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Disordered alcohol and substance use in Irish farmers: A cross-sectional survey

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Abstract

Purpose: Farming is a high-pressure occupation. Populations of farmers face significant health risks, including injury, mental illness, and in some cases, heavy alcohol use. However, there is little research on farmers' use of substances beyond alcohol. This study examines factors relating to Irish farmers' disordered alcohol and substance use.

Methods: In accordance with STROBE guidelines for cross-sectional research and reporting, we examined disordered alcohol and substance use in 351 Irish farmers using the Alcohol Use Disorders Identification Tool (AUDIT) and Drug Use Disorders Identification Tool (DUDIT).

Findings: While 28% of farmers did not drink, 40% of those who did drink exceeded the AUDIT threshold for disordered use. Similarly, while 95% of farmers did not use substances, 78% of farmers who did use substances exceeded the DUDIT threshold for disordered use. Age was the most important risk factor for disordered alcohol and substance use and correlated with other main risk factors: lower income, no children, part-time farmer, and full-time off-farm roles. Disordered drinking was highest in farmers engaged in full-time education.

Conclusions: This population of Irish farmers report broadly healthy alcohol and substance use behaviors. Irish farmers may serve as a model group whose strengths can be utilized in interventions within and beyond the Irish farming community. Our results confirm the importance of analyzing demographic factors in farmers' drinking and identify younger farmers as especially at-risk for harmful alcohol and substance use.

KEYWORDS
AUDIT, DUDIT, health behaviors, Ireland, rural culture

DISORDERED ALCOHOL AND SUBSTANCE USE IN IRISH FARMERS: A CROSS-SECTIONAL SURVEY

Farming is a high-pressure occupation that carries many risks for farmers, many of which are outside of their control. Farmers, those who manage or own farms, face external pressures stemming from market fluctuations, poor profit margins,[1–3] animal disease,[4] extreme weather,[5,6] and fluctuating work hours that make socialization with their peers challenging.[7] In Ireland, as in much of Europe, this pressure is borne by a shrinking population of farmers, most of them older

men, working on a declining number of farms.[8,9] As a result of these pressures, some farming populations have a higher prevalence of mental health issues,[10–12] and some populations of farmers drink heavily.[13,14] However, alcohol use varies dramatically across different populations, and there is little research on farmers' use of substances beyond alcohol.[14] In the current article, we examine factors related to disordered alcohol and substance use in Irish farmers.

While heavy alcohol and substance use concerns the frequency or amount of alcohol and/or drugs consumed, disordered alcohol/substance use concerns the recurrent use of alcohol and/or drugs which cause clinically significant impairment, including health problems, disability, and failure to meet major responsibilities at work, school, or home.[15] Symptoms of disordered alcohol and substance use include withdrawal, tolerance, and impaired control, for example.[16] Disordered alcohol and substance use can cause psychosocial problems, including family estrangement[17] and criminal activity[18]; resulting physical health problems include liver, gastrointestinal issues,[19] hepatitis C, and HIV.[20] Due to its toxicity, heavy alcohol use is also associated with physical illnesses, such as cirrhosis of the liver,[21] stroke,[22] cancer[23]; and illegal activity, such as drink-driving[24] and violence.[25] Research on alcohol and substance use in high-pressure occupational groups includes health care workers,[26] truck drivers,[27] athletes,[28] and police.[29]

Disordered use of alcohol and other substances confers heavy psychological, social, and public health costs and consequences in the farming community. Costs of heavy alcohol use include poor mental and physical health, stress on the families of farmers,[30] animal neglect,[31] poor productivity,[32] and farm accidents/injury.[33] The connection between heavy alcohol use and health issues such as depression is well-documented in workers across the agricultural sector, including hired laborers and other farmworkers in the United States[34–36] and farmers in Australia.[37–39] However, there is a lack of similar research in European farming populations[14] as no research to date has examined disordered alcohol use in European farming populations using validated psychometric measures.

Ireland is known for its "drinking culture" such that drinking is a fundamental part of social life, particularly in rural parts of Ireland.[40–42] Per capita, consumption of alcohol in Ireland is the sixth highest in the world.[43] The prevalence of disordered alcohol use in Ireland is 14.8%,[44] approaching rates in the United States (15%) and well above the average for high-income countries (11.8%) and western Europe (7.1%).[45] Fifty percent of Irish men reported drinking at least 6 standard alcoholic drinks per drinking session compared to 17.6% of females,[44] which qualifies as binge drinking.[46] Young males are most likely to exhibit excessive drinking practices compared to older cohorts and female drinkers.[44] Less is known about disordered substance use in Ireland as most research focuses on rates of consumption alone. According to the national survey of drug and alcohol use, 23% of Irish adults reported lifetime substance use, with 7.4% of the sample reporting recent substance use.[44] Males aged 25-34 years had the highest prevalence of recent drug use (25.8%) compared to other age and gender cohorts.[44] Thus, the Irish public's alcohol and substance use varies by age and gender.

More scientific research with Irish farmers is needed to both identify factors related to disordered alcohol use and investigate first-hand accounts of substance use in this community. Although weekly drinking is substantially lower in farming men than the general population,[47] farmers younger than 45 may be particularly at risk; over half engage in binge drinking at least once a month,[48] and age is closely correlated with drinking frequency. While these findings point toward possible disordered alcohol use (which can include but is not limited to consumption alone) among some Irish farmers, this remains to be examined. There is even less scientific evidence of Irish farmers' substance use. Irish media reported that both security and medical services identify rising cocaine use among rural populations.[49] Additional first-hand accounts describe how some farmers use cocaine to ward off fatigue and keep up with the demands of the job.[50] Despite this qualitative evidence, no study to date has assessed rates of disordered substance use among Irish farmers.

As farmers' alcohol use varies across cultures, and there is very little research on farmers' substance use, further cross-sectional work is necessary to examine risk factors for farmers' alcohol and substance use in different populations.[14] To our knowledge, most research on Irish farmers' alcohol and substance use focuses on consumption alone. Additionally assessing the harm caused by Irish Farmers' alcohol and substance consumption[15] is important to account for the diversity of drinking cultures in Ireland; a given rate of alcohol consumption could be seen as harmful in 1 population but a normalized part of socialization in another.[40–42,51] Therefore, there is a need to assess farmers' alcohol and especially substance use using measures that account for both consumption and resulting issues characteristic of disordered use. In this study, we examine disordered alcohol and substance use in adult Irish farmers and investigate potential risk factors associated with disordered use, including age, employment, income level, and education.

METHOD

Participants

This study's source population was Irish farmers, including designated farmholders,[8] as well as others who have worked managing or owning a farm in Ireland. Participants for this study were recruited as part of a larger investigation on Irish farmers' mental health literacy and help-seeking. We recruited adult farmers of any farm type (eg, dairy, beef, tillage) and any gender through convenience sampling. To ensure our participant pool was diverse, convenience sampling included survey distribution across social media platforms, in farming-related educational programs, and at farming events across Ireland. Current and former farmholders, other full-time farmers, and part-time farmers (such as those employed in off-farm jobs or enrolled in education) were eligible to participate and formed the study population. Casual farm laborers, seasonal farmworkers, and farm spouses were excluded from the study population. The sample size was determined using the online calculator available on openepi.com,[52] which utilizes the

statistical formula developed by Scheaffer and colleagues.[53] Based on our use of cross-sectional design, desired confidence intervals (90%), and the total national sample of farmers (N = 135,037),[8] we determined that 271 participants would be sufficient.

Measures

We pilot-tested the survey used in the larger study with a representative subsample of 10 adult Irish farmers. This survey was composed of 81 items and took approximately 15-20 minutes to complete. After piloting, we shortened the survey to accommodate participants' feedback; however, no substitutions were made to alcohol/substance use measures.

Participant demographics and health

Participants completed demographic information, including age, gender, number of children, relationship status, education, and whether they lived alone. To match the terms for gender commonly used in Irish English[54,55] and in research with Irish farmers,[47,48] participants could indicate their gender as either "male," "female," "non-binary," "other," or "prefer not to answer." Farm information collected included farm type, farm size, net income, and farm-specific net income. Participants indicated if they had physical, mental, or substance use issues via 3 single-item measures that listed common physical and mental health issues and substance use issues. A second physical health variable, musculoskeletal issues, was created and included back, knee, and hip impairments. Participants indicated if mental/physical/substance/alcohol use issues interfered with their daily functioning via 3-items adapted from the Short Form Health Survey-12.[56] Scores on this scale ranged from 1 "*0 times*" to 6 "*20-30 times.*" Higher scores indicated a higher health-related impact on daily functioning. A mean score was calculated across the 3 physical, mental, and substance use domains. Higher mean scores indicated poorer health-related daily functioning. Cronbach's alpha for the scale was 0.79.

Alcohol

To measure disordered alcohol use, we employed the Alcohol Use Disorders Identification Test (AUDIT).[57] The AUDIT is composed of 10 items referring to levels of alcohol consumption, symptoms of dependency, and the impact of drinking on the self and others. The first 3 items measuring alcohol consumption (AUDIT-C) are rated on a 5-point Likert scale with 0 = *Never*, 1 = *Monthly or less*, 2 = *2 to 4 times a month*, 3 = *2 to 3 times a week*, and 4 = *4 or more times a week*. Items measuring dependence and harm are rated on scale points with 0 = *Never*, 1 = *Less than monthly*, 2 = *Monthly*, 3 = *Weekly*, and 4 = *Daily or almost daily*. AUDIT-C scores are summed to give an overall score out of 12, with a score of 6 or more indicating harmful levels of consumption.[58] Cumulative scores are summed to give an overall score out of 40. The following classifications of alcohol use were used[57]: Abstinence (0),

Low-risk alcohol use (1-7), medium level of hazardous and harmful alcohol use (8-15), High level of hazardous and harmful use (16-19), and Extreme alcohol dependence (20-40). A score of 8 or more indicates harmful and hazardous alcohol use and possible alcohol dependence disorder.[57] Cronbach's alpha for the scale was 0.87.

Substance use

To measure disordered substance use, we employed the Drug Use Disorders Identification Tool (DUDIT).[58] This 11-item measure includes questions on frequency of use (*How often do you use drugs*), binge use (*quantity of use, heavily influenced, intensity of longing, unable to stop once started*), and harmful use (*neglected to do something, morning after use, guilty conscience, been hurt due to drug use*). Items that measure frequency are rated on scale points with 0 = *Never*, 1 = *Monthly or less*, 2 = *2 to 4 times per month*, 3 = *2 to 3 times per week*, and 4 = *4 or more times per week*. Items that measure harm-related use are rated on a scale with 0 = *Never*, 1 = *Less than monthly*, 2 = *Monthly*, 3 = *Weekly*, and 4 = *Daily or almost daily*. Items are summed to give an overall DUDIT score out of a total of 44. A score of 6/44 for males and 2/44 for females indicates abuse or harmful use and a score of 25 or more for both genders indicates dependence.[55] Cronbach's alpha for the scale was 0.92.

Procedure/data collection

Ethical approval was granted by the Dublin City University Research Ethics Committee (#2022/107) before data collection commenced. Both paper copies and online versions of the questionnaire were completed by participants anonymously. Qualtrics survey software[59] was employed to deliver the questionnaire online via an anonymous weblink. The weblink was distributed via key contacts in the farming community known to the authors via email and social media platforms (Facebook, Instagram, and Twitter). In-person recruitment took place at farming events, including shows, marts, and farm-safety classes by a national farming organization, where paper copies of study information, consent, and the questionnaire were distributed by the research team to participants. Digital data were downloaded from Qualtrics[59] and imported to IBM SPSS version 28.[60] Questionnaire data were manually entered to SPSS. Data were collected from July 12th to November 4th, 2022. We obtained 118 hard-copy surveys and 513 online responses, 280 of which were removed due to insufficient response (ie, solely opening the survey or only completing demographic information). Thus, 351 were included for analysis. Cross-sectional data were interpreted and reported in accordance with STROBE guidelines for rigorous observational research.[61]

Statistical analysis

Little's missing completely at random (MCAR)[62] analysis indicated that data for all variables were missing at random (*P*<.05) with the

exception of net income and farm-specific income. The Expectation-Maximization technique[63] was used to obtain predicted values for all variables with the exception of income variables. The rates of alcohol and substance use and misuse were examined. An alpha level of 0.05 was used for analyses. A descriptive analysis was conducted to assess participant characteristics. Shapiro-Wilk's tests[64,65] demonstrated that data did not follow a normal distribution ($P<.05$). Spearman's rank order correlation analyses examined the relationship between demographic variables (age, farm size, farm income, net income, health functioning) and alcohol and substance use. The strength of these relationships was classified as small (0.10), medium (0.30), and large (0.50).[66] Mann-Whitney U-tests (gender, living alone, physical/musculoskeletal/mental/substance use issues, farming full/part-time) and Kruskal-Wallis tests with post-hoc analyses (education level, number of children, relationship status, principal farm type, off-farm role) were used to assess relationships between demographic characteristics, alcohol use, and substance use. The effect size r with the following classifications was used: 0.10 = small, 0.30 = medium, and 0.50 = large.[66]

RESULTS

Participants' mean age was 36 years (36.0 ± 13.7, range = 18-78). Most participants were male (76.4%) and married or in a relationship (67.2%, n = 236). Compared to farmholders nationally, our sample was much younger (36 compared to 57) and had a lower percentage of men (76 compared to 87).[8] The majority were part-time farmers (64.7%), with third-level education (59.5%) and employed in full-time off-farm roles (41.9%). Participants were mainly dairy (34.5%), beef (34.2%), sheep (9.4%), livestock and crop (7.7%), or beef and sheep farmers (6.3%). A large proportion of farms were ≤100 acres (50.4%, n = 177, 148.8 ± 240.2). Most participants reported a net farm income below €40,000 (63.3%, n = 222, 34,713.8 ± 126,059.0) while one-fifth did not report their net farm income (19.7%). Total net income from the farm and off-farm employment was below €40,000 for 41.6% (n = 146, 44,871.8± 44,767.3) of participants, while 18.8% did not report their total net income. The majority reported no addiction or substance use issues (97.2%). The mean health functioning score was 1.6±0.83. Table 1

TABLE 1 Participant distribution.

Region of Ireland	% (n)
Dublin	1.4% (5)
Mid-East	9.7% (34)
South East	6.3% (22)
Midlands	22.2% (78)
West	21.9% (77)
Mid-West	18.2% (64)
South West	11.1% (39)
Border	9.1% (32)

displays participant distribution across regions of Ireland. Table 2 displays demographic and farm-specific information.

Alcohol use

In total, 71.8% used alcohol (n = 252), and 29.1% presented with a score of ≥8 on the AUDIT, indicating hazardous and harmful alcohol use (5.56±6.05, range: 0-40, n = 102) Table 3 presents the AUDIT scores of participants.

There was a medium negative association between alcohol use and age ($r = -.29$, $P<.001$). Participants with no children recorded significantly higher alcohol use ($Mdn = 6.0$) than participants with children ($Mdn = 2.0$, $\chi^2 = 11,273.5$, $P<.001$, $r = -.22$). Participants with musculoskeletal issues reported lower alcohol use ($Mdn = 2.5$), than those without ($Mdn = 5.0$, $U = 9,281.5$, $P = .048$, $r = -.11$). In the entire sample, 2.8% of participants reported an alcohol/substance use disorder, with a mean AUDIT score of 14.5±7.6. Of the participants who reported an alcohol/substance use disorder, 80% had hazardous and harmful alcohol use. Participants with substance use issues reported higher alcohol use scores ($Mdn = 16.0$), than those without ($Mdn = 4.0$, $U = 28,225$, $P<.001$, $r = .19$). There was a small, negative association between alcohol use and net farm income ($r = -.13$, $P = .026$). Participants who were part-time farmers reported higher alcohol use ($Mdn = 5.0$), than full-time farmers ($Mdn = 2.0$, $U = 10,287.0$, $P<.001$, $r = -.22$). There was a statistically significant association between alcohol use and off-farm roles ($\chi^2 = 12.2$, $P = .033$). Participants who were in full-time off-farm employment ($\chi^2 = -35.0$, $P = .005$, $r = -.15$; $Mdn = 5.0$) or full-time education ($\chi^2 = -76.5$, $P = .021$, $r = -.12$; $Mdn = 9.5$) reported higher alcohol use than those with no off-farm role ($Mdn = 3.0$). No other significant associations were observed for gender, living alone, relationship status, health functioning, physical or mental health issues, farm size, total net income, or principal farm type ($P>.05$).

Substance use

In total, 5.1% of participants reported drug use in the past year (n = 18; 0.44±2.31, range: 0-23). Of the participants who indicated drug use, 77.8% were identified as having harmful substance use (n = 14). The prevalence of harmful substance use/abuse in the entire sample was 4.0%.

There was a small positive association between drug use and health functioning ($r = .17$, $P = .002$). Participants with substance use issues reported higher drug use ($Mdn = 0$), than those without ($Mdn = 0$, $U = 2,139.5$, $P<.001$) with a small effect size ($r = .19$). There was a small negative association between drug use and farm size ($r = -.12$, $P = .031$). Participants who were farming part-time reported higher drug use ($Mdn = 0$), than full-time farmers ($Mdn = 0$, $U = 13,317.0$, $P = .029$, $r = -.12$). There was a statistically significant association between drug use and off-farm roles ($\chi^2 = 14.7$, $P = .012$). Participants who were in full-time off-farm employment ($\chi^2 = -14.2$, $P = .003$, $r = -.16$) reported

TABLE 2 Demographic and farming-specific information of participants (N = 351).

Demographic variable	Category	% (n)	Farming-specific variable	Category	% (n)
Gender	Male	76.4% (268)	Current farm employment	Part-time	64.7% (227)
	Female	23.6% (83)		Full-time	35.3% (124)
Relationship status	Single	32.7% (115)	Off-farm role	None	33.3% (117)
	In a relationship	29.1% (102)		Part-time job	21.4% (75)
	Married	38.2% (134)		Full-time job	41.8% (147)
Children	No	57.3% (201)		Part-time education	0.6% (2)
	Yes	42.7% (150)		Full-time education	2.8% (10)
Education	Primary school	0.6% (2)	Principal farm type	Dairy/dairy and dry stock	34.5% (121)
	Lower secondary[a]	5.7% (20)		Livestock and crop	7.7% (27)
	Upper secondary[b]	21.1% (74)		Tillage	2.6% (9)
	Third level	59.5% (209)		Beef	34.2% (120)
	Post-graduate	13.1% (46)		Sheep	9.4% (33)
				Other	11.6% (41)

Abbreviations: n, number of participants; %, percentage.
[a] Junior/Intercertificate.
[b] Leaving certificate.

TABLE 3 AUDIT scores of participants (N = 351).

AUDIT score	%	(n)	Classification
0	28.2	99	Abstinence
1-7	42.7	150	Low-risk alcohol use
8-15	21.4	75	Medium level of hazardous and harmful alcohol use
16-19	4.6	16	High level of hazardous and harmful alcohol use
20-40	3.1	11	Extreme alcohol dependence

Abbreviations: n, number of participants; %, percentage.

higher drug use ($Mdn = 0$), than those with no off-farm role ($Mdn = 0$), or those in part-time off-farm employment ($\chi^2 = -11.0, P = .046, r = -11$). In addition, participants in full-time education reported higher drug use than participants with no off-farm role ($\chi^2 = -34.3, P = .007, r = -.14$) or those in part-time off-farm employment ($\chi^2 = -31.2, P = .017, r = -13$). No other significant associations were observed for gender, age, education, living alone, children, relationship status, physical, musculoskeletal, or mental health issues, farm income, total net income, or principal farm type ($P>.05$). There was a small, positive association between alcohol and drug use/abuse ($r = .26, P<.001$).

DISCUSSION

In this cross-sectional study, we examined disordered alcohol and substance use in Irish farmers and associated demographic risk factors. Primarily, we identified that nearly 1 in 3 (29%) farmers reported harmful alcohol use. Similar to previous research in Irish populations,[47] we identified that age was the most important factor in farmer's alcohol issues, with younger farmers at a greater risk for harmful use. Other risk factors for harmful alcohol use (having no children, being a part-time farmer, having low income, or being involved in full-time off-farm roles like education) are also all characteristic of younger farmers. Farmers in full-time education had the most harmful alcohol use. The overall prevalence of substance use in this sample of Irish farmers was low (5%), although most (77%) farmers who reported substance use reported doing so at harmful levels. Farmers' drug use was associated with their alcohol use and was similarly more harmful in younger farmers and other associated demographic groups such as those involved in full-time education.

Irish farmers overall reported moderate alcohol use, with average AUDIT (5.6) and AUDIT-C (3.6) scores well below the cutoff for harmful levels (8 and 6). We identified similar rates of harmful alcohol use in Irish farmers (29%) to those observed in farming populations in Nigeria (33%),[67] but lower than samples of men from farming populations in the United States (Nebraska, 38%, North Carolina, 50%).[40,68] Farmers' alcohol consumption alone was notably below population levels in Ireland (4.9) as well as many other European countries,[69] including the United Kingdom (6.2), Germany (4.6), and Spain (3.9). Our findings match previous observations[47] that Irish farmers diverge from the general pattern of farmers' alcohol use being heavier than the general population.[14] Indeed, farmers' alcohol consumption was less disordered than other Irish groups: 50% of parents,[70] 66% of students,[71] and 76% of athletes[72] reported hazardous alcohol use compared to only 29% of farmers.

However, concluding that these Irish farmers have moderate alcohol consumption overall masks the prevalence of disordered alcohol use in this sample. We identified that out of every 10 farmers in our sample, 3 (28%) completely abstain from drinking, 4 (43%) drink at

moderate levels, and 3 (29%) exhibit harmful drinking. Effectively, the low mean AUDIT scores of this population are driven by a high number of farmers who do not drink at all. For farmers who do drink, however, 4 out of every 10 meet or exceed the threshold for possible alcohol use disorder.[57] These results expand identified patterns of alcohol use in farming men to farmers of all genders: despite overall lower levels of alcohol consumption than the general population, a concerning 1 in 5 farming men binge drink weekly.[47,48] Based on these results, interventions on safer alcohol use in Irish farmers must be carefully implemented, such as developing peer-support networks to capitalize on farmers' broadly healthy alcohol use and identify farmers who are most at risk.

Despite a third of this cohort of Irish farmers reporting harmful drinking, only 2.8% of our sample described themselves as having a substance use disorder of any kind (including alcohol). While it is well-founded that people frequently downplay the severity of their alcohol and substance use,[73] we believe this disparity is more likely a reflection of the normalization of high alcohol consumption in Irish culture or simply a cognitive comparison with other groups, such as students[71] and athletes,[72] where a greater majority engage in harmful drinking. Nevertheless, this discrepancy highlights the potential for interventions based on health literacy[74] and awareness in farming communities.

We identified that age was the most important demographic factor associated with farmers' alcohol use, with younger farmers more likely to have disordered alcohol use. Our results confirm the importance of age as a risk factor in both the Irish public's[44] and farmers'[48] harmful alcohol use. Even more, we identified that most other risk factors for harmful alcohol use, such as having a lower income, having no children, being a part-time farmer, or being involved in full-time off-farm roles like education, were correlated with age to the extent that all of these groups were younger on average than our sample as a whole. The norms surrounding young adulthood in Ireland and the stresses of holding multiple jobs could all add to the harmful drinking across these younger groups. For example, farmers engaged in full-time education specifically had a median score (9.5) above healthy levels (8). This could be explained by the compounding pressures of keeping up with farming and education as students who work longer hours often drink more,[75,76] and/or by the adoption of the heavy-drinking culture widespread in higher education across Ireland and the UK.[71] While these relationships are speculative, they merit further qualitative analysis of young farmers' substance use and associated risk factors, such as work stress or burnout. Due to high rates of alcohol issues in farmers attending education, interventions may be best delivered through educational programs like agricultural degrees and certificate programs, such as the Green Certificate.

In contrast to the Irish media[49] where drug use is presented as highly common and problematic in farmers, we found that only 5% of our sample reported using substances at all, and that 4% used substances to a harmful extent. Effectively, this means that safe substance use is extremely rare, with only 1 in every 5 farmers who use substances doing so at moderate levels. Farmers' overall low rate of substance use falls below other measures that 7% of the general Irish population recently used substances.[47] It is entirely possible that, as is frequently the case with illegal substances,[77] farmers under-reported their substance-use habits. The population of farmers who did report substance use followed similar patterns to those who use alcohol, with younger age and its associated factors (in this case, harmful alcohol use, having no children, being a part-time farmer, or being involved in full-time off-farm roles like education) linked with more harmful substance use. However, farmers who used substances additionally reported poorer health and were affected by this more in their daily lives, than those without. Due to this danger for young farmers, the possibility of under-reporting, the correlation between farmers' substance and alcohol use, and their similar demographic risk factors, we recommend that interventions target farmers' harmful alcohol use and encourage generalizable psychological strengths such as empowerment that are helpful in changing substance use behaviors as well.[78]

Our findings and their implications should be considered with respect to the limitations of our study. First, the self-identified farmers who self-selected into our survey necessarily shape our assessment of factors related to disordered alcohol and substance use as they are not demographically representative of Irish farmers. Second, with 351 participants, our sample should be understood as representative at a 5% margin of error and 90% confidence interval alone. Third, our cross-sectional analysis of demographic differences in farmers' disordered alcohol and substance use are correlational only and are not evidence of causality. Therefore, these results illustrate broad patterns in 1 sample of Irish farmers and are proof of neither the social processes that influence alcohol and substance use nor diagnostic claims of alcohol and substance use disorders.

In sum, we identified moderate to low levels of alcohol and substance use in this population of Irish farmers below those previously observed in the general population. However, 2 of every 5 farmers who use alcohol and 4 of every 5 farmers who use substances do so to harmful levels potentially indicative of a substance use disorder. These patterns of harmful use were especially common in younger farmers as well as those with associated demographic factors, such as lower income, part-time employment, and participation in full-time education. These farmers in full-time education had the most harmful alcohol use and are an important group to target for interventions. Conversely, Irish farmers, especially older farmers, represent a population with broadly healthy alcohol and substance use behaviors and may serve as a model group whose strengths can be built on and utilized in interventions within and beyond the Irish farming community.

CONFLICT OF INTEREST STATEMENT

The authors declare no potential conflict of interest with this manuscript. Ethical approval was granted by the Dublin City University Research Ethics Committee (DCUREC/2022/107).

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