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Research Article

Sociodemographic Risk Factors for the Persistence of Harmful Alcohol Use: A Pooled Analysis of Prospective Cohort Studies

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Abstract

Background: Previous research suggests several sociodemographic risk factors for the persistence of harmful alcohol use. However, the evidence is limited due to short follow-up times, retrospective reporting and selected study populations. We pooled data from prospective cohort studies to systematically evaluate whether the sociodemographic risk factors differ between the incidence and persistence of harmful alcohol use.

Methods: Data were from six prospective cohort studies from the US, UK and Japan (n=28,394). We conducted a two-stage meta-analysis to examine the associations of seven sociodemographic risk factors (sex, age, ethnicity, relationship status, educational attainment, smoking and psychological distress) with the incidence and persistence of harmful alcohol use. Tests of heterogeneity were used to evaluate whether the associations differ between the incident and persistent use.

Results: Male sex, younger age, living without a partner, higher education, smoking, and psychological distress were associated with a greater risk of both the incidence and the persistence of harmful alcohol use in mutually adjusted models (ORs=0.97-1.91). There were no differences in the associations of these risk factors with incident and persistent use, except that the association of psychological distress was greater with incident use compared to persistent use (p for heterogeneity<0.05).

Conclusion: These findings suggest that the incidence and persistence of harmful alcohol use share a similar set of sociodemographic risk factors in the general population.

Keywords: Persistent harmful alcohol use; Sociodemographic risk factors; Meta-analysis; Prospective cohort studies

Introduction

Alcohol dependence and harmful alcohol use in general is a chronic mental health problem. Although 75%-91% of alcohol dependent individuals eventually recover, relapses are common and full recovery is slow [1-4]. To improve recovery, it is important to identify risk factors for the persistence of harmful alcohol use.

Previous research suggests that the persistence of harmful alcohol use is associated with male sex, younger age, having never been married or having been separated, ethnic minority status, higher educational attainment, smoking and psychological distress [1-8]. However, some of the findings have been mixed. For instance, younger age has been also associated with lower likelihood of persistent harmful alcohol use, and some studies have reported no association, or even negative association, with higher educational attainment and incidence or persistence of harmful alcohol use [2,7,9]. Moreover, many of the studies have been limited by retrospective study designs, and the few longitudinal studies are limited to short (2-3 years) follow-ups and small and selected populations [1,2,10,11].

In addition to the persistence of harmful alcohol use, several studies have shown that sex, age, marital status, ethnicity, educational attainment, smoking and psychological distress are associated with the incidence of harmful alcohol use [7,12-15]. This suggests that similar risk factors may contribute to both incidence and persistence of harmful alcohol use. However, whether some sociodemographic factors are more important for persistence than incidence has not been systematically compared. We pooled data from six prospective cohort studies and examined how sociodemographic risk factors (sex, age, marital status, ethnicity, educational attainment, smoking status, psychological distress) are associated with the incidence and persistence of harmful alcohol use in the general population. The longitudinal data allowed us to examine whether these risk factors were differently associated with the persistence versus incidence of harmful alcohol use.

Materials and Methods

Subjects

Data were from six prospective cohort studies: the Wisconsin Longitudinal Study Graduate and Sibling samples (WLSG and WLSS), the Midlife in the United States Study (MIDUS), the Midlife in Japan Study (MIDJA), the Health and Retirement Study (HRS), the National Child Development Study (NCDS), and the British Birth Cohort Study (BCS). Supplementary Table 1 for the descriptive characteristics of the study populations. The original samples of the studies included 63 141 participants in total. Of these, 39 462 provided data on baseline alcohol use. Of these, 31 571 provided data on follow-up alcohol use which yielded a final study sample of 28 394 (Figure 1). All participants provided an informed consent for participation.

Table 1: Descriptive characteristics of the study population (N=28394)

Sociodemographic factors	Harmful alcohol use at baseline (n=5575)	No harmful alcohol at baseline (n=22819)
Sex (male)	3453 (62%)	9922 (43%)
Age (mean)	39 (SD 11)	39 (SD 11)
Marital status	Descriptive	Descriptive
Married/cohabiting	3035 (54%)	12828 (56%)
Not married/cohabiting	2540 (46%)	9991 (44%)
Educational attainment		
Primary	835 (15%)	3691 (16%)
Secondary	2821 (51%)	12084 (53%)
Tertiary	1919 (34%)	7044 (31%)
Ethnicity (majority)	5557 (99%)	22609 (99%)
Smoking status	Descriptive	Descriptive
Current smoker	2360 (42 %)	7177 (31%)
Never/ex-smoker	3215 (58 %)	15642 (69%)
Psychological distress		
Mean z-score	0.00 (SD 1.0)	0.00 (SD 1.0)
Harmful alcohol use at follow-up	3263 (59%)	2992 (13%)

*Only one study (n=3721) included data on ethnicity

**All analyses inlcuded distress as a continuous standardized (z-score) variable

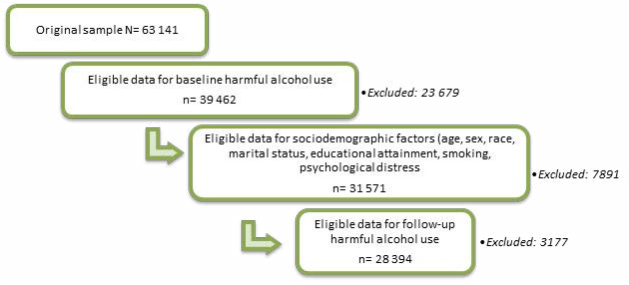

Figure 1: Election of the final study sample

Assessment of sociodemographic factors

Seven sociodemographic factors were assessed at each study baseline through participants' self-reports. These were age, sex, marital status (1=partnered, 0=not partnered), educational attainment (1=primary, 2=secondary, 3=tertiary), ethnicity (0=majority, 1=minority), current smoking status (0=never smoked or ex-smoker, 1=current smoker) and psychological distress. Psychological distress was assessed with the General Health Questionnaire, (BCS, HALS), Center for Epidemiologic Studies Depression Scale (WLSG, WLSS), the Malaise inventory (NCDS), Negative Affectivity Scale (MIDJA) and K-6 Distress Scale (MIDUS). Psychological distress scores were standardized (z-scores) for the analyses.

Statistical analyses

We followed a two-stage meta-analytical approach to evaluate the associations of sociodemographic factors with harmful alcohol use. The associations of all sociodemographic factors with harmful alcohol use at follow-up were examined simultaneously in mutually adjusted models, and the reported results are therefore the associations of each sociodemographic factor with harmful alcohol use when controlling for all other sociodemographic factors. To assess the incidence of harmful alcohol use, we conducted a series of logistic regression analyses among those with no harmful alcohol use at baseline, where we predicted harmful alcohol use at follow-up with each sociodemographic factor at baseline (age, sex, marital status, educational attainment, ethnicity, ever smoked, psychological distress). These analyses were conducted separately in each six studies, and the odds ratios obtained from these analyses were pooled in a meta-analysis. To assess the persistence of harmful alcohol use, we conducted a series of logistic regression analyses among those with harmful alcohol use at baseline, where we predicted harmful alcohol use at follow-up with the sociodemographic factors at baseline. As in the analysis for incidence, the analyses for persistence were conducted separately in each six studies, and the odds ratios obtained from these analyses were pooled in a meta-analysis. To compare the pooled estimates between those with no harmful alcohol use at baseline (the incidence of harmful alcohol use) and those with harmful alcohol use (the persistence of harmful alcohol use) at baseline, we conducted tests of heterogeneity. To illustrate the associations, we plotted the marginal predicted probabilities for the persistence of harmful alcohol use at different levels of the sociodemographic risk factors.

The analyses were performed using STATA 16 statistical software.

Results

Characteristics of the pooled sample are presented in (Table 1). The mean age in the pooled sample was 39 (SD=11), and there were 15 019 (53%) women. In total, 5 575 (20%) participants reported harmful alcohol use at baseline and 6 255 (22%) reported harmful alcohol use at follow-up. Among those with no harmful alcohol use at baseline, 13% reported incidence of harmful alcohol use at follow-up; and of those with harmful alcohol use at baseline, 59% reported persistence of harmful alcohol use at follow-up. Follow-up

times ranged from 4 to 19 years between the included studies, with a mean follow-up time of 8 years.

The associations of sociodemographic risk factors with harmful alcohol use are presented in Figure 2. Among those with no harmful alcohol use at baseline, male sex (OR 1.70, 95% CI 1.47, 1.96), younger age (OR 0.97, 95% CI 0.95, 0.99), higher educational attainment (OR 1.17, 95% CI 1.09, 1.25), no presence of a partner (OR 1.17 CI 0.82, 1.34), current smoking (OR 1.51, CI 0.38, 0.65) and psychological distress (OR 1.21, CI 1.13, 1.31) were associated with the incidence of harmful alcohol use at follow-up see (Figures S1-S7). Similarly, among those with harmful alcohol use at baseline, male sex (OR 1.66, CI 1.33, 2.08), younger age (OR 0.99, CI 0.97, 1.00), higher educational attainment (OR 1.19, CI 1.06, 1.35), no presence of a partner (OR 1.01, CI 0.83, 1.23), current smoking (OR 1.26, CI 1.03, 1.54) and psychological distress (OR 1.08, CI 1.02, 1.15) were associated with the persistence of harmful alcohol use at follow-up see (Figures S1-S4 and S6-S7). Ethnicity was not associated with harmful alcohol use at follow-up either among those with no harmful alcohol use at baseline or those with harmful alcohol use at baseline see (Figure S5). However, data on ethnicity was available only in one of the included studies, and the estimates for the associations of ethnicity and harmful alcohol use are thus more imprecise.

The heterogeneity tests indicated that the associations of sociodemographic risk factors were similar for both incident and persistent harmful alcohol use (p-values for heterogeneity >0.05), except that the association of psychological distress with incident harmful alcohol use was greater compared to persistent harmful alcohol use (p=0.022) see (Figure 2). (Figure 3) presents the marginal probabilities of the persistence of harmful alcohol use for different sociodemographic profiles.

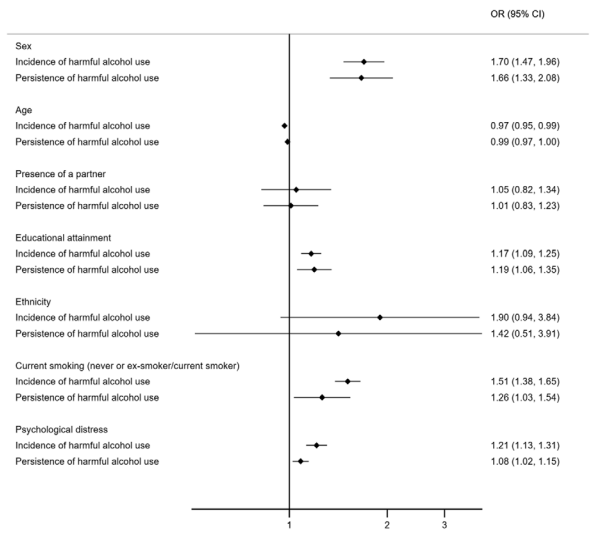

Figure 2: Associations of sociodemographic risk factors with the incidence and persistence of harmful alcohol use in all six data sets combined Note: OR, odds ratios; CI, confidence interval. Incidence of harmful alcohol use was defined as no harmful alcohol use at baseline and harmful alcohol use at follow-up. Persistence of harmful alcohol use was defined as harmful alcohol use both at baseline and at follow-up.

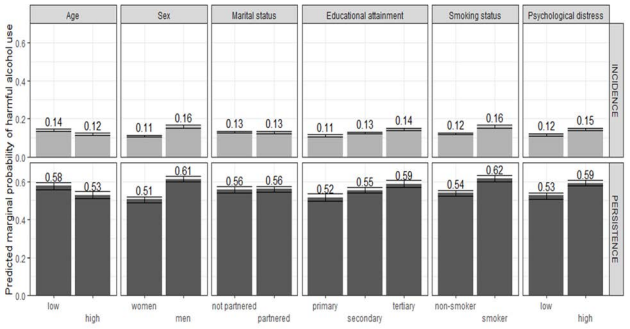

Figure 3: Marginal probabilities for the incidence and persistence of harmful alcohol use in different levels of sociodemographic risk factors. Note: Incidence of harmful alcohol use was defined as no harmful alcohol use at baseline and harmful alcohol use at follow-up. Persistence of harmful alcohol use was defined as harmful alcohol use both at baseline and at follow-up.

Discussion

Pooling data from six prospective cohort studies, we observed that both the incidence and persistence of harmful alcohol use were associated with a similar set of sociodemographic risk factors: male sex, younger age, higher educational attainment, absence of a partner, current smoking and psychological distress were associated with greater likelihood of both the incidence and persistence of harmful alcohol use in the general population. There were no differences in the risk factors between the incidence and persistence of harmful alcohol use, except for the association of psychological distress which was greater with incident harmful alcohol use compared to persistent harmful alcohol use.

Our findings are in line with previous studies suggesting that sex, age, marital status, smoking, and psychological distress increases the risk for both incidence and persistence of harmful alcohol use. [1-8,12-15]. In our study, male sex and current smoking had the strongest associations with both the incidence and persistence of harmful alcohol use. Contrary to previous findings, ethnicity was not associated with the incidence nor the persistence of harmful alcohol use, but data on ethnicity was available for only one cohort study, which made these estimates less precise. Our results also support many earlier findings suggesting that younger age increases the risk for both incidence and persistence of harmful alcohol use [2,5,14].

Our findings suggest that higher educational attainment is associated with both incident and persistent harmful alcohol use. In contrast to our results, some previous studies have linked higher educational attainment with lower likelihood of the incidence and persistence of alcohol dependence [7,15]. A recent study suggested that higher educational attainment is associated with higher frequency of alcohol use, but lower risk for alcohol dependence [16]. The 'alcohol harm paradox' refers to the discrepancy in the harm caused by alcohol consumption between lower and higher socio-economic groups [17,18]. Although highly

educated people may consume alcohol in harmful levels, they may be less likely to cross the diagnostic criteria for alcohol dependence. Our findings are in line with this hypothesis since we defined harmful alcohol use as having at least one of the alcohol use questionnaire items answered "yes", which yields a sensitive measure for harmful alcohol use. The higher persistence of harmful alcohol use among highly educated people may be related to the lower harm and thus fewer clinical interventions or less incentive to stop drinking. Another possible explanation for the previous mixed findings of education and harmful alcohol use is that the association is nonlinear, for instance following a U-shaped association. This would explain why previous studies have reported an elevated risk for harmful alcohol uses both in the lowest and highest educated groups. To clarify this, future studies should test nonlinear associations between education and harmful alcohol use.

The recurring nature of harmful alcohol use could explain why the same risk factors are associated with both the incidence and persistence of harmful alcohol use. Evidence suggests that long term remission from alcohol dependence often requires full abstinence, and alcohol related cues easily trigger relapse [5,19]. Our study did not assess possible remission and relapse during follow-up, and some of the persistent harmful alcohol users may have recovered and relapsed between baseline and follow-up. Regardless of potential remissions in between, the risk factors could have exposed the same individuals for continuing use over and over. For instance, the associations between younger age and persistent harmful alcohol use might be explained by a social environment with more exposure to alcohol consumption and fewer responsibilities, which may not only lead to harmful alcohol use, but also make it more difficult to stop. Likewise, the social environment of non-cohabitated individuals may include more alcohol related cues and encouragement to drink, as, in many cultures, alcohol consumption is often involved in socializing and dating. People having psychological distress may be more vulnerable to harmful alcohol use, but also lack mental resources needed to maintain recovery. We found that men are at a higher risk for both incidence and persistence of harmful alcohol use. Men tend to seek help for health problems less frequently than women [20,21], which may explain the higher persistence of harmful alcohol use. In our study, smoking was associated with both the incidence and persistence of harmful alcohol use, which supports earlier findings [3,8,14]. Comorbid substance abuse disorders have shown to increase the risk for persistence of alcohol use disorders [3]. Cigarette smoking has shown to predict relapse after remission, and might act as a trigger to both initiation and persistence of addictive behaviors [5].

Some limitations need to be noted. Our data were observational and thus we cannot draw causal conclusions. Although we controlled for a robust set of variables potentially confounding the associations, we cannot rule out residual or unmeasured confounding. Self-reported measures of alcohol use are subject to social desirability bias, which may underestimate the rates of harmful alcohol use. The measures of harmful alcohol use were not uniform across studies, which may have introduced heterogeneity in the outcome assessment. Our study comprises data from longitudinal cohort studies, where selective loss to follow-up is inevitable. Although harmful alcohol use at baseline predicted attrition only in one of the study cohorts (BCS), it is possible that selective attrition biased the observed associations see (Supplementary Table 2).

The strengths of our study include combining data of national cohorts from the United States, the United Kingdom, and Japan, and using longitudinal data in assessment of the persistence of harmful alcohol use. In addition, using subclinical measures of alcohol use enabled us to include subjects with risky yet easily unregistered or unnoticed alcohol use. Large scale evidence suggests that alcohol use associated mortality risk increases at lower doses of weekly alcohol, than most of the risk thresholds defined across the globe is [22]. Despite the higher mortality risk, harmful alcohol users may maintain a good quality of life and continue the use regardless of the risks [23].

Conclusion

In sum, we found that the incidence and persistence of harmful alcohol use share several typical socio-demographic risk factors. Further studies should aim to clarify these associations by adding potential biological and treatment effect components to the models in multi-national and population based studies.

Acknowledgement

None

Conflict of Interest

The authors report no conflicts of interest.

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Author Contributions

All authors participated in conceptualizing this study. AE and KK analyzed the data, and AE, KK and KG interpreted and reported the data. MJ facilitated access to data. AE wrote the draft for this study. All authors critically reviewed and approved the final manuscript.

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