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Social networks and alcohol use disorders: findings from a nationally representative sample

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Abstract

Background—While some argue that social network ties of individuals with alcohol use disorders (AUD) are robust, there is evidence to suggest that individuals with AUDs have few social network ties, which are a known risk factor for health and wellness.

Objectives—Social network ties to friends, family, co-workers and communities of individuals are compared among individuals with a past-year diagnosis of alcohol dependence or alcohol abuse to individuals with no lifetime diagnosis of AUD.

Method—Respondents from Wave 2 of the National Epidemiologic Survey on Alcohol Related Conditions (NESARC) were assessed for the presence of past-year alcohol dependence or past-year alcohol abuse, social network ties, sociodemographics and clinical characteristics.

Results—Bivariate analyses showed that both social network size and social network diversity was significantly smaller among individuals with alcohol dependence, compared to individuals with alcohol abuse or no AUD. When social and clinical factors related to AUD status were controlled, multinomial logistic models showed that social network diversity remained a significant predictor of AUD status, while social network size did not differ among AUD groups.

Conclusion—Social networks of individuals with AUD may be different than individuals with no AUD, but this claim is dependent on specific AUD diagnosis and how social networks are measured.

Keywords

Alcohol use disorders; National Epidemiologic Survey on Alcohol Related Conditions (NESARC); social networks

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Introduction

There is considerable disagreement concerning social networks of individuals with an alcohol use disorder (AUD). While some argue that social networks, or multiple social ties to friends, family, co-workers and community, of individuals with AUD are robust, good-sized networks (1,2), there is other evidence to suggest that (i) individuals with less diverse social networks have high levels of alcohol use (3,4), and (ii) as social network ties become small and less diverse, the severity of AUD increases (5,6). To examine the social networks of individuals with AUDs, social network characteristics among individuals with a past-year diagnosis of alcohol dependence, alcohol abuse and individuals with no diagnosed AUD (in their life) are compared among respondents from a nationally representative sample.

Social networks and alcohol use disorders

There is a substantial body of research that suggests social networks play a critical role in an individual's health status. The overwhelming conclusion from this work is that individuals who have fewer social networks experience worse physical health. Perhaps the most striking conclusion from research on this effect has shown, in several longitudinal samples, that as the number of social ties in a network decrease, individuals experience higher mortality rates (7–9). While these conclusions concerning social networks and general health are well-established, little is known concerning how social networks influence specific measures of health, including alcohol use disorders.

While some work has shown that fewer ties in a social network is a small, yet significant predictor of alcohol consumption, these results are drawn from non-clinical samples and have produced inconsistent findings (3,4). However, alcohol use alone is not a sufficient criterion to establish the presence of an alcohol use disorder. What is needed in the literature is a thorough examination of social network characteristics and whether social network characteristics differ among individuals diagnosed with alcohol abuse or alcohol dependence.

What are social networks?

Common groups composing an individual's social network include family, friends, co-workers and community groups. Social network size and social network diversity are two distinct measures of social networks. *Social network size* is defined as the number of persons (across all types of social relationships) for which individuals report frequent (at least once every 2 weeks) social interaction. *Social network diversity* measures number of social roles (types of social relationships) for which individuals report some level of participation at least once every 2 weeks (10).

Current study

While the findings examining social networks and health suggest that larger, more diverse networks are beneficial for both physical and mental health, it is not clear what the social networks of individuals with AUDs look like, and whether smaller size and/or diversity of social networks may contribute to AUDs. Drawing from the literature surrounding social networks and health, two research questions have been generated to examine the social

networks of individuals with AUDs: (i) Do individuals with alcohol abuse, alcohol dependence, and those with no history of AUD differ in terms of their social networks? (ii) Are social networks a predictor of AUD status, controlling for known social and clinical factors related AUD??

Methods

Sample

Data used to examine these questions are from wave 2 of the National Epidemiologic Survey on Alcohol Related Conditions (NESARC) (2004–2005). NESARC is a population-representative survey of United States adults aged 18 or older living in noninstitutionalized settings (11–13). Wave 2 NESARC data were weighted to reflect survey design characteristics and to account for oversampling of certain groups. NESARC data are also weighted to be representative of the US population on socioeconomic variables, based on the 2000 decennial census.

Measures

Social networks are the primary independent variable for the current study. The Social Network Index (14) from the NESARC was used to derive two different measures of social networks: (i) social network diversity, and (ii) social network size. Social network diversity measures the number of persons (across all types of social relationships) for which individuals report frequent (at least once every 2 weeks) social interaction. Social network size measures the number of persons (across all types of social relationships) for which individuals report frequent (at least once every 2 weeks) social interaction (10).

Social Network Index—In this study, the individual items from the Social Network Index and response options were adapted from prior work on social networks (10,14). To complete this measure, NESARC participants were asked to report the number of interactions they had across people in 12 different groups, either in person, on the phone, or over the internet. Groups of the Social Network Index are outlined in Table 1. Among each of the 12 social network groups, individuals who responded to the Social Network Index questions in the affirmative (yes), or with a number greater than zero were considered to possess membership in a social network. To compute a score for social network size, a count variable was created as the sum total of members in a social network across all 12 groups (range 0–285; skew 3.29, kurtosis 19.93). To compute a score for social network diversity, a count variable was created for the number of groups an individual had at least one member in, across all 12 groups (range 0–12, skew 0.15, kurtosis 2.75).

Alcohol use disorders—Individuals in the NESARC completed the Alcohol Use Disorder and Associated Disabilities Interview Schedule – DSM-IV version (AUDADIS-IV) (11). From the AUDADIS-IV, three groups were formed: (i) Individuals with no lifetime diagnosis of alcohol abuse or dependence, $N = 23\,350$ (88.1% of total sample), (ii) individuals with a past-year diagnosis of alcohol abuse, $N = 1\,709$ (6.5% of total sample), and (iii) individuals with a past-year diagnosis of alcohol dependence, with or without abuse, $N = 1\,433$ (5.4% of total sample). Individuals with a prior-to-past year diagnosis of

alcohol abuse or alcohol dependence, were omitted ($N = 8161$), leaving a final sample of 26 492 individuals.

Sociodemographics—Individuals were assessed for several sociodemographic characteristics including race/ethnicity; gender; annual household income; and age (in years).

Mental health disorders—Two mental health disorders were examined in this study: (i) a binary variable examining past-year history of an anxiety disorder (social phobia, panic disorder with or without agoraphobia, and generalized anxiety disorder), and (ii) a binary variable examining past-year history of major depression. These two disorders were selected for the study given their higher prevalence in the US population compared to other mental health disorders (13).

Analyses

Analyses were computed using weighted population data in STATA Version 12 (15). This software implements a Taylor series linearization to adjust for the complex survey design. Multinomial logistic regression analyses were used to make bivariate comparisons among AUD groups and social network size. Chi-square analyses, followed by pair-wise comparisons of AUD groups were used to make bivariate comparisons among social network diversity categories. Finally, two multinomial logistic regression analyses were used to examine social network size and social network diversity as predictors of AUD status while adjusting for sociodemographic and other clinical variables. The first model used no lifetime AUD as the dependent variable referent, the second, using alcohol dependence as the dependent variable referent, in order to compare social network size and social network diversity between individuals with alcohol dependence and alcohol abuse. These two models are presented side by side in the results.

Results

When examining AUDs in the NESARC, 88.1% of individuals reported no lifetime AUD, 6.5% of individuals reported a past-year diagnosis of alcohol abuse, and 5.4% of individuals reported a past-year diagnosis of alcohol dependence (see Table 2). Chi-square analyses comparing sociodemographics and clinical characteristics between individuals with no lifetime AUD, individuals with alcohol abuse, and individuals with alcohol dependence, showed that individuals with alcohol abuse were more likely to be White, male, higher income, younger in age, and have a co-occurring mental health (depression or anxiety) or drug use disorder compared to individuals with no lifetime AUD. Additionally, chi-square analyses showed that individuals with alcohol dependence were more likely to be male, higher income, younger in age, and have a co-occurring mental health (depression or anxiety) or drug use disorder compared to individuals with no lifetime AUD. Finally, compared to individuals with alcohol abuse, individuals with alcohol dependence were more likely to be racial/ethnic minority, female, lower income, younger in age, unemployed, and have a co-occurring mental health (depression or anxiety) or drug use disorder.

Social network size

Across most social network groups, a pattern emerged suggesting that individuals with alcohol dependence possessed the smallest social networks in size. The analyses in Table 3 present the global F test associated with each multinomial model and denote where pair-wise significant differences emerge. The average social network size of individuals with no history of alcohol abuse was 24.09 persons. The average social network size of individuals with alcohol abuse was 22.67 persons. The average social network size of individuals with alcohol dependence was 19.96 persons. These differences were significant, $F(2, 26\ 490) = 17.9, p < 0.05$, with pair-wise comparisons showing that individuals with alcohol dependence had significantly smaller social networks than individual with alcohol abuse and no AUD. There were a few notable exceptions in the pair-wise comparisons of social network groups.

First, in terms of size, individuals with alcohol dependence had the largest social networks of students/teachers (0.92), followed by individuals with alcohol abuse (0.91). Individuals with no history of AUD had the smallest student social networks (0.44), $F(2, 26\ 490) = 6.9, p < 0.01$. Second, individuals with alcohol dependence had the largest social networks of co-workers (2.88), followed by individuals with alcohol abuse (2.79). Individuals with no history of AUD had the smallest co-worker social networks (1.91), $F(2, 26\ 490) = 20.8, p < 0.01$. Finally, individuals with alcohol abuse had the largest social networks of “other” groups (2.79), followed by individuals with alcohol dependence (1.94). Individuals with no history of AUD had the smallest social networks of “other” groups (1.81), $F(2, 26\ 490) = 8.3, p < 0.01$.

Social network diversity

When examining social network diversity, a similar pattern emerges, suggesting that the social networks of individuals with alcohol abuse (4.88) are as diverse as individuals with no lifetime AUD (4.89), and individuals with alcohol dependence (4.41) have social networks less diverse than individuals with alcohol abuse and no history of AUD (see Table 4). $\chi^2(2, N = 26\ 492) = 35.2, p < 0.01$.

While the overall mean number of social groups presented above shows that individuals with alcohol dependence have the least diverse networks, an examination of percentages within each diagnostic group showed this pattern is not constant across all social network groups. For example, individuals with alcohol abuse were most likely to report a social network including their friends (94.4%), compared to 89.3% of individuals with no history of AUD and 91.6% of individuals with alcohol dependence, $\chi^2(2, N = 26\ 492) = 17.8, p < 0.01$. Additionally, individuals with alcohol abuse (8.2%) and alcohol dependence (9.8%) were more likely than individuals with no history of AUD (6.0%) to report a social network including students/teachers, $\chi^2(2, N = 26\ 492) = 12.9, p < 0.01$. Furthermore, among the social network group of co-workers, individuals with alcohol abuse (55.9%) and alcohol dependence (54.2%) were more likely than individuals with no history of AUD (37.8%) to report a social network including co-workers, $\chi^2(2, N = 26\ 492) = 111.4, p < 0.01$. Last, concerning the social network of “other” groups, individuals with alcohol abuse (26.3%) were more likely than individuals with alcohol dependence (18.4%) and individuals with no

history of AUD (19.7%) to report a social network including other groups, $\chi^2(2, N = 26492) = 15.1, p < 0.01$

Multinomial model

A multinomial logistic regression model examined social network size and social network diversity as predictors of AUD status simultaneously, controlling for social and clinical factors related to AUD status. While social network size and social network diversity were correlated ($r = 0.47$), an assessment of model multicollinearity showed acceptable variance inflation factors (VIF) for both social network diversity (VIF = 1.51) and social network size (VIF = 1.32), when included as independent variables in the same model (see 16).

The multinomial logistic regression model showed that when comparing individuals with alcohol abuse to individuals with no AUD, individuals with alcohol abuse had a lower relative risk of a diverse social network (relative risk ratio (RRR) = 0.93). However, no differences were observed in social network size between individuals with no history of AUD and individuals with alcohol abuse. When comparing individuals with alcohol dependence to individuals with no AUD, individuals with alcohol dependence had a lower relative risk of a diverse social network (RRR = 0.88). However, no differences were observed in social network size between individuals with no history of AUD and individuals with alcohol dependence. Finally, compared to individuals with alcohol dependence, individuals with alcohol abuse had a higher relative risk of a diverse social network (RRR = 1.06). However, no differences were observed in social network size between individuals with alcohol abuse and individuals with alcohol dependence (Table 5).

Discussion

This study examined social networks of individuals from a population-representative sample using two different measures of social networks: social network size and social network diversity. To our knowledge, this is the first study to examine a nationally representative, community-based sample of individuals with a focus on comparing social networks among individuals with alcohol use disorder (AUD) to individuals with no AUD. Specifically, this study compared social networks characteristics among three groups of individuals: (i) no lifetime AUD group, (ii) individuals with a past-year diagnosis of alcohol abuse, and (iii) individuals with a past-year diagnosis of alcohol dependence.

Bivariate results of this study found that both social network size and diversity was significantly smaller among individuals with alcohol dependence, compared to individual with alcohol abuse or no AUD. However, these bivariate patterns may be confounded by the relative younger age of individual with AUD in our sample. The multivariate model showed that when social and clinical factors were accounted for, social network size was not a significant predictor of AUD status. However, the multivariate model showed social network diversity was a significant predictor of AUD status when comparing alcohol abuse to no AUD, alcohol dependence to no AUD, and alcohol abuse to alcohol dependence. However, the relative risk ratios associated with each comparison may suggest that the overall predictive power of social networks on AUD status is relatively small. For example,

social network diversity of persons with AUD was found to be smaller by less than one group.

The multivariate model results may resolve the conflict concerning social networks and AUD evidenced in the literature (e.g. 2,5,6), which show disagreement concerning whether social networks of individuals with AUD are equal in size to individuals with no AUD (1,2), or are considerably smaller (5,6). One particular reason why this disagreement emerges is from the smaller, clinical samples associated with the findings. This study has applied a substantially large, population-representative sample to resolve this question. Social networks of individuals with AUD may be different to individuals with no AUD, but this is dependent on the severity of AUD diagnosis and whether social networks are measured in terms of size or diversity.

Limitations

While these results offer insight into the arrangement of social networks among individuals with alcohol abuse, alcohol dependence, and individuals with No AUD, there are several important limitations worth discussing. To begin, causal relationships cannot be inferred from the cross sectional nature of the data. Furthermore, there are many measures available to assess social networks. Here we have used a measure primarily focused on social network structure (e.g. size, shape, etc.). A criticism of this measure is that it is not possible to examine the proximity of members in a social network; all members are weighted equally. A second criticism of this measure involves the use of wording. It is not clear how “internet” communication was interpreted. Additionally, the large sample size of the NESARC may detect differences at levels that are relatively small. These small effect sizes observed in NESARC data warrant additional focused examinations of social networks among individuals with alcohol problems, as well as an examination of additional social network dimensions beyond size and diversity. Additionally, this paper assumes that social networks are stable through time. However, evidence suggests that this can be a valid assumption (17), even among adults with alcohol dependence (1).

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Table 1**Social Network Index.**

1	Are you married, dating, or involved in a romantic relationship? (Yes/No)
2	How many of your grown children do you see or talk to on the phone or Internet at least once every 2 weeks?
3	Do you see or talk on the phone or Internet to any of your parents or people who raised you at least once every 2 weeks? (Yes/No)
4	Do you see or talk on the phone or Internet to your spouse's/partner' parents or other people who raised your spouse/partner at least once every 2 weeks? (Yes/No)
5	How many of your other relatives, not counting spouses, partners, children, parents or parents-in-law do you see or talk to on the phone or Internet at least once every 2 weeks?
6	How many close friends do you see or talk to on the phone or Internet at least once every 2 weeks?
7	How many fellow or teachers do you see or talk to on the phone or Internet at least once every 2 weeks?
8	How many people do you work with that you see or talk to on the phone or Internet at least once every 2 weeks?
9	How many of your neighbors do you visit or talk to at least once every 2 weeks?
10	How many people involved in volunteer/community service do you see or talk to on the phone or Internet at least once every 2 weeks?
11	How many members of your religious group do you see or talk to socially every 2 weeks?
12	Thinking about all other groups together, how many members of these other groups do you see or talk to on the phone or Internet at least once every 2 weeks?

Social network diversity scoring: If respondent is married, or responds with a number of one or greater for each of the following questions, participant is a member of the social network.

Social network size scoring: Count of the number of individuals a respondent reports within each of the following questions.

Source: Brisette et al. 2000 (10)

Table 2

Sociodemographic and clinical characteristics.

Race/Ethnicity	Overall N = 26 492%	No AUD n = 23 350%	Alcohol abuse n = 1709%	Alcohol dependence n = 1433%	χ^2
White	68.1	67.1	80.6	67.5	202.4**
Black	12.2	12.5	7.9	12.6	
Am. Indian/Alask. Native	1.9	1.8	2.2	1.9	
Asian/Pacific Islander	5.2	5.6	1.7	2.7	
Hispanic	12.7	12.9	7.5	14.9	
Gender					
Male	42.5	38.2	73.8	68.6	495.3**
Female	57.5	61.7	26.2	31.4	
Household income ¹					
\$0–\$19 999	19.9	20.4	10.7	22.6	210.2**
\$20 000–\$34 999	19.3	19.7	14.5	18.9	
\$35 000–\$69 999	32.4	32.1	35.4	33.9	
\$70 000 and over	28.5	27.8	39.5	24.6	
Age					
18–24 years	8.4	7.0	14.5	21.9	140.1**
25–44 years	36.9	34.9	50.1	50.6	
45–64 years	33.3	34.1	30.1	25.7	
65 years or older	21.4	24.0	5.4	1.9	
Past-year major depressive disorder	7.9	6.9	8.1	22.9	186.1**
Past-year anxiety disorder	11.9	10.8	12.3	27.8	401.3**

All Ns in column headings are expressed as unweighted values. All table values are weighted column percentages (standard errors).

¹ Measured in dollars per year

** p<0.01

Table 3

Bivariate comparisons of social network size.

	Overall mean <i>N</i> = 26 492	No AUD mean <i>n</i> = 23 500	Alcohol abuse mean <i>n</i> = 1709	Alcohol dependence mean <i>n</i> = 1433	<i>F</i>
Spouse/Partner ^a	0.63	0.65	0.55	0.43	85.4***
Parents ^a	0.90	0.90	0.92	0.89	1.9
Children	1.15	1.23	0.61	0.47	288.3***
Relatives	3.79	3.86	3.32 ^b	3.19 ^b	13.0***
Friends	4.92	4.87	5.32	5.09	0.1
Religious groups	7.24	7.44	5.62	4.09	31.9***
Students/Teachers	0.50	0.44	0.91 ^b	0.92 ^b	6.9***
Co-workers	2.02	1.91	2.79 ^b	2.88 ^b	20.8***
Neighbors	2.56	2.32	1.93	1.64	39.0***
Volunteer groups	1.82	1.90	1.42 ^b	1.04 ^b	12.9***
Other groups	2.25	1.81 ^b	2.79	1.94 ^b	8.3***
Total persons	23.68	24.09 ^b	22.67 ^b	19.96	17.9***

^a Binary variable where number reflects proportion of persons with parent/spouse/partner in social network^b All pair-wise comparison among alcohol use disorder groups were statistically significant ($p < 0.05$) except groups with this super-script

All table values are weighted column percentages (standard errors).

Chi square tests use design-based corrected *F**** $p < 0.01$

Table 4

Bivariate comparisons of social network diversity.

	Overall % or (M) N = 26 492	No AUD % or mean n = 23 500	Alcohol abuse % or mean n = 1709	Alcohol dependence % or mean n = 1433	χ^2
Spouse/Partner	62.5	64.5	55.1	42.8	98.7**
Parents	90.4	90.3 ^a	91.9 ^a	88.9 ^a	7.4
Children	47.3	50.6	28.1	22.3	241.9**
Relatives	92.9	93.1 ^a	93.5 ^a	87.6	8.7**
Friends	89.8	89.3	94.4	91.6	17.8**
Religious groups	44.1	58.9	35.9 ^a	33.9 ^a	228.8**
Students/Teachers	6.4	6.0	8.2 ^a	9.8 ^a	12.9**
Co-workers	40.0	37.8	55.9 ^a	54.2 ^a	111.4**
Neighbors	69.0	70.0	63.6 ^a	60.1 ^a	27.1**
Volunteer groups	17.9	18.5	14.8 ^a	12.6 ^a	12.8**
Other groups	20.1	19.7 ^a	26.3	18.4 ^a	15.1**
Total groups	(4.86)	(4.89) ^a	(4.88) ^a	(4.41)	35.2**

All table values are weighted column percentages (standard errors).

Chi square tests use design-based corrected *F***
p<0.01^a All pair-wise comparison among alcohol use disorder groups were statistically significant except groups with this super-script

Table 5

Multinomial logistic regression of social networks.

	Abuse vs. no AUD		Dependence vs. no AUD		Abuse vs. dependence	
	RRR ^a	95% CI	RRR	95% CI	RRR	95% CI
Race/Ethnicity						
White	–	–	–	–	–	–
Black	0.48**	0.39–0.59	0.76**	0.62–0.92	0.63**	0.49–0.81
Am. Indian/Ala. Native	1.03	0.63–1.68	1.51	0.87–2.61	0.68	0.36–1.29
Asian/Pacific Islander	0.18**	0.11–0.29	0.35**	0.20–0.60	0.51	0.24–1.06
Hispanic	0.34**	0.27–0.44	0.69**	0.56–0.86	0.49**	0.38–0.65
Gender						
Male	–	–	–	–	–	–
Female	0.22**	0.19–0.25	0.25**	0.19–0.27	0.96	0.78–1.17
Household income^b						
\$0–\$19 999	–	–	–	–	–	–
\$20 000–\$34 999	1.24	0.97–1.57	0.85	0.68–1.07	1.45**	1.08–1.94
\$35 000–\$69 999	1.53**	1.26–1.86	0.88	0.71–1.09	1.74**	1.36–2.23
\$70 000 and over	1.78**	1.45–2.19	0.73*	0.59–0.92	2.43**	1.88–3.14
Age						
18–24 years	–	–	–	–	–	–
25–44 years	0.70**	0.58–0.85	0.54**	0.45–0.66	1.29*	1.03–1.62
45–64 years	0.39**	0.32–0.48	0.28**	0.23–0.35	1.39*	1.06–1.82
65 years or older	0.10**	0.07–0.14	0.03**	0.2–0.04	3.79**	2.31–6.24
Anxiety disorder	1.23*	1.02–1.49	2.46**	2.02–2.98	0.50**	0.39–0.64
Major depressive disorder	1.38**	1.08–1.74	2.94**	2.38–3.62	0.46**	0.36–0.61
Social network diversity	0.93**	0.89–0.97	0.88**	0.84–0.92	1.06*	1.01–1.12
Social network size	0.99	0.99–1.01	0.99	0.99–1.01	0.99	0.90–1.01

^aRelative Risk Ratio, interpreted as a ratio relative to base category, which appears after “vs.” in each column

b Measured in dollars per year.

* $p < 0.05$

** $p < 0.01$