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Severnity of alcohol dependence in the Swedish adult population: Association with consumption and social factors

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A B S T R A C T
The severity of alcohol dependence can be estimated by the number of DSM-IV criteria that are fulfilled for this disorder. This paper describes the proportions in a general population sample that meet different numbers of diagnostic criteria for alcohol dependence and their association with drinking and social background factors. Data came from a random, cross-sectional, self-report survey of adults from 12 Swedish communities, 28,800 persons, age 19–70, were surveyed through postal questionnaires. 14,706 questionnaires (51%) could be used for analysis. Alcohol dependence was assessed by questions relating to the seven DSM-IV criteria for alcohol dependence. Alcohol consumption and social background factors were examined in relation to alcohol dependence. A total of 73.8% of the general population fulfilled no criteria for alcohol dependence; 4.0% reported 3 or more criteria and qualified for the diagnosis of alcohol dependence. There were trends toward an increasing number of dependence criteria with increasing consumption levels and negative social background factors. The majority of people with alcohol dependence however did not drink at the highest consumption levels, did not live alone, and were not unemployed. Given the current definition of alcohol dependence the majority of people have few criteria fulfilled (3 or 4) and few social problems. This has important implications for treatment as dependence with low severity may require less treatment and less specialist involvement.

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Introduction

Alcohol problems are common; most industrialized countries have a prevalence of alcohol use disorders in the range of 8–10%, making it comparable with other major health problems such as diabetes, depression and asthma (WHO, 2004).

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) alcohol dependence is defined as “A maladaptive pattern of alcohol use, leading to clinically significant impairment or distress, as manifested by three or more of seven criteria, occurring at any time in the same 12-month period” (APA, 1994). Any combination of three criteria will be sufficient to qualify for the diagnosis. Consequently, there is a large variation within the group of alcohol dependent individuals.

Although there is discussion in the literature regarding the strengths and weaknesses of categorical versus dimensional definitions of alcohol dependence, most investigators agree that the number of dependence criteria fulfilled can be used as a measure of dependence severity (Grove, McBride, & Slade, 2010; Hasin & Beseler, 2009; Hasin, Hatzenbuehler, Keyes, & Ogburn, 2006). The addiction treatment sector mostly deals with severe forms of alcohol dependence. Given the definition of dependence, a wide spectrum of severity, ranging from very light to very severe, can be expected. In clinical practice, most cases of alcohol dependence tend to be viewed as too complicated to be managed by general practitioners and are instead referred to specialists, either in psychiatric clinics or in specialized dependence clinics. However, there is evidence to suggest that many people who meet the minimum criteria for alcohol dependence are otherwise well functioning individuals who could be managed equally well in general outpatient health settings (Andreasson, Hansagi, & Osterlund, 2002). This has two potential advantages: first, it may help increase help-seeking behavior among patients who perceive specialist clinics to be stigmatizing, and second, it could ‘free up’ specialists to focus their limited resources on patients with the most severe symptoms.

Most people with alcohol dependence do not seek treatment (Cunningham & Breslin, 2004; Kuramoto, Martins, Ko, & Chilcoat, 2011). Different studies estimate that fewer than 20% have ever been in treatment (Grant, 1997a); a recent study from the UK estimated that only 1 out of 18 had received treatment (NHS, 2010). One reason for the reluctance to seek treatment is that treatment in specialized addiction clinics is perceived as unattractive, largely due...
to a reluctance to identify oneself with the severe problem groups that presently constitute the treatment population in these clinics. Consequently, many people who have overcome alcohol problems have done so without the aid of formal treatment. It appears that it is only when problems become very severe that the barriers to treatment are overcome; a Swedish study reported that, among those with three or more DSM-dependence-criteria, who had overcome their alcohol problems, 20% had been in treatment and among those with 6–7 criteria, about half had been in treatment (Blomqvist, Cunningham, Wallander, & Collin, 2007).

Persons found in treatment tend to have the most severe forms of alcohol dependence, resulting in social problems (e.g., finances or housing) and with high rates of comorbidity. At the same time, previous studies have found that large proportions of individuals with less severe drinking problems collectively experience more alcohol related harm than the smaller group with more severe problems (Gmel, Klingemann, Muller, & Brenner, 2001; Poikolainen, Paljarvi, & Makela, 2007). This is referred to as the prevention paradox (Kreitman, 1986). This paradox has important implications for the health care system and has long been a strong argument for broadening the base of treatment for alcohol dependence (SNIPH, 2008). Before this can occur, however, there is a need for more research describing the proportion of individuals in the general population who meet the criteria for alcohol dependence at varying levels of severity. This information could be used to estimate the number of individuals who could potentially be treated in general health clinics as opposed to specialist treatment facilities. In the Swedish context, there are few studies which have described the proportion of individuals who meet the current definition of dependence and their level of social functioning.

The aim of this paper is to describe the proportion of Swedish adults with different numbers of diagnostic criteria for alcohol dependence, and the relevance of this for treatment planning.

In order to learn more about the characteristics of adults with different levels of alcohol dependence, we include age, sex, drinking habits, and three socio-demographic variables in the analyses. Education, employment status, and living arrangements are three variables that are consistently linked to alcohol use, abuse and dependency (Grant, 1997b; Kalaydjian et al., 2009; Swendsen et al., 2009; Teesson et al., 2010). However, what is less clear from the literature is how these factors vary in relation to the severity of alcohol dependence, as defined by the DSM-IV criteria.

**Material and methods**

**Participants**

Data come from a random, cross-sectional, self-report survey of adults aged 19–70 years from 12 Swedish communities (SNIPH, 2008). Communities of different size and geographical location were chosen in order to maximize the representativeness of the final sample. The selected 12 regions include high and lower socio-economic areas, rural and urban districts in the north and south of the country. Six hundred persons per community, were surveyed through postal questionnaires each year during four years (2003, 2004, 2006 and 2007). Of the 28,800 individuals who were contacted, 17,804 (60.4%) returned the questionnaire, and of these, 14,716 (51%) were completed sufficiently to be included in the analyses. Comparisons to the general population showed that data were representative regarding age and gender distribution, with a slight under representation of younger and unemployed men, and a slight overrepresentation of highly educated men and women (SCB, 2011).

**Measures**

**Alcohol consumption**

Quantity and frequency of consumption (during the last 12 months) of: low strength beer (2.8–3.5 % alcohol by volume); regular beer (4.5–5.5 %); wine; spirits; cider and alcopops. The volume–frequency measure was transformed into estimated standard drinks (1 drink containing 12 g of alcohol).

**Standard drinks**

Consumption was divided in three groups: 0–14 standard drinks per week for men or 0–9 for women; 15–28 standard drinks per week for men or 10–18 for women and >28 standard drinks per week for men or >18 for women.

**Heavy episodic drinking (HED)**

Drinking six or more standard drinks on a single occasion during the last 12 months. Responses were dichotomized: never or once/ a few times a year and once a month or more often (frequent).

**Social background factors**

**Living arrangements**

Respondents were categorized as living alone (with or without children) or living with somebody (partner, parents or friends).

**Education**

Respondents were categorized according to their highest education: elementary school, or high school/university. This question was only included in the 2006 and 2007 surveys.

**Employment**

Respondents were categorized as either working/being employed (including students and conscripts) or not working/being employed (including people with early retirement, or disability/sickness pension).

**Age**

In the multinomial logistic regression age was dichotomized according to the median split (45 years), into two groups: 19–44 year olds and 45–70 year olds.

**Alcohol dependence**

Seven questions were included, one per DSM-IV criterion. Responses were categorized into “Yes”, or “No”, including non-consumers. DSM-IV related questions used:

- “Has it happened during the last 12 months that you have drunk much more alcohol, or for a longer time period, than you had planned?”
- “Have you tried to cut down on your drinking during the last 12 months but failed?”
- “Have you spent a lot of time during the last 12 months drinking, being drunk or recuperating from drinking?”
- “Have you during the last 12 months been drinking instead of working, attending to family responsibilities, friends or important leisure activities?”
- “Have you during the last 12 months continued to drink, despite knowing that this causes problems with other people, mental problems or disease?”
- “Have you during the last 12 months noticed that you needed to drink a lot more than before to feel the effect of alcohol?”
- “Have you during the last 12 months experienced physical or psychological problems when you stopped drinking (such as shaking, nausea or anxiety)?”
Frequency analyses were used to examine the proportions of respondents with DSM-criteria in relation to age: number of standard drinks; heavy episodic drinking; living arrangements; education and employment. Analyses were, in most cases, done for men and women separately, and separately for the different age groups (19–25; 26–40; 41–64 and 65+). We used Chi square analyses, with Bonferroni corrections, to examine possible gender and/or group differences. Multinomial logistic regression calculated the odds of belonging to each of the different dependence criteria groups (1–2, 3–4 or 5+). The independent factors were entered simultaneously. In analysis of gender, women were the reference category, and in analysis of age, 45–70 year olds were the reference category. All analyses were performed with SPSS version 20.

Results

Most people, 73.8% had no criteria for alcohol dependence. Decreasing proportions reported an increasing number of criteria. 4.0% reported 3+ criteria and thereby qualified for the diagnosis alcohol dependence. Out of these, the majority, 75% reported 3 or 4 criteria, and 25% reported 5+ criteria. The proportion with dependence differed with age and gender. Young people reported more dependence than older people (Table 1).

More than women reported dependence across all levels of dependence. At age 19–25 the gender differences were insignificant however.

The most commonly reported dependence criterion, independent of age and gender, was drinking more than intended (Table 2). For both genders a strong increase in dependence was seen with increased drinking (Table 3). However, both among men and women with 3–4 dependence criteria, the majority were low or moderate drinkers. Among women with 5+ dependence criteria, 46% (Table 3) belonged in the highest consumption category (18+ standard drinks per week). For men with 5+ dependence criteria, 58% belonged to the highest consumption category (28+ standard drinks per week) and 42% reported low/moderate consumption.

Higher proportions of men and younger people reported dependence criteria compared to women and older people. Also, in the 5+ dependence criteria group, 91% reported frequent heavy episodic drinking (Table 4). The majority, with any reported number of dependence criteria, lived together with someone, had a higher education and were employed.

Multinomial logistic regression analyses examined the degree to which sociodemographic factors predicted different levels of severity of dependence, as indicated by the number of diagnostic criteria fulfilled (Table 4). Younger age, being male, frequent heavy episodic drinking and living alone all predicted having 1–2, 3–4 and 5+ dependence criteria rather than belonging to the zero-criteria group. Also, being unemployed increased the odds of having 3–4, as well as 5+ dependence criteria.

Discussion

The present study shows that, when using the current DSM diagnosis criteria, 4% of the adult Swedish population is alcohol dependent. In accordance with previous findings (Teesson et al., 2010), men reported dependence considerably more often than women, with a widening gender gap with increasing number of dependence criteria. A striking association with age was found where alcohol dependence was by far most common in the youngest age group, the 19–25-year-olds, with prevalence going down with each age category. One plausible reason for this age distribution is that it conforms well to the consumption curve in Sweden, where consumption peaks at age 20–24 (Leifman & Gustafsson, 2003).

Similar results have been reported in earlier studies (Harford, Grant, Yi, & Chen, 2005). However, unlike previous studies, no significant gender differences in the youngest age group were found; women and men were alcohol dependent to the same extent. This finding, not previously reported in Sweden, conforms to recent developments in hospital admissions for alcohol related problems (Ahacic & Thakker, 2010), where a strong increase in treatment for alcohol dependence is recorded for young women.

Young women are also being treated for alcohol poisoning three to five times as often today as they were ten years ago (Harford et al., 2005). Hallgren, Leifman, and Andreasson (2012) suggest that this increase could be due to a polarization in youth drinking, where a sub-group of young people, possibly with a large risk factor burden, have increased their consumption substantially, while the majority continue to drink less over time, and are harmed less by their drinking.

Another explanation that has been suggested is measurement error, where young people would interpret the survey questions differently than older people (Caetano & Babor, 2006). This explanation was based on young adults reporting considerably higher rates of withdrawal and tolerance. What the present study finds however, is an increase in rates for each of the dependence criteria of approximately the same magnitude. Also, the youngest age group report higher rates of dependence at all levels, rendering this explanation less plausible. However, the question still remains whether dependence in this age group is qualitatively different from dependence in older groups.

Most of the results in this study confirm the prevention paradox when applied to alcohol dependence. While on the individual level there is an increasing risk for dependence with increasing alcohol consumption and certain social background factors, the majority of

### Table 1

<table>
<thead>
<tr>
<th>Number of dependence criteria</th>
<th>Age and gender</th>
<th>19–25</th>
<th>26–40</th>
<th>41–64</th>
<th>65+</th>
<th>All ages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n = 898</td>
<td>n = 1135</td>
<td>n = 2097</td>
<td>n = 2329</td>
<td>n = 3255</td>
</tr>
<tr>
<td>0+</td>
<td></td>
<td>43.7</td>
<td>47.6</td>
<td>63.6*</td>
<td>77.4*</td>
<td>78.0*</td>
</tr>
<tr>
<td>1–2+</td>
<td></td>
<td>44.8</td>
<td>41.9</td>
<td>31.4*</td>
<td>20.7*</td>
<td>18.6*</td>
</tr>
<tr>
<td>3–4+</td>
<td></td>
<td>8.9</td>
<td>7.9</td>
<td>3.7*</td>
<td>1.6*</td>
<td>2.3*</td>
</tr>
<tr>
<td>5+</td>
<td></td>
<td>2.7</td>
<td>2.6</td>
<td>1.3*</td>
<td>0.3*</td>
<td>1.1*</td>
</tr>
</tbody>
</table>

*p < 0.05. Significant gender differences.

Significant differences between all age groups.

Significant differences between all age groups except 41–64 and 65+.

Significant differences between age 19–25 and the other age groups.
people with dependence do not belong to the most pronounced high risk groups. They do not belong to the highest consumption group, nor are they single-living, low-educated, or without employment. The finding that a large proportion of the dependent group report low or moderate consumption suggests a large variability in vulnerability to alcohol and the development of alcohol-related problems. One should note, however, that within the dependence group a difference emerges between the majority with 3–4 dependence criteria and the minority with 5–7 criteria. For the latter group most members do indeed belong to the most pronounced high risk group.

These results have important implications for treatment planning. As researchers have noted earlier, there appears to exist two worlds of alcohol problems, where large differences are found between clinical samples and population samples, where the former have more severe forms of dependence (Storbjörk & Room, 2008). Aside from treatments in specialist settings, where several are found to be effective (Berglund, Thelander, & Jonsson, 2003), there are also simple treatment protocols that can be delivered by non-specialist doctors and nurses (Andreasonn et al., 2002; Sobell & Sobell, 1993). Furthermore, effective pharmacological treatment has been introduced, which can be delivered by non-specialists in general health care settings (Anton et al., 2006). Thus, several developments have created new and improved possibilities for generalists in health care to treat alcohol dependence.

The results from the present study indicate that the majority of dependent persons are socially stable. There is however a minority with more severe dependence and a more pronounced risk factor burden. Currently in Sweden, there is a tendency among general health practitioners to refer most alcohol dependent cases to the specialist sector. This large utilization of specialist treatment may be unnecessary. The implications of treating less severely dependent cases in general practice are twofold: firstly, a more appropriate utilization of specialist resources, and second, a likely increase in help-seeking behavior among patients who perceive specialist clinics as stigmatizing. This is significant given that as few as one in five people with an alcohol use disorder report seeking treatment (Teesson et al., 2010).

To help guide general practitioners in their decision to refer alcohol dependent patients to specialist clinics, it could be useful to develop a tool which grades the severity of dependence. One such simple tool could be the number of dependence criteria. The results from our study suggests that patients with 1–4 dependence criteria have less severe problems, with sufficient social stability to allow management in non-specialist settings, whereas those with 5 or more could be referred to specialists. This hypothesis needs to be tested in clinical practice. The need to shift the responsibility for treatment from specialist services to primary health care has been recognized in many countries for over 20 years (IoM, 1990). This shift is unlikely to happen as long as the present view of alcohol dependence as a very complicated disorder to manage prevails. Previous studies of the correlates of alcohol dependence in the United States have shown that socio-economic risk factors for dependence vary as a function of DSM-IV symptom severity, which suggests that our findings have relevance outside Sweden (Grant, 1997b; Swendsen et al., 2009). Previous investigations in the US and Australia have also confirmed that most alcohol dependent individuals do not seek treatment due to the stigma associated with specialist clinics, highlighting the importance of brief interventions in general health care settings (Kalaydjian et al., 2009; Teesson et al., 2010).

### Study limitations

A limitation, as with many surveys, was a considerable non-response rate. Some previous research reports that non-responders

Table 2
Prevalence of the seven DSM-IV alcohol dependence criteria in different age groups. Percentages based on all respondents.

<table>
<thead>
<tr>
<th>Dependence criteria</th>
<th>19–25</th>
<th>26–40</th>
<th>41–64</th>
<th>65+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drinking more than intended</td>
<td>43.9</td>
<td>41.0</td>
<td>29.2*</td>
<td>16.8*</td>
</tr>
<tr>
<td>Tired of alcohol</td>
<td>6.2</td>
<td>7.4</td>
<td>4.6*</td>
<td>2.0*</td>
</tr>
<tr>
<td>Spent much time</td>
<td>11.4</td>
<td>9.5</td>
<td>5.0*</td>
<td>1.4*</td>
</tr>
<tr>
<td>Continued drinking despite problems</td>
<td>5.9*</td>
<td>3.1*</td>
<td>2.8*</td>
<td>1.0*</td>
</tr>
<tr>
<td>Tolerance</td>
<td>13.0</td>
<td>10.3</td>
<td>2.7*</td>
<td>1.5*</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>4.3</td>
<td>5.7</td>
<td>3.8*</td>
<td>1.6*</td>
</tr>
</tbody>
</table>

*p < 0.05. Significant gender differences.

Table 3
Percentages of individuals fulfilling criteria for alcohol dependence in relation to number of consumed standard drinks per week.

<table>
<thead>
<tr>
<th>Number of dependence criteria</th>
<th>Alcohol consumption standard drinks per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
</tr>
<tr>
<td></td>
<td>0–14</td>
</tr>
<tr>
<td>0</td>
<td>92.4</td>
</tr>
<tr>
<td>1–2</td>
<td>74.5</td>
</tr>
<tr>
<td>3–4</td>
<td>42.9</td>
</tr>
<tr>
<td>5+</td>
<td>20.8</td>
</tr>
</tbody>
</table>

*p < 0.05. All consumption group differences were significant, for both men and women.

### Table 4
Prevalence in per cent and odds ratio estimates (OR) of the different dependence criteria in relation to gender, age, heavy episodic drinking (HED), living arrangements, education and employment status.

<table>
<thead>
<tr>
<th>Dependent criterion</th>
<th>1–2</th>
<th>3–4</th>
<th>5+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (men) (%)</td>
<td>54.1</td>
<td>55.9</td>
<td>64.9</td>
</tr>
<tr>
<td>OR</td>
<td>1.10 (1.0–1.21)</td>
<td>1.16 (0.93–1.45)</td>
<td>1.64 (1.13–2.39)</td>
</tr>
<tr>
<td>Age (19–44) (%)</td>
<td>68.5</td>
<td>71.4</td>
<td>67.8</td>
</tr>
<tr>
<td>OR</td>
<td>1.97 (1.78–2.18)</td>
<td>2.50 (1.93–3.25)</td>
<td>2.06 (1.36–3.12)</td>
</tr>
<tr>
<td>Frequent HED (%)</td>
<td>57.0</td>
<td>81.9</td>
<td>90.5</td>
</tr>
<tr>
<td>OR</td>
<td>5.12 (4.68–5.61)</td>
<td>5.19 (4.72–5.71)</td>
<td>5.17 (4.69–5.71)</td>
</tr>
<tr>
<td>Live alone (%)</td>
<td>26.8</td>
<td>38.0</td>
<td>46.9</td>
</tr>
<tr>
<td>OR</td>
<td>1.20 (1.08–1.34)</td>
<td>1.96 (1.57–2.46)</td>
<td>3.01 (2.40–3.11)</td>
</tr>
<tr>
<td>Elementary school (%)</td>
<td>11.4</td>
<td>12.8</td>
<td>20.3</td>
</tr>
<tr>
<td>OR</td>
<td>0.75 (0.64–0.88)</td>
<td>0.96 (0.67–1.37)</td>
<td>1.20 (0.71–2.03)</td>
</tr>
<tr>
<td>No work (%)</td>
<td>7.1</td>
<td>15.3</td>
<td>23.0</td>
</tr>
<tr>
<td>OR</td>
<td>0.89 (0.75–1.07)</td>
<td>1.96 (1.42–2.70)</td>
<td>2.85 (1.80–4.50)</td>
</tr>
</tbody>
</table>

*p < 0.05. Significant except where numbers are in italics.

Note: In the multinominal regression, the left column is the reference group.
in alcohol surveys to a higher degree than responders are heavy drinkers with more alcohol related problems (Lahaut, Jansen, van de Mheen, & Garretsen, 2002; Wild, Cunningham, & Adlaf, 2001). It is therefore possible that we have underestimated the proportions of people with heavy drinking and many dependence criteria. It is also conceivable that people with dependence are more prone to respond if they live in socially favorable conditions. The communities were chosen to be representative for the Swedish population. However, there was an under-representation of large communities and, based on previous studies, this may have led to an under representation of the consumption levels (Ramstedt, 2009). The questionnaire used in the present study was originally formulated for another study, evaluating the effects of a prevention trial in six intervention communities. Thus, only a few items relating to the DSM-IV dependence criteria could be included. The instrument used has not been validated against other established instruments. As there is a need for an effective brief dependence instrument, our group is presently planning a study with that aim.

Conclusions

Our findings indicate that 4% of the Swedish adult population meets the DSM-IV criteria for alcohol dependence. Importantly, the results suggest that a large majority of dependent persons have a milder form of the disorder and could be managed in generalist settings, whereas a minority have a severe form, requiring specialist services.

Acknowledgments

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