



# A Small Randomized Controlled Trial of Three Remote Methods to Collect Mental Health Data from Migrant Farmworker Adults

Jack Tsai<sup>1,2,3,5</sup> · Anabel Rodriguez<sup>1,4</sup> · Victoria Solis<sup>1</sup>

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## Abstract

There has been limited longitudinal study of the health of migrant farmworkers due to their migratory lifestyles and there are opportunities to test new remote data collection methods in this subpopulation. A small randomized controlled trial was conducted with 75 migrant farmworker families who were randomly assigned to one of three groups that participated by (1) telephone interview, (2) online survey, or (3) mobile app between June 2021–April 2022. Of 50 farmworker adults who completed the baseline survey, there was differential attrition with 21% of the telephone interview group, 18% of the online survey group, and 3.2% of the online app group completing the 2-month follow-up. Over this period, migrant farmworkers reported relatively few mental health problems but notable alcohol use problems. Online apps were less effective than traditional methods for remote data collection. Alcohol use problems among migrant farmworkers in the U.S. may be an issue that deserves further study.

**Keywords** Farmworkers · Immigrants · Migrant workers · Mental health · Data collection

## Background

Mental health is a pressing issue among the estimated 2.5–3 million migrant farmworkers in rural America [1–5]. Studies have found that up to 45% of migrant farmworkers have reported moderate levels of depression [4, 6–8] and up to 18% have reported impairing levels of anxiety [4, 8, 9] compared to the general United States (U.S.) population with 4.2% experiencing moderate levels of depression and 2.7% experiencing severe anxiety [10]. However, there are various barriers for migrant farmworker families to access mental

healthcare. These barriers might include costs of care, uninsurance, lack of transportation, language difficulties, cultural differences, limited knowledge about services, transient and migratory lifestyles, and stigma and fear of deportation and fear of law enforcement agencies [3, 4, 6, 7]. There has not been adequate longitudinal research on mental health, mental healthcare use, and related factors among migrant farmworkers to fully explore these issues.

One major challenge to conducting longitudinal research with migrant farmworkers is the migratory nature of their work and lifestyles as well as limited-English proficiency and limited access to technology and internet services in remote regions. There are various validated tools that have been developed to measure mental health of migrant farmworkers, such as the Spanish versions of the Center for Epidemiologic Studies Depression Scale (CES-D; [3]) and the Patient Health Questionnaire-9 (PHQ-9; [4]). However, it is largely unknown to what extent administration of these measures and other data collection methods, such as online surveys and phone apps, are feasible and usable among migrant farmworker populations.

These issues became particularly salient during the Coronavirus Disease-2019 (COVID-19 pandemic) which involved social distancing measures to be put in place and prohibited many in-person interactions like conducting

✉ Jack Tsai  
Jack.Tsai@uth.tmc.edu

<sup>1</sup> School of Public Health, University of Texas Health Science Center at Houston, Houston, TX, USA

<sup>2</sup> National Center On Homelessness Among Veterans, United States Department of Veterans Affairs, Washington, DC, USA

<sup>3</sup> Department of Psychiatry, Yale University School of Medicine, New Haven, CT, USA

<sup>4</sup> Southwest Center for Occupational and Environmental Health, Houston, TX, USA

<sup>5</sup> 7411 John Smith Drive, Suite 1100, San Antonio, TX 78240, USA

in-person interviews, focus groups, and surveys. While there have been few cross-sectional reports indicating migrant farmworkers faced heightened vulnerabilities during the COVID-19 pandemic [11, 12], to date, there has been no published longitudinal study of the mental health of migrant farmworkers in the U.S. during the pandemic. Even beyond the pandemic, there is great utility in understanding the best methods to survey this important vulnerable working population.

In the current study, we conducted a small randomized controlled trial to test three different remote data collection methods with migrant farmworkers in South Texas with a 2-month follow-up period. The three remote methods were: telephone interview, online survey, or mobile app. To contribute to knowledge gaps on the mental health of U.S. migrant farmworkers during the COVID-19 pandemic, we also examined the mental health and well-being of the sample over time. The results will inform design and planning of future studies with this subpopulation as well as provide insights on the mental health of this subpopulation.

## Methods

This study invited over 200 migrant farmworker family members residing in Texas and participating in the Education Service Centers (ESC) Migrant Education Program (MEP) between June 2021 and April 2022. The purpose of MEP is to “design and support programs that help migrant students overcome the challenges of mobility, cultural and language barriers, social isolation, and other difficulties associated with a migratory lifestyle” [13]. One feature of this program is the Parent Advisory Committee, which is comprised of migrant farmworker parents, schoolteachers, and other community partners, that meets throughout the academic year at ESC regions across Texas. Recruitment for this study occurred through the MEP and the Parent Advisory Committee. A total of 75 farmworker families agreed to participate and were randomly assigned to one of three groups to complete surveys by: (1) telephone survey; (2) online survey through Qualtrics, or (3) mobile app called LifeData. Participants were provided \$10 compensation per assessment.

Research personnel randomized assignments by family unit; therefore, there were a different number of individuals assigned to each group. Out of a total of 150 individuals who were assigned, there were 109 adults and 41 adolescents. This study only included the adult participants. Of the 109 adults that were assigned to groups, there were 39 adults in the telephone group, 39 adults in the online survey group, and 31 adults in the mobile app group. To maximize data collection, research personnel invited participants who dropped out of their assigned group to continue the study

by switching to a different data collection group of their preference. We conducted separate analyses on participants across groups after they had switched. No phone carrier charges for data or study application use were incurred by participants. All study procedures were approved by the institutional review board at the University of Texas Health Science Center at Houston (HSC-SPH-20-0756).

## Measures

Across all groups, data were collected through a battery of self-report measures. These measures were made available in both English and Spanish depending on participant choice.

Sociodemographic and background characteristics were collected at baseline through a questionnaire that asked about age, gender, nationality, education, income, marital status, children, current housing situation and housing history, and employment.

Psychological stress was assessed with the Migrant Farm Worker Stress Inventory (MFWSI; [4]), a 39-item self-report, validated instrument that assesses the quality and severity of stress in migrant farm work. Participants are asked to rate how stressful they find statements on a five-point Likert scale from 0 (Have not experienced) to 4 (Extremely stressful). Responses are summed for a total score ranging from 0 to 156, with a threshold score of 80 or higher indicating relatively high levels of migrant farmworker stress (i.e., representing upper 25% of scores) [4].

Symptoms of major depressive and generalized anxiety disorders were assessed with the two-item Patient Health Questionnaire (PHQ-2; [14]) and the two-item Generalized Anxiety Disorder-2 (GAD-2; [15]), which are each highly correlated with the longer versions of each respective measure (PHQ-9 and GAD-7). Both measures have been utilized in previous studies of Spanish-speaking populations [16]. Items on both the PHQ-2 and GAD-2 were summed with scores of  $\geq 3$  indicative of a positive screen for each respective disorder [17].

Symptoms of posttraumatic stress disorder (PTSD) were assessed with the Posttraumatic Stress Disorder Checklist, Version 5 (PCL-5; [18]), which asked participants to refer to a “very stressful experience” in their life and to rate 20 symptoms of PTSD on the degree to which they experienced each symptom in the past year on a five-point Likert scale from 0 (Not at all) to 4 (Extremely). The PCL-5 has been well validated and tested on English and Spanish-speaking populations [19]. Responses were summed for a total score that ranged from 0 to 80 considered as  $\geq 33$  to be indicative of a positive screen for PTSD [20].

Symptoms of alcohol use disorder were assessed with the Alcohol Use Disorders Identification Test-Consumption

(AUDIT-C) with a score  $\geq 4$  indicative of a positive screen [21].

Somatic symptoms were assessed with the Somatic Symptoms Scale-8 (SSS-8; [22]) which consisted of eight items that asked participants to rate how much they were bothered by common somatic symptoms within the past 7 days on a five-point Likert scale from 0 (Not at all) to 4 (Very much). Responses were summed for a total score that ranged from 0 to 32.

Social support was assessed with the Multidimensional Scale of Perceived Social Support (MSPSS; [23]) which is a 12-item measure of perceived adequacy of social support from three sources: family, friends, and significant others. Participants were asked to rate items on a seven-point Likert scale from 1 (Very strongly disagree) to 7 (Very strongly agree). Responses were summed for a total score that ranged from 12 to 84.

## Data analysis

First, descriptive statistics were conducted to characterize the total sample and then the three groups at baseline. Bivariate analyses using t-tests and chi-square tests compared characteristics of the three groups at baseline. Second, frequency analyses were conducted to examine the level of study participation among the three groups over time. All these analyses were based on participants in their original group assignment. Third, repeated measures analysis of variance (rANOVA) for continuous variables and Cochran's Q test for categorical variables were conducted to examine changes in psychological stress, mental health, substance use, social support, and quality of life of the total sample longitudinally. This last set of analyses were based on the total sample irrespective of group and included participants who switched groups. Statistical analyses were performed using Stata version 17.0.

## Results

As shown in Table 1, the majority of migrant farmworkers were aged 30 s (age range = 18–59), female, reported family annual income below \$30,000, had lived in the U.S. an average of 18 years (range = 1–42 years), and lived with family with an average of five other household members (range = 2–7). In addition, 17% of participants reported they had experienced homelessness in adulthood with a total average of 195.8 days homeless in their lifetime (range 2–720). In terms of employment, participants reported they had worked an average of 13 years in agriculture (range = 1–45 years) and most worked in some type of produce harvesting as a migrant farmworker. Some participants

held other jobs in addition to being migrant farmworkers, with the most common being jobs in the service industry.

In comparing the telephone, online survey, and online app groups, participants in the telephone group were significantly more likely to be from the U.S., had higher levels of education, and had fewer children compared to the other two groups. There were no other significant group differences on sociodemographic or background characteristics.

Table 2 shows the level of completion among the three groups over the 2 months of the study. Across groups, 50 migrant farmworker adults completed the baseline survey. There was differential attrition between groups starting at baseline, with 22 participants completing baseline in the telephone group (56.4% completion from initial assignment), 22 in the online survey group (56.4%), and 6 in the online app group (19.4% completion or 80.6% dropout). At 1 month, there was substantial attrition across groups as 30.8% of participants in the telephone group from initial assignment were retained, 25.6% retained in the online survey group, and 12.9% retained in the online app group. Finally, at 2 months, 66.6% of participants in the telephone group were retained from 1 month (or 20.5% retained since initial assignment), 70.0% retained in the online survey group (or 17.9% retained since initial assignment), and 25.0% retained in the online app group (or 3.2% retained since initial assignment).

Among those who dropped out, eight participants in the mobile app group dropped out and indicated their preference to be moved to the online survey group at baseline or 1 month; and one participant in the mobile app group dropped out and was moved to the telephone interview group. Across groups and after switches, a total of 50 participants completed the survey at baseline, 26 participants at 1-month follow-up, and 16 participants at 2-month follow-up.

Table 3 describes the mental health of participants across the three groups over the 2-month study period. Overall, the total sample reported relatively lower migrant farmworker stress; few symptoms of depression, anxiety, PTSD, and psychosomatic symptoms; and moderate levels of social support. Over 2 months, there was a significant increase observed in migrant farmworker stress and alcohol use problems, but declining anxiety and PTSD symptoms.

## Discussion

This study contributes to research about the mental health of migrant farmworkers and strategies to overcome data collection challenges due to their migratory lifestyles and reservations about sharing personal health information. Through a small randomized trial, we tested three different remote data collection methods with a sample of U.S.

**Table 1** Sociodemographic characteristics of migrant farmworker adults in South Texas ( $N=50$ )

Characteristics	All ( $N=50$ )	Telephone interview ( $n=22$ )	Online survey ( $n=22$ )	Mobile app ( $n=6$ )	Test of difference	
	Mean (SD) or $n$ (%)	Mean (SD) or $n$ (%)	Mean (SD) or $n$ (%)	Mean (SD) or $n$ (%)	F or $X^2$	$p$ -value
<i>Age</i>	37.1 (11.8)	35.1 (2.6)	38 (2.3)	40.2 (5.4)	.55	.59
<i>Gender</i>					.82	.66
Female	38 (76.0)	18 (81.8)	16 (72.7)	4 (66.7)		
<i>Nationality</i>					8.45	.02*
United States	24 (50.0)	16 (72.7)	7 (31.8)	1 (25.0)		
Mexico	24 (50.0)	6 (27.3)	15 (68.2)	3 (75.0)		
<i>Hispanic</i>	47 (100.0)					
<i>Survey language</i>					1.96	.38
English	31 (62.0)	16 (72.7)	12 (54.6)	3 (50.0)		
Spanish	19 (38.0)	6 (27.27)	10 (45.5)	3 (50.0)		
<i>Years living in the U.S</i>	18.4 (8.6)	25.0 (3.6)	15.5 (2.0)	19 (2.0)	3.26	.06
<i>Education</i>					17.99	.02*
No formal	1 (2.0)	–	–	1 (20.0)		
Elementary	4 (8.0)	–	3 (13.6)	1 (20.0)		
Middle school	7 (14.0)	1 (4.8)	5 (22.7)	1 (20.0)		
High school	19 (38.0)	9 (42.9)	9 (40.9)	1 (20.0)		
Above high school	17 (34.0)	11 (52.4)	5 (22.7)	1 (20.0)		
<i>Marital status</i>					4.86	.56
Single	13 (26.0)	8 (36.4)	4 (18.2)	1 (16.7)		
Married	35 (70.0)	13 (59.1)	17 (77.3)	5 (83.3)		
D/S/W	2 (4.0)	1 (4.6)	1 (4.6)	–		
<i>Children</i>	36 (73.5)	14 (63.6)	18 (81.8)	4 (80.0)	1.98	.37
Number of children	3.1 (1.2)	2.4 (.3)	3.7 (.3)	3.3 (.3)	6.63	.003**
<i>Living accommodations in Texas</i>					.24	.88
Own home	20 (41.7)	8 (38.1)	10 (45.5)	2 (40.0)		
Rent home/apartment	28 (58.3)	13 (61.9)	12 (54.6)	3 (60.0)		
<i>Living company in Texas</i>					2.43	.30
Living alone	9 (18.4)	6 (27.3)	2 (9.1)	1 (20.0)		
Living with family	40 (81.6)	16 (72.7)	20 (90.9)	4 (80.0)		
<i>Household residents</i>	5.3 (1.2)	5.0 (.3)	5.6 (.2)	5.6 (0.4)	1.72	.19
<i>Years working in agriculture</i>	13.2 (10.6)	13.1 (2.6)	14.3 (2.7)	8.75 (1.6)	.44	.65
<i>Migration employment or crop harvested</i>					11.35	.50
Multiple produce	17 (41.5)	6 (33.3)	10 (52.6)	1 (25.0)		
Watermelon	6 (14.6)	5 (27.8)	1 (5.3)	–		
Corn	6 (14.6)	2 (11.1)	2 (10.5)	2 (50.0)		
Animal handling	6 (14.6)	2 (11.1)	3 (15.8)	1 (25.0)		
Cotton	3 (7.3)	1 (5.6)	2 (10.5)	–		
Construction	2 (4.9)	1 (5.6)	1 (5.3)	–		
Meat processing	1 (2.4)	1 (5.6)	–	–		
<i>Migration living setting</i>					6.47	.37
Own home	2 (4.4)	1 (5.3)	1 (4.6)	–		
Rent home/apartment	21 (46.7)	6 (31.6)	12 (54.6)	4 (80.0)		
Housing provided by employer	20 (44.4)	10 (52.6)	9 (40.9)	1 (20.0)		
Migrant camps	2 (4.4)	2 (10.5)	–	–		

**Table 1** (continued)

Characteristics	All (N=50)	Telephone interview (n=22)	Online survey (n=22)	Mobile app (n=6)	Test of difference	
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	F or X <sup>2</sup>	p-value
<i>Migration living situation</i>					7.43	.12
Living alone	2 (4.4)	2 (10.5)	–	–		
Living with family	39 (86.7)	14 (73.7)	22 (100.0)	4 (80.0)		
Living w/ co-workers who migrate	4 (8.9)	3 (15.8)	–	1 (20.0)		
<i>Other employment in Texas</i>					9.73	.78
Agriculture industry	4 (9.8)	1 (5.6)	3 (15.8)	–		
Cleaning services	3 (7.3)	–	2 (10.5)	1 (25.0)		
Construction	4 (9.8)	1 (5.6)	2 (10.5)	1 (25.0)		
Elderly home health provider	2 (4.9)	2 (11.1)	–	–		
Medical field	2 (4.9)	1 (5.6)	1 (5.3)	–		
School and city services	3 (7.3)	2 (11.1)	1 (5.3)	–		
Service industry	12 (29.3)	6 (33.3)	5 (26.3)	1 (25.0)		
Stay-at-home parent	11 (26.8)	5 (27.8)	5 (26.3)	1 (25.0)		
<i>Family annual income</i>					9.33	.67
Less than \$10,000	12 (25.5)	4 (19.1)	6 (28.6)	2 (40.0)		
\$10,000–\$19,999	15 (31.9)	7 (33.3)	6 (28.6)	2 (40.0)		
\$20,000–\$29,999	6 (12.7)	5 (23.8)	1 (4.8)	–		
\$30,000–\$39,999	2 (4.2)	–	2 (9.5)	–		
\$40,000–\$49,999	1 (2.1)	–	1 (4.8)	–		
\$60,000–\$69,000	3 (6.4)	2 (9.5)	1 (4.8)	–		
Do not know	8 (17.0)	3 (14.3)	4 (19.1)	1 (20.0)		
<i>Experienced homelessness for at least 1 month since age of 15</i>					.38	.83
Total days homeless	195.8 (243.5)	296 (159.6)	120.7 (59.3)	20.0 (–)	.67	.55

D/S/W Divorced/Separated/Widowed

\*p < .05, \*\*p < .01

**Table 2** Study attrition among migrant farmworkers who participated by telephone interview, online survey, and mobile app

	Telephone interview	Online survey	Mobile app	Switched to a different method
Assigned family units	25	25	25	–
Assigned adults	39	39	31	–
Baseline	22	22	6	Five Mobile app switched to the Online survey
1 month	12	10	4	Three Mobile app switched to the Online survey One Mobile app switched to the Telephone interview
2 months	8	7	1	–
Total surveys completed (including switches)	42	39	11	

migrant farmworkers and found that mobile phone apps like LifeData were not as effective in engaging migrant farmworkers as a survey method than traditional methods such as through phone interviews or online surveys. Only a handful

of participants in the mobile app group completed the baseline assessment, so it is not that many were willing to use it and attrition occurred over time. Rather, it seems at least in our sample, most migrant farmworkers were reluctant to

**Table 3** Mental health of migrant farmworkers over 3 months across data collection methods

	Baseline Mean/Count (SD/%) <i>N</i> = 50	1-month Mean/Count (SD/%) <i>N</i> = 26	2-months Mean/Count (SD/%) <i>N</i> = 16	Test of dif- ference <i>F</i> or <i>X</i> <sup>2</sup>	<i>p</i> -value
Migrant Farm Worker Stress Inventory (MFWSI)	34.9 (26.5)	35.3 (24.1)	39.1 (27.7)	0.53	0.59
# positive screen for MFWSI	4 (8.0%)	1 (3.8%)	3 (18.8%)	170	.000**
Patient Health Questionnaire-2 (PHQ-2) score	0.9 (1.3)	0.7 (1.0)	0.4 (0.5)	2.11	0.13
# positive screen for PHQ-2	4 (8.0%)	2 (7.7%)	0 (0.0%)	172	.000**
Generalized Anxiety Disorder-2 (GAD-2) score	0.9 (1.4)	0.7 (1.0)	0.6 (1.0)	1.13	0.33
# positive screen for GAD-2	5 (10.0%)	1 (3.8%)	1 (6.3%)	170	.000**
Posttraumatic Stress Disorder Checklist, Version 5 (PCL-5) scores	7.8 (11.4)	5.1 (6.8)	2.6 (5.9)	3.32	0.04*
# positive screen for PCL-5	3 (6.0%)	0 (0.0%)	0 (0.0%)	178	.000**
Alcohol Use Disorders Identification- Consumption (AUDIT-C) score	0.8 (1.4)	1.5 (1.9)	0.9 (1.7)	2.67	0.08
# positive screen for AUDIT-C	3 (6.0%)	5 (19.2%)	3 (18.8%)	164	.000**
Somatic Symptoms Scale-8	6.2 (5.3)	5.4 (5.5)	6.9 (6.2)	1.60	0.21
Multidimensional Scale of Perceived Social Support	55.4 (19.7)	53.3 (23.1)	53.4 (24.4)	1.35	0.70

\**p* < .05, \*\**p* < .01

even start using the mobile app despite research personnel offering technical assistance on how to use the mobile app. It is not clear whether U.S. migrant farmworkers tend not to use mobile apps in general, or specifically mobile apps for health surveys. Regardless, our findings suggest mobile apps may not be the best remote data collection method for migrant farmworkers.

There are known barriers that may explain this, such as cultural differences, privacy concerns, fear of deportation and law enforcement, and lack of access to technologies and internet services in remote locations [3, 4, 6, 7]. Instead, we found that the highest rate of study participation was among migrant farmworkers who were engaged through traditional telephone interviews. Study participation by online survey was not far beyond telephone interviews (4% lower participation rate). These findings inform design and planning of future studies with U.S. migrant farmworkers on which remote data collection methods may be most fruitful, sample sizes needed, and the level of attrition that may be expected with each method.

Our sample of migrant farmworkers reported relatively low levels of farmworker stress (i.e., average score 35–39 out of 156) and did not report particularly high symptoms of depression, anxiety, or PTSD that warrant clinical attention during the COVID-19 pandemic. For example, 8% of our sample screened positive for major depression and 6% screened positive for PTSD at baseline, which is comparable or lower than the estimated point prevalence of major depression and PTSD in the U.S. adult population [24, 25]. Moreover, migrant farmworker stress increased slightly over the 2-month study period, symptoms of depression, anxiety, and PTSD declined over time. Since we used a convenience sample, it is not clear how generalizability our findings are.

However, our findings suggest U.S. migrant farmworkers have been quite resilient in their mental health during the COVID-19 pandemic, which accord with recent studies that have found veterans with severe mental illness or recent homelessness have fared better in their mental health than those in the general population [26, 27]. Migrant farmworkers, along with other subpopulations, who have experienced considerable adversities in their lives may have developed a certain level of resilience that mitigated and protected psychological impacts of the COVID-19 pandemic.

One area that may deserve clinical attention is the level of alcohol use reported in our sample. In our small sample size, we observed increases in reported alcohol use problems over time with about 19% of migrant farmworkers screening positive for alcohol use problems which is higher than the 10–13% prevalence of high-risk drinking found in the general U.S. adult population [28]. Several studies over the past decade have reported high alcohol consumption among farmworkers in general, and the negative health and social consequences of their heavy drinking [29, 30]. Increased problems with alcohol use have been consistently reported in the general U.S. population during the COVID-pandemic [31–33] and further study is needed to determine whether this was this “COVID-19 effect” on alcohol consumption disproportionately impacted migrant farmworkers. This is an area that needs follow-up evaluation to observe whether alcohol use problems remain elevated in the population or return to baseline levels in the aftermath of the COVID-19 pandemic.

There were several limitations of this study worth noting. We had a small sample size so our findings should be interpreted with caution and study replication with a larger sample size is needed. We followed migrant farmworkers

for a duration of 2 months; a longer follow-up period may yield further insights about our different data collection methods and richer data about their mental health. Our data was based on self-report and subject to recall and respondent bias, especially since there is social stigma around mental health status that may have affected the openness of migrant farmworkers from sharing information about their mental health. We did not assess level of acculturation/assimilation which are important constructs related to psychosocial functioning [34–36]. The COVID-19 pandemic was a complex event that involved not only disease transmission but social distancing measures, city lockdowns, restrictions on international travel, and social strife—all of which may have impacted the results in unmeasured ways. Last, we focused on migrant farmworkers in the U.S. who lived in Texas who were predominantly Mexican–American adults and it is unknown whether these findings would be generalizable to other Hispanic subgroups or migrant farmworkers outside the U.S.

## New Contribution to the Literature

Limitations notwithstanding, this study contributes to knowledge about effective remote data collection methods to assess the mental health of U.S. migrant farmworkers. This study provides needed information to guide future design of migrant farmworker studies by finding phone interviews and online surveys are much more effective in engaging and obtaining data from migrant farmworkers than mobile apps over multiple follow-up periods. Mobile apps may not be as readily adopted by migrant farmworkers, migrant farmworkers may be reluctant to share personal information on mobile apps, and mobile apps may not yield completion rates as high as traditional data collection methods. More work is needed to encourage adoption of mobile apps or develop ways to maximize traditional data collection methods to conduct beneficial research for the migrant farmworker population. Remote data collection methods were useful and necessary during the COVID-19 pandemic, which revealed migrant farmworkers in our study were resilient in their mental health over time during the pandemic. Further study is needed to understand the psychosocial and cultural factors underlying the resilience of migrant farmworkers and under what circumstances are remote data collection methods best to use for this population.

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## Declarations

**Conflict of interest** None of the authors report any conflicts of interest with this work.

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