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Depression as a Risk Factor for Agricultural Injuries

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Abstract. *The agricultural industry has historically had one of the highest injury and mortality rates, and they have been on the rise during the past decade. Appropriate educational programs are essential to reverse this trend. To help extension educators and health care professionals with the development of such programs, a study dealing with health and safety concerns of farmers and farm workers in Virginia was initiated with multiple objectives. One aspect of this broad study, the effect of depression on agricultural injury rate, is discussed in this paper.*

The population for this study included Virginia farmers currently cultivating 28 or more hectares, on a full or a part-time basis. Approximately 26,000 farms in Virginia met this criteria and a sample of 1,650 was randomly selected for the study. Owners or operators of these farms were asked to complete and return a survey mailed to them. Over 300 returned the completed survey.

Using the response from eight mental health related questions, 53 respondents were classified as "depressed." Seven of the 15 respondents on anti-depressant medications were also listed in the depressed group. Results of the analysis showed that the injury rate was significantly higher among farmers experiencing depression as compared to the rest. Educational programs for recognizing depression, prevention, and treatment may help reduce the agricultural related injury rates.

Keywords. agriculturists, farmers, farm workers, injuries, depression, wellness, agricultural safety.

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Introduction

During the last decade, the agricultural industry experienced the highest injury related mortality rates. The 22.5 fatalities per 100,000 hours in agriculture, exceeded the rates in mining (21.2) and construction (13.6). In general, these high-risk jobs are held primarily by men (CDC, 1998; NSC, 2001). Recent studies have shown that the injury rate in agriculture has been rising steadily during the past decade in part because the Occupational and Safety Health Act (OSHA) regulations are not binding on privately owned farms as they are in mining and other manufacturing industries (Penn. State Univ., 2003; NIOSH, 2004).

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Farm activities such as livestock handling, operating farm machines, and working on elevated locations are all high-risk activities that can cause injuries (Ramage, 2005; Picket et al., 1995; Browning et al., 1998, Lyman et al., 1999; Mariger et al., 2006). Other factors such as disabilities, stress, compromised health, and depression can also increase injuries in the work place. Orsorio et al., (1989) attributes the high mortality rate in agriculture to stress-related conditions. Uncertainties associated with the weather (droughts and floods), pests and finance, and long hours on the job create undue stress on farmers that is typically not experienced by other workers. Continuous exposure to these pressures may lead to isolation, frustration and ultimately depression (Fraser et al., 2005).

Depression has become a national epidemic. The general myth that only women are affected by depression is rapidly changing as more and more men are diagnosed with depression (Scelfo, 2007). Estimates show that annually over 6 million men will be diagnosed with depression (Orengo et al., 2004). Many more may be unaware or unwilling to acknowledge that they are suffering from depression. Furthermore, many men do not know why they are depressed. Unfortunately, since many consider depression a sign of weakness, most men opt to suffer with it rather than seek professional help. Individuals experiencing depression continuously can become irritable (Scelfo, 2007; Gregoire, 2002). The fact that most farmers want to be independent, makes them vulnerable to depression (Barnes and Ruse, 2006).

Primary symptoms of depression may include loss of motivation and inability to feel pleasure, deep chronic sadness or distress, changes in sleep patterns, lack of physical energy (apathy), feelings of hopelessness and worthlessness, lack of concentration, overeating or loss of appetite, withdrawal and reduced social interactions, and disinterest in living (Carver, 2005). Individuals experiencing depression may lose interest in hobbies, and social and personal interactions that they used to enjoy.

Statistics show that both injury and mortality rates in agriculture have been on the rise during the last decade. Appropriate educational programs are essential to reverse this trend. For cooperative extension educators and health professionals to develop effective educational programs, impact of agricultural activities on the health and safety status of farmers must be ascertained. In addition, common causes of accidents and injuries on farms are important. To meet these needs a broad-based study was designed and initiated with the goal of assessing the health and wellness status of farm workers in Virginia. A recent study by Barnes and Ruse (2006) concluded that farmers, in general, experience depression and they depend on anti-depressant drugs more than others. It has also been observed that many discontinue taking anti-depressants such as Prozac, Zoloft, Paxil and Wellbutrin due to side effects such as impotency and weight gain (Carver, 2005). Therefore, the objective of the study was to determine the effect of depression on agricultural injury rate.

Materials and Methods

Survey

The survey developed for this study is based on a 12-month recall period. The one-year recall period was chosen to maximize recollection of events that had happened during the previous 12 months and to average out the effect of seasonal and other short-term variations, which could distort the accident reports and other information of interest (SIAP, 1998). The questionnaire was

developed from the literature and standardized instruments covering injury and accident prevention.

The survey included sections covering demographics, types of agricultural operations, occupational exposures, non-family wage employees, work history of the farmer, accidents on the farm/ranch, and medical treatments. It also sought information on respondent health, mental and physiological function including questions on specific diseases, and activities of daily living (ADLs)/independent activities of daily living (IADLs) as defined by Mahoney and Barthel (1965) and Katz and Lyerly (1963). Eight mental health related questions from the SF-36 (McHorney et al., 1993) were included in the survey to assess the degree of depression (Ware and Sherbourne, 1992). This short form depression scale was selected because of its broad acceptance and its applicability to a wide variety of populations. The SF-36 has good internal validity (Crombach's alpha ranging from 0.76 to 0.90) (AMIA, 1996) and it has been used in a variety of studies (Garratt et al., 1993; Lyons et al., 1994; McHorney et al., 1993; Corica et al., 2006; Eshaghi et al., 2006).

Sample

In 2002, there were over 47,000 farms in Virginia (Census of Agriculture, 2002). This total included active and inactive farms. In an effort to include only active farms, it was decided that only Virginia farmers cultivating 28 or more ha on a full or part-time basis would be included in the study. This farm size was specified to assure that the primary source of income for these participants was the farm. Approximately 26,000 farms in Virginia met these criteria. A random sample of 1,650 farms was selected for this study according to sample size guidelines established by Krejcie and Morgan (1970).

The survey instrument² was developed from standardized instruments used in similar studies and is described in detail in Mariger et al. (2006). The 13-page survey with 12 sections was developed and evaluated by agricultural specialists and pretested by a small group of farmers in Virginia as suggested by Ary et al. (1996). The feedback from these groups was used to finalize the survey that is presented at http://filebox.vt.edu/users/rgrisso/papers/ext/health_survey.pdf.

Three-hundred and eight participants (19%) completed the surveys and were returned by the established deadline. This response rate is comparable to the national average for surveys of similar length. Even though the response rate was low, the number of responses (308) was close to the desired sample size (330) determined by the conservative sample size guidelines (Krejcie and Morgan, 1970). As expected, a close examination of responses showed that majority of the responses came from rural agricultural communities in Virginia. In addition, the responses represented 76 (80%) of the counties in Virginia.

Statistical Analysis

All statistical analyses were performed using SPSS Statistical Package (version 14). The means and standard deviations were calculated using the data extracted from the survey. Student's t-

² In compliance with the University Policy, the survey developed was reviewed and approved by the University Research Division's Institutional Review Board (IRB # 00000667).

tests were used to examine differences between those classified as “depressed” and “not depressed” for several variables. In addition, to ensure that the number in each group was not influencing the results of the t-test, Cohen’s d effect size (Cohen, 1988) was used (Rosenthal and Rosenow, 1991).

Results and Discussion

Respondent Characteristics

The mean age of the survey respondents was sixty. The majority of the respondents were married males (about 85%). The average participant in this study had limited college education and they earned more than \$30,000 per annum. Both alcohol and tobacco use was found to be common among the respondents. Between 5 and 10 percent of the respondents indicated they were taking drugs that could impair equilibrium, mental alacrity, or cause drowsiness. For more details of the demographics, hazard types and injury rates see Mariger et al. (2006).

Mental Health Indicators

Participants provided information on their mental and physical health status. The feedback was useful in determining how many of the respondents were experiencing depression and how that condition affected the injury rate.

The responses to the eight questions in Table 1 were used to determine whether or not the respondent was experiencing depression. Those responding positively to five or more of these questions were identified as “depressed” and the remaining “not depressed”. Based on this criterion, 53 of the respondents were found to experience depression. Twenty-four respondents answered “usually” to three of the eight questions listed in Table 1. The questions most often answered as “usually” or “often” in the depressed group were: “Feel tired even though you are well rested” (11.7%), “Feel hopeless about the future” (5%), and “Lost interest in things you used to enjoy” (4.5%). It is also of note that 12 respondents indicated positive responses for six of the eight depression questions: ten for seven of the eight questions and three gave a positive response to all eight questions. Though not a clinical diagnosis, those reporting the highest number of indicators would most likely be more severely depressed.

Relationship to Injury Rate

To test our hypothesis that depression is associated with injury rates, mean of injury rates from all causes and their standard deviations were computed and summarized in Table 2.

A standard t-test was used to compare the mean of injury rates between the two groups (Table 3). Results of this analysis showed that at a 95% confidence level, the mean injury rate among those experiencing depression is significantly higher than the rest of the population.

To test the magnitude or strength of association between depression and injury rate, a Cohen’s d effect size was calculated. The effect size was found to be in the medium range; a sufficient level of magnitude to support our hypothesis that depression is associated with injury rate on a

practical level (Cohen, 1988). However, from the survey feedback it was not clear whether the depression caused an increase in the injury rate or the injuries caused the depression.

Individuals with depression are more prone to accidents than others due to lack of attention and concentration resulting from preoccupation, anxiety, irritability, agitation, fatigue from lack of adequate sleep, and tiredness (Stalones and Beseler, 2004). In addition, those suffering from depression may take risks with little regard for consequences, make suicidal gestures or attempts that go wrong, and take alcohol or other substances that impair functioning to relieve distress Edwards (1995). Clinical trials have identified reductions in cognitive and psychomotor function that can be attributed to anti-depressant medications (Freeman and O'Hanlon, 1995).

Medications

The survey also sought information on medications used by the participants in eight different categories. These included prescription medicines for heart, pain, asthma, glaucoma, diabetes, and anti-depressants. They were also asked to list any over-the-counter pain medicines and herbal/natural remedies used. In addition to reporting whether or not the respondents were on these drugs two weeks prior to completing the survey, they were asked to provide the name of the drug and report whether they were prescribed by a doctor.

The responses indicated that 15 respondents were on anti-depressant drugs. Of this total, seven were identified as “depressed.” This statistic may reflect that the other half taking anti-depressants were responding to medication and were no longer exhibiting enough of the depression indicators to be included in the depressed group. Even though the information was self-reported, it appears that most in the “depressed” group may benefit from professional consultation and educational programs on how to cope with depression.

Conclusions and Recommendations

The focus of this study was to assess the effect of depression on injury rate. The results show that depression is associated with a significant increase in agricultural related injury rates. This conclusion shows the importance of including depression and mental status in educational programs for improving agricultural safety. Further investigation on the effect medications, or the combination of depression and medications, should also occur. Perhaps it is time to begin encouraging farm workers to think more about mental health issues and health improving activities to reduce their risk for injuries. Short self-administered depression and health screening tests are available that would be suitable for community and agricultural safety programs. The stigma of depression in men needs to be addressed. It deserves our attention if it can help reduce agricultural injuries.

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Table 1. SF-36 depression subscale; Respondents general feelings about themselves

Frequency of following conditions	N	Percent of Respondents			
		Usually	Often	Sometimes	Never
Feel tired even though you are well rested	290	3.4	8.3	66.9	21.4
Blame yourself for things that are outside your control	285	1.4	2.5	37.5	58.6
Have a lack of, or poor appetite	289	0.3	0.7	12.1	86.9
Feel hopeless about the future	284	1.1	3.9	18.3	76.8
Lost interest in things you used to enjoy	287	2.1	2.4	41.5	54.0
Have feelings of worthlessness	287	1.0	2.8	18.5	77.7
Have difficulty concentrating or making simple decisions	288	0.3	2.1	28.1	69.4
Have thoughts of suicide	288	0.0	0.0	4.2	95.8

Table 2. Mean injury rates and standard deviations for the “depressed” and “not depressed” groups.

Depression score (presence of five indicators)	N	Injuries from all causes		
		Mean Injury Rate	Std. Deviation	Std. Error
“Not depressed”	237	0.1139	0.4009	2.604E-02
“Depressed”	53	0.3019	0.5401	7.419E-02

Table 3. T-test for equality of mean number of injuries between “depressed” and “not depressed” respondents

Characteristic	t	df	Significance	Cohen's d	Effect size
Mean number of injuries	-2.4 ^[b]	65.4	0.020	-0. ^[a]	Medium ^[a]

[a] Effect size interpretation (Cohen, 1988)

[b] Equal variances not assumed