment, Planning & Evaluation Lab (APEL). Please visit: https://hsc.unm.edu/population-health/research-centers/assessment-planning.

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integrates new theories and concepts focused on the work environment and working conditions.[14] COPSOQ has been extensively validated and widely used internationally, and is available in 25 languages.[15]

Also in tune with a comprehensive work and life perspective is the Worker Well-Being Questionnaire (WellBQ), which measures "worker well-being as a holistic construct rather than simply workplace or work-related well-being" and integrates multiple dimensions encompassing work, home, community, and society.[6] WellBQ makes a strong attempt to capture the work and nonwork contexts, and the subjective and objective well-being domains.

Despite widespread consensus and literature on the need to adopt a more comprehensive approach to OSH, tools that properly reflect this perspective and measure multilevel factors are limited, particularly worker-specific validated questionnaires.

OSH AND THE SOCIOECOLOGICAL MODEL

Programs to advance the safety, health, and well-being of workers must take a holistic perspective that focuses on life conditions. If workers are integrated into a societal context, we must accept aspects of work and life as interdependent.

The socioecological model (SEM) informs such an approach by considering the complex interplay between multiple level factors determining health and well-being. The model has been applied to the worker and the workplace, specifically to explore the multiple factors that influence work-life balance and how they operate.[16] The SEM has also been used to define the integrated approach to worker health that has gained relevance in the two decades. Researchers suggest that comprehensive approaches that identify and address the root causes of health and social problems can be more successful in reducing occupational injury and disability compared to those only focusing on worker and workplace factors.[17]

Although extensive literature exists on the psychological and worksite-related factors that contribute to occupational injury and illness (such as autonomy, work conditions, and safety culture), this research is almost exclusively limited to the work environment. Similarly, although current occupation surveillance systems provide data on injury, particularly fatal injuries, accurate and reliable data on nonfatal injury and illness are not available. Furthermore, occupational surveillance systems are yet to integrate work and life conditions from a multilevel, socioecological perspective, and information on the psychosocial factors that may contribute to workers' overall health and well-being is lacking. This is also true for agricultural workers.

This article presents the Organic Farmer Safety, Health & Life Questionnaire (OFSHLQ), a population-specific, theory-based, and multilevel tool that integrates both work and life dimensions.

WHY THE ORGANIC FARMER?

Organic agriculture supports traditional practices, ecological balance, and conservation, and interest in organic farming and products continues to increase. International 2022 data showed unprecedented growth in organic agriculture, with 4.5 million organic producers in 188 countries.[18] In the US, the organic industry is now the fastest-growing segment of US agriculture.[19] The US Department of Agriculture (USDA) Organic Integrity Database (OID) (https://organic.ams.usda.gov/integrity) lists 46,240 certified operations globally, of which 27,280 (60%) are located in the US (as of mid-April 2024).

Despite the growth in organic practices, data on organic farmers are scarce. This is true not only for demographic data but also for many psychosocial, behavioral, and health indicators that may relate to occupational safety and health and workers' well-being. This is in part because surveillance systems do not generally identify the organic farmer. Furthermore, researchers suggest that agricultural surveillance data and research findings may not necessarily apply to the organic farmer,[20–22] and that there are relevant differences between conventional and organic farmers.[23,24]

THE ORGANIC FARMER SAFETY, HEALTH & LIFE QUESTIONNAIRE

Background

The Organic Farmer Safety, Health & Life Questionnaire (OFSHLQ) was part of a larger project aimed to typify the organic producer and develop and validate a survey that measures multilevel factors that may contribute to OSH for organic farmers. The study also explored safety and injury, and these results have already been reported.[22] This paper presents OFSHLQ's conceptualization, development process, and psychometric testing and properties.

Conceptual Model

The OFSHLQ was informed by traditional concepts of "well-being" and "wellness," which propose that good health encompasses more than just the physical dimension. The concept goes back to ancient times,[25] but was promoted again in the 1950s[26] and later as part of the wellness movement of the 1980s and 1990s.[27,28]

Consistent with traditional and newly proposed holistic models of health and wellness, worker's safety and health issues cannot exclusively be studied and addressed within the work environment, but rather through a social and contextual lens that integrates the intrapersonal, interpersonal, community, and societal factors that determine health and well-being. The OFSHLQ was informed by a whole-person, multidimensional model of health and wellness. In addition to standard items on farm and work, self-reported injury, safety practices, health status/illness, and lifestyle, the OFSHLQ's model integrates workplace psychosocial factors, balanced aspects of work and personal life, and other contextual factors such as policy, economy, society, and community (Fig. 1).

Development Process

OFSHLQ's development process consisted of a search that identified research literature and actual tools that take a multilevel perspective to OSH, a participatory review process that included reiterated internal and external interdisciplinary expert review, pilot testing and verbal feedback from farmers, and psychometric testing.

The literature review confirmed that multilevel and validated instruments are limited. Two instruments that were particularly reviewed and considered for items' adoption are the COPSOQ and the WellBQ. Both questionnaires take a multilevel approach and integrate traditional worksite dimensions such as work experience, workplace policies, and culture and safety climate, with more contextual items assessing work-life balance such as life satisfaction, financial security, and social support.[6,13,14]

OFSHLQ's items of safety and health and injury and illness were adopted from standard surveillance systems, such as the Survey of Occupational Injuries and Illnesses (SOII) by the US Bureau of Labor Statistics. Items on self-reported health status, including mental health/psychological distress and lifestyle and behavior, were adopted from standard health/health care assessments and surveillance tools such as the National Health Interview Survey (NHIS), the Behavioral Risk Factor Surveillance System (BRFSS) questionnaire, and the National Agricultural Workers Survey (NAWS), administered to hired crop workers.

A literature review revealed items on other dimensions of the whole person health conceptual model, such as spirituality and intellectual development and their role in quality of life. These items were adopted from tools identified through a literature search across numerous unidimensional and multidimensional scales[29–32] Farm and work and sociodemographic items were adopted from tools used by NCAS/USDA such as the Census of Agriculture and the Organic Survey, and the American Community Survey. One population-specific section includes items based on the principles of the organic movement by the International Federation of Organic Agriculture Movements.[33]

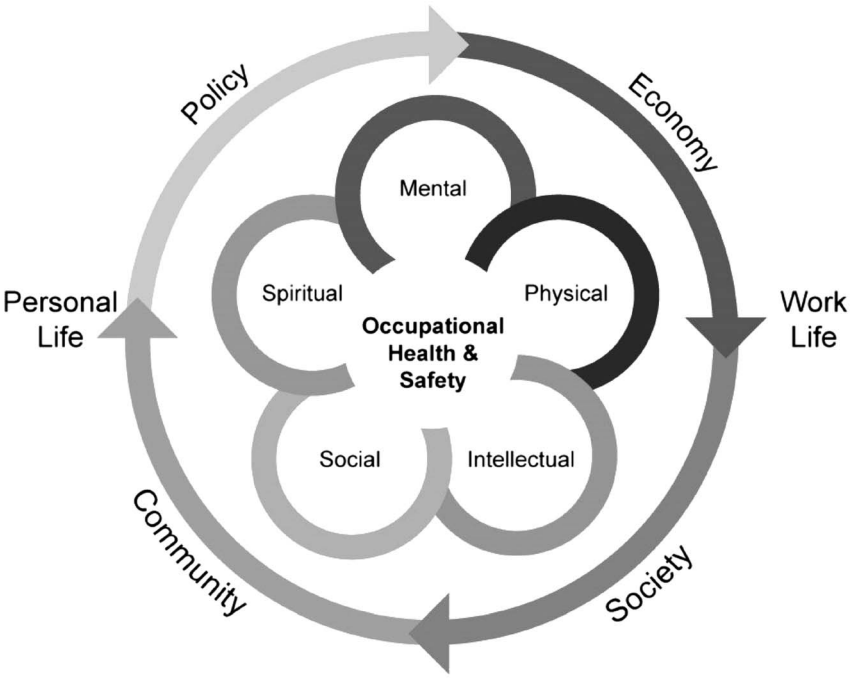

FIGURE 1. OFSHLQ Conceptual Model.

The study's team compiled gathered resources and developed a prototype consisting of 13 sections (eg, sociodemographic, community life, social capital, mood, and feelings) and over 200 items. The team, consisting of an interdisciplinary group of OSH researchers and practitioners in OSH, epidemiology, social sciences, health education and promotion, behavior change, and agricultural science, discussed the prototype, identified overlapping and duplicated dimensions, and made recommendations for additions and deletions as well as formatting. A second draft was then developed and presented to two external reviewers with expertise in OSH and social sciences and six regional organic farmers. Reviewers were asked to assess whether the questionnaire properly represented the conceptual framework and to provide written feedback on content and constructs. Farmers were asked to complete the questionnaire and provide verbal feedback on wording, clarity, completion time, appropriateness of questions, and overall content and formatting. These data were collected through a one-on-one interview that focused on the face validity of the tool.

The reviewers concluded that the five dimensions of health and wellness were well represented overall, and that the standard sections on injury, illness, safety, and health were properly included. They provided item-specific comments and made recommendations for revisions, additions, and deletions (eg, relocating the sociodemographic section to the end of the questionnaire, providing a definition of "producer," and regrouping safety items). Farmers' feedback was instrumental in making the questionnaire clearer and more user-friendly. For instance, several inquired about the purpose of the questionnaire and why it included many questions unrelated to "actual" farming. Others referred to "seasonality" as an important issue to help focus certain questions and make them easier to respond to. The response time was consistently estimated to be between 20 and 30 minutes.

A prototype was then developed. It consisted of 179 items divided into sections addressing sociodemographic and farm and work characteristics; safety, injury, and training needs; lifestyle and health; and work, personal, and social life. Additional feedback was obtained from farmers and seven individuals involved in OSH and agriculture and food production (eg, occupational medicine, extension agents, and farmer trainers). This resulted in minor revisions (eg, reference to climate change) that were integrated into a final version that was developed after the psychometric.

PSYCHOMETRIC TESTING

Psychometric testing was conducted on 47 items measuring psychosocial constructs (ie, perceptions of safety, health, and life). Excluded were variables measuring a specific situation or experience (eg, sociodemographic characteristics, training needs, health status, lifestyle practices). Measures, analyses, and results are reported below.

Design and Sample

A cross-sectional survey design was used to pilot the final version of the OFSHLQ and conduct psychometric testing. The study was approved by the Institutional Review Board at the University of New Mexico Health Sciences Center.

Participants consisted of US-certified organic crop producers listed in the OID. Qualifying criteria included the following" (*a*) 18 years or older, and (*b*) currently operating an organic crop farm in the five states of the study's region (Arkansas, Louisiana, New Mexico, Oklahoma, and Texas). An email invitation was sent to 219 operators listing an email address, and a recruitment packet via postal mail to 399 producers who only listed a physical address and to those who did not respond to the email invitation. Overall, a total of 499 unduplicated producers were invited to access an electronic or paper copy of the OFSHLQ. REDCap (Research Electronic Data Capture), a secure web application, was used for data collection. Paper survey data were manually entered into the database by trained project staff. The final dataset included 124 records. Of those, nine were excluded from the analysis because they did not meet qualifying questions or provide answers to sociodemographic questions. The response rate was estimated at 25%.

Regarding missing data, across the 47 items in the psychometric testing, missing rates were low, ranging from 0.01% (1 out of 115 missing) to 7% (8 out of 115 missing). Additionally, there was no indication that any one variable caused that missingness. Hence, listwise deletion was adopted to handle missing data on items.

TABLE 1. Social Demographic Characteristics of Respondents

	N	%
Age		
25–34	12	9.68
35–44	22	17.74
45–54	23	18.55
55–64	16	12.90
65 or older	37	29.84
Gender identity		
Female	39	31.45
Male	67	54.03
Transgender	1	0.81
Prefer not to disclose	2	1.61
Race		
American Indian, Alaskan Native, Indigenous	9	7.26
Asian/Pacific Islander	2	1.61
Black, African American	0	0
Native Hawaiian/Pacific Islander	1	0.81
White	93	75.00
Prefer not to disclose	11	8.87
Ethnicity		
Hispanic/Latino	16	12.90
Non-Hispanic/Non-Latino	77	62.10
Education Level		
Less than high school diploma 1–4	2	1.61
High school diploma 5	14	11.29
Some college or 2-y degree 67	21	16.94
4-y college degree 8	40	32.26
Graduate degree 9 10	32	25.81
Annual household income		
Less than $25,000	9	7.26
$25,000 to $49,999	13	10.48
$50,000 to $99,999	34	27.42
$100,000 to $249,999	44	35.48
Household size		
Live alone	17	13.71
Lives with 1 other person	18	14.52
Lives with 2 other people	29	23.39
Lives with 3 or more other people	44	35.48
Marital status		
Single	15	12.10
Married	73	58.87
Divorced	7	5.65
Widowed	7	5.65
Cohabitating	8	6.45
Operator type		
Owner operator	101	81.45
Worker (non-owner)	19	15.32
Years of experience in farming		
Less than 10 y	25	20.16
More than 10 y	91	73.39
Years of experience in organic farming		
Less than 10 y	68	54.84
More than 10 y	48	38.71
Hours per week of work on the farm		
40 or fewer hours per week	39	31.45
41–60 h/wk	37	29.84
More than 60 h/wk	39	31.45

Missing responses are not included; percentage for each response category does not add up to 100%.

The sociodemographic characteristics of the valid sample are presented in Table 1. A majority of participants were 45 years and older (61%), male (54%), White (75%), and non-Hispanic/non-Latino (62%), and possessed a 4-year college degree or higher (58%). A considerable portion of participants were married (59%), worked more than 40 hours per week on the farm (61%), and reported an annual household income exceeding $50,000 (63%). A high majority were owner-operators (81%) and had more than 10 years of farming experience (73%); only 39% had equivalent experience in organic farming.

Measures

The 47 items were assigned to two overall categories:

a) Work, Safety, and Personal Life Choices and Situations. Thirty-nine items assessed various psychosocial attributes related to work, safety, and personal life with a five-point Likert response scale ranging from 1 = strongly disagree to 5 = strongly agree. These items were distributed across five sections: work environment (10 items; eg, "There are enough people of staff on the farm to get all the work done"); attitudes toward safety (4 items; eg, "My safety and the safety of others on the farm is a priority"); reasons to pursue organic farming (19 items; eg, "It gives a positive image to a farm"); and perceptions of personal life (6 items; eg, "I receive sufficient emotional support from others" and "spirituality has a positive influence in my daily life").
b) Intellectual Health and Life Satisfaction. Intellectual health was measured using five items addressing participants' engagement in activities promoting personal growth and community involvement, and a five-point Likert response scale ranging from Never (1) to Always (5). Items included statements such as "I seek opportunities to teach or mentor others" and "I participate in cultural events and programs." Life satisfaction was assessed through three items: life, work, and organic practices and work. Participants rated each item on a scale from 1 (Not satisfied at all) to 4 (Very satisfied).

Data Analysis

The analysis aimed to identify the number of underlying constructs (ie, factors) within the 47 items, as well as determine which items are associated with each factor. Because this was the initial development of the OFSHLQ, an exploratory approach was adopted without specific assumption on the underlying constructs. A series of exploratory factor analyses (EFAs) were utilized to elucidate the constructs behind the 47 items, as well as the item-construct relations. The constructs were further named based on the group of items with the strongest associations with a particular construct. Consistent with recommendations from prior literature,[34] the principal axis factoring extraction method was employed to find the underlying latent (unobservable) factors among items. The Promax rotation method, one of the oblique rotation methods, was utilized in interpreting factor loadings. The oblique rotation method was selected on the assumption that factors are correlated with each other.

The EFA process comprised three steps: (1) assessing data suitability for EFA, (2) determining the number of latent factors, and (3) evaluating the factor solutions. Data appropriateness for EFA was examined through the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy[35] and the Test of Sphericity.[36] KMO assesses the degree to which construct items cohere, with values ≥0.70 considered optimal.[34] The Bartlett test assesses whether the correlation matrix differs significantly from an identity matrix (ie, all items are uncorrelated with each other), indicating the presence of item correlations suitable for EFA. A comprehensive approach was taken to determine the number of latent factors, comparing results from the eigenvalue-greater-than-one-rule, scree plot, and parallel analysis.[37] Once the number of factors was established, factor solutions including factor loadings and correlations were reported. An item was deemed "loaded" on a factor if its loading exceeds 0.30,[37] with factor interpretation based on the items heavily loaded on each factor. Items sharing a factor constituted a scale.

The reliability of the scale scores defined by the EFA findings was estimated using Cronbach's alpha as the internal consistency measure. Reliability refers to the degree of measurement error associated with the scale scores, with higher values indicating increased consistency in scale scores from the same individuals across various occasions.[38]

TABLE 2. Pattern Factor Loadings After Rotation of the Work Environment Section

Item	Factor 1: Work Satisfaction	Factor 2: Work Role Perception
My job on the farm requires that I keep learning new things	−0.13	**0.53**
My job on the farm requires that I work very fast	−0.08	0.17*
On the farm, I know exactly what is expected of me	0.21	**0.43**
The safety of workers/volunteers is a high priority on the farm	0.13	**0.69**
I am proud of the work I do	0.13	**0.81**
Conditions on the farm allow me to be about as productive as I can be	**0.67**	0.17
There are enough people or staff on the farm to get all the work done	**0.74**	−0.25
The farm is run in a smooth and effective manner	**0.78**	−0.20
I can change my starting and quitting times on a daily basis	0.25*	0.18
Morale of people working on the farm is high	**0.36**	0.07

Pattern factor loadings above the 0.30 threshold are in bold. The largest pattern factor loading but does not exceed the 0.30 threshold for each item is denoted by *.

All analyses, encompassing basic descriptive statistics of items, reliability estimations, and EFAs among items were employed using the R packages psych and GPArotation under R version 4.3.2.

EFA Results

Eleven scales were developed based on the EFA results, distributed across six overall dimensions:

1. Work environment (10 items). Bartlett's test of sphericity ($\chi^2 = 292.20$, $P < .001$) indicated a very low probability that the correlations matrix of these 10 items was an identity matrix, further supporting scale factorability. Additionally, the overall KMO measure was 0.71, which is greater than the recommended minimum of 0.70[34] and characterized as "middling."[35] These assessments validate the use of the EFA on the current sample.

An EFA was performed using a principal axis factoring method and the Promax rotation. Although the eigenvalues-larger-than-one rule suggested a four-factor solution, both the scree plot and parallel analysis favored a two-factor solution. Given the 10 items in this section, a two-factor solution was adopted, anticipating at least three to four items with factor loadings surpassing the threshold of 0.3. Pattern factor loadings from the two-factor model are detailed in Table 2.

For the first factor, the items "allow to be productive" (0.67), "enough people or staff" (0.74), "smooth and effective" (0.78), and "high morale" (0.36) exhibited pattern loadings above the cutoff. The similarity among these items is that they represent participants' satisfaction with the working environment. On the other hand, the second factor comprised the items "requires learning new things" (0.53), "knowing the expectation" (0.43), "safety as high priority" (0.69), and "proud of the work" (0.81). The commonality among these items is that they reflect how participants perceived their role in their work. Consequently, two factors from the work environment items were identified: work satisfaction and work role perception. These two factors accounted for 24.42% and 12.69% of the total variance, respectively. The factor correlation was 0.26.

Two items from this section did not yield any pattern loading above the threshold. However, "requires to work fast" showed a loading factor of 0.17 and alignment with work role perception. The item "change my starting and quitting times" exhibited cross-loadings on both factors, but was assigned to work satisfaction because it showed a stronger correlation (0.25) with this factor compared to work role perception (0.18). Overall, the work environment satisfaction scale consisted of five items, whereas the work role perception scale comprised another five items.

1. Attitudes toward safety (four items). Bartlett's test of sphericity ($\chi^2 = 224.306$, $P < .001$) and the KMO measure (0.80) indicated the suitability of EFA on the current sample. Table 3 showcases the pattern factor loadings of the four items, all of which exceeded the threshold. The items "safety as priority" (0.65), "improving safety" (0.71), "report safety concern" (0.90), and "ensure safety" (0.83) suggested a one-factor model: safety attitudes, which accounted for 60.48% of the total variance.
2. Reasons to pursue organic farming (19 items). Bartlett's test of sphericity ($\chi^2 = 1572.447$, $P < .001$) and KMO measure (0.88) indicated the appropriateness of employing EFA on the current sample. While evaluating multiple criteria for determining the number of factors, three distinct criteria yielded different factor solutions: the eigenvalue-larger-than-one rule suggested a four-factor model, the scree plot depicted a three-factor solution, and the parallel analysis advocated a two-factor solution. Based on the interpretability of the factors,[37] the four-factor solution was adopted. The pattern factor loadings are presented in Table 4. Overall, four factors underlaid farmers' decisions in pursuing such career and explained a total of 59.01% of the variance: holistic well-being (44.06%), community connection (8.06%), environmental stewardship (3.78%), and economic autonomy (3.11%). Factor correlations among the four factors ranged from 0.20 to 0.73.

The item "affordability" exhibited a loading with the economic autonomy factor at 0.26 and 0.24 with the holistic well-being factor. As the concept of affordability was more aligned with economic considerations, the item was assigned to the economic autonomy scale. The item "harmony with nature" exhibited cross-loadings above the threshold of 0.30 on both the holistic well-being and the environmental stewardship factors. Due to its direct link to environmental concern, it was assigned to the environmental stewardship scale. Consequently, four scales were developed under this section of the survey: holistic well-being (six items), community connection (six items), environmental stewardship (three items), and economic autonomy (four items).

TABLE 3. Pattern Factor Loadings After Rotation of the Attitude Toward Safety Section

Item	Factor: Safety Attitudes
My safety and the safety of others on the farm is a priority	**0.65**
I am actively working toward improving farming safety	**0.71**
I encourage workers to report any safety concerns	**0.90**
I keep up with recommendations to ensure my safety and the safety of my employees/volunteers	**0.83**

Pattern factor loadings above the 0.30 threshold are in bold.

TABLE 4. Pattern Factor Loadings After Rotation of the Reasons to Pursue Organic Farming Section

Item	Factor 1: Holistic Well-Being	Factor 2: Community Connection	Factor 3: Environmental Stewardship	Factor 4: Economic Autonomy
Gives a positive image to a farm	−0.05	**0.66**	0.14	−0.12
Provides access to local markets	−0.28	**0.76**	0.03	0.10
Is more profitable than conventional farming	−0.14	−0.02	−0.19	**0.66**
Gives me more freedom over what I grow than conventional farming	−0.03	0.11	0.27	**0.50**
Information on organic farming is easy to obtain	0.14	0.20	−0.04	0.30*
Reduces chemical output to the environment	−0.09	0.02	**0.98**	−0.08
Products are healthier for the family	0.08	0.00	**0.82**	−0.03
Is affordable to people in my community	0.24	0.01	0.16	0.26*
Lets me live more in harmony with nature	**0.50**	−0.09	**0.51**	−0.05
Keeps me fit	**0.65**	0.07	0.13	−0.24
Keeps me motivated	**0.75**	0.24	−0.16	−0.14
Keeps me connected to others	0.14	**0.73**	−0.08	0.01
Positively contributes to my family life	0.27	**0.32**	0.08	0.23
Facilitates being connected to my community	0.20	**0.70**	0.09	−0.15
Contributes positively to my physical health	**0.69**	0.11	0.19	−0.07
Contributes positively to my mental health	**0.94**	−0.17	0.01	0.10
Contributes positively to my social life	0.18	**0.61**	−0.19	0.14
Contributes positively to my spiritual life	**0.92**	−0.03	−0.12	−0.06
Contributes positively to my overall well being	**0.91**	−0.14	0.04	0.11

Pattern factor loadings above the 0.30 threshold are in bold. The largest pattern factor loading but does not exceed the 0.30 threshold for each item is denoted by *.

1. Perceptions of personal life (six items). Bartlett's test of sphericity ($\chi^2 = 302.469$, $P < .001$) yielded significance, indicating that the correlation matrix among the six items was not an identity matrix. However, the KMO was 0.65, characterized as "mediocre."[35] This suggested that, although there were correlations among items, their shared variances were not robust. All three criteria led to the identification of a two-factor model. Table 5 presents the pattern factor loadings following Promax rotation. For factor 1, the items "family interfere with work" (0.33), "share worries" (0.91), and "emotional support" (0.67) exhibited loadings surpassing the 0.3 threshold, suggesting a nuanced relationship between personal and professional life. Therefore, this factor was labeled as social and work-life balance (three items). This factor accounted for 21.18% of the total variance.

For the second factor, the items "positive influence of spirituality" (0.93), "prayer" (0.95), and "spiritual life satisfaction" (0.60) demonstrated loadings exceeding the 0.3 threshold, underscoring the significance of spirituality in this sample. This factor was labeled as spiritual well-being (three items), which explained 38.07% of the variance. The correlation between the two factors was 0.19.

1. Intellectual health (five items). Bartlett's test of sphericity ($\chi^2 = 91.204$, $P < .001$) and KMO measure (0.75) supported the use of the EFA on the current sample. All three criteria pointed to a one-factor model. The pattern factor loadings after the promax rotation are displayed in Table 6. The five items exhibited factor loadings greater than the 0.3 threshold (0.44 to 0.71). Given the shared themes observed across the five items, this factor was labeled as intellectual health and accounted for 37.78% of the total variance.
2. Life satisfaction (three items). Bartlett's test of sphericity ($\chi^2 = 302.469$, $P < .001$) was significant, indicating that the correlation matrix among the six items was not an identity matrix. However, the KMO was only 0.69. All the three criteria indicated a one-factor model. All three items loaded on the latent factor from 0.65 to 0.87. Hence, this underlying factor was labeled as life satisfaction (Table 7), which accounted for 64.65% of the total variance.

RELIABILITY ANALYSIS

Reliability estimates across all 11 scales scores ranged from 0.58 to 0.92 (Table 8).

Limitations

The sample was relatively small; however, it was sufficient to conduct a complete set of EFAs. Although validity and reliability tests were conducted, future psychometric testing may focus on criterion validity, both concurrent and predictive, and test-retest reliability. The

TABLE 5. Pattern Factor Loadings After Rotation of the Perceptions of Personal Life Section

Item	Factor 1: Social and Work Life Balance	Factor 2: Spiritual Well-Being
The demands of family interfere with my farm work	**0.33**	0.10
I feel that there is no one I can share my most private worries and fears with	**0.91**	−0.07
I receive sufficient emotional support from others	**0.67**	0.08
Spirituality has a positive influence in my daily life	0.01	**0.93**
I use prayer, mediation and/or quiet personal reflection in my life	−0.01	**0.95**
I am satisfied with my spiritual life	0.08	**0.60**

Pattern factor loadings above the 0.30 threshold are in bold.

TABLE 6. Pattern Factor Loadings After Rotation of the Intellectual Health Section

Item	Factor: Intellectual Health
I seek opportunities to teach or mentor others	**0.44**
I keep informed about social and political issues	**0.58**
I am interested in understanding the views of others	**0.71**
I participate in cultural events and programs	**0.53**
I seek opportunities to learn new things	**0.53**

Pattern factor loadings above the 0.30 threshold are in bold.

sample was limited to USDA-certified organic producers in the Southwest region of the US. Although the sample may not represent the entire US or regional organic producer population, using both postal mailing and electronic approaches for recruitment and data collection may have resulted in a more diverse and representative sample. Data were only available for those who completed the survey, a comparative analysis of respondents and nonrespondents was not possible.

DISCUSSION

This article presents the conceptual model that informed the OFSHLQ, the development process, and the results of the psychometric testing on key theoretical constructs. The study was justified by the lack of validated tools to assess OSH from a multidimensional perspective. Although other popular tools take a more comprehensive approach compared to traditional OSH instruments, they seem to fall short on measuring relevant outside-work factors that contribute to occupational injury and illness. Overall, they have not been validated or do not totally integrate health, quality of life, and nonwork domains that have shown to have an impact on the safety and health of workers. For instance, the WellBQ has not generated sufficient scientific literature, and there is no evidence on its psychometric properties. The COPSOQ's focus is the workplace; it measures psychosocial conditions at work. Items on health and well-being are limited to self-reported health status.

The OFSHLQ was informed by a theoretical model that incorporates aspects of work and life that represent the multilevel factors that may contribute to workers' safety, health, and well-being. The development process contributed to the validity of the tool: pilot testing with farmers contributed to face validity, expert review to content validity, and EFA to construct validity.

An important feature of the OFSHLQ is that it integrates standard items on self-reported occupational injury and illness, as well as farming practices. Thus, it may be used to fill the gap in OSH surveillance data in this population of farmers. This makes the OFSHLQ very unique, as other comprehensive tools focus on psychosocial and work conditions but do not address self-reported injuries and illness. Furthermore, current occupational surveillance has many limitations, including a significant lack of data on organic farmers, and researchers have called for a more reliable system.[20,39,40] In fact, the OFSHLQ was used to estimate self-reported nonfatal injury rates and explore safety practices, data that had not been reported before in a sample of organic farmers.[22]

TABLE 7. Pattern Factor Loadings After Rotation of the Life Satisfaction Section

Item	Factor: Life Satisfaction
In general, how satisfied are you with your life?	**0.87**
In general, how satisfied are you with your work and work arrangements?	**0.87**
Overall, how satisfied are you as an organic farmer?	**0.65**

Pattern factor loadings above the 0.30 threshold are in bold.

TABLE 8. Reliability Scores

Scale	Cronbach's Alpha
Work satisfaction	0.67
Work role perception	0.66
Safety attitudes	0.87
Holistic well-being	0.92
Community connection	0.85
Environmental stewardship	0.89
Economic autonomy	0.58
Social and work-life balance	0.64
Spiritual well-being	0.87
Intellectual health	0.68
Life satisfaction	0.82

The sociodemographic and farm and work sections may also contribute to better typify the organic farmer and farm. Although the US National Agricultural Statistics Service (NASS) conducts surveys with certified organic producers, the focus is primarily on acreage, production, sales, and marketing practices. The Census of Agriculture collects limited sociodemographic, work, and farm data on farms with organic sales. Although certain demographic and work and farm characteristics may be linked to occupational injury and illness, there is very little research using these data to explore risks among organic farmers.[20,22] Regarding representativeness, due to the limitations of current surveillance systems, it is not feasible to estimate whether the study's sample represents the national or regional certified organic farmer.

The sections on health, health care, and lifestyle could contribute to surveillance, as well as research and practice. Aside from small and subpopulation-specific studies, there are no reliable data on the health status, health care needs, and health-related behaviors of US agricultural workers, much less for organic farmers. NAWS collects health history data, which have been used to explore health conditions such as hypertension, asthma, and diabetes in this population.[41] On health care, a COVID-19 regional study with USDA-certified organic producers showed that, although many experienced health care delays, a very high majority of participants had health insurance.[42] Given the substantial expansion of organic farming and the potential for organic farmers to bolster a new generation of agricultural workers, it is imperative to understand their health and health care needs. Identifying behavioral risks is essential for shaping health promotion strategies and preventing diseases.

Mental health is broadly addressed throughout the OFSHLQ, including self-reported work-related stressors, stress level, and mental health status. Other factors that may contribute to mental health are also represented, such as work and life satisfaction, and social/emotional, intellectual, and spiritual life. Research on farmers' psychological distress and poor mental health is extensive. Studies emphasize the influence of multilevel factors that extend beyond intrapersonal and occupational to include interpersonal, community, social, and other contextual factors.[43–47] There is a scarcity of recent literature on the mental health of organic farmers, especially within the US context. Few studies have examined the factors influencing farmers' mental well-being and the differences between conventional and organic farming in this regard.[48–50] Overall, the OFSHLQ expands current research and literature on the mental health of farmers, and elucidates factors that may be specific to the organic farmer (eg, production and marketing practices; subscription to organic principles).

Regarding the EFA, results indicate that the key theoretical constructs studied were properly integrated and the underlying factor

structures of each item set are generally acceptable. These represent traditional OSH dimensions, such as work autonomy and safety culture and attitudes. Population-specific are items on reasons for adopting organic practices, community connections, and a more holistic perspective of well-being. Although factors that may contribute to OSH and the overall well-being of the organic farmer, the literature also points out that these same factors may constitute sources of stress in this population. A 2018 study discussed literature that refers to potential sources of stress unique to the organic farmer, such as the perceived need of the farmer to embrace the organic movement, the concept of civic/environmental agriculture, alternatives to industrialized food production, and contribution to the community's social and economic development.[48] Future research should further explore whether sources of stress differ between conventional and organic farmers.

Of importance are items capturing perceived social and personal aspects of life, including social support and work-life balance. The role of social support in health status and outcomes is well documented, and its association to life satisfaction and quality of life.[51,52] EFA results suggest that these items are meaningful and represent the interaction between personal and professional life.

EFA results also suggest that spiritual and intellectual health are relevant and each set of items are well integrated into the OFSHLQ. Similarly, the role of these dimensions in health and well-being is supported by the literature. Spirituality, prayer, and spiritual life satisfaction may contribute to mental health and psychosocial well-being.[53,54] The intellectual dimension of health and wellness, represented by personal development, social awareness, and community involvement, refers to valuing learning and personal growth and development. For the organic farmer, this may include learning sustainable agricultural practices and developing a business plan.

EFA results are robust on overall life satisfaction items. This is important from a work and life perspective as research supports the positive association between job satisfaction and health, happiness, and well-being.[55,56]

The reliability analysis yielded moderate to strong correlations across the key scales of the OFHSLQ (Table 8). Although Cronbach's alpha is widely used to assess the internal consistency of scales, values below the commonly accepted threshold of 0.80 can suggest potential issues with reliability. The reliability analysis results of the present study indicated that of the 11 scales identified by the EFA, 5 had reliability scores lower than 0.80. This may be attributed to several factors. For example, some of the constructs measured by these scales are inherently complex, which might lead to a lower degree of item intercorrelation (eg, economic autonomy). Additionally, scales with fewer items can also result in lower Cronbach's alpha values due to the limited number of items contributing to the overall internal consistency (eg, social and work-life balance). This limitation suggests that the findings related to these scales should be interpreted with caution. The lower reliability scores highlight the need for further refinement of these measures. Future research could address this limitation by revisiting the items within these scales, increasing the number of items to improve reliability, or considering alternative reliability assessments. However, the results of the reliability analysis suggest overall consistency across the tested dimensions and items of the OFSHLQ.

CONCLUSION

The OFSHLQ is a multidimensional tool that integrates traditional surveillance and research variables and other dimensions of work and life that are consistent with an expanded paradigm of OSH. Theoretical constructs showed acceptable psychometric properties, including validity and reliability.

Although the OFSHLQ was originally conceived and developed to collect OSH data on organic producers, it could easily be adapted to other occupations and sectors. Thus, the tool may be instrumental in comparative studies. Similarly, because of its flexible format and distinctive dimensions, the OFSHLQ constitutes a resource for a variety of health, social, and agricultural scientists. Individual sections and scales may be used to, for example, typify a particular workforce; explore safety practices and estimate injury rate; assess lifestyle, health status, and health care needs; identify motivators and barriers to farming; and inform interventions and policies aimed at protecting farmers and promoting sustainable agricultural practices. Furthermore, because it integrates multilevel factors, the OFSHLQ may be used to explore associations across a variety of independent and outcome variables such as intrapersonal, interpersonal, work, health, life, and social variables.

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