

Mental Health Research with Latino Farmworkers: A Systematic Evaluation of the Short CES-D

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Abstract Mental health research among Latino farmworkers is hampered by the absence of measurement evaluation that ensures farmworkers understand and can consistently and appropriately respond to questions about mental health. Cross-sectional data were obtained from 409 farmworkers via interviewer-administered survey questionnaires. Mental health was operationalized with the short-form Center for Epidemiologic Studies, Depression (CES-D) scale. The structured interviewer-administered survey questionnaires included measures to capture personal and work-related factors that could affect farmworkers' ability to understand and respond to mental health questions probed by the CES-D. Good variability in item response was observed across the 10 short-form CES-D items. There was no evidence of differential response across sub-groups of farmworkers for six of the 10 items. Responses to four of the 10 items differed by educational

attainment, country of origin, and language preference. Overall, the internal consistency of the 10 items exceeded standard conventions, and observed differences in depressive symptoms were as expected. Researchers in farmworker mental health must remain attentive to the strength and validity of available measures for migrants, different ethnic groups and different socioeconomic backgrounds. Nevertheless, the overall pattern suggests that the CES-D is a viable tool for advancing farmworker mental health research.

Keywords Latino farmworkers · Immigrant · Mental health · Measurement evaluation · CES-D · Depressive symptoms

Introduction

Mental health research among farmworkers, 75% of whom are Latinos from Mexico [1], is a challenging undertaking. As has been outlined elsewhere [2], the mental health of Latino farmworkers and other Latino immigrants is a broad conceptual domain that includes hedonic morbidity such as depression and anxiety, as well as eudemonic aspects of health such as optimal functioning and high mental health-related quality of life. Further complicating the issue is the existence of folk illnesses common in various Latino cultures and Latino sub-groups, such as *susto* and *nervios* [3, 4].

Once an investigator identifies a substantive mental health domain, identifying instruments to assess farmworker mental health becomes a particular challenge [2]. The demographic profile of farmworkers presents several challenges to measuring mental health. Regional and within cultural variation in the meaning of comparable

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Spanish terms presents linguistic barriers to conducting mental health research with farmworkers. Latino farmworkers typically have little formal education [1]. Estimates from the most recent National Agricultural Workers' Survey (NAWS) indicate that the median and modal level of education among farmworkers is 6 years of education in Mexico. Lack of formal education and poor reading levels among many farmworkers makes it difficult for them to participate in self-administered surveys. Further, low levels of formal education and corresponding inexperience responding to highly structured instruments (e.g., test-taking) raise questions about farmworkers' ability to understand and respond to questions asked in interviewer-administered questionnaires, especially items with highly abstract concepts [5].

The challenge of administering standard questionnaires and assessments to farmworkers, and presumably other Latino immigrants with a similar demographic profile, was recently illustrated. Grzywacz et al. [6] reported that farmworkers have substantial difficulty interpreting and responding to the K-6, a short form instrument designed to quantify levels of psychological distress [7]. Specifically, they reported that participants consistently commented that the structure of the K-6 items was too complex, and that the language used in the items had a negative connotation. These results are troubling because the structure and language used in the K-6 are highly similar to those used in standard instruments in psychiatric epidemiology like the Composite International Diagnostic Interview (CIDI) [8] and the Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS) [9]. Grzywacz et al.'s results parallel earlier research. Specifically, Johnson et al. [10] reported that Mexican-Americans had difficulty responding to the question "During the past week, how often have you felt that you could not shake off the blues, even with help from family or friends?" because the phrase "shake of the blues" had ambiguous cultural meaning. Johnson et al. further showed that difficulty understanding the item was associated with inflated frequency of endorsing the item. Other researchers have documented systematic differences between Mexican Latinos and non-Hispanic whites in responses due to item understanding or the complexity of items' response options [5, 11]. Taken together, available research suggests that standard tools used in mental health research need systematic and rigorous measurement evaluation before using them with farmworkers or other Latino immigrants whose background is similar to that of farmworkers.

The goal of this study is to determine the value of the short-form version of the Center for Epidemiologic Studies-Depression Scale (CES-D) [12] for use with immigrant Latino (mostly Mexican) farmworkers. To achieve this goal we use pilot data collected from a field test of a new

module added to the National Agricultural Workers Survey to, (1) delineate variation in response patterns to individual CES-D items by characteristics that introduce potential sources of measurement error; (2) determine the internal consistency of the short CES-D for the entire sample and for selected subgroups; and (3) document associations between depressive symptoms and farmworker characteristics.

Method

Overview

The data for this analysis are from interviews collected during the Spring 2007 cycle of NAWS ($N = 409$). The NAWS is the primary source of data on US farmworkers in the crop labor force. Each year since federal fiscal year 1989, the NAWS has conducted interviews with a national probability sample of field workers employed in crop agriculture, not including workers with a temporary work permit (H2A visa). The US Department of Labor sponsors the NAWS and it is fielded by the Aguirre Division of JBS International.

Sampling

A detailed description of the NAWS sampling and weighting procedures is summarized elsewhere (see <http://www.doleta.gov/agworker/naws.cfm>), but is summarized here. The NAWS uses a multi-stage sampling design to account for seasonal and regional fluctuations in the level of farm employment. The year is divided into three interviewing cycles, each lasting 4 months to capture seasonal fluctuations in the agricultural work force. The number of interviews allocated to each cycle is proportional to the amount of crop activity at that time of the year.

During each interview cycle four levels of sample selection are used: region, county cluster, employer and field worker. At the highest level, the NAWS sampling scheme divides the continental United States into 12 regions. Each region in turn consists of clusters of counties that have similar farm labor usage patterns. County selection is made from a standing roster of randomly selected county clusters. Every cycle, in each region, the staff draws a random sample of county clusters from the roster. Random sorting ordered counties within clusters and determined the starting county. The penultimate sampling stage is the selection of agricultural employers using simple random sampling. NAWS staff compiled a list of agricultural employers from public agency records. Field staff review, supplement and update the lists annually using local information.

Data Collection

All NAWS data are collected through interviewer-administered survey questionnaires in a face-to-face interview context by trained interviewers. Before approaching workers, interviewers are trained to contact the selected growers or contractors, explain the purpose of the survey, and obtain access to the work site in order to schedule interviews. Interviewers then go to the farm, ranch, or nursery and select a random sample of workers using field sampling techniques designed by a statistician. As such, the sample includes only workers actively employed in agriculture at the time of the interview. Prior to collecting data interviewers explain the purpose of the survey to the workers, ask them to participate, and obtain informed consent. Interviewers administer the questionnaire in the location and language of the worker's choice. Workers receive a \$20 honorarium for their participation.

Measures

Depressive symptoms, the dependent variable, were measured using a 10-item version of the CES-D scale [13]. The short-form version includes items assessing depressive symptoms in the three primary domains of symptomology identified in the parent instrument (i.e., depressed affect, interpersonal relations, and positive affect) [14]. Items ask participants to report the frequency of each symptom in the past 7 days using one of four response options, including “rarely or none of the time (less than 1 day)” = 0, “some or a little of the time (1–2 days)” = 1, “occasionally or a moderate amount of time (3–4 days)” = 2, and “most or all of the time (5–7 days)” = 3. Analyses of data obtained in previous samples of Latino immigrants indicated the 10-item short form of the CES-D has acceptable internal consistency ($\alpha = .73$ [95% CI = 0.70–0.76]) and that it accounts for 78.3 of the variance in scores from the full CES-D [12].

We focus on three characteristics that have the potential to create error in measurement. First, we focus on *educational attainment* as an indicator of participants' ability to respond to relatively abstract concepts and respond to structured interview items. To capture possible cultural variation in item interpretation we consider *country of birth* (i.e., U.S., Mexico, Other) as well as *language preference* (i.e., English, Spanish, Indigenous language).

Personal and occupational characteristics likely to contribute substantively to variation in depressive symptoms are used as criterion for evaluating construct validity. Personal characteristics that may shape depressive symptoms and that were included in the NAWS questionnaire included: gender, marital status including presence/absence of spouse (i.e., not married, married but unaccompanied by spouse, married and accompanied by spouse), and

documentation status. Each of these characteristics has been demonstrated to be associated with depressive symptoms in previous farmworker research [15–17]. Occupational characteristics that may shape depressive symptoms include years in agriculture, and worker status (migrant versus settled) [2].

Results

Participants in this sample were predominantly men (77.8%) from Mexico (77.8%) who had little formal

Table 1 Sociodemographic characteristics of farmworker in this sample

Personal characteristics	N	%
Sex		
Male	318	77.75
Female	91	22.25
Age		
18–24 years	107	26.16
25–29 years	61	14.91
30–39 years	92	22.49
40 or more years	149	36.43
Marital status		
Not married	156	38.14
Married, away from spouse	77	18.83
Married, with spouse	176	43.03
Educational attainment		
0–6 years	207	50.61
7–9 years	89	21.76
10 or more years	113	27.63
Country of birth		
Mexico	294	71.88
US	96	23.47
Other	19	4.65
Language		
Speaks English	96	23.47
Speaks Spanish	298	72.86
Speaks Indigenous language	15	3.67
Seasons in US agriculture		
1 year or less	54	13.20
2–3 years	49	11.98
4–7 years	89	21.76
8 or more years	217	53.06
Worker type		
Migrant worker	105	25.67
Settled worker	304	74.33
Documentation (work authorized)		
No	218	53.30
Yes	191	46.70

education; fully one-half of the sample reported 0–6 years of education (Table 1). A small proportion of participants were from countries other than the US or Mexico, most from Central American countries like Honduras and Guatemala. Although a substantial proportion of participants were younger than 25 years of age, the majority of farmworkers were over 30 years of age with fully 36% being over the age of 40. Most farmworkers (43.0%) were married and accompanied with their spouse, but over one-third were unmarried and only a minority (18.8%) were married but unaccompanied by their spouse. The vast majority of participants spoke Spanish as their primary language, but nearly one-quarter reported English as their primary language and fewer than 5% reported speaking primarily an indigenous language. Most participants (53%) reported working in US agriculture for 8 or more years. Fully three-quarters of the sample were seasonal farmworkers and over half were characterized as lacking legal documents to work in the US.

Average responses to each of the 10 items used in the short CES-D suggested good variability across the items (Table 2). As might be expected, CES-D items assessing the frequency of positive affect were relatively common: the average farmworker reported feeling happy (item 1) or enjoying life (item 7) most days in the past week. By contrast, although the modal score for the negative affect items was zero, there was a clear range with fewer workers reporting zero to feeling lonely (item 3) and sad (item 8) and more workers reporting zero for the negative social interaction items (items 6 & 9).

Responses to most of the CES-D items did not vary by factors that may contribute to measurement error (Table 2). Responses to six of the 10 items did not vary by educational attainment, country of origin, or language preference. The highly robust items were those asking about: (1) restless sleep (item 2), (2) feeling depressed (item 4), (3) feeling that everything was an effort (item 5), (4) feeling people were unfriendly (item 6), (5) feeling people disliked you (item 9), and (6) could not get going (item 10).

However, responses to 4 of the 10 items did differ across group characteristics (Table 2). The item asking about happiness (item 1) differed by *country of origin* and *language preference*, both indicators intended to capture possible cultural variation in item meaning. Observed differences in this item indicated that those from a country other than the US or Mexico and those who spoke English reported more frequent feelings of happiness. The item asking about feelings of loneliness (item 3) differed by *educational attainment*, *country of origin*, and *language preference*, such that those with the least education, those from a country other than the US or Mexico, and those who spoke an indigenous language reported more frequent feelings of loneliness. The item asking about life

enjoyment (item #7) likewise differed across all three characteristics, such that those with the least education, those from Mexico, and those who spoke an indigenous language reported the least frequent life enjoyment. Finally, the sadness item (item 8) differed by *educational attainment* and *language preference*, such that individuals with the least education and those who spoke an indigenous language reported the most frequent feelings of sadness.

The estimated reliability of the short CES-D for the total sample and specific subgroups met the standard convention of .70 in nearly all cases (Tables 3). The estimated reliability of the instrument was marginal for farmworkers from the US and those who spoke English; however, the 95% confidence intervals suggested no evidence that the estimated reliability coefficients differed significantly from one sub-group to the next. The acceptable internal consistency supports aggregating across the items to summarize the frequency of depressive symptoms. Despite the differential responses reported in Table 2 to individual CES-D items by education, birth country, and language there was no evidence that aggregated scores differed by these characteristics.

Turning to consideration of criterion validity, there was evidence that total depressive symptom scores differed across groups in expected ways (Table 4). That is, there is evidence that unmarried farmworkers had the highest depressive symptoms score whereas those who were married and accompanied by their spouse had the lowest depressive symptoms. Individuals with documentation had lower depressive symptoms than those without documentation, and migrant workers reported more depressive symptoms than settled workers. When all three factors are considered simultaneously, only marital status survived such that those who were married and accompanied had significantly lower depressive symptoms than those who were unmarried. Additional contrasts indicated that depressive symptoms were higher among those who were married but unaccompanied compared to those who were married and accompanied.

Discussion

Measurement evaluation is an important step in advancing mental health research and intervention among farmworkers [2]. Previous research indicates that Mexican-American's in general [5, 10] and Latino farmworkers in particular [6] may have difficulty understanding and responding to standard structured instruments designed to assess mental health. Responses to poorly understood questionnaire items and response options can misrepresent participants mental health symptoms and corresponding estimates of poor mental health [5, 10, 11]. In this study we

Table 2 Mean (*M*) responses and standard deviations (*SD*) for individual CES-D items by educational attainment, country of birth and language preferences as potential sources of measurement error

	Total <i>M</i> (<i>SD</i>)	Educational attainment (years)				Country of birth			Language		
		0–6 <i>M</i> (<i>SD</i>)	7–9 <i>M</i> (<i>SD</i>)	10 or more <i>M</i> (<i>SD</i>)		US <i>M</i> (<i>SD</i>)	Mexico <i>M</i> (<i>SD</i>)	Other <i>M</i> (<i>SD</i>)	English <i>M</i> (<i>SD</i>)	Spanish <i>M</i> (<i>SD</i>)	Indigenous <i>M</i> (<i>SD</i>)
1. I was happy <i>Estuve feliz</i>	2.12 (1.10)	2.06 (1.16)	2.15 (1.03)	2.20 (1.03)		2.35 (0.93)	2.02 (1.15)	2.47 (0.91)	2.31 (0.96)	2.09 (1.12)	1.47 (1.25)
2. My sleep was restless <i>Dormí mal</i>	0.37 (0.68)	0.36 (0.68)	0.32 (0.63)	0.42 (0.73)		0.38 (0.65)	0.36 (0.68)	0.47 (0.84)	0.39 (0.67)	0.36 (0.68)	0.40 (0.74)
3. I felt lonely <i>Me sentí sola</i>	0.50 (0.93)	0.62 (1.03)	0.55 (0.90)	0.26 (0.70)		0.24 (0.65)	0.58 (0.99)	0.63 (0.01)	0.23 (0.64)	0.55 (0.96)	1.33 (1.29)
4. I felt depressed <i>Me sentí deprimido</i>	0.28 (0.68)	0.30 (0.70)	0.23 (0.56)	0.27 (0.74)		0.18 (0.58)	0.32 (0.72)	0.11 (0.46)	0.18 (0.58)	0.30 (0.70)	0.53 (0.83)
5. I felt everything I did was an effort <i>Sentí que todo lo que hacía tomaba esfuerzo</i>	0.23 (0.62)	0.26 (0.62)	0.11 (0.41)	0.28 (0.74)		0.27 (0.67)	0.22 (0.59)	0.32 (0.82)	0.26 (0.67)	0.23 (0.62)	0.13 (0.35)
6. People were unfriendly <i>La gente no fue amistosa</i>	0.10 (0.41)	0.09 (0.37)	0.08 (0.43)	0.14 (0.46)		0.10 (0.42)	0.10 (0.41)	0.11 (0.32)	0.10 (0.42)	0.10 (0.42)	0
7. I enjoyed life <i>Yo gocé la vida</i>	1.73 (1.26)	1.58 (1.29)	1.63 (1.23)	2.13 (1.12)		2.26 (1.03)	1.54 (1.28)	2.26 (1.05)	2.26 (1.02)	1.60 (1.27)	1.20 (1.42)
8. I felt sad <i>Me sentí triste</i>	0.44 (0.84)	0.54 (0.93)	0.42 (0.80)	0.30 (0.67)		0.30 (0.67)	0.50 (0.90)	0.32 (0.58)	0.29 (0.66)	0.46 (0.85)	1.13 (1.30)
9. I felt that people disliked me <i>Sentí que yo no le gustaba a la gente</i>	0.08 (0.35)	0.07 (0.33)	0.11 (0.49)	0.06 (0.24)		0.06 (0.24)	0.08 (0.34)	0.21 (0.71)	0.06 (0.24)	0.09 (0.38)	0
10. I could not get going <i>No pude motivarme</i>	0.10 (0.36)	0.08 (0.30)	0.14 (0.50)	0.11 (0.34)		0.12 (0.32)	0.09 (0.38)	0.11 (0.32)	0.11 (0.32)	0.10 (0.39)	0

Table 3 Estimated internal consistency (and 95% confidence intervals) of short CES-D, and mean (*M*) depressive symptoms by potential sources of measurement error

	Alpha	95% CI	<i>M</i>	SD	<i>P</i> -value
Total sample	0.78	(0.56, 0.99)	6.17	2.73	0.5216
Educational attainment					
0–6 years	0.80	(0.65, 0.95)	6.08	2.75	
7–9 years	0.75	(0.54, 0.96)	5.75	2.73	
10 or more years	0.72	(0.51, 0.94)	6.49	2.65	0.1868
Birth country					
US	0.70	(0.48, 0.92)	6.65	2.39	
Mexico	0.79	(0.62, 0.96)	5.89	2.76	
Other	0.70	(0.48, 0.92)	6.49	2.65	0.3131
Language					
English	0.69	(0.47, 0.92)	6.65	2.36	
Spanish	0.79	(0.62, 0.96)	5.96	2.82	
Indigenous	0.77	(0.62, 0.92)	6.20	2.96	

P-values based on chi-square tests

Table 4 Mean (*M*) total depressive symptoms by selected personal and occupational characteristics

	<i>N</i>	<i>M</i>	SD	<i>P</i> -value
Total sample	384	6.11	2.73	0.1353
Gender				
Men	298	5.87	2.66	
Women	86	6.92	2.82	0.0009
Marital status				
Not married	144	6.30	3.13	
Married, away from spouse	76	5.83	2.74	
Married, with spouse	164	6.07	2.32	0.0189
Documentation (work authorization)				
No	210	5.82	2.84	
Yes	174	6.45	2.55	0.1870
Seasons in US agriculture				
1 year or less	52	6.02	2.56	
2–3 years	47	6.21	3.49	
4–7 years	82	6.20	2.40	
8 or more years	203	6.07	2.71	0.0165
Worker type				
Migrant worker	100	5.81	3.01	
Settled worker	284	6.21	2.62	

P-values refer to results of *t*-tests when the criterion involves two categories, and one-way analysis of variance when the criterion involves three or more categories

systematically evaluated a short-form version of the CES-D to evaluate possible measurement problems. The overall pattern of results suggests that the short-form CES-D performs well among immigrant Latino farmworkers.

There was no evidence of differential response by educational attainment, country of origin, or language in six of the 10 short-form CES-D items. This suggests that farmworkers ability to understand the concepts contained within the items and generate a response is robust to variation in item comprehension (as evaluated by level of formal education) and possible cultural variation in the meaning of item content (as evaluated by country of origin and language preference). However, systematic differences in farmworkers' responses were observed for four of the 10 items. Responses to all four items differed by language preference making it the most common source of differential response. Educational attainment and country of origin were each associated with differential responses to three of the items.

The pattern and consistency of differential response varied depending on the criterion characteristic. Educational attainment had the most consistent pattern of differential responses whereby individuals with the least education consistently reporting more frequent depressive symptoms, suggesting those with little formal education may not fully comprehend the questions or the offered response set [10]. Similarly, for three of the four items where differential response was observed by language preference, those who spoke an indigenous (non-Spanish) language reported more frequent depressive symptoms. Recognizing that the items were delivered in Spanish, these results are consistent with those by Johnson et al. [10] who reported that that difficulty understanding an item was associated with inflated frequency of endorsing the symptom queried by the item. Least consistent was the pattern of differential response by country of origin. Responses to two items varied such that individuals from a country other than the US or Mexico (most likely a Central American country) reported more frequent happiness and more frequent loneliness. Respondents from Mexico compared to those from the US or some other country, reported less frequent feelings of life enjoyment. Differential item response by country of origin is likely accounted for by language preference. Indeed, observed differences in item response by country of origin were largely attenuated once language preference is adjusted.

Differential item responses notwithstanding, all evidence suggests that the short form CES-D effectively assessed the latent construct of interest, depressive symptoms. The internal consistency was generally acceptable, exceeding the standard convention of 0.70 in the sample and nearly all of the farmworker subgroups. Results of bivariate analyses intended to evaluate criterion validity were consistent with previous research. That is, the results indicated that unmarried farmworkers have the greatest depressive symptoms whereas those who are married and accompanied by their spouse have the least symptoms is

consistent with previous research suggesting that the ambivalence that accompanies leaving family behind and subsequent social isolation are significant threats to farmworker mental health [15, 17]. Legal status or the absence of work authorization is an ongoing stressor that undermines the mental health of farmworkers [15]; consequently observed differences by documentation status suggest the short-form CES-D is appropriately measuring depressive symptoms. Likewise, assuming that the transient nature of migrant farm work is experienced as stressful, the observed difference in depressive symptoms by worker type reinforces confidence that the short-form CES-D is a valid measure.

The results of this study must be interpreted in light of its limitations. Foremost is the absence of a gold-standard criterion for evaluating the construct validity of the short-form CES-D. The absence of a gold-standard criterion is perplexing because previous evidence suggests that the structure and language used in instruments that could serve as the gold standard (e.g., CIDI or AUDADIS) are problematic for farmworkers [6]. Thus, further research will require the development of alternative strategies for validating measures of farmworker mental health. Next, the sample was generally small, thereby reducing the effective sample for several subgroups of farmworkers. The number of farmworkers who spoke an indigenous language, for example was very small ($n = 15$) suggesting that the pattern of results observed for this subgroup should be interpreted cautiously. Future research with larger samples, preferably samples that recruit representative subsamples of farmworkers from across each of the, so called, “migrant streams” is needed.

Limitations notwithstanding, the results of this study contribute to the small but growing literature devoted to farmworker mental health. This is the first study to evaluate item responses by farmworkers to a mental health instrument. Although there was evidence of possible response bias due to poor understanding of item content, the overall pattern of results suggests that farmworkers understand and can appropriately respond to the short-form CES-D items, the instrument has good internal consistency, and scores obtained from the instrument behaved as expected. In short, although more research is needed, the pattern of results suggests the short-form CES-D is a viable tool for mental health research among immigrant Latino farmworkers.

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