

RESEARCH ARTICLE

The Effects of AgrAbility on the Mental/Behavioral Health of Farmers and Ranchers with Functional Limitations: A Comparison Study

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Abstract

Background: While research on the quality of life (QOL) levels of farmers and ranchers with disabilities is growing, research focused on interventions that improve their behavioral health is almost nonexistent. The AgrAbility Project, a USDA initiative, offers practical solutions to increase farmers and ranchers with disabilities' QOL and independent living and working (ILW) levels.

Aim of the Study: The objectives of the current study are threefold: first, to assess overall pretest-posttest changes in the ILW and QOL levels of AgrAbility participants; second, to focus on the behavioral health changes of AgrAbility participants; and third, to compare those changes in a group of AgrAbility participants to those of a no-treatment comparison group.

Methods: AgrAbility treatment group participants (N = 273) included farmers and ranchers from 14 states with various disabilities who participated in AgrAbility and no-treatment comparison group participants (N = 100) from 17 states. Both groups completed ILW and McGill Quality of Life surveys.

Results: Paired samples t-tests indicated that AgrAbility participants' ILW and QOL improved with large or larger than typical effect sizes. Paired samples t tests indicated that AgrAbility participants' behavioral health improved significantly with medium effect sizes. Independent samples t tests reported significantly higher gain scores on all three behavioral health subscales for AgrAbility participants compared with the group of non-participants.

Conclusions: These results show that participation in the AgrAbility Project was associated with significant improvements in behavioral health when compared to the no-treatment group which experienced no significant change in their behavioral health. The current study makes an initial contribution to the search for an evidence-based intervention for improving the physical and behavioral health of farmers and ranchers with functional limitations.

Key Words: AgrAbility; Behavioral health; Farmers and ranchers with disabilities; Quality of life; Social support.

Introduction

Environmental and financial stress experienced by farmers and ranchers has recently gained the public's attention as a serious concern. People who work in agriculture experience the highest rate of suicide among all occupations, a rate five times higher than that of the general population (84.5/100,000 vs. 16.1/100,000) (McIntosh et al., 2016; Weingarten, 2017). Many farmers and ranchers experience an elevated risk of stress and psychological symptoms. Research with representative samples of farmers revealed that individuals who obtain the majority of their income from farming were at an increased risk of depressive symptoms and health challenges compounded that risk (Scarth, Stallones, Zwerling, & Burmeister, 2000).

In addition to the heightened risk of suicide and behavioral health concerns, farmers and ranchers experience a high risk of injury and disability associated with agricultural accidents. In 2015, agricultural occupations (farming, fishing, and forestry) had the highest rate of fatal injury among all major occupational groups (Bureau of Labor Statistics, 2016a). Crop and animal production have an injury incidence rate of 5.4 and 6.6 nonfatal injuries per 100 full-time workers (Bureau of Labor Statistics, 2016b). Experiencing injury and disability may also put farmers and ranchers at risk of stress and behavioral health concerns if they experience challenges living and working independently on their farms. Psychologist Mike Rosmann, who addresses ranchers and farmers' behavioral health needs notes, "People engaged in farming ... have a strong urge to supply essentials for human life, ... and to hang on to their land and other resources needed to produce these goods at all costs" (Weingarten, 2017, p. 6).

Beginning in 1990, The National AgrAbility Project aimed to assist farmers and

ranchers with disabilities in maintaining independent and successful lives in agriculture thereby enhancing their quality of life (QOL). The current study describes the effect of AgrAbility information, education, and services on the mental/behavioral health of farmers and ranchers with disabilities as compared with a no-treatment comparison group. Land-grant universities in cooperation with nonprofit disability organizations currently provide AgrAbility services to farmers and ranchers with disabilities in 22 states under the U.S. Department of Agriculture National Institute of Food and Agriculture (NIFA, 2017). AgrAbility projects provide services in order to assist farmers and ranchers with disabilities in pursuing independent and successful lives in agriculture: on-site assessments to identify disability-related challenges in the home and workplace; recommendations of assistive technology to overcome present barriers; and referrals to service providers for financial, educational, behavioral, or rehabilitative support. By improving farmers and ranchers' ability to function effectively on a daily basis in their chosen occupation, AgrAbility also aims to improve participants' quality of life and behavioral health.

Research examining the psychological health specifically of farmers and ranchers with disabilities remains limited, but work with the general farming population may help us understand their experiences (Schweitzer, Deboy, Jones, & Field, 2011). Agricultural workers experience a number of unique stressors that impact their psychological health including physically demanding and time-consuming work, economic instability, environmental and weather-related stressors, and isolation from health resources in rural communities (Berry, Hogan, Owen, Rickwood, & Fragar, 2011; Gregoire, 2002; Schweitzer et al., 2011). Researchers have

documented that farm and ranch families experience unique economic as well as personal and family strains including close links between work and family life, interpersonal challenges and communication difficulties between family members on multi-generational farms (Marantz-Baden & Colvin, 1986; Weigel & Weigel, 1990), and ambiguity in family roles following illness or injury (Carson, Araquistain, Ide, Quoss, & Weigel, 1994). All of these stressors happen in the context of unpredictable, uncontrollable stressors involving weather, equipment, and financial markets.

Researchers have identified psychological hazards associated with agricultural work including suicide (Tiesman et al., 2015), depression and anxiety (Sanne, Mykletun, Moen, Dahl, & Tell, 2004), and high levels of occupational stress (Booth & Lloyd, 2000). Environmental stressors, economic hardship, and a lack of behavioral health services associated with rural farm life alongside stressors of disability could leave farmers and ranchers with disabilities at high risk of psychological health concerns (Schweitzer et al., 2011). A journalist who previously farmed explained, “We were growing food, but couldn’t afford to buy it. We worked 80 hours a week, but we couldn’t afford to see a dentist, let alone a therapist” (Weingarten, 2017, p. 2). The current study evaluated whether AgrAbility services were associated with changes in participants’ behavioral health and facilitated a greater understanding of the role AgrAbility plays in the behavioral health of farmers and ranchers with disabilities.

Literature describing the mental health of older adults and rural populations with physical disabilities may help inform research on the behavioral health of farmers and ranchers with disabilities. The average age of U.S. farmers has been rising for decades and the current average

age of principal operators is 58.3 (United States Department of Agriculture, 2014). AgrAbility participants most commonly reported chronic illnesses as the origin of their primary disability followed by agricultural-related incidents. The most commonly reported disabilities include arthritis, spinal cord injuries, amputation, and back injuries (Meyer & Fetsch, 2006). Cassileth et al. (1984) studied patients’ overall mental health status from six different types of chronic illnesses (arthritis, diabetes, cancer, renal disease, and dermatologic disorders) and found patients did not differ across diagnostic groups or from the general population. However, recently diagnosed individuals (i.e., within four months) experienced poorer mental health than their peers further out from their initial diagnosis. There was a relationship between declining health and mental health status. Their results suggest that psychological adaptation occurs over time following diagnosis, but that declining physical status, which may be expected in older farmers and ranchers, may hinder behavioral health. Adults from rural communities who have a physical disability are also at risk of developing secondary conditions that are often preventable such as mental or social disorders resulting from complications associated with the initial disability condition (Allen, Field, & Frick, 1995; Kinne, Patrick, & Doyle, 2004; Seekins, Clay, & Ravesloot, 1994).

AgrAbility’s vision, mission, and services seek to address many of the dimensions of good behavioral health in addition to attending to the farmer or rancher’s physical needs. Researchers identified distinct dimensions reflecting good mental health by studying individuals who are “flourishing” (i.e., free of a mental concern in the last 12-months). Dimensions of good mental health included positive affect, avowed quality of life, self-acceptance, personal growth, purpose in life, environmental mastery, autonomy, positive

relations with others, social acceptance, social actualization, social contribution, social coherence, and social integration (Keyes, 2007).

AgrAbility provides onsite, face-to-face visits in the home and workplace to hear the individual's and their family's goals and needs, and thorough assessments to pinpoint changes in the home and workplace, makes recommendations for adaptive technology and equipment modifications, and makes referrals to behavioral health and other professionals. These can improve their environmental mastery and autonomy as well as maintain one of their main purposes in life, farming or ranching. In addition, many participants offer or receive peer-support in relationships with other farmers and ranchers with disabilities leading to social contributions and integration.

Previous research with AgrAbility participants demonstrated that receiving services was associated with increased levels of overall quality of life as well as increased ability to live and work independently ($p < .001$) (Fetsch, Jackman, & Collins, in press). Furthermore, in an AgrAbility intervention-comparison group study, a group of 225 AgrAbility participants reported statistically significant pretest-posttest improvements in QOL levels while comparison group participants reported no change in QOL levels (Fetsch & Turk, in press).

The current study contributes to a limited knowledge on the effectiveness of AgrAbility at improving the behavioral health of farmers and ranchers with disabilities using a no-treatment comparison group. By examining the behavioral health and existential well-being changes of AgrAbility participants over time, researchers will gain greater understanding of the baseline behavioral health status of farmers and ranchers with disabilities as well as provide valuable information to AgrAbility service providers to improve their capacity to increase both

participants' physical functioning in their chosen occupation and their behavioral health and existential well-being.

The primary purposes of the current study are threefold: first, to assess overall pretest-posttest changes in the independent living and working (ILW) and QOL levels of AgrAbility participants; second, to focus on the behavioral health changes of AgrAbility participants; and third, to compare those changes in a group of AgrAbility participants with similar changes in a no-treatment comparison group.

Materials and Methods

Participants.

Fourteen AgrAbility Teams (AR, CO, GA, KS, ME, MO, NC, NE, OK, PA, TX, VA, WI, and WV), having obtained Institutional Review Board approval from their state land grant universities, used a modified Dillman (2007) method to prepare and mail two mailings 10 days apart for the AgrAbility treatment group with a cover letter, McGill Quality of Life (MQOL) and ILW surveys, and a stamped, self-addressed envelope. We decided against sending a final request for survey completion via registered mail to reduce costs as reported earlier (Fetsch & Turk, in press). No economic incentives were provided.

Participants included 273 adult ranchers and farmers with functional limitations who contacted their state AgrAbility Project for assistance and completed and returned pretests prior to their involvement with AgrAbility and posttests upon the completion of their work with AgrAbility (Fetsch & Turk, in press). On average, AgrAbility participants spent 15.74 months with AgrAbility ($SD = 12.96$; $N = 273$; $Range = 1 - 106$ months or 8.83 years).

Participants' self-reported incidence of behavioral health disabilities was low in the present sample ($N = 258$) as seen in Table 1.

From a list of 54 disabilities, treatment group primary disabilities included most frequently reported disabilities of back injury (10.6%), arthritis (10.3%), joint injury (9.5%), and visual impairment (8.4%) down to least frequently reported disabilities of mental illness (0.4%, $n = 1/258$) and mental retardation or intellectual disability (0.4%, $n = 1/258$). Mental illness was reported as a secondary disability by 0.9% ($n = 1/112$) and as a tertiary disability by 4.3% ($n = 2/46$). No one in the current sample reported mental retardation or intellectual disability as a secondary or tertiary disability.

These behavioral health incidences are similar to those reported by new AgrAbility participants in a 25-year study of primary disability incidences ($N = 7,779$) (Fetsch, Petrea, Field, Jones, & Aherin, 2017). Among the least frequently reported primary disabilities in this large sample were mental illness (1.7%, $n = 129/7,392$) and mental retardation or intellectual disability (0.6%, $n = 48/7,392$). Mental illness was reported as a secondary disability by 1.7% ($n = 47/2,693$) and as a tertiary disability by 4% ($n = 35/883$). Mental retardation or intellectual disability was reported as a secondary disability by 0.5% ($n = 13/2,693$) and as a tertiary disability by 0.7% ($n = 6/883$) of this large sample.

As reported elsewhere, the no-treatment comparison group consisted of 100 adult ranchers and farmers with functional limitations from 17 states who did not receive AgrAbility services or on-site visits (Fetsch & Turk, in press). On average, the comparison group's mean number of months between pretest and posttest was 13.76 months ($SD = 0.98$; $N = 100$; *Range* = 12 – 19 months).

We conducted exploratory data analyses on the demographics for both groups to see how similar and different they were from each other. We conducted an independent samples *t* test to

see if the mean age of the two groups were different. The AgrAbility intervention group was significantly older ($M = 59.67$, $SD = 14.82$, $N = 259$) than the comparison group ($M = 54.64$, $SD = 12.99$, $N = 99$).

As can be seen in Table 1, since most of the categorical variables had one level that included the majority of participants, we created dichotomous variables, e.g. owner/operator versus non owner/operator, full time versus non full time, and chronic non incident versus non chronic non incident. We combined field/grain and hay versus non field/grain and hay. Finally, we combined the four major primary disabilities (back injury, arthritis, visual impairment, and joint injury) versus all the remaining disabilities.

We calculated chi-square tests. Assumptions were checked and met. The two-tailed chi-square tests were not statistically significant for the AgrAbility intervention and comparison groups on gender ($\chi^2 = .32$, $df = 1$, $N = 361$, $p = .570$). Phi was .03, which is a smaller sized effect than is typical in the behavioral sciences (Cohen, 1988). Likewise, the two-tailed chi-square tests were not statistically significant for the treatment and comparison groups on primary disability ($\chi^2 = .04$, $df = 1$, $N = 358$, $p = .851$, phi = .01, smaller) (Cohen, 1988) nor on chronic nonincident origin of disability ($\chi^2 = 2.44$, $df = 1$, $N = 346$, $p = .118$, phi = .08, smaller) (Cohen, 1988).

On the other hand, two-tailed chi-square tests revealed that the treatment group had significantly more owners or operators ($\chi^2 = 10.64$, $df = 1$, $N = 361$, $p = .001$, phi = .17, small) (Cohen, 1988), significantly more participants who farmed full time ($\chi^2 = 43.24$, $df = 1$, $N = 361$, $p = .000$, phi = .35, small to medium) (Cohen, 1988), and significantly more participants whose primary agricultural operation was field or grain and hay ($\chi^2 = 11.60$, $df = 1$, $N = 360$, $p = .001$, phi = .18, small) (Cohen, 1988).

Table 1. Demographic Information of Farmers and Ranchers with Disabilities (N = 273; N = 100)

Characteristics	Treatment N (%)	Comparison N (%)	χ^2	p
Gender			.32	.570
Males	188 (68.9)	75 (75)		
Females	73 (26.7)	25 (25)		
Missing	12 (4.4)	0		
Role on Farm			10.64	.001
Owner/Operator	188 (68.9)	54 (54)		
Spouse/Partner	39 (14.3)	33 (33)		
Dependent Adult	9 (3.3)	9 (9)		
Employee	9 (3.3)	1 (1)		
Other	16 (5.9)	3 (3)		
Missing	12 (4.4)	0		
Work Status			43.24	.000
Full Time	166 (60.8)	25 (25)		
Part Time	44 (16.1)	22 (22)		
Occasional	28 (10.3)	38 (38)		
None	23 (8.4)	15 (15)		
Missing	12 (4.4)	0		
Primary Agricultural Operation			11.60	.001
Field/Grain	85 (31.1)	11 (11)		
Livestock	71 (26.0)	39 (39)		
Dairy	54 (19.8)	22 (22)		
Agribusiness	21 (7.7)	5 (5)		
Hay	5 (1.8)	5 (5)		
Vegetable	8 (2.9)	4 (4)		
Poultry	4 (1.5)	1 (1)		
Other Animal	3 (1.1)	9 (9)		
Other	10 (3.7)	3 (3)		
Missing	12 (4.4)	1 (1)		
Primary Disability			.04	.851
Arthritis	28 (10.3)	17 (17)		
Back Injury	29 (10.6)	8 (8)		
Visual Impairment	23 (8.4)	3 (3)		
Joint Injury	26 (9.5)	12 (12)		
Orthopedic Injury	16 (5.9)	8 (8)		
Spinal Paraplegia	12 (4.4)	5 (5)		
Stroke	12 (4.4)	5 (5)		
Heart Disease	10 (3.7)	1 (1)		
Other	102 (37.4)	41 (41)		
Missing	15 (5.5)	0 (0)		

Origin of Disability			2.44	.118
Chronic Nonincident	134 (49.1)	62 (62)		
Non-agricultural Other	60 (22.0)	14 (14)		
Agricultural-related	35 (12.8)	14 (14)		
Non-agricultural Motor				
Vehicle Accident	19 (7.0)	8 (8)		
Missing	25 (9.2)	2 (2)		

Measures.

Measures used in this study included the MQOL, the ILW, and demographics. All have been described elsewhere (Fetsch et al., in press; Fetsch & Turk, in press; Jackman, Fetsch, & Collins, 2016). While the MQOL includes both physical well-being subscales (physical symptoms and physical well-being), for the purposes of this article, we focused on change in the behavioral health well-being subscales (psychological well-being, existential well-being, and support).

Psychological well-being included four items on self-reported frequencies during the past two days of feeling depressed, nervous or worried, and sad, and how felt about the future between not afraid and terrified. As recommended by Robin Cohen, the creator of the MQOL Survey, these items were transposed and recoded so that high numbers indicated higher levels of psychological well-being (Cohen et al., 1997). Existential well-being included self-reported frequencies during the past two days of viewing one’s life as very purposeful and

meaningful, of having progressed in achieving life goals, of thinking about one’s life as worthwhile, of having control over one’s life, of feeling good about oneself as a person, and of seeing the past two days as a gift. The support subscale included two items that assessed how much the person saw the world as caring and responsive to one’s needs and how supported the person felt.

Results

The first purpose was to assess overall pretest-posttest changes in the ILW and QOL levels of AgrAbility participants. Paired samples *t* tests indicated that while participating in AgrAbility, participants’ ILW total pretest-posttest scores improved, $t(238) = 13.72, p = .000, d = .88$. The difference is both statistically significant and large or larger than typical using Cohen’s (1988) guidelines. Paired samples *t* tests also showed that the AgrAbility treatment group QOL total pretest-posttest scores improved significantly, $t(239) = 11.94, p = .000, d = .77$, which is large or larger than typical (Cohen, 1988) as seen in Table 2.

Table 2. AgrAbility Treatment Group Paired Samples *t* Test Comparisons of Pre-Test and Post-Test Mean Scores on ILW and QOL Scores (n = 239-271)

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
ILW Score				13.72	238	.000**	.88
Pre	17.41	5.38	239				
Post	22.25	5.70	239				

QOL Score				11.94	239	.000**	.77
Pre	5.53	1.65	240				
Post	6.98	1.75	240				
Single Item Scale				10.74	254	.000**	.67
Pre	5.45	2.07	255				
Post	7.11	2.14	255				
Physical WB				8.31	248	.000**	.53
Pre	5.15	2.14	249				
Post	6.59	2.26	249				
Physical Symptoms				10.67	264	.000**	.66
Pre	4.59	2.27	265				
Post	6.25	2.71	265				
Psychological WB				10.51	269	.000**	.64
Pre	5.71	2.40	270				
Post	7.30	2.18	270				
Existential WB				10.13	270	.000**	.62
Pre	6.13	2.00	271				
Post	7.40	1.76	271				
Support				8.40	268	.000**	.51
Pre	6.20	2.20	269				
Post	7.46	2.01	269				

** $p < .001$.

The comparison group reported a significant improvement on the ILW ($p = .033$) and on the single item MQOL subscale ($p = .036$). On all other six MQOL subscales,

comparison group mean scores decreased from pretest to posttest at non-significant levels as seen in Table 3.

Table 3. No-Treatment Comparison Group Paired Samples t Test Comparisons of Pre-Test and Post-Test Mean Scores on ILW and QOL Scores (n = 98-99)

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>p</i>
ILW Score				2.16	99	.033*
Pre	19.42	5.96	100			
Post	21.02	5.14	100			
QOL Score				1.82	98	.072
Pre	5.09	0.74	99			
Post	4.90	0.70	99			
Single Item Scale				2.13	99	.036*
Pre	4.46	2.82	100			
Post	5.29	2.49	100			
Physical WB				0.47	99	.640
Pre.	4.91	2.49	100			
Post	4.74	2.62	100			
Physical Symptoms				1.21	99	.231
Pre	5.30	1.76	100			
Post	5.04	1.41	100			
Psychological WB				1.17	99	.244

Pre	5.20	1.31	100			
Post	4.98	1.37	100			
Existential WB				0.54	99	.591
Pre	5.00	1.18	100			
Post	4.91	1.11	100			
Support				0.79	98	.431
Pre	5.09	2.36	99			
Post	4.85	1.89	99			

* $p < .05$.

The second purpose was to focus on the behavioral health changes of AgrAbility participants as reflected by changes in psychological well-being, existential well-being, and support. A paired samples *t* test indicated that the psychological well-being pretest-posttest scores improved significantly, $t(269) = 10.51, p = .000, d = .64$, which is a medium effect size (Cohen, 1988) (cf. Table 2). A paired samples *t* test showed that the existential well-being pretest-posttest group mean score improved significantly, $t(270) = 10.13, p = .000, d = .62$, with a medium effect size (Cohen, 1988) (cf.

Table 2). A paired samples *t* test indicated that the support subscale pretest-posttest group mean score improved significantly, $t(268) = 8.40, p = .000, d = .51$, a medium effect size (Cohen, 1988) (cf. Table 2).

The third purpose was to compare these changes as reported by a group of AgrAbility participants with changes in a no-treatment comparison group. Table 4 shows that the AgrAbility treatment group participants' mean posttest minus pretest gain scores were significantly greater than the gain scores of comparison group participants on all subscales.

Table 4. Comparison of AgrAbility Group Participants' Mean Gain Scores on MQOL and ILW Subscales (n = 239-271) with Those of a No-Treatment Comparison Group (n = 99-100)

Subscale Difference Scores	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
MQOL				10.24 ^a	309.8	.000	.75
Treatment	1.45	1.88	240				
Comparison	-.19	1.04	99				
Physical Symptoms				6.72	363	.000	.58
Treatment	1.66	2.53	265				
Comparison	-.26	2.13	100				
Physical WB				4.01 ^a	146.4	.000	.39
Treatment	1.44	2.74	249				
Comparison	-.17	3.63	100				
Psychological WB				7.62 ^a	241.1	.000	.59
Treatment	1.59	2.48	270				
Comparison	-.21	1.81	100				
Existential WB				5.94	369	.000	.60
Treatment	1.27	2.07	271				
Comparison	-.09	1.61	100				

Support				4.40 ^a	147.4	.000	.39
Treatment	1.26	2.46	269				
Comparison	-.24	3.05	99				
ILW				3.94 ^a	145.7	.000	.53
Treatment	4.83	5.45	239				
Comparison	1.60	7.41	100				

^aThe *t* and *df* were adjusted because variances were not equal.

AgrAbility participants reported significantly higher psychological well-being difference scores. Inspection of the two group means reveals that the average psychological well-being score improvement for treatment group participants ($M = 1.59$) is significantly higher than the gain score for the comparison group ($M = -.21$). The difference between the means is 1.38 points on a 10-point test. The effect size *d* is approximately .59, which is a medium to large effect size (Cohen, 1988). Also, on the existential well-being subscale, the AgrAbility treatment group reported significantly higher gain scores ($M = 1.27$) than the comparison group gain score ($M = -.09$), which is a mean difference of 1.18 points on a 10-point test. The effect size *d* is .60 which is a mean difference of 1.18 points on a 10-point test. The effect size is a medium to large sized “effect” (Cohen, 1988).

Likewise on the support difference subscale, the AgrAbility participant group increased significantly more ($M = 1.26$) than the comparison group gain score ($M = -.24$), which is a mean difference of 1.02 points on a 10-point test. The effect size is .39 which is a medium effect size (Cohen, 1988).

Discussion

The current study provides preliminary evidence that AgrAbility reaches beyond its intended goal of helping farmers and ranchers physically adapt and continue their lives in agriculture. Results suggest that AgrAbility may also improve participants’ behavioral health. These findings demonstrate the effectiveness of a

program at improving behavioral health in a population that is currently at risk of stress, mental health concerns, and suicide (Booth & Lloyd, 2000; McIntosh et al., 2016; Scarth et al., 2000). NIFA funding supports competitive grant proposals that focus primarily on addressing physical rather than behavioral needs of AgrAbility participants. AgrAbility teams provide information, education, and services with on-site visits to assist them to modify and operate their machinery, complete chores, access workspaces, manage their farm or ranch, and live in their homes on their ranches or farms. Virtually no resources or personnel are funded to address the significant behavioral health issues that many men and women experience as they confront life-changing accidents, illnesses, or conditions that threaten their economic, physical, and behavioral well-being. Therefore, the improvements in psychological well-being, existential well-being, and support levels experienced by AgrAbility participants, compared to the no-treatment group, are particularly meaningful.

Regarding their psychological well-being levels in this study, AgrAbility participants reported decreasing levels of depression, sadness, and worry. They reported changes in their perception of their future from fearful to hopeful. Participants in the no-treatment comparison group experienced no significant change in their levels of psychological well-being. If AgrAbility participants experience improved behavioral health associated with their participation in AgrAbility, they may be at less risk of suicide

within a population particularly at-risk. Research provides a strong link between depression and suicide (Dumais et al., 2005). AgrAbility may serve as a resource in improving the behavioral health of farmers and ranchers with disabilities, a rural population who experiences economic, geographical, and time barriers to seeking mental health care (Bischoff, Hollist, Smith, & Flack, 2004).

With regard to existential well-being, AgrAbility participants' perceptions of their lives shifted from being without purpose to being more meaningful. They shifted toward achieving their life goals and progressed toward perceived life fulfillment. Increasing ILW may have helped participants regain perceived control over their lives.

However, the comparison group also experienced a significant increase in ILW, but not an increase in psychological or existential well-being or support, suggesting that improved ILW alone did not contribute to AgrAbility participants' growth in existential well-being. AgrAbility's aims when serving participants do include several markers of good mental health, including environmental mastery and autonomy, as well as supporting the social contributions of farmers and ranchers, and helping them continue working in their vital occupation (Keyes, 2007). Overall, AgrAbility participants experienced a shift to feeling overall more worthwhile, hopeful, and supported in their lives.

Regarding their support levels, AgrAbility participants shifted their view of the world from seeing it as an impersonal place to one that is caring and responsive to their needs. They are feeling supported. Individuals in the no-treatment comparison group did not report changes in their social support. Improvements in social support may be meaningful to farmers and ranchers with functional limitations. For example, close to 30 studies have demonstrated a

modest association between social support and chronic illness management (Gallant, 2003) and the extent and quality of social support has been identified as a key non-medical factor influential in how individuals adapt to chronic disability (Marks, Allegrante, & Lorig, 2005).

These changes are not being reported by non-AgrAbility participants. Participants in the no-treatment control group did not experience significant change in their QOL over the study time period. This suggests that without intervention, farmers and ranchers with functional limitations did not experience growth in their behavioral health and may experience decline. Although the no-treatment control group did not experience statistically significant decline in their QOL their means on each subscale decreased over the study period. This may suggest that over more time, they may experience significant decline in QOL, but further research is needed.

We suspect that at least two things may be at play here. First are the likely mindset changes (Dweck, 2006; Yeager & Dweck, 2012). As AgrAbility empowers participants to regain success at accomplishing tasks on the ranch or farm that were previously difficult to impossible to accomplish due to functional limitations, mindsets may change to more positive ones like "I can do this again!" Futures may shift from despair to hope. Second is that SRAP teams may "normalize" functional limitations. They accept participants and their families as they are. Perhaps as a result farmers and ranchers feel less isolated and more connected with others, which may explain why their support levels rise. The improvements in behavioral health and support associated with participation in AgrAbility may play an important role in decreasing the stress, depressive symptoms, and even suicide that farmers and ranchers experience at a disproportionate rate.

The improvements in QOL documented among AgrAbility participants compared to the no-treatment group should be interpreted within the context of the study's limitations. First, the groups were not randomly assigned; therefore, group differences in QOL could be related to unmeasured or documented pre-existing differences, e.g. AgrAbility participants were older. Individuals who chose to participate in AgrAbility may be more motivated initially toward self-growth than individuals in the no-treatment comparison group. Importantly, the two groups were not significantly different on some demographic data including gender, type of primary disability, or origin of disability. However, the AgrAbility group was significantly older, more likely to be the owner/operator of the farm or ranch, more likely to farm full-time, and more likely to operate a field, grain, or hay farm.

Although these pre-existing differences may contribute to the group differences we found, one might expect that it would be more difficult to affect the behavioral health of the AgrAbility group. Older, full-time farm owners would be at heightened risk for the economic and environmental stressors of farming more so than their less involved counterparts. Also, older farmers and ranchers would be more likely to experience normative age-related declines in health, possibly affecting their perceived support and behavioral health. In addition, our measures of behavioral health were self-reports of adults' perceived existential well-being, support, and psychological well-being. Future research could evaluate other aspects of mental/behavioral health, including diagnostic criteria or observational reports from other informants. However, within the context of its limitations, the current study makes an initial contribution to the search for an evidence-based intervention aimed at improving the physical and behavioral

health of farmers and ranchers with functional limitations.

Conclusions

First, findings in the current study suggest that a group of 273 farmers and ranchers who participated in AgrAbility reported statistically significantly improved ILW and QOL levels with large or larger than typical effect sizes. Second, the AgrAbility treatment group reported statistically significant pretest-posttest improvements with medium effect sizes on three measures of behavioral health (psychological well-being, existential well-being, and support). Third, the results of a comparison of AgrAbility treatment group pretest-posttest changes with those of a no-treatment group of 100 ranchers and farmers with disabilities showed significantly higher behavioral health gain scores for the AgrAbility intervention group than for the no-treatment group with medium to large effect sizes on the psychological well-being subscale and on the existential well-being subscale, and with a medium effect size on the support subscale.

At a time when efforts to improve the behavioral health of farmers and ranchers by increasing access to traditional or tele-counseling struggle to find funding (Weingarten, 2017), the current study offers evidence that a current program may provide modest improvements in farmers and ranchers' psychological well-being and perceived support. Further research is needed to understand what aspects of AgrAbility contributed to improved psychological well-being, support, and existential well-being. A better understanding of the mechanisms responsible for the relationship between AgrAbility participation and improved psychological well-being and support could help improve the effectiveness of AgrAbility itself, and could offer insights into how to improve the

QOL of other individuals experiencing functional limitations from chronic disability or illness.

It is recommended that as physicians, psychiatrists, psychologists, licensed marriage and family therapists, social workers, mental health counselors, and other behavioral health therapists encounter ranchers and farmers with functional limitations, they consider referring them to state or regional AgrAbility at <http://www.agrability.org/>.

It is further recommended that producers and professionals urge their legislators to provide federal funding for the Farm and Ranch Stress Assistance Network (FRSAN) with regional and national helplines and counseling for ranchers and farmers (Weingarten, 2017). Previously, FRSAN was approved but not funded.

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Conflict

There were no conflicts of interest.

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